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# Predicting the Consumers' Intention to Adopt Mobile Shopping: An Emerging Market Perspective

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**Abstract**

Technological advancement in mobile devices and the growth of wireless internet connections have fundamentally altered the way consumers shop. Mobile shopping (m-shopping) provides benefits such as time saving, convenience and improvement of the overall quality of life. With such tremendous benefits, the adoption rate of m-shopping however is still at the infancy stage. To explore further on this, the study analyses the factors that influence the consumers' intention to adopt m-shopping which have been sparsely explored by extending the traditional technology acceptance model (TAM) with three additional constructs, namely perceived risk (PR), subjective norms (SN) and personal innovativeness in information technology (PIIT). Using online survey method, 142 usable questionnaires were obtained and subsequently analyzed using multiple regression analysis. The results found that the intention to adopt m-shopping is only determined by PU, PEOU and SN. PR and PIIT, however, require further investigation as they were found to be insignificant with the intention to adopt m-shopping. The study includes not only the implications for researchers but also suggestions on mobile marketing plans for practitioners.

**Key words:** Mobile Shopping, Mobile Commerce, Technology Acceptance Model, Malaysia

# 1 Introduction

Traditionally, the function of mobile phone is only to transmit the thoughts and ideas between two or more humans through phone calls or message handling. With increased processing power and storage capability, mobile devices have become more sophisticated. The technology advancement in mobile devices and the development of various wireless telecommunication networks such 3G, WIMAX and 4G have led to new innovation within the area of mobile commerce (m-commerce). The development in m-commerce not only altered the way businesses are conducted, but also brought convenience in terms of lifestyles to consumers by making possible the use of mobile phones for banking, booking, ticketing, payments and etc [47], [52]. One area in the m-commerce services, which is gaining popularity among modern consumers, is mobile shopping (m-shopping).

M-shopping is any monetary transactions related to purchases of goods or services through internet enabled mobile phones or over the wireless telecommunication network. To a certain degree m-shopping is different from online shopping as the characteristics are founded on dimensions such as ubiquity, flexibility, personalization, convenience and mobility [82]. According to Ant Ozok and Wei [6], online shopping is no longer restricted to desktop computers and wired connections. According to a study by Retail Merchandiser [75], the m-shopping industry is valued at $2.2 billion. Another study revealed that the number of consumers in United States (US) using mobile phones to browse products and services have increased to over 48 percent in 2011 compared to 27 percent in 2009 [22]. It is further predicted that by 2015, shoppers throughout the world would have purchased about $120 billion worth of services and goods [40]. With such tremendous potential, m-shopping is set to become the next big wave in m-commerce.

There are numerous advantages of adopting m-shopping. Consumers can shop ‘anytime’ and ‘anywhere’ due to the uninterrupted connectivity using mobile devices; hence they do not need to have physical presence in a store [52]. These bring benefit in terms of convenience, time saving and the improvement of quality of life [5], [15]. At the same time, the shopping flow can be supported from the initial phase of logging, searching, comparing prices, ordering, and paying to conducting after sales services [52]. Yang [102] further suggested that in view of the seamless shopping transactions across multiple channels, consumers would be able to receive an optimal shopping experience. Similarly, retailer can also send customized information about their product and service to their customers’ handsets [102]. This would fulfill the previously unmet needs of multi-channel shoppers [31], thus resulting in better revenues for retailers in the long run [45].

Although m-shopping renders convenience and benefits to consumers, interestingly, many of them do not utilize their mobile phone for shopping [52]. In the US, the acceptance of m-shopping is not as strong as anticipated [27]. In China, m-shopping falls in the average ranked (ranked 15/30) of importance among Chinese consumers [15]. In Malaysia, survey in 2010 revealed that only 8.8 percent of consumers have actually made payments using their mobile phones despite having over 10,335,000 3G subscribers [58]. Additionally, out of the 8.8 percent, only 17.9 percent of them had actually purchased products through their devices [58]. Tables 1 and 2 provided more information on the breakdown of the percentage. The numbers appear to be lagging despite there are more hand phone subscribers at 36,661,000 in 2011 [58] than the actual population which is estimated to be 28 millions [87]. With such high mobile phone penetration rate, surprisingly the percentage of m-shopping adoption in Malaysia remains low. Thus, the challenge is for retailers and mobile marketers to understand the perception leading to this low acceptance rate, and formulate strategies to increase m-shopping.

Table 1: Make Payment through Hand Phone

| Make payment through hand phone | Percentage (%) |
|---|---|
| Yes | 8.8 |
| No | 91.2 |

Source: Malaysian Communications and Multimedia Commission (MCMC) [58]

Table 2: Type of Purchase and Payments

| Type of purchase and payments | Percentage (%) |
|---|---|
| Pay Bill | 45.2 |
| Pay Bank | 26.2 |
| Purchases | 17.9 |
| Top Up Prepaid | 54.8 |
| Pay Friend | 9.5 |
| Send Money Overseas | 4.8 |
| Others | 8.3 |

Source: Malaysian Communications and Multimedia Commission (MCMC) [58]

There were a number of recent works conducted in the area of m-shopping. However, most of these works are confined to the developed markets perspective such as in Spain [5], United States [44], [102], Denmark [95] and Germany [10], with scarce researchers investigating the acceptance of m-shopping in countries which have yet to received the developed nation status like Malaysia. Similarly, most of the previous studies are conducted from a specific viewpoint. For example, m-shopping channels [49], m-brand loyalty [47], decision supports for m-shopping [57], [95], location-awareness systems for m-shopping [103], m-shopping for fashion goods [44], m-shopping website security [46] and the selection criteria for m-shopping sites [101]. Consequently, researches addressing the consumer's intention to adopt m-shopping have been overlooked and in particular, the traditional adoption model for Information Technology (IT) innovation. The investment in new technology like m-shopping can only reap benefits provided that consumers accept this technology [78]. By understanding the reasons why consumers are reluctant to adopt m-shopping only can the practitioners prioritize the services or applications that need further improvement in order to better manage the m-shopping sites and to strategize their mobile marketing plan. Therefore, the main goal of this paper is to fill this vacuum by studying the intention of consumers to accept m-shopping which is still marginally adopted in Malaysia.

The structure of the paper is as follows. In the first part of the paper, we provide an overview of the theoretical foundation influencing m-shopping adoption. This is followed by hypothesis building and research model. Subsequently, we present a description of our research methodology, data analysis and discussions. The last section is on conclusion, implication and suggestion for future research.

# 2 Literature Review

## 2.1 Factors Influencing the Adoption of m-shopping

Over the past years, scholars have been trying to developed frameworks with the ambition to explain the factors leading to consumers' acceptance of new IT. Among the traditional theoretical models which have been proposed by psychologists, IT and marketing scholars and co-existed in different terminology includes the followings;

1. Theory of Reasoned Action (TRA) [28]
2. Technology Acceptance Model (TAM) [24]
3. Theory of Planned Behavior (TPB) [3]
4. Diffusion of Innovation (DOI) [76]

The traditional frameworks have also been integrated to increase predictive power in the explanation of IT adoptions;

1. Decomposed Theory of Planned Behavior (DTPB) [92]
2. TAM 2 [96]
3. UTAUT [97]

In view that DTPB, TAM2 and UTAUT are the integration of the traditional frameworks; the literature shall give attention on the traditional theoretical frameworks such as TRA, TPB, TAM and DOI.

## 2.2 Theory of Reason Action (TRA)

Theory of Reason Action (TRA) (Figure 1) was proposed by Fishbein and Ajzen [28] with the aim to study the attitude-behavior relationship by linking subjective norms, attitudes and the behavioral intention. The model concludes that a person's actual action is a direct determinant of behavioral intention and that behavioral intention is actually influenced by two independent determinants, namely subjective norms and attitude towards behavior. Subjective norms is the individual perception of social pressure whether or not to perform a certain behavior and it is influenced by normative beliefs and motivation to comply while the individual positive or negative feeling of performing a behavior is reflected by the attitude towards behavior and is affected by believes and evaluations. According to Ajzen [3], TRA has been adopted widely and has been extended in the Theory of Planned Behaviour (TPB).

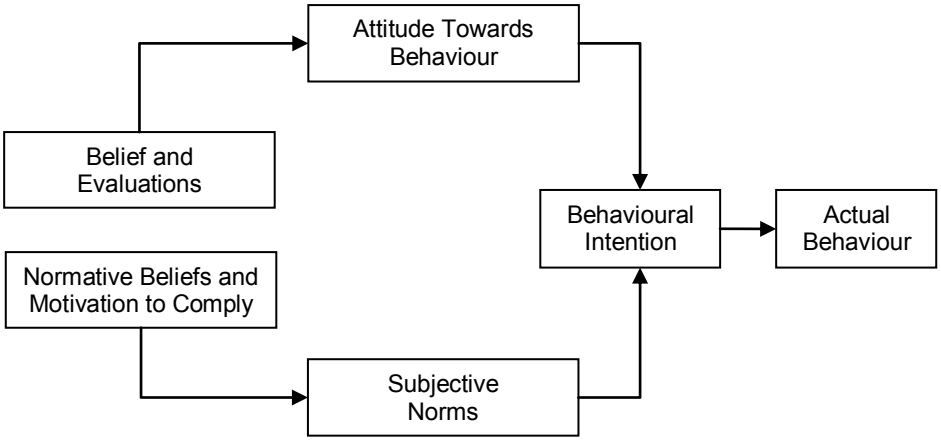


Figure 1: Theory of Reason Action [28]

## 2.3 Theory of Planned Behavior (TPB)

The Theory of Planned Behaviour (TPB) [3] (Figure 2), on the other hand is an improvement of the TRA. It introduces a third factor known as perceived behavioral control (PBC) as a determinant of both intention and behavior. Ajzen and Madden [4] refers PBC as both the individual's perceptions in the form of opportunity and situational resources, which impede or facilitate the performance of a targeted behavior. According to TPB, the actual individual's behavior is influenced by behavioral intention, which is driven by subjective norms (SN), attitude (AT) and PBC. According to Hagger et al. [36], with the introduction of PBC, TPB is able to predict up to 44.05 percent of the variance in the behavioral intention as compared to only 32.7 percent using TRA.

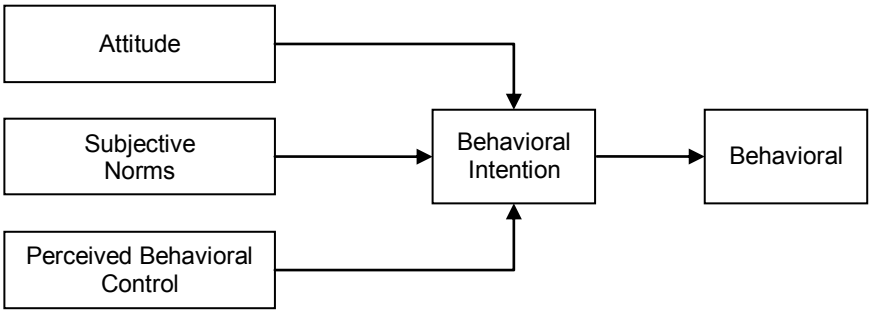


Figure 2: Theory of Planned Behavior [3]

## 2.4 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) (Figure 3) was adopted from TRA and is one of the most widely adopted models in the explanation of IT adoption studies. According to Mathieson [61], the TAM is a better model in the explanation on the user's intention to adopt IT when compared to TRA or TPB. In the explanation of the TAM concept, Davis [24] theorizes two attitudinal determinants towards the reason behind the adoption of new technology, namely perceived ease of use (PEOU) and perceived usefulness (PU). PEOU refers to the "degree to which a person believes that using a particular system would be free from effort" while PU is the "degree to which a person believes that using a system would enhance his or her job performance" [24] p. 320. AT, on the other hand, influences behavioral intention (BI) and consequently the actual usage. The TAM has since been replicated and applied in various consumer technology adoption studies such as online banking [89], broadband adoption [84], mobile commerce [45] and mobile learning [88]. However, since the model only considered two determinants and does not actually reflect the overall influences on consumers' acceptance [23], many scholars have proposed the extension of TAM by incorporating additional constructs to better predict the consumers' adoption behavior such as subjective norms [93], perceived playfulness [63], perceived resources [62], facilitating conditions [70], perceived entertainment [9] and perceived credibility [98].

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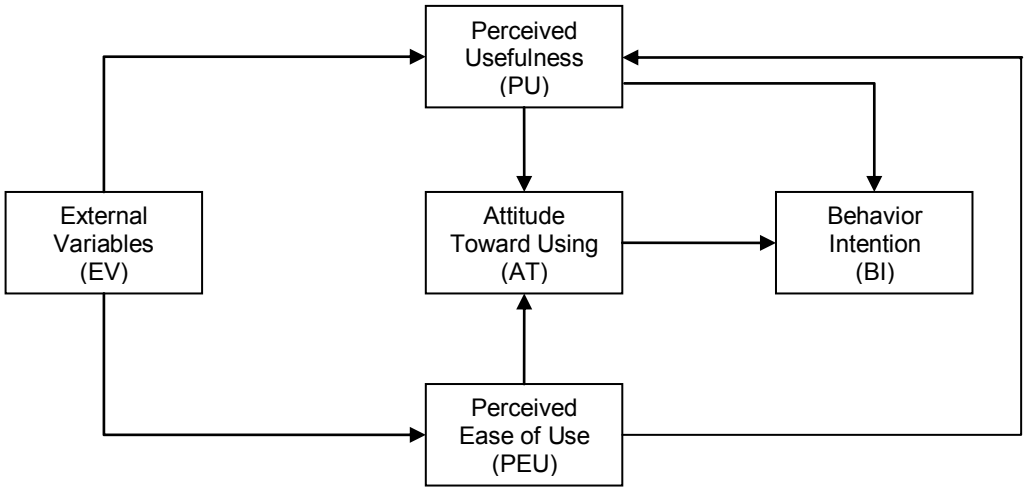


Figure 3: Technology Acceptance Model [24]

## 2.5 Diffusion of Innovation (DOI)

Diffusion of Innovation (DOI) theory which was initiated by Rogers [76] explained how the innovation spread overtime in a certain social systems. According to Rogers, there are five categories of adoption. These five categories of adoption represent a bell curve and includes categories such as innovators (venturesome) at 2.5 percent, early adopter (respectable) at 13.5 percent, early majority (deliberate) at 34 percent, late majority (skeptical) at 34 percent and laggards (traditional) at 16 percent [77]. Chong et al. [18] further explained on the five characteristics of innovation which are important in the acceptance behavior. They are relative advantage, complexity, compatibility, triability and observability. Relative advantage is the degree in which the innovation is perceived to be more superior to its precursor and it is similar to convenience and PU. Complexity, on the other hand, is the degree that the innovation is viewed to be difficult to comprehend and is interchangeable with PEOU. Compatibility is the extent of whether the innovation is viewed as consistent with potential adopters' past experiences, values and needs. Trialbility is the degree an innovation may be experimented for a fixed period prior to adoption. Lastly, observability is defined as the extent that the innovation are observable to others. The five characteristics can explain about 49-87 percent of the diffusion rate [99]. According to a study by Moore and Benbasat [64], the adoption behavior is consistently related to relative advantage, compatibility and complexity. One weakness of the model is that it neglects the post adoption stage and only consider the adoption stage of innovation [105]. Figure 4 shows the DOI.

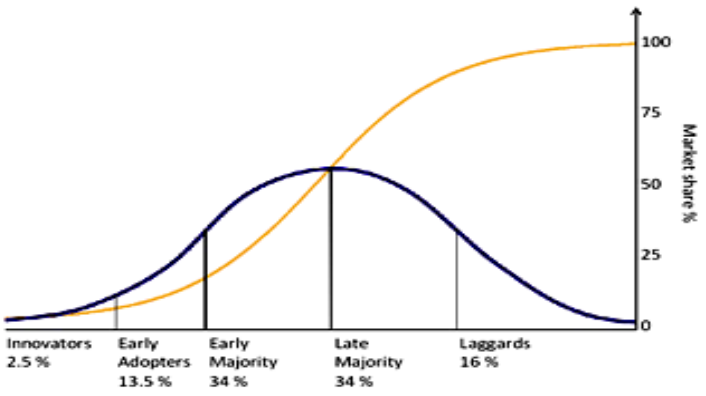


Figure 4: Diffusion of Innovation [76]

Our research framework is based on the revision of TAM. TAM was adopted in this study as it is one of the most robust models [96] to explain individual's acceptance of new technology and m-shopping is also a technology based innovation. The limitation of TAM is that the model has no other construct to estimate the overall adoption other than the two constructs of PU and PEOU. The study therefore decided to expand the model with three additional constructs, namely perceived risk (PR), subjective norms (SN) and personal innovativeness in information technology (PIIT) with behavioral intention. This is done so that the new framework can better associate with the consumers' intention to adopt m-shopping in Malaysia. The three constructs were integrated as part of the research framework due to two reasons:

1. Potential risk is among the major problem confronting consumers in any IT adoption study related field.

2. The motivation to shop online is influenced by consumer's surrounding and also grounded from the user's characteristic.

In additional, the paper deliberately excluded the adoption of laptop, mobile games devices, iPad, palm-sized computers from the study and to define m-shopping as shopping services that are accessed and delivered via mobile devices such as mobile phones and smart phones. The rationale goes that smart phone and mobile phones are the two most widely adopted handheld devices in Malaysia. The study also decided to adopt intention as a replacement of actual behavior since m-shopping is an end-user technology and in this case the adoption can be predicted using consumer's intention. Figure 5 as illustrates our proposed research framework.

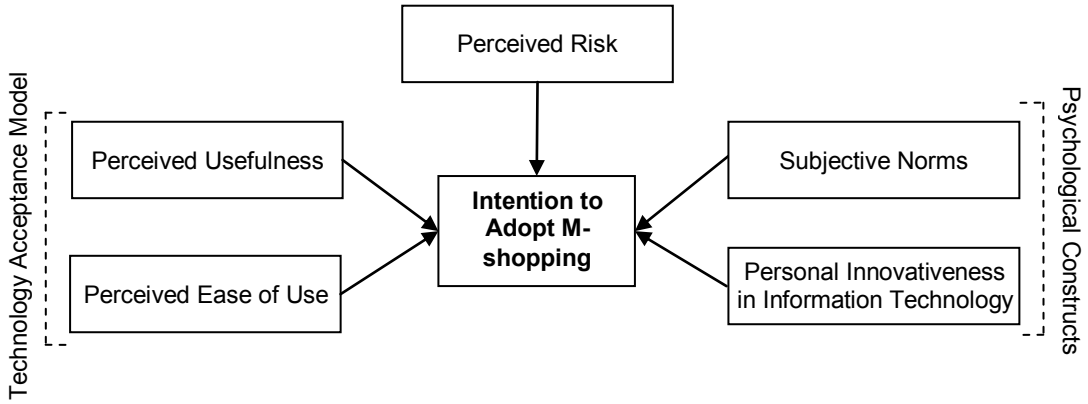


Figure 5: Research Framework

# 3 Hypotheses Development

## 3.1 Perceived Usefulness (PU)

Perceived usefulness (PU) is regarded as one of the factors that affect consumers' intention to adopt mobile banking [14] and broadband services [84]. As defined by Davis [24], PU is a form of extrinsic motivation and refers to the extent the prospective adopter perceive the adoption of particular system to be beneficial in improving his or her performance. Davis further added that if the adoption of new technology can result in usefulness in terms of productivity, job effectiveness and the overall improvement towards the individual's job, users are more likely to adopt the particular system. There have been considerable amount of evidences to suggest that user's intention on new technology is influenced by PU [1], [90]. For example, Kan et al. [42], adopting 500 college students as a sample, found that PU was significant with the intention to adopt m-shopping in Taiwan. One of the characteristics of the internet-enable mobile phones is the 'always on' and 'portable' features. The characteristics of the mobile phones enable users to complete the shopping transaction 24/7 as they are no longer constraints by the limitation of time and location. This would translate into convenience for users who are spending more time outside their work and office and for consumers who are always on the go [15], [34], [95]. Similarly, another study by Siau et al. [83] revealed that consumers are likely to adopt their mobile phones for shopping if they are able to compare prices for both goods and services using the price comparisons software available on the mobile internet. Broeckelmann [10], in an experimental study in Germany using cartoons to gauge the participant's view on mobile services also confirmed the finding. The results indicated that consumers would not hesitant to adopt m-shopping when compared to bricks-and-mortar stores if the mobile price compassion service can bring advantages to consumers. Thus, if m-shopping can render benefits in terms of time saving, improvement in the quality of life, convenience and the ability to compare product prices, for example, consumers will likely to adopt m-shopping, hence we proposed the following hypothesis:

H1. PU has a positive significant relationship with m-shopping adoption.

### 3.2 Perceived Ease of Use (PEOU)

Perceived ease of use (PEOU) refers to the extent a prospective adopter's perceive the using of a particular system would be free of physical and mental effort [24]. The constructs indicate that the complexity of a particular system is one of the biggest barriers in innovation [17], [76]. Thus, when the consumers perceived the system as easier to learn and use, they are more likely to accept the particular system [72]. By applying it to the perspective of m-shopping, the overall user friendliness in accessing the Internet using the mobile devices is an important factor in improving consumers' satisfaction as they expect their devices to provide similar experience like their personal computers [60]. While it is possible for consumers to purchase using their mobile devices, findings also showed that the small display screen, screen resolution and input mechanisms create frustration among consumers when browsing products on their mobile devices [55], [86]. Sharing the similar sentiment, Mahatanankoon et al. [56] also stressed that most mobile devices are restricted to ergonomics factors. Lu and Su [52] further revealed that most mobile devices are limited in terms of battery power, memory capacity, multimedia capabilities and has lower bandwidth allocation, thus presenting a challenge for online retailers when planning on how data should be displayed. Lee and Park [46] argued that the process of entering the credit card information over the mobile devices during transaction can be a hassle. When faced with all of the above problems, mobile users would require more mental and physical efforts when adopting their mobile devices to shop. Cronin et al. [21] shared that the overall cost of shopping for users could be affected by this excessive mental cost. Hence, in order to reduce the physical efforts of consumers, mobile devices must have an easy navigation structure and simplicity in terms of design and processing power [73]. Additionally, online shopping websites must also be optimized for mobile usage. Yang [102] concluded that the ease of use for m-shopping is associate with the easiness of navigating and accessing the mobile websites. Chan et al. [12] stressed that one drawbacks of adopting mobile devices to shop is the extensive scrolling due to the limited display screen. Thus, mobile websites must have clearer links to key sites with lesser graphics loads to boast sales. Drawing from another study, the management of Crocs and Federick's brand saw an increase in traffic percentage when their website was optimized for mobile user [22]. Considering a number of studies revealed the linkage between PEOU with the intention to use m-shopping, we proposed the following hypothesis:

H2. PEOU has a positive significant relationship with m-shopping adoption.

### 3.3 Subjective Norms (SN)

Subjective norms (SN) is defined by Fishbein and Ajzen [28] as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" p. 302. According to Karahanna et al. [43], SN is considered as one of the elements in social influence. Bhattacherjee [8] further categorized SN into two components, namely the interpersonal and external influence. External influence includes the mass-medias and expert opinions while the interpersonal influence consists of user's relatives, family members and friend. An individual in the initial stage may have an unfavorable perception towards a particular system but may comply to adopt if others who are important towards the individual perceives he or she should comply with those beliefs. The individual may comply with the suggestions due to two reasons. One being the perception of people attribute relevance towards an individual has coercive power and secondly the people attribute relevance towards the individual favors him or her to comply in a certain manner [96]. Many studies have indicated the importance of SN in intention or actual usage. A study by Nysveen et al. [66] using 375 Norwegians, indicated that the normative pressure determines the user's intention to adopt mobile services. The authors further explained that the individual will be more likely to adopt the particular system if he or she felt more social pressure as the result from the influence of superiors or friends. Marketing scholar, Rogers further validated the study in the DOI theory where SN influences the adoption of innovation [77]. Thus, based on the TRA model [28], if individuals perceive others that signify importance to the individual should perform in a certain behavior they would likely to comply, and this leads us to believe that SN has a significant influence towards m-shopping intention. The following hypothesis is proposed:

H3. SN has a positive significant relationship with m-shopping adoption.

### 3.4 Personal Innovativeness in Information Technology (PIIT)

Personal innovativeness (PI) is the willingness of an individual to embrace or try out a new product or service to accomplish specific goals [20], [33]. The theory of DOI explained that PI is a personality construct as they do not exist in all individuals [74]. Adopting the PI construct to study on new IT adoption, Agarwal and Prasad [2] introduced the concept of personal innovativeness in information technology (PIIT). Many studies have shared the influence on PIIT on intention. The findings from Sullivan and Drennan [85] in Australia adopting university students as samples revealed that PIIT influences the intention to adopt m-services. The study indicated that students with PIIT characteristic was found to be more willing to accept new technology before others. The rationale goes that individuals with innovative characteristics are usually active seekers in terms of new ideas and therefore they are able to handle uncertainty in new technology adoptions [76]. Lopez-Nicolas et al. [51] also echoed similar findings in which they concluded that individuals with higher perceived innovativeness generally have better positive thinking on new innovation. Citrin et al. [19] in their studies concluded that individuals who purchased online is perceived as an innovative person. Goldsmith [32] explained that general innovativeness and online buying-specific innovativeness influence individual to purchase online. Consistent with other finding on online purchases, Limayern et al. [48] also concluded that PIIT directly impact the purchases intention. Therefore, in view that PIIT contributes to the individual's predisposition to adopt a specific IT innovation, the following hypothesis is proposed:

H4. PIIT has a positive significant relationship with m-shopping adoption.

### 3.5 Perceived Risk (PR)

Perceived risk (PR) is conceptualized as the "expectation of lose" associated with purchase [71]. Similarly, PR is also defined as the expectation of uncertainty and the perceived consequences from the purchases of goods and services [25]. According to Tan and Teo [91], PR is one of the most widely recognize barriers in the adoption of technology innovation. Chang et al. [13] highlighted that there are two categories of risks, namely the product and the transaction risks. The study however will only focus on transaction risks due to the nature of m-shopping which is online in nature. Transaction risks involve potential consequences as a result of engaging a transaction to purchase a product or service online [13]. This may include the concerns from payment risk [39] and system security [35]. Forsythe and Shi [29] associated online shopping with financial risk such as the misuse of the credit card information. Many online customers are unlikely to disclose their credit card details on their mobile device due to the fear that their credit card information might be intercepted by third parties for wrongful purposes [41], [46]. In another study by Mahatanankoon et al. [56], mobile transactions such as electronic payments was not ranked highly among United States consumers due to the fear of security. This is one of the main problems faced by mobile consumers when using their mobile devices to transact [15]. Wu and Wang [101] further concluded that since transaction is conducted using a limited screen, consumers tend to feel uneasy when shopping online hence security are among important criteria when choosing m-shopping sites. Another study by Hung et al. [38] revealed that consumers usually discontinue m-shopping over the doubt of security issues. As Gefen and Straub [30] concluded the levels on consumers' intention to purchase online is strongly influenced by the level of consumer's trust on security, thus, the following hypothesis is proposed:

H5. PR has a positive significant relationship with m-shopping adoption.

## 4 Research Methodology

### 4.1 Sampling and Data Collection

In order to further understand the motivation leading to the intention to adopt m-shopping, a study was conducted between January and March, 2012. Malaysia is a good context to study on the adoption of m-shopping in view of the high penetration rate in mobile devices. The respondents for this study are anyone who owns internet-enable mobile phones or have connectivity to the wireless telecommunication network. The criteria were added as they are more likely to adopt m-shopping. The requirement of having a credit card was excluded from the study requirement since most of the ATM cards in Malaysia can also function as a debit card to purchase goods and services online and in view that most Malaysian have at least an ATM card. The study also decided to adopt university student as a sample due to four reasons. Firstly, based on a research conducted by Forrester, young consumers are more likely to adopt m-shopping when compared to older consumers [81]. Secondly, younger consumers have better positive attitude towards online shopping and internet experience [26]. Thirdly, college students are heavy users of mobile phones due to diverse activities [11]. Lastly, according to the survey conducted by Malaysian Communications and Multimedia Commission (MCMC) [58], the results showed that the highest number of hand phone users in Malaysia are young adults between the age of 20 and 24 at 17.3 percent and is followed by the age group of 25-29 at 15.9 percent. Taking into consideration the above factors, university students can represent to a certain extent the Malaysia's population. Emails were sent out to all undergraduate and postgraduate student at one of the largest university in Perak, Malaysia to participate in this study. Empirical data was gathered using the web-based survey and was posted online for 2 months. All respondents in the study were guaranteed confidentiality and anonymity in

terms of their responses. Out of the 148 respondents, 4 were eliminated as they did not own a mobile device and another 2 was dropped as their mobile phone has no internet connection thus leaving a total respond of 142 usable data or 95.94 percent or response rate.

### 4.2 Survey Instruments

Five independent variables were adopted in this study, namely PU, PEOU, SN, PIIT and PR. The independent variables were adopted from previous and existing literature as tabulated in Table 3. On average, each of the variables consists of four to six questions. For the dependent variable, 5 questions were developed to measure the consumers' intention to adopt m-shopping. All the questions for the dependent and independent in this study were measured using the Five-point Likert scale, with "1" as strongly disagree to "5" as strongly agree.

Table 3: Questionnaires Sources and Number of Items

| Constructs | Number of items | Sources |
|---|---|---|
| Perceived Usefulness (PU) | 5 | Aldas-Manzano et al. [5], Davis et al. [23], Tan et al. [89] |
| Perceived Ease of Use (PEOU) | 5 | Aldas-Manzano et al. [5], Davis et al. [23], Tan et al. [89] |
| Subjective Norms (SN) | 6 | Tan et al. [88] |
| Personal Innovativeness in Information Technology (PIIT) | 4 | Goldsmith and Hofacker [33] |
| Perceived Risk (PR) | 5 | Tan et al. [89] |
| Intention to Use (IU) | 5 | Tan et al. [89] |

## 5 Data Analysis

### 5.1 Sample Profile

Table 4 illustrates the descriptive statistic of the demographics characteristic. The sample consisted of 68 males (47.89 percent) and 74 females (52.11 percent). The results show that 2.11 percent are below 20 years old, 78.88 percent between 21-25 years old, 16.20 percent between 26-30 years old, 2.11 percent between 31-35 years old and 0.70 percent above 40 years old. Out of the 142 respondents, 38.73 percent owns a mobile phone while another 57.75 percent owns a smart phone. In terms of education background, the survey found that majority of the respondents hold a bachelor degree or professional qualification at 77.46 percent, followed by diploma or advanced diploma at 8.45 percent, no college degree at 7.75 percent and master or PhD degree at 4.23 percent. Lastly, most of the respondents are still single at 92.96 percent.

Table 4: Demographic Profile of Respondents

| **Variables** | | **Subject Frequency** | **Percentage** |
|---|---|---|---|
| Gender | Male | 68 | 47.89 |
| | Female | 74 | 52.11 |
| Age | Below 20 years old | 3 | 2.11 |
| | 21 - 25 years old | 112 | 78.88 |
| | 26 - 30 years old | 23 | 16.20 |
| | 31 - 35 years old | 3 | 2.11 |
| | 36 - 40 years old | 0 | 0 |
| | Above 40 years old | 1 | 0.70 |
| Marital Status | Single | 132 | 92.96 |
| | Married | 10 | 7.04 |
| Type of Products Own | Mobile Phone | 55 | 38.73 |
| | Smart Phone | 82 | 57.75 |
| | Other | 5 | 3.52 |
| Qualification | No College Degree | 11 | 7.75 |
| | Diploma/Advanced Diploma | 12 | 8.45 |
| | Bachelor Degree/Professional Qualification | 110 | 77.46 |
| | Master/PhD Degree | 6 | 4.23 |
| | Other | 3 | 2.11 |

## 5.2 Factor Analysis and Scale Reliability

Exploratory Factor Analysis (EFA) with varimax rotation was carried out on adoption factors and intention to use m-shopping. The results of EFA are summarized in Table 5. The result showed that the Cronbach's alpha value ranges between 0.792 to 0.908 which are greater than the recommended threshold 0.70 according to Nunnally and Bernstein [65].

Table 5: Factor Analysis and Scale Reliability

| Constructs | Items | Factor Loadings | Cronbach's alpha |
|---|---|---|---|
| Independent Variables | | | |
| PU | 5 | 0.684 - 0.826 | 0.848 |
| PEOU | 4 | 0.661 - 0.809 | 0.792 |
| SN | 6 | 0.688 - 0.817 | 0.863 |
| PIIT | 4 | 0.762 - 0.906 | 0.887 |
| PR | 3 | 0.829 - 0.884 | 0.811 |
| Dependent Variable | | | |
| IU | 5 | 0.813 - 0.932 | 0.908 |

Notes: PU = Perceived Usefulness; Perceived Ease of Use = PEOU; SN = Subjective Norms;
PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk;
IU = Intention to Adopt m-shopping

## 5.3 Statistical Analysis

Multiple regression analysis (MRA) was used to test the model framework shown in Figure 5. According to scholars such as Hair et al. [37], Ooi and Arumugam [67] and Ooi et al. [68], MRA is an appropriate method in this research study as the analysis can be employed to examine the linkage between a dependent and many independent variables. The factors such as behavioral intention to use m-shopping, PU, PEOU, SN, PIIT and PR were included in the MRA to investigate the proposed hypothesis. The results showed that TAM has the aptitude of explaining the decision making of users in the adoption of m-shopping (Table 6). The findings show a positive relationship between PU and IU ($\beta = 0.238$, $p < 0.01$), PEOU and IU ($\beta = 0.231$, $p < 0.01$) and SN and IU ($\beta = 0.281$, $p < 0.01$) in which the SN has a strongest positive relationship with IU. However, there is an insignificant relationship between PIIT and IU ($\beta = 0.135$, $p > 0.05$) and PR and IU, as revealed by the results ($\beta = 0.101$, $p > 0.05$). Pertaining to adoption factors and mobile shopping associations, 48.4 percent of the variance in consumers' of m-shopping services is accounted by adoption factors. Hence, it can be concluded that H1 (PU), H2 (PEOU) and H3 (SN) were supported while H4 (PIIT) and H5 (PR) were not supported.

Table 6: Regression Analysis

| | Unstandardized Coefficients | | Standardized Coefficients | | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| **Model** | **B** | **Std. Error** | **Beta** | **t-value** | **Sig** | **Tolerance** | **VIF** |
| | -0.229 | 0.384 | | -0.596 | 0.552 | | |
| **PU** | **0.268** | **0.090** | **0.238** | **2.970** | **0.004** | **0.591** | **1.693** |
| **PEOU** | **0.289** | **0.094** | **0.231** | **3.060** | **0.003** | **0.667** | **1.500** |
| **SN** | **0.292** | **0.073** | **0.281** | **4.025** | **0.000** | **0.777** | **1.288** |
| PIIT | 0.128 | 0.066 | 0.135 | 1.938 | 0.055 | 0.777 | 1.287 |
| PR | 0.156 | 0.102 | 0.101 | 1.523 | 0.130 | 0.861 | 1.161 |
| R Square | 0.484 | | | | | | |
| Adjusted R-Square | 0.465 | | | | | | |
| F-value | 25.557 | | | | | | |
| P-value | 0.000 | | | | | | |

Notes: PU = Perceived Usefulness; Perceived Ease of Use = PEOU; SN = Subjective Norms;
PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk

# 6 Discussions

PU was found to be the second most significant factor in the influence of IU of m-shopping. The findings however contradicts with a study by Aldas-Manzano et al. [5] using 470 samples in Spain where evidences showed that consumers would purchase regardless whether m-shopping provides advantages or vice versa. The result however is in agreement with previous findings in Taiwan. Hung et al. [38] using students as respondents found PU significant in exploring the continuous intention to adopt mobile phones for online shopping. Lu and Su [52] on the other hand, using the structural equation modeling also provide evidences on the importance of PU in the intention to adopt m-shopping in Taiwan. The findings from Rouibah et al. [80] in Kuwait also revealed the importance of PU in the intention to adopt online shopping using camera mobile phones. Thus, in order for consumers to adopt m-shopping, they must feel the advantages when compared with the traditional bricks-and-mortal stores.

The findings also revealed that PEOU is a significant determinant to forecast the intention to adopt m-shopping in this study. Although the findings contradicts with a study in Hong Kong where PEOU was insignificant with the intention to adopt m-commerce, the study corresponds with prior finding by scholars such as Lu et al. [53], Mallat et al. [59] and Rouibah et al. [80]. The study was also in agreement with Wang et al. [98] where PEOU is significant with the behavioral intention to adopt m-services, using samples from respondents attending an e-commerce symposium in Taiwan. Another study by Wu and Wang [101] also revealed that the intention to adopt m-shopping websites is associated with the ease of use such as in product search and online help. Thus, we can conclude that if the mobile device is user friendly and the webpage to access m-shopping can be used without much effort, consumers will embrace m-shopping thus resulting in higher adoption rate.

Interestingly, SN has the strongest influence on the IU of m-shopping in Malaysia thus suggesting that the opinions of family members, friends and mass-media is highly valued by the individual during the decision whether or not to adopt m-shopping. Study by Tan et al. [88] on m-learning in Malaysia also indicated that SN has the strongest influence on IU. Rouibah [79] in their study in Arab also found that SN exerts the strongest direct effect on the adoption intention more than PU and PEOU. Triandis [94] commented the influence of SN is the greatest when the adoption behavior is new. Since m-shopping adoption rate is still very much at the infancy stage in view of the low percentage rate from the MCMC survey results, consumers are likely to rely on experiences of their friends, mass-media and family members as they do not have any experience using the device for shopping.

Contrary to our hypothesis, the results of the study show that PIIT does not have significant impact in the intention to adopt m-shopping. The study contradicts with the finding in Australia [85], China [50] or Spain where Aldas-Manzano et al. [5] using 407 respondents as samples concluded that PIIT influences the intention to adopt m-shopping. The finding however is supported by a study from Lu et al. [54]. One possible explanation is due to the education background of the respondents where it was revealed that 77 percent hold at least a degree. Thus, their decisions are not based the braveness or curiosity in trying out new technology but more on rationality and logic such as usefulness, ease of use, functionality and etc.

Wu and Wang [100] commented that PR is an important determinant in the study on the intention to adopt a certain technology within m-commerce services among variables. PR, however is insignificant with the IU of m-shopping, contrary to our hypothesis. The findings contradict with a study by Pavlou [69] where PR has significant effect on IU in online transactions. One possible explanation is that 80.99 percent respondents in this study are below 25 years of age. They are young and therefore more aware on the latest changes in technology [89]. They are comfortable making transactions online, hence overriding any potential risk reflected with m-shopping.

# 7 Implications

From the theoretical point of view, this study has contributed to the existing body of knowledge. Since TAM only consists of two determinants and these are insufficient to predict the overall adoption of technology, this study offer insights on consumer intention to adopt through the expansion of the model three new constructs, namely SN, PIIT and PR. Hence, this study can better predicts the consumers' intention to adopt m-shopping for nations, which have yet to receive the developed nation status.

The findings from this study have several important implications for retailers, mobile marketers, service developers and software engineers to increase the m-shopping acceptance rate among consumers. Hence, we offer five important guidelines and implementation strategy for practitioners to further improve on their mobile marketing plan.

Firstly, since PU is a significant factor in predicting the consumers' intention to adopt m-shopping, practitioners should stressed on the development of software associated with m-shopping such as the price comparison software [10], online purchasing advisor [7] and recommendation software [104]. Only by providing additional advantages when compared to the traditional bricks-and-mortal stores, can practitioners help to create the impression of usefulness among consumers. Drawing another example adopted by Ministry of Sound, the company delivered tickets directly to mobile phones during purchase, thus consumers do not need to print the tickets [60]. In addition, practitioners can also cast their marketing campaigns by emphasizing on the usefulness of adopting m-shopping.

Their promotion should focus on the 'always on' and 'portable' features of mobile phones and the convenience associated with them for shopping. The impression of usefulness can thus be created and will lead to the increase in the intention to adopt among consumers.

Secondly, due to the limited size of mobile screen, more steps and processing page is needed whenever a consumer transact using their mobile device [52]. Since PEOU is another important variable to predict consumers' intention to adopt m-shopping, practitioners should optimize their websites for mobile usage such as the ease of navigation and accessing websites from consumers' mobile phone. In addition, the PEOU can also be created by reducing the complexity of the mobile phone design. For example, by making the mobile device more user-friendly such as in screen size, visual displays and keyboard interface. The combination of the above strategies can create a favorable environment for consumers to shop thus increasing their perception of ease of use.

Thirdly, SN is also significant in predicting the consumers' intention to adopt m-shopping. As an individual's intention to adopt is influenced by mass-media, expert opinion, user's relatives, family members, friends and etc, practitioners who want to distinguish themselves from their competitors should engage heavily in social commerce. This includes advertising in different social networks or channels. The emphasis should be concentrated on selecting social networks which have the greatest media impact on consumer, e.g., 'Facebook', 'Friendster' and etc. Practitioners can also consider conducting seminars by inviting opinion leaders, celebrities or experts in mobile phone. Consumers may be influenced to adopt m-shopping in the long run as a result.

Fourthly, since PIIT is insignificant with the consumers' intention to adopt m-shopping, practitioners may not need to segment the market based on different category of consumers during the early introduction stage of the product life cycle. As consumers' intention to purchase is based on rationality and logic and not purely on curiosity and boldness as suggested by the PIIT theory, practitioners should design better services and applications in association with m-shopping in order to meet the specific needs of consumers.

Lastly, although PR is insignificant with the consumers' intention to adopt m-shopping, nevertheless they should also be included to increase the confidence level of consumers who have yet to engage in m-shopping. During the process of payment in transactions, practitioners should implement transparency management. Further attention should also be given in developing better security features to reduce transaction risk such as the risk of misuse of credit card information. All of these will be useful in improving consumer's believe in the system security.

# 8 Limitations and Future Studies

As with any study, there are limitations to our research. These limitations should be used to improve future research. Firstly, the target population for this study is university students. Nearly two-third of them aged between 21 to 25 years. As such, the findings should not be generalized to other age groups. Chong et al. [16] in their study revealed that older consumers are likely to adopt m-commerce when compared to younger consumers in Malaysia. This could be due to the higher spending power of older consumers than younger Malaysian. Therefore, different pattern of intention may arise between young and old consumers. It is therefore important for future research to study and compare the consumers' intention across different age groups.

Secondly, as indicated in the findings of this study, the overall consumers are highly educated. About 77.46 percent of respondents hold a bachelor degree or professional qualification. However, consumers with lower education might have different intention to adopt m-shopping. If future research can target on respondents from different education qualifications, the findings will provide better generalization.

Thirdly, this study is limited by location. The findings from this study were conducted within the Malaysia context. Therefore, the validity of the findings is limited to one single market view point and cultural background. However, there may be differences when investigating other emerging nations. For this reason, the limitation should be considered for future research to include samples of consumers from other countries when comparing the findings obtained.

Fourthly, the findings were not obtained from different time period but at a specific point of time. The consumers' intention to adopt m-shopping may change from time to time. For example, the PEOU was not significant when the technology was introduced but became significant after 14 weeks [23]. Hence, it might be helpful if longitudinal research is considered as part of the study for future research.

Lastly, many other significant predictors have been left out in this study. The results show that there are only 46.5 percent of consumers' intention to adopt m-shopping can be explained by this research model (Adjusted R-Square = 0.465). This is another direction for future research to continue investigating other significant predictors such as perceived financial cost, perceived playfulness, perceived flexibility, facilitating conditions, self-efficacy and so on.

# 9 Conclusion

This paper aims to examine the predictors of consumers' intention to adopt m-shopping in Malaysia. It is expected that more people will be connecting their mobile devices to the web for m-shopping. For m-shopping to reach its fullest potential, practitioners should offer customers the usefulness and ease of use. Since SN is also a significant predictor of consumers' intention to adopt m-shopping, the construct should not be neglected. This study has successfully extended TAM and also contributed to the existing body of knowledge in relation to consumers' intention to adopt m-shopping from the perspective of emerging market. The suggestions in the implications section will also be useful for retailers and mobile marketers when advancing the development of their mobile marketing plan.

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