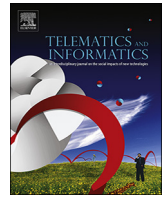


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Gender and age: Do they really moderate mobile tourism shopping behavior?

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ABSTRACT

With the growing popularity of mobile devices (m-devices) and technological advancement in wireless networks, a new form of shopping channel has emerged in the tourism industry. Mobile tourism shopping refers to the use of m-devices to shop for tourism products and services. Given the benefits and potential of this channel, the acceptance however is not widespread and currently an under-addressed topic among academicians. Specifically practitioners are also sceptical if consumers are ready to accept this alternative channel. Drawing upon the Unified Theory of Acceptance and Usage of Technology (UTAUT) as a baseline model, the proposed model was integrated with flow theory, psychological characteristic, social environment and security concern factors to study on the mobile consumers' behavioral intention. Through the use of Partial Least Squares-Structural Equation Modelling of 503 mobile respondents, it was discovered that some of the structural paths are not consistent with past literatures. Additionally, a non-parametric permutation approach has also been conducted to discover the gender and age differences in the decision making. The findings however are mixed and therefore require further testing. This study has valuable contributions to academicians, practitioners, and society. Academically, the integrated framework contributes to the tourism and marketing literatures by uniting UTAUT, flow theory, psychological characteristic, social environment and security concern factors. Practically, by focusing on the important factors affecting consumers' decision to adopt mobile tourism shopping, organisations can create effective mobile marketing campaigns. Socially, the study contributes to job creations and revenue generation for the host country.

1. Introduction

Traditionally mobile devices (m-devices) have been used primarily for calling and texting (Tan et al., 2017). However with the advancement of m-devices and wireless networks (e.g., Fourth Generation (4G), Long Term Evolution (LTE) and Worldwide Interoperability for Microwave Access (WiMAX)), m-devices have evolved into a multimedia machine which supports interactive communications (Marriott et al., 2017). With faster connectivity, m-devices enable consumers to perform a variety of functions which were once only possible through a desktop computer. As such many new business opportunities have emerged within the mobile commerce perspective in view of the development of mobile technology (Hew et al., 2017a). They include mobile shopping (Mahapatra, 2017; Shang and Wu, 2017), mobile banking (Alalwan et al., 2017; Singh and Srivastava, 2018), mobile payment (Ooi

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and Tan, 2016; Liébana-Cabanillas et al., 2017), mobile entertainment (Wong et al., 2016; Hew et al., 2016b) and etc. The advancement has also appeared to have an effect on the tourism industry which spurs the development of tourism products from the perspective of mobile (Kim and Law, 2015; Hew et al., 2016a; Tan et al., 2017). Consumers can browse any of the mobile websites and complete their purchase using their m-devices. Hence, purchasing tourism product are now no longer confined to only online, on a desktop computers or traditional brick-and-mortar stores but also rapidly migrating to the m-devices in a consumer's pocket (Hew et al., 2018). The tourism products are characterized by experiential, intangible, heterogeneous and perishable which make them very information intensive and thus ideal to be distributed electronically using a m-device (Xiang et al., 2015). Consequently the technology advances have lead to faster, cheaper and efficient travel distribution and booking mechanisms that were inconceivable generation ago (Gardiner et al., 2014).

The adoption of this new alternative channel brings benefits to consumers and tourism providers. The technology allows consumers to determine the time and place where they would like to accomplish their task by removing the restrictions that currently exist. Wang et al. (2014) empirically found that consumers search and book travel products while on work, lunch times and during commuting to work. Since m-devices are ubiquitous, the convenience allows consumers to purchase when travelling (Morosan, 2014; Tan et al., 2017). Schaal (2015) for example uncovered that bookings using m-devices for hotels are conducted on the same day. Henceforth, this allows consumers take advantage of last minute bargains which result to saving in costs and time (Wang et al., 2014). Accordingly, the usage of m-devices has also lead to a new business model for tourism organization (Kim et al., 2016). Apanasevic et al. (2016) highlighted that the adoption helps to increase the positive image and reputation of the organization. Specifically, the offering of products and services using m-devices helps to increase customer loyalty and satisfaction with travel agencies and suppliers (Hua, 2016; Tan et al., 2017). Correspondingly, the channel also serves as a strategy to differentiate the organization's product from intense competitors, improve service quality and an opportunity to access new markets to enhance tourist satisfaction that otherwise cannot be achieved using conventional channels (Tsai et al., 2005; Lee et al., 2007).

The utilization of m-devices for online shopping in the hospitality and tourism industry is on the rise (Makki et al., 2016a,b). Schaal (2015) indicated that one third of Orbitz Worldwide's hotel bookings are conducted using m-devices and represents about 25 percent of the company's product mix. Similarly, 50 percent of consumers visited TripAdvisor using m-devices (Schaal, 2015). Travelport has forecasted that 70 percent of travel transactions within the next three years will be originated from m-devices (Loureiro and Loureiro, 2017). Emarketer.com (2017) further enumerated that the travel booking using m-devices in the United States is forecasted to reach USD\$ 108.75 billion by year 2021 with mobile travel sites predicted to be over half of all sales. Realizing on the importance many tourism organizations have started to focus on their websites to allow booking, searching and reservations on their mobile platforms to meet this rising demand (Xiang et al., 2015; Kim and Law, 2015). In Malaysia for example, tourism organizations such as TripAdvisor, Booking.com, Expedia, AirAsia have begun to focus on mobile websites by mobile-optimizing their websites that are workable in m-devices (Hew et al., 2016a).

Many past literatures worldwide have shown that consumers are indeed accessing mobile websites on their m-devices to purchase for tourism products (Schaal 2015; Kim et al., 2016; Marriott et al., 2017). However many consumers in Malaysia do not adopt to this alternative channel (Tan et al., 2017). Interestingly, Malaysians have been found to have high hesitation in mobile shopping with a reported 81 percent of abandonment rate (Wong et al., 2015b; Thestar.com.my, 2016a,b). The figures remain puzzling despite the country has advanced modern infrastructure for 3G and Wimax (Hew et al., 2016a). Sanakulov and Karjaluo (2015) explained that the availability of new m-devices does not necessary mean that consumers will use the available mobile services immediately. In reality, there are many potential challenges that exist which makes the adoption uncertain (Mohammadi, 2015). Liu and Yu (2017) for example found that reading on a m-devices is different from reading using a desktop computer due to the smaller screen size which makes the large font size not suitable in m-devices. Hence, Parker and Wang (2016) argued that the motivations, expectations and behavior of consumers differ when using m-devices and desktop computer in view of different situational interactions and the specific channel limitations. Thus this shows that the study on tourism from the viewpoint of m-device is important (Liu and Yu, 2017).

Empirical literatures conducted on tourism in Malaysia so far have been limited to specific viewpoints such as halal tourism, rural tourism, marine tourism, medical tourism, heritage tourism and crisis tourism (Jaafar, 2012; Ooi et al., 2013; Jaafar et al., 2015; Mohd Taher et al., 2015; Samori et al., 2016; Henderson, 2016; Rasoolimanesh et al., 2016a,b). Moreover the viewpoint is confined to specific theories and models such as entrepreneurship, supply chain, economics and human resource (Choo and Mohd Nasurdin, 2014; Jaafar et al., 2015; Lee and Fernando, 2015; Purwomarwanto and Ramachandran, 2015; Giap et al., 2016); At the moment, few studies have investigated the use of m-devices in purchasing tourism products particularly from the perspective of Information Technology/Information System (IT/IS) models (Morosan and DeFranco, 2016; Tan et al., 2017). Specifically the use of m-devices to purchase have yet to be clearly comprehend in the tourism and hospitality industry (Law et al., 2015; Park and Tussyadiah, 2016). Mahrous and Hassan (2016) found that many consumers in the emerging markets still prefer to use travel agencies in a specific stages of the purchasing decision, such as booking and payment with m-devices used occasionally only for travel planning. As such, Hua (2016) reiterated that the study on mobile dimensions is lagging behind the industry practices in the hospitality and tourism field.

Based on this research gap, the study investigates on the motivation of consumer's behavioral intention to purchase tourism products using m-devices. As many Malaysians still regard purchasing tourism products using m-devices as a new concept (Tan et al., 2017), the understanding will enable organizations to create a successful travel websites which will induce the usage intention of external consumers (Hew et al., 2016a). Specifically the understanding on the consumer's channel choice is important for tourism organizations seeking survival and growth in the local and global markets (Mahrous and Hassan, 2016). The following is the structure of the paper. Overview of the consumer behavior in the tourism industry is firstly outlined. The consumer behavior is explained through the theories of consumer decision making model and theories of technology acceptance (Öz, 2015). This is followed by the

justification of the conceptual framework and the proposed model. Then we present on the hypotheses development, next the methodology of study, data analysis and discussion are presented. In the final section the study incorporates the implications, conclusion and future study.

2. Literature review

2.1. Consumer decision making models

Tourism products are characterized by features such as heterogeneity, inseparability, perishability, intangibility and may involve high priced (Kolb, 1984). Since consumers cannot experience the travel products in advance, they often have a stronger sense of risk and uncertainty over the products (Chang, 2015). In order to reduce such risk, consumers demand higher involvement in search. In other words, they tend to go through the consumer decision making models prior to purchase (Öz, 2015). Among popular consumer decision making models includes Nicosia, Engel-Kollat-Blackwell and Howard-Sheth's model (Nicosia, 1966; Engel et al., 1968; Howard and Sheth, 1969). The models concede that decision making is a problem-solving process comprising various stages directed at consumption choices. Glasscock and Fee (2015) argued the stages mainly centred around need recognition, information, search, evaluation of alternatives, making choice and post-purchase evaluation. While the model has been useful, they have received a number of critics especially in the manner how the relationship between variables have been identified and the proxies in which the variables can be operationalized (Lye et al., 2005). Regardless, the models however have been widely adopted as a standard in online and offline consumer behavior research despite receiving many criticisms (Karimi et al., 2015).

2.2. Flow theory

Flow refers to the holistic sensation felt by the individual when they act with total involvement was originally developed by Csikszentmihalyi (1975), who seeks to understand the intrinsic value of enjoyment and how the enjoyment occurs in individual experience. Agarwal and Karahanna (2000) argued that when engaging in a particular activity, users have little distinction between past, present and future. Hence, they are often accompanied by a loose of time in such that their distractions are pushed to the periphery of consciousness. In order for consumers to experience flow within a specific activity, the consumer must perceive a balance between the challenges and their technical skills, of which both must be above the critical level (Zhou, 2013). Perceived Enjoyment (PEJ) was found to be one of the most used constructs in the flow theory (Gao and Bai, 2014). In recent years there are many studies that adopted flow theory to explain the interaction between technology and consumers (Zha et al., 2015). Specifically many scholars have found that flow theory leads to a favourable attitude towards IT/IS adoption (Zhou et al., 2015) and in the hospitality and tourism industry (Bilgihan et al., 2015).

2.3. Unified acceptance and use of technology (UTAUT)

Unified Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al. (2003) to bring coherence and synthesis to the technology acceptance literatures. This was because there were many models that had appeared over the last few years by mixing concepts of various technologies, ad hoc models, or to use only constructs that favour their research without considering of other alternatives (Rondan-Cataluña et al., 2015). The model combined competing technology models to predict behavioral intention (BI) and use behavior (Ooi and Tan, 2016). The model consists of four main antecedents; Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) (Wong et al., 2015a). Many empirical evidences were provided that the model outperformed the eight constituent models in explaining the variance in user's intention to adopt a particular IT/IS (Venkatesh et al., 2003). As such UTAUT has since been widely adopted in exploring new mobile technology acceptance studies. They are such as mobile banking (Tan and Leby Lau, 2016; Yu, 2012), mobile television (Wong et al., 2016), mobile applications (Kang, 2014; Tan et al., 2017), mobile payment (Musa et al., 2015) and mobile learning (Ho et al., 2010; Reychav et al., 2016). The model however is not without limitations. UTAUT only considers one individual's behavior which is context-dependent and cannot be extended to other behaviors (Masrom and Hussein, 2008). Additionally while the model is parsimony and popular, the condenses of many theories and models into one framework remains a limitation (Park, 2010). Further, UTAUT was developed based on the organizational setting which the constructs are considered to be distinctly utilitarian in character (Rondan-Cataluña et al., 2015). UTAUT 2 was established in view of the limitations of the original model (Venkatesh et al., 2012). Lai and Shi (2015) opined that UTAUT 2 has not been widely adopted although the model has shown improvement in the explanation power. UTAUT 2 has also received criticism in which the model is being overly simplistic in conceptualizing performance perceptions which resulted to vague operationalization and conceptualization of constructs (Morosan and DeFranco, 2016).

2.4. Justification of the conceptual framework

Since purchasing tourism products using m-devices is at the infancy in Malaysia the research decided to adopt UTAUT as the main theoretical background to evaluate the success of this new innovation. The applicability of UTAUT is ideal since the model concentrates during the active adoption of the technology in question and not during the rejection or acceptance due to the mass popularity (Venkatesh et al., 2003). UTAUT however lacks of attention to technological details and cannot explain why some technology innovations are more acceptable than others within the same user population (Bankole and Bankole, 2016). Nikou and

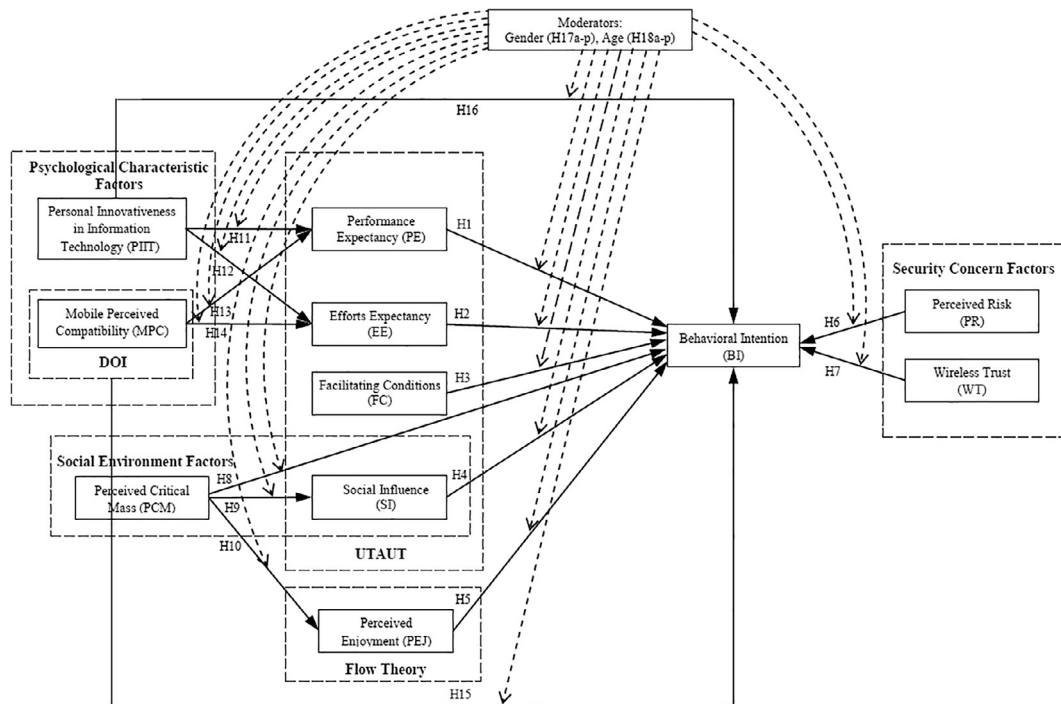


Fig. 1. Conceptual framework.

Bouwman (2014) opined that when there are human-oriented interaction involved with mobile technology, conventional technology acceptance theories cannot be sufficient to explain on consumer's BI. As consumer acceptance of new technology is a complicated phenomenon which cannot be obtained with using just one single theory driven model, the core model needs re-visitation (Jackson et al., 2013).

Personal Innovativeness in Information Technology (PIIT) and Mobile Perceived Compatibility (MPC) were added as UTAUT neglects the psychological perspective of consumers (Tan et al., 2014a; Nikou and Bouwman, 2014). The perspective is important as it allows the psychological process linked with the adoption of innovation be explained (Morosan, 2014). Additionally, Malaysia is a collective society which means that that the importance of other plays a role in influencing adoption decision (Tan and Leby Lau, 2016). As such Perceived Critical Mass (PCM) was adopted. Morosan (2014) concluded that despite a robust of research in technology adoptions, the role of risk and trust have rarely been recognized in the use of mobile technologies in the travel and hospitality industry. Since Malaysians have general tendency to distrust online transactions (Tan and Leby Lau, 2016), Perceived Risk (PR) and Wireless Trust (WT) have been added. In addition, PEJ is a critical factor that could sustain consumer's engagement and consumer acceptance on applications that offers utilitarian benefits (Pe-Than et al., 2015). Since they are important in the acceptance of new technology innovation, PEJ was integrated (Van der Heijden, 2004). Finally BI was adopted over continues use intention or post adoption behavior as the endogenous construct since the adoption is still relatively new in Malaysia (Tan et al., 2017). Thus this would allow researchers to investigate consumer behavior in the travel and hospitality industry in a more meaningful manner (Wang and Wang, 2010). The conceptual framework drawn from the study is shown in Fig. 1.

3. Hypotheses development

3.1. Performance expectancy (PE)

PE is associated with the belief of an individual whether using a particular system leads to improvement in task performance (Venkatesh et al., 2003). When the system brings benefits this would encourage adoption (Tojib and Tsarenko, 2012). Many past studies in the tourism industry have found supporting relationships between PE and BI. (No and Kim; 2013; Morosan, 2014; Kim et al., 2016). The advantages of m-devices are associated with their characteristics namely flexibility, ubiquity, mobility, personalization and dissemination which sets them apart from the traditional electronic commerce or bricks-and-mortar stores (Chong, 2013). There are numerous advantages adoption m-devices when purchasing in the tourism industry. Wang and Wang (2010) conducted a study on the mobile hotel reservation systems in Taiwan and elaborated that when compared to traditional hotel booking system, m-devices allow consumer to obtain up-to-date, complete, accurate information on the hotel bookings conveniently. Wang et al. (2014) explained that the adoption of m-devices allow for instant information and answers whenever the consumers have inquiries. For example, consumer can pick up their smartphone, open the screen and able to obtain the information instantly. Tan et al. (2017) shared that websites such as Expedia Hotels, Hotels.com, Flight and Trip Advisor provide consumer with information

such as comparing prices of different services (e.g., car rentals, accommodations and flights) through the m-device. When consumer perceived that there are advantageous adoption m-devices for shopping this would lead to the increase of BI. Thus, the following hypothesis has been formulated:

H₁. PE is positively associated with BI to adopt mobile devices to purchase tourism products.

3.2. Effort expectancy (EE)

EE refers to the ease of use when using a particular system (Venkatesh et al., 2003). Aljukhadar and Senecal (2015) opined that the EE to use an organization's website is important to the success within the Internet content and as such they must be easily understood and visible navigation. Many past studies have found the significant relationship between PE and BI (No and Kim, 2013; Tan et al., 2017). In the BI to adopt m-devices to purchase ancillary services in air travel in the United States, EE was found to be an important predictor (Morosan, 2014). Yang (2015) opined that when consumers shop using their m-devices, they tend to compare this with web-based predecessor. Specifically they stressed on the ease of access and navigation of mobile sites when mobile shopping (Yang, 2010). Loureiro and Loureiro (2017) highlighted that consumers will only look into 3–4 options displayed on a mobile browser as compare to 10 on a desktop computer. Yeh and Li (2014) empirically performed a study on online travel websites in Taiwan. They found that search engines, landmarks, hyperlinks and frames are associated with the efficiency of navigation among consumers. Practitioners have started to adjust the interface of their websites to suit the mobile environment in view of the importance. Hew et al. (2016a) highlighted that Expedia, Agoda.com, Air Asia, Trip Advisor and Booking.com have started to extend their websites to fit the mobile screen. When consumer experiences simplicity and does not require much effort in using this would lead to the increase of BI. Thus, the following hypothesis has been formulated:

H₂. EE is positively associated with BI to adopt mobile devices to purchase tourism products.

3.3. Facilitating conditions (FC)

Venkatesh et al. (2012) refers FC as the knowledge, resources, training, technical infrastructure and documentation that is available to encourage support usage of a particular system. Lallmahomed et al. (2013) opined that BI to adopt would be higher if the technical support, hardware/software and the knowledge of the system is available and as such have influence the adoption of IT/IS such as in the tourism industry. Theoretically in order to use m-devices in the wireless environment certain operational skills in configuring and operating are necessary (Teo et al., 2015b). As such consumers tend to look for support or assistance when experiencing the usage of new technology (Hew et al., 2015). FC was found to influence the purchase from low-cost carrier websites in Spain (Escobar-Rodríguez and Carvajal-Trujillo, 2014), purchase the air travel ancillary services in the United States (Morosan and DeFranco, 2016) and the use of Near Field Communication m-devices in the United States hotels. In this context of study when FC is available, this will help to reduce the obstacles in adoption and as such leads to the increase of BI. Thus, the following hypothesis has been formulated:

H₃. FC is positively associated with BI to adopt mobile devices to purchase tourism products.

3.4. Social influence (SI)

According to Venkatesh et al. (2012, p. 451), SI refers to the “degree to which an individual perceives that important others believe he or she should use the new system” and can be further classified into interpersonal and external influences (Bhattacharjee, 2000; Sim et al., 2012). SI has been found to affect the BI among user for various mobile service adoption studies (Foley et al., 2007; Thorbjørnsen et al., 2007; Sim et al., 2014) by altering the belief structures of consumers (Lu and Wang 2008; Liu, 2016), resulting them to respond to social pressure (Yang, 2010; Chong et al., 2010; Tan et al., 2012). Thus, based on the groups they are involved, consumers usually will adjust their beliefs (Bankole and Bankole, 2016). Gretzel et al. (2000) concluded that the tourism industry is intangible and falls under the information-intensive industry and thus they cannot be sample prior to consumption. As purchasing using m-devices on tourism is still in an early stage of the product life cycle, Reyhav et al. (2016) opined that consumers will consult their networks on their decision prior to making a purchase. Lee et al. (2007) empirically found that prior to purchasing tourism products online, consumers in Korea consider the opinion from their family and friends. Additionally, consumers in Malaysia also perceived the important of other referent individuals before using m-devices to purchase for tourism products (Tan et al., 2017). Thus, the following hypothesis has been formulated:

H₄. SI is positively associated with BI to adopt mobile devices to purchase tourism products.

3.5. Perceived enjoyment (PEJ)

Venkatesh (2000) described PEJ as whether the engagement on a system is enjoyable and considered this as part of the intrinsic motivation. PEJ is the process or experience itself and not directly related to the physical motivation objective (Young Im and Hancer, 2014). Agarwal and Karahanna (2000) also expressed the similar sentiment whereby they described PEJ as the focused immersion and temporal dissociation among other factors and that ‘nothing else seemed to matter’. The appearance on mobile websites are important to encourage adoption as consumers are not just motivated to purchase based on utilitarian but also hedonic motives (San-Martín et al., 2015). PEJ has been found to be significant with the BI of various mobile studies (Liu and Li, 2010; Karaiskos et al., 2012). Jeng (2013) empirically found that consumers experienced enjoyment when searching for a perfect tourism product online. Lu

and Su (2009) elaborated that the enjoyment could take forms such as in background music, animations, pictures and commercial flash through the consumer's m-devices. Young Im and Hancer (2014) opined that travellers used m-devices to search for travelling information and at the same time share and interact with others which give them a sense of enjoyment. In addition, Scholl-Grissemann and Schnurr (2016) discovered that the customization of tourism products (mix and match) leads to enjoyable experience among consumers. Ramification strategies was further proposed by Ozturk et al. (2016a) as an important element when designing mobile booking for hotels. Thus, the following hypothesis has been formulated:

H₅. PEJ is positively associated with BI to adopt mobile devices to purchase tourism products.

3.6. Perceived risk (PR)

Tan et al. (2014a) defined PR as the individual's belief that there is a probability that an unexpected event may occur which leads to the decrease in confidence especially when making decision (Im et al., 2008). Mobile technology is often associated with higher vulnerability to cyber attacks and intrusions as opposed to wired technologies in view that the system involves lean information (Morosan, 2014; Mortimer et al., 2015). Consumers are concerned that they will experience psychological and financial losses as a result of their personal information which travel through airwaves being manipulated by hackers (Tan et al., 2014a). Many mobile literatures have found significant relationship between PR and BI (Teo et al., 2012b; Tan et al., 2015). In the tourism studies, Wang and Wang (2010) argued that consumers are usually hesitant to adopt mobile hotel reservation due to the concern on immature mobile software development which will lead to exposure of financial data (e.g., bank balance, credit rating) and other private information (e.g., location history). Similarly, Peng et al. (2012) studied on the BI to adopt tourism mobile payment system in China and found that consumers perceived the system to be risky. Finally, Ozturk et al. (2016a) opined that the reluctant of consumers to book hotel rooms using m-devices as opposed to electronic commerce or travel agencies is associated with PR. Thus, the following hypothesis has been formulated:

H₆. PR is negatively associated with BI to adopt mobile devices to purchase tourism products.

3.7. Wireless trust (WT)

Pavlou (2003) considers that WT as the willingness of consumers to become vulnerable to online retailers after careful consideration on the characteristics of retailers. Jung et al. (2015) concluded that WT helps to activate a cognitive response which is related to the consumer judgment between the magnitude of benefits and risks. This is important due to the lack of existence of personal contact between the customers and employees (Alalwan et al., 2016). In the hospitality industry, many consumers were reluctant to trust small merchants (Cobanoglu et al., 2015). Morosan (2014) explained that m-devices often contain personal information of an individual (e.g., photos, address, messages). In view that most mobile transactions would require a certain involuntary disclosure, many consumers are concerned on how the information is being used. As such many consumers often have doubts on the sellers and the outcomes of the transaction resulted from using m-devices (Siau and Shen 2003; Yang, 2015). Additionally some tourism products offered online are pricier in comparison with clothing, music and books (Kim et al., 2007). Since many tourism products are intangible and inseparable in which the consumption happened only after the visit takes place (Mwaura et al., 2013), a certain degree of WT is important to reduce the uncertainty and generate a sense of safety (Yang, 2015). The relationship between WT and BI have been validated in many tourism studies such as in the study on hotels bookings in Spain (Muñoz-Leiva et al., 2012), Egypt (Agag and El-Masry, 2016) and China (Li et al., 2017). As WT helps to reduce the uncertainty of intentions, motives, prospective actions of online vendor (Kramer, 1999), thus, the following hypothesis has been formulated:

H₇. WT is positively associated with BI to adopt mobile devices to purchase tourism products.

3.8. Perceived critical mass (PCM)

CM refers to the “the minimum number of adopters of an interactive innovation for the future rate of adoption to be self-sustaining” (Mahler and Rogers, 1999, p. 721). The concept of PCM is similar with network externality (Koohikamali et al., 2015) and the bandwagon effect (Leibenstein's, 1950). The idea proposed that when the quantity of adopter reaches a critical mass, extrinsic benefits emerge, attracting more consumers to join (Markus, 1987). Specifically when there is a large number of users adopting to a specific IT/IS, this signals to other users that the system is important and worth pursuing (Chang et al., 2014). PCM affects the BI to adopt through interaction with other consumers (Lin and Lu, 2011) and was widely applied in the tourism studies. PCM for example was found to have significant relationship with the BI to adopt social virtual worlds using Habbo Hotel (Mäntymäki and Salo, 2013). Similarly Wang et al. (2016) also found that PCM is significantly positively associated with the mobile hotel reservation adoption (Wang et al., 2016). As the adoption of m-devices to purchase tourism products become more popular, this will attract more consumers to adopt. Indirectly many consumers will be obliged to conform to this new usage when many of their social circles adopt them which leads to the BI. Additionally, PCM was found to influence PEJ (Wei and Lu, 2014; Zhou et al., 2015). Gao and Bai (2014) argued that consumer can share information and interact instantly with a large number of users which leads to the perception of pleasure and joy. Similarly PCM was also found to influence SI (Nikou and Bouwman 2014; Chang et al., 2014). Van Slyke et al. (2007) argued that PCM is determinant of SI based on social psychological perspective. The logic goes that the number of people influences consumers unconsciously. Even if they are unconvinced they might conform to the particular action assuming that a large number of consumers know something that they do not and with such large number of users, they are unlikely to be wrong. Chen et al. (2016) explained that the logic is evident especially for consumers with little knowledge on technologies. Thus, the following

hypotheses have been formulated:

- H₈. PCM is positively associated with BI to adopt mobile devices to purchase tourism products.
- H₉. PCM is positively associated with SI.
- H₁₀. PCM is positively associated with PEJ.

3.9. Personal innovativeness in information technology (PIIT)

PI refers to the level in which an individual is willing to adopt or experiment in new innovation. Park et al. (2015) found that PI helps to foster innovative behavior and in particular the acceptance of new product (Makki et al., 2016a,b). PI was subsequently introduced in the IT domain and was renamed as PIIT (Agarwal and Prasad, 1998). Scholars indicated that innovative consumers have higher level to embrace new technology as they have higher tolerance towards uncertainty, risk-oriented, venturesome and self confidence (Rogers, 1995; López-Nicolás et al., 2008; Tan et al., 2015). PIIT was found to be significant with many tourism studies. Makki et al. (2016a,b) found that PIIT has the strongest significant relationship with BI to adopt Near Field Communication mobile payment in the fast-paces restaurant and tourism industry. Tan et al. (2017) also uncovered the positive significant relationship in the extended UTAUT study on mobile tourism in Malaysia. Additionally when consumers perceived higher PIIT, this also leads to the development of positive perception towards usefulness and ease of use (Leong et al., 2013; Tan et al., 2014b). Thus, the following hypotheses have been formulated:

- H₁₆. PIIT is positively associated with BI to adopt mobile devices to purchase tourism products.
- H₁₁. PIIT is positively associated with PE.
- H₁₂. PIIT is positively associated with EE.

3.10. Mobile perceived compatibility (MPC)

MPC refers to the degree whether the existing mobile innovation is considered to be reconcilable with the existing value, experience, needs and behavioral patterns of potential consumers (Rogers, 1995). Past experiences of using similar technologies can form a favorable perception of new technology (Kim et al., 2016). This is because consumers will view the new innovation in a more familiar manner (Ilie et al., 2005). As such fitness of the innovation preferred lifestyle of consumers for example have been shown to impact BI to adopt mobile services (Kim et al., 2009). In the tourism studies, MPC was found to be positively significant with the BI to adopt mobile payment in the tourism industry in China (Peng et al., 2012) and also mobile tourism guide in Thailand (Trakulmaykeek and Benrit, 2015). Both authors concurred that as m-devices have been used for many other mobile services, which lead to higher confidence and thus higher BI. Additionally, MPC was also found to increase EE in the study on the adoption to adopt m-devices to book for hotel rooms on mobile websites (Ozturk et al., 2016b). Recently Yap and Tan (2017) empirically found that MPC also leads to higher PE in their study on mobile social media marketing in Malaysia using an extended UTAUT model. The rationality goes that when the adoption of a new system is reconcilable with the potential consumer's lifestyles, activities, practices and experiences, they are likely to feel comfortable and exert the proper understanding on usage which leads to the increase perception of usefulness and ease of use (Ooi and Tan, 2016). Thus, the following hypotheses have been formulated:

- H₁₅. MPC has a positive significant relationship with BI to adopt mobile devices to purchase tourism products.
- H₁₃. MPC has a positive significant relationship with PE.
- H₁₄. MPC has a positive significant relationship with EE.

3.11. Moderating effect of gender

Gender differences have been observed to lead to different decision making and information processing (Hoyer and MacInnis, 2010; Teo et al., 2012a; Wong et al., 2014). The differences of attitude about IT/IS adoptions can be explained by the outcome of socialization process (Tam and Oliveira, 2016). Eagly and Wood (1991) elaborated that different decision-making among men and women has linkage with the role of gender which dictates how they should behave in society. In the social role theory, consumers behave differently based on expectation from themselves and others (Biddle, 1986). Hence, the activity of the person who performs a particular role can be predicted based on the expectation of that role (Zhang et al., 2017). Wang (2010) asserted that both males and females experience multiple roles experience, role conflict and role overload that functions as plan to guide behavior. In addition, in the social role theory, female are characterized by emotional traits whereas instrumental traits influenced male (Deng et al., 2010). Zhang et al. (2017) reiterated that in the gender role theory, males are encouraged to be brave and independent while females follow the behavior to be more social, emotional and caring of others. In view of the differences, male and female have different decision in adopting m-devices (Hew et al., 2017c) the following hypothesis has been made:

- H_{17a-p}. Gender moderates all relationships among variables in the research model.

3.12. Moderating effect of age

Younger consumers were found to have heavier usage of mobile technology in the tourism industry as opposed to the older consumers (Mang et al., 2016). Studies indicated that elderly consumers prefer to purchase their air tickets using traditional travel agency where as younger consumers prefer to purchase on the internet (Manzano and López-Valpuesta, 2010). Studies by Emarketer.com (2016) also empirically found that consumers above 55 years in the United Kingdom have completely shunned the

usage of m-devices to purchase for tourism products. Tacken et al. (2005) explained that this is due the declining cognitive ability of older consumer which is associated with biological changes. Aharony (2015) revealed that older consumers take longer time to get used to a technological innovations. As such, Wong et al. (2012) opined that younger and older consumers have different variations in the needs, interests and goal orientations to use new technology. In view of the differences between older and younger consumers, this is likely to lead to different acceptance of new services such as the use of m-devices to purchase for tourism products. The following hypothesis has been made:

H_{18a-p}. Age moderates all relationships among variables in the research model.

4. Research methodology

4.1. Data collection and sampling method

As the study is focused from the perspective of Malaysia and the tourism industry, a pre-test of the questionnaire was conducted with mobile commerce experts, particularly those that specialized in mobile tourism. A pre-test helps to minimize misinterpretation, reduce vagueness and fuzziness of the questionnaire design so as to ensure that they remain understandable and clear for the respondents. A face-to-face interview via the debriefing method were conducted (Hunt et al., 1982). As a result, some technical jargon and vague statements were removed based on the comments received.

In order to test the hypotheses, Klang Valley, Malaysia was selected as the sampling location. Klang Valley includes Kuala Lumpur which is the capital city of Malaysia and the adjoining cities in the state of Selangor with urban clusters. Klang Valley was chosen as it has relatively high percentage of mobile users and mobile penetration rate when compared to other states in Malaysia (Hew et al., 2017b). Moreover Klang Valley contributes about RM 263 billion towards the Malaysia's gross national income and has been identified as the centre for cultural, financial and economics for Malaysia (Pan et al., 2015). In view of the working opportunities, many Malaysian across different states converge to Klang Valley for better job prospects (Leong et al., 2017). Hence, the samples drawn in this location can be assumed to be diversified. In other words, they can be generalized as a good representation of different ages, backgrounds, races and religions of the Malaysia's population (Balachandran and Tan, 2015; Ooi and Tan, 2016).

The survey was conducted at five major shopping malls in Klang Valley. They are Pavillion, Suria KLCC, Mid Valley Megamall, Berjaya Times Square and One Utama Shopping Mall. According to ExpatGo (2016), the malls were listed in the top 20 shopping malls in Kuala Lumpur. A mall intercept approach was adopted whereby shoppers who finished shopping and exited the shopping mall were intercepted and politely asked if they were willing to participate in the study. To ensure a fair representation of sample, the survey was conducted at different times and different days in a week (Hew et al., 2017c). The mall intercept approach according to Kasim and Alfandi (2014) is the most efficient method for marketers to collect data. Khare (2014, p.9) elaborated that the mall-intercept method "is considered random and unbiased method for data collection wherein respondents experience sense of anonymity". Additionally the approach also constitutes an adequate sampling universe (Hew et al., 2017c). Similarly, the approach has also been adopted by many mobile tourism researchers in Malaysia (Tan et al., 2017; Hew et al., 2017a).

The questionnaire distribution were assisted by two research assistants and was held from May to July 2017. Prior to the distribution of the self-administered questionnaires, four pre-qualifying questions were added to ensure that they are qualified respondents. Should the answer to these pre-qualifying questions be positive, the respondents would be invited to fill up the remainder of the questionnaire. Respondents were first briefed on the terminology and examples were enlightened before asking to circle their level of agreement in response to the questionnaire. In order to reduce any response bias the survey did not collect any personal information from the respondents. Out of the 600 questions distributed, 536 samples were gathered. Further analysis reveals that only 503 samples were usable for statistical analysis after removing extensive missing items. Hence, this translates to a response rate of 83.4 percent. Leong et al. (2017) explained that the high response rate is justifiable since the data collection was achieved using face-to-face method whereby any ambiguity can be clarified on the spot.

The study confirmed the minimum sample size following the suggestions from Boomsma's (1982) simulation studies using the formula ($n \geq 50r^2 - 450r + 1100$); whereby n is the required sample size and r is the ratio of indicators to latent variables. Based on 11 constructs variables and 55 indicator constructs, $r = 5$. Thus the lower bound on sample size required in this study is 100. As the study adopted 503 sample size, this satisfy the lower sample size threshold for Structural Equation Modelling (SEM) (Westland, 2010). According to Chin (1998) the sample size also exceed the rule of thumb that the minimum sample size should be greater or equal to 10 times the largest number of arrows pointing to a particular latent variable in the structural model.

4.2. Measurement of instrument

The self-administered questionnaire of the survey is divided into two main sections. Section A is concerning the demographic profile whereas the Section B measures the perception on the constructs. All the measurement items represented in the study were adapted from existing literatures to suit the context of study. Seven-point Likert scale with scores ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" were adopted to measure the degree of satisfaction among respondents. Table 1 shows the full list of the items and their respective sources.

Table 1
Constructs and sources of questionnaire items.

Research Constructs	Measurement Items and Descriptions	Sources
PE	PE1: I find using m-devices to purchase tourism-related products useful in my daily life. PE2: Using m-devices to purchase tourism-related products increases my chances of achieving things that are important to me PE3: Using m-devices to purchase tourism-related products help me accomplish tasks more quickly. PE4: Using m-devices to purchase tourism-related products increases my productivity. PE5: Using m-devices to purchase tourism-related products save me a lot of time.	Wong et al. (2015a) Tan et al. (2017) Venkatesh et al. (2003) Venkatesh et al. (2003) Wong et al. (2015a)
EE	EE1: Learning how to use m-devices to purchase tourism-related products is easy for me. EE2: My interaction using m-devices to purchase tourism-related products is clear and understandable. EE3: I find using m-devices to purchase tourism-related products easy to use. EE4: It would be easy for me to become skilful at using m-devices to purchase tourism-related products. EE5: Learning to use m-devices to purchase tourism-related products does not require a lot of my mental effort.	Venkatesh et al. (2003) Venkatesh et al. (2003) Venkatesh et al. (2003) Venkatesh et al. (2003) Wong et al. (2015a)
FC	FC1: I have the resources necessary to use m-devices to purchase tourism-related products. FC2: I have the knowledge necessary to use m-devices to purchase tourism-related products. FC3: My friends/family members guide me to purchase tourism-related products using m-devices. FC4: I can get help from others when I have difficulties using m-devices to purchase tourism-related products.	Venkatesh et al. (2003) Venkatesh et al. (2003) Tan et al. (2017) Venkatesh et al. (2003)
SI	SI1: Those people who are important to me thinks that I should use m-devices to purchase tourism-related products. SI2: Those people that influence my behavior thinks that I should use m-devices to purchase tourism-related products. SI3: Family/relatives have influence on my decision to use m-devices to purchase tourism-related products. SI4: Mass media (e.g., TV, newspaper, articles, radio) will influence me to use m-devices to purchase tourism-related products. SI5: I will use m-devices to purchase tourism-related products if my colleagues use it. SI6: Using m-devices to purchase tourism-related products will enable me to improve my social status.	Venkatesh et al. (2003) Venkatesh et al. (2003) Tan et al. (2014b) Tan et al. (2014b) Tan et al. (2014b) Tan et al. (2014b)
PEJ	PEJ1: The process of surfing using m-devices to purchase tourism-related products is enjoyable. PEJ2: While accessing m-devices to purchase tourism-related products, I have experienced pleasure. PEJ3: Overall, I believe that visiting mobile websites using m-devices to purchase tourism related products is fun. PEJ4: Purchasing tourism-related products through mobile websites using m-devices is pleasant. PEJ5: Purchasing tourism-related products using m-devices is entertaining.	Wong et al. (2015b) Wong et al. (2015b) Wong et al. (2015b) Wong et al. (2015b) Wong et al. (2015c)
PR	PR1: Using m-devices to purchase tourism-related products is not financially secure. PR2: I would not feel secure sending sensitive information across the websites using m-devices. PR3: The risk of abuse of billing information (e.g., credit card number, bank account data) by hackers is high when using m-devices to purchase tourism-related products. PR4: The risk of an unauthorized third party overseeing the transaction is high when using m-devices to purchase tourism-related products. PR5: Overall, using m-devices to purchase tourism-related products is not a safe place to transmit sensitive information.	Tan et al. (2010) Tan et al. (2010) Leong et al. (2013) Leong et al. (2013)Tan et al. (2010)
WT	WT1: I would trust my bank to offer secure banking services when using m-devices to purchase tourism-related products. WT2: I would trust my m-device manufacturer to provide a m-device which is appropriate to purchase tourism-related products.	Ooi and Tan (2016) Ooi and Tan (2016)
PCM	WT3: I believe that if an outsider gains access to my credit card account, the bank will take complete responsibility for my money. WT4: I would trust my tourism organizations to perform to the outmost of the customers' benefit. WT5: I would trust my tourism organizations have the necessary skills and ability to fulfil its tasks. PCM1: Most people in my group use m-devices to purchase tourism-related products. PCM2: Many people I communicate with use m-devices to purchase tourism-related products. PCM3: Of the people I communicate with regularly, many use m-devices to purchase tourism-related products.	Ooi and Tan (2016) Ooi and Tan (2016) Ooi and Tan (2016) Zhang et al. (2015) Cocosila and Igonor (2015) Cocosila and Igonor (2015)
PIIT	PCM4: Most people in my community use m-devices to purchase tourism-related products frequently. PCM5: Most people in my office use m-devices to purchase tourism-related products frequently. PIIT1: I think I would be the first among my circle of friends to purchase using m-devices for tourism-related products. PIIT2: I think I know more about using m-devices to purchase tourism-related products than my circle of friends. PIIT3: I like to experiment with new ways of doing things. PIIT4: I like to be around unconventional people who dare to try new things. PIIT5: I am very curious about how things work.	Zhang et al. (2015) Zhang et al. (2015) Tan et al. (2014b) Tan et al. (2017) Tan et al. (2014b) Tan et al. (2014b) Tan et al. (2014b)
MPC	MPC1: Using m-devices to purchase tourism-related products would be compatible with all aspects of my lifestyle.	Ooi and Tan (2016)

(continued on next page)

Table 1 (continued)

Research Constructs	Measurement Items and Descriptions	Sources
	MPC2: I think that using m-devices to purchase tourism-related products would fit well with the way I like to live and work.	Ooi and Tan (2016)
	MPC3: I would appreciate using m-devices to purchase tourism-related products instead of alternative modes of shopping.	Ooi and Tan (2016)
	MPC4: Using m-devices to purchase tourism-related products is compatible with all aspects of my current ways of shopping.	Ooi and Tan (2016)
	MPC5: I think that using m-devices to purchase tourism-related products fit well with the way I like to purchase products and services.	Ooi and Tan (2016)
BI	BI1: I intend to use m-devices to purchase tourism-related products in the future.	Venkatesh et al. (2003)
	BI2: I will always try to use m-devices to purchase tourism-related products in my daily life.	Wong et al. (2015a)
	BI3: I plan to use m-devices to purchase tourism-related products frequently.	Venkatesh et al. (2003)
	BI4: I believe my interest to use m-devices to purchase tourism-related products will increase in the future.	Wong et al. (2015b)
	BI5: I intend to increase my use of m-devices to purchase tourism-related products when the opportunity arises.	Tan et al. (2014a)

Notes: EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

5. Analysis of data

5.1. Characteristics of respondents

Table 2 shows the demographic information of 503 respondents for this study. Most of the respondents are found to be between 30 and 39 years old, single and have education qualifications.

5.2. Statistical analysis

SmartPLS 3 software version 3.2.6 was engaged to perform the Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis (Hair et al., 2017). The statistical technique allows the researchers to test the set of interrelated hypotheses concurrently by appraising the relationships among multiple exogenous and endogenous variables in a theoretical model. A two-step approach in conducting PLS-SEM was strictly followed for the outer measurement and inner structural model evaluation. Subsequently the study tested for Common Method Bias (CMB), moderation effects, model fitness, effect size and the predictive power of the research model. PLS-SEM was adopted for two reasons. Firstly, PLS-SEM is suitable for prediction and theory development in obtaining maximum variance explained (Hair et al., 2014). This is opposed to Covariance-based Structural Equation Modelling which is to confirm the fitness of a theoretical foundation with the observed data (Jöreskog, 1982; Anderson and Gerbing, 1988). Secondly PLS-SEM is suitable for complex research model with multifaceted constructs (Ang et al., 2015). As the study extends the UTAUT model with flow theory, psychological characteristic, social environment and security concern factors with 11 constructs variables and 55 indicator constructs, PLS-SEM is suitable in this study.

5.2.1. Common method bias

Since the data was gathered using a single instruments for both endogenous and exogenous variables, CMB may arise. The study decided to adopt both procedural and statistical remedy to control CMB (Liang et al., 2007; Podsakoff et al., 2003). The study adopted simple language, use concise items and assure that there is no correct nor incorrect responses for procedural remedy (Hew et al., 2017a). Statistically the study also adopted Harman's one-factor test (Podsakoff et al., 2003). The study found that the sole factor only explains 15.288% of the total variance explained. As the figure is below the minimum 50%, CMB has not been detected (Tan et al., 2017). The study also follows the approach by Liang et al. (2007) to check on CMB. If the method factor loadings are insignificant and the indicators' substantive variances are substantially greater than their method variances" (Liang et al., 2007, p. 87), this implies that common method bias is not an issue. According to the result in Table 3 the average of (R_a^2) are substantially greater than their method variances (R_b^2) with a ratio of 803.4: 1 (Hew et al., 2017a). Hence CMB is not an issue.

5.2.2. Assessing the outer measurement model

According to Hair et al. (2017) both reliability and validity have to be verified during the evaluation of the outer measurement model. Reliability refers to "a scale should consistently reflect the construct it is measuring" (Leong et al., 2011, p. 506). Dijkstra-Henseler's rho (ρ_A) which is a more accurate estimation of data consistency was used (Ting et al., 2017). From the readings in Table 4, the value of ρ_A is greater than 0.7 threshold indicating that all the exogenous and endogenous construct in this study is reliable (Dijkstra and Henseler, 2015). On the other hand, validity is examined by both convergent and discriminant validity. Convergent and discriminant validity refers to the "the extent to which different measures of the same construct are in fact related" and "how different measures of different constructs are not related" respectively (Fransen et al., 2014, p. 1376). Factor loading and

Table 2
Demographic Characteristics of the Respondents.

Demographic characteristic		Counts	Percentage (%)
Gender	Male	336	66.8
	Female	167	33.2
Age	15–19	16	3.2
	20–24	48	9.5
	25–29	61	12.1
	30–34	73	14.5
	35–39	167	33.2
	40–44	46	9.1
	45–49	47	9.3
Marital status	50 and above	45	8.9
	Single	304	60.4
Experience of using m-devices to purchase tourism-related products	Married	199	39.6
	Less than 3 years	306	60.8
	3–5 years	169	33.6
Frequency of using m-devices to purchase tourism-related products (in a year)	More than 5 years	28	5.6
	1–3 times	196	39.0
	4–6 times	207	41.2
Types of tourism-related products purchased*	More than 6 times	100	19.9
	Accommodation	342	68.0
	Arts and Pop Culture	65	12.9
	Attractions	189	37.6
	Cruises	46	9.1
	Entertainment	170	33.8
	Festivals and Events	68	13.5
	Food and Beverage	89	17.7
	Games	47	9.3
	Recreation Activities	64	12.7
	Spas	26	5.2
	Sports	14	2.8
	Theme Parks	116	23.1
	Tours Packages	176	35.0
	Transportation	289	57.5
Travel Agency Services	103	20.5	
Other Reservation Service Activities	32	6.4	
Highest education level	No College Degree	117	23.3
	Diploma/Advanced diploma	89	17.7
	Bachelor Degree/Professional Qualification	161	32.0
	Master/PhD Degree	136	27.0
Respondent's industry	Banking	105	20.9
	Financial Institutional	49	9.7
	IT Related	35	7.0
	Manufacturing	30	6.0
	Retail	71	14.1
	Telecommunication	40	8.0
	Tourism	30	6.0
	Education	28	5.6
	Others	115	22.9

Notes: a. ²Respondents are allowed to opt for more than one options.

Average Variance Extracted (AVE) in Table 4 were used as a criterion to test the convergent validity. The general rule of thumb indicates that outer loading should have a value of 0.708 or higher while AVE exceed 0.5 to be consider satisfactory (Hair et al., 2017). However items with outer loading between 0.4 and 0.7 can be accepted if other indicators with high loading can explain 50 percent of the AVE; while loading before 0.4 should be removed (Hair et al., 2017). As such MPC1 and SI1 was included while PIIT1 was dropped due to the poor outer loading of 0.325. Additionally, all AVE values exceed the 0.5 threshold. While Fornell and Larcker (1981) criteria often has been used in many mobile studies (Tan et al., 2017) they lack of discriminant validity (DV) in common research situations (Henseler et al., 2015). Hence, Hetero-Trait-Mono-Trait (HTMT) ratio of correlations was employed to assess DV (Henseler et al., 2015). Using the most conservative criterion (HTMT < 0.85), the results in Table 5 demonstrates that DV is not an issue in the present study (Ting et al., 2017). In addition the HTMT inference with 5000 bootstrapping samples using the no sign change option and bias-corrected and accelerated (BCa) bootstrap and 95 percent confidence intervals indicated that none of the confidence interval (2.5 and 97.5 percent) achieve the requirement value of 1. This imply that all of the constructs in Table 6 are empirically distinct and DV has been established.

Table 3
Common Method Factor Analysis.

Latent Construct	Indicators	Substantive factor loading (R_a)	Substantial variance square (R_a^2)	Method factor loading (R_b)	Method variance square (R_b^2)
BI	BI1	0.989 ^{***}	0.978	-0.036 [*]	0.001
	BI2	0.990 ^{***}	0.980	-0.009 ^{NS}	0.000
	BI3	0.995 ^{***}	0.990	-0.007 ^{NS}	0.000
	BI4	0.961 ^{***}	0.924	0.039 ^{***}	0.002
	BI5	0.963 ^{***}	0.927	0.013 ^{NS}	0.000
EE	EE1	0.946 ^{***}	0.895	-0.043 ^{**}	0.002
	EE2	0.953 ^{***}	0.908	-0.055 ^{**}	0.003
	EE3	0.961 ^{***}	0.924	0.017 ^{NS}	0.000
	EE4	0.948 ^{***}	0.899	0.030 [*]	0.001
	EE5	0.865 ^{***}	0.748	0.052 [*]	0.003
FC	FC1	0.929 ^{***}	0.863	-0.029 ^{NS}	0.001
	FC2	0.921 ^{***}	0.848	-0.043 [*]	0.002
	FC3	0.888 ^{***}	0.789	0.026 ^{NS}	0.001
	FC4	0.845 ^{***}	0.714	0.049 [*]	0.002
MPC	MPC1	0.718 ^{***}	0.516	-0.019 ^{NS}	0.000
	MPC2	0.950 ^{***}	0.903	-0.032 [*]	0.001
	MPC3	0.970 ^{***}	0.941	-0.017 ^{NS}	0.000
	MPC4	0.977 ^{***}	0.955	0.022 ^{NS}	0.000
	MPC5	0.962 ^{***}	0.925	0.041 [*]	0.002
PCM	PCM1	0.914 ^{***}	0.835	0.024 ^{NS}	0.001
	PCM2	0.925 ^{***}	0.856	0.015 ^{NS}	0.000
	PCM3	0.985 ^{***}	0.970	-0.044 ^{**}	0.002
	PCM4	0.951 ^{***}	0.904	-0.006 ^{NS}	0.000
	PCM5	0.887 ^{***}	0.787	0.013 ^{NS}	0.000
PE	PE1	0.893 ^{***}	0.797	0.042 [*]	0.002
	PE2	0.942 ^{***}	0.887	-0.006 ^{NS}	0.000
	PE3	0.939 ^{***}	0.882	-0.031 ^{NS}	0.001
	PE4	0.924 ^{***}	0.854	-0.007 ^{NS}	0.000
	PE5	0.898 ^{***}	0.806	0.005 ^{NS}	0.000
PEJ	PEJ1	0.993 ^{***}	0.986	-0.070 ^{***}	0.005
	PEJ2	0.999 ^{***}	0.998	-0.041 ^{**}	0.002
	PEJ3	0.990 ^{***}	0.980	-0.009 ^{NS}	0.000
	PEJ4	0.942 ^{***}	0.887	0.048 ^{**}	0.002
	PEJ5	0.913 ^{***}	0.834	0.072 ^{***}	0.005
PIIT	PIIT2	0.901 ^{***}	0.812	0.038 ^{NS}	0.001
	PIIT3	0.988 ^{***}	0.976	-0.011 ^{NS}	0.000
	PIIT4	0.995 ^{***}	0.990	-0.032 ^{***}	0.001
	PIIT5	0.957 ^{***}	0.916	0.008 ^{NS}	0.000
	PR	PR1	0.607 ^{**}	0.368	-0.042 [*]
PR2	0.935 ^{***}	0.874	-0.039 ^{**}	0.002	
PR3	0.970 ^{***}	0.941	-0.003 ^{NS}	0.000	
PR4	0.975 ^{***}	0.951	0.037 ^{**}	0.001	
PR5	0.958 ^{***}	0.918	0.031 [*]	0.001	
SI	SI1	0.513 [*]	0.263	0.088 ^{NS}	0.008
	SI2	0.927 ^{***}	0.859	-0.008 ^{NS}	0.000
	SI3	0.978 ^{***}	0.956	-0.015 ^{NS}	0.000
	SI4	0.983 ^{***}	0.966	-0.02 ^{NS}	0.000
	SI5	0.963 ^{***}	0.927	-0.007 ^{NS}	0.000
	SI6	0.941 ^{***}	0.885	-0.003 ^{NS}	0.000
	WT1	0.954 ^{***}	0.910	0.000 ^{NS}	0.000
	WT2	0.956 ^{***}	0.914	-0.007 ^{NS}	0.000
	WT3	0.973 ^{***}	0.947	-0.003 ^{NS}	0.000
	WT4	0.971 ^{***}	0.943	-0.007 ^{NS}	0.000
	WT5	0.929 ^{***}	0.863	0.018 ^{NS}	0.000
	Average	0.930	0.872	0.001	0.001

Notes:

a. EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

b. PIIT1 was dropped due to its poor loading.

c. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$, ^{NS} insignificant.

Table 4
Convergent Validity and Construct Reliability.

Latent Construct	Items	Loadings	Mean	Standard Deviation	rhoA (ρ_A)	Average Variance Extracted (AVE)
BI	BI1	0.971	3.784	2.154	0.991	0.96
	BI2	0.986				
	BI3	0.991				
	BI4	0.982				
	BI5	0.969				
EE	EE1	0.920	5.670	1.342	0.975	0.874
	EE2	0.923				
	EE3	0.968				
	EE4	0.964				
	EE5	0.896				
FC	FC1	0.904	4.924	1.301	0.952	0.798
	FC2	0.868				
	FC3	0.916				
	FC4	0.885				
MPC	MPC1	0.687	4.358	1.953	1.018	0.845
	MPC2	0.952				
	MPC3	0.975				
	MPC4	0.981				
	MPC5	0.966				
PCM	PCM1	0.925	5.570	1.261	0.963	0.871
	PCM2	0.931				
	PCM3	0.963				
	PCM4	0.950				
	PCM5	0.895				
PE	PE1	0.916	4.846	1.228	0.984	0.843
	PE2	0.942				
	PE3	0.939				
	PE4	0.910				
	PE5	0.883				
PEJ	PEJ1	0.946	4.080	2.099	0.988	0.936
	PEJ2	0.971				
	PEJ3	0.984				
	PEJ4	0.974				
	PEJ5	0.960				
PIIT	PIIT2	0.911	5.274	1.489	0.982	0.923
	PIIT3	0.984				
	PIIT4	0.983				
	PIIT5	0.964				
PR	PR1	0.653	5.123	1.625	0.959	0.808
	PR2	0.952				
	PR3	0.968				
	PR4	0.950				
	PR5	0.934				
SI	SI1	0.585	5.288	1.647	0.959	0.809
	SI2	0.925				
	SI3	0.967				
	SI4	0.968				
	SI5	0.954				
	SI6	0.935				
WT	WT1	0.949	5.615	1.563	0.983	0.915
	WT2	0.951				
	WT3	0.974				
	WT4	0.973				
	WT5	0.937				

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

b. PIIT1 was dropped due to its poor loading.

Table 5
Hetero-Trait-Mono-Trait (HTMT_{gs}).

Latent Construct	BI	EE	FC	MPC	PCM	PE	PEJ	PIIT	PR	SI	WT
BI											
EE	0.120										
FC	0.116	0.162									
MPC	0.089	0.083	0.050								
PCM	0.047	0.087	0.080	0.202							
PE	0.096	0.049	0.073	0.100	0.084						
PEJ	0.360	0.045	0.136	0.161	0.073	0.043					
PIIT	0.104	0.126	0.113	0.149	0.183	0.032	0.127				
PR	0.125	0.057	0.021	0.069	0.124	0.029	0.076	0.138			
SI	0.169	0.027	0.183	0.064	0.255	0.089	0.153	0.105	0.109		
WT	0.089	0.018	0.025	0.035	0.272	0.048	0.025	0.022	0.042	0.032	

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

b. Shaded boxes are the standard reporting format for HTMT procedure.

5.2.3. Inspecting the inner structural model

Upon the confirmation that the constructs measurement are valid and reliable, Standardized Root Mean Square Residual (SRMR) was adopted to assess both estimated and saturated model for the global goodness of model fit (Henseler et al., 2016). The result showed that the saturated and estimated model is 0.033 and 0.056 respectively, which is less than 0.08 to show the model fit was good (Hu and Bentler, 1998). Additionally the saturated model shows the figure for the upper bound of the confidence interval larger than the original value (0.61 > 0.056) indicating the fitness of the overall model (Henseler et al., 2016). Prior to assessing the inner structural model, collinearity test was assessed for the presence of highly correlated constructs. The results showed that the variance inflation factors (VIF) values of all constructs ranged from 1.000 to 1.123, well below the cut-off threshold of 5.0 (Hair et al., 2017), indicating the absence of multicollinearity.

The inner structural model was performed using 5000 bootstrapping subsamples with no sign change option and bias-corrected and accelerated (BCa) bootstrap at 95 percent confidence intervals (Hair et al., 2017). The t-value of each path coefficient in which a value of 1.96, 2.56 and 3.29 shows a significance level of 0.05, 0.01 and 0.001 respectively was adopted to verify the hypotheses developed. Recently, scholars have started to adopt the bias corrected confidence interval as part of their reporting apart from the t-value (Rasoolimanesh et al., 2016a,b). Hair et al. (2017, p. 156) explained that if the “confidence interval does not contain the value zero, the path coefficient is significant”. The hypotheses testing results from PLS-SEM are reported in Table 7 and Fig. 2.

The results indicate that PE, EE and SI (H1: $\beta = 0.103$, $\rho < 0.05$; H2: $\beta = 0.113$, $\rho < 0.001$; H4: $\beta = 0.11$, $\rho < 0.05$) has a significant positive relationship with BI, as was hypothesised. FC (H3: $\beta = 0.031$, $\rho > 0.05$) however was not supported. In terms of security concerns factors, PR (H6: $\beta = -0.109$, $\rho < 0.05$) has significant negative relationship with BI but not WT (H7: $\beta = 0.008$, $\rho > 0.05$). Also, PEJ (H5: $\beta = 0.353$, $\rho < 0.001$) has positive influences on BI. In contrast, the impact of PCM on BI (H8: $\beta = -0.078$, $\rho > 0.05$) and PEJ (H10: $\beta = 0.072$, $\rho > 0.05$) are both statistically insignificant and thus unsupported in this study. Surprisingly PCM has positive significant association with SI (H9: $\beta = 0.244$, $\rho < 0.001$). Moreover on the psychological characteristic factors, PIIT has positive influence on EE (H12: $\beta = 0.113$, $\rho < 0.05$), but not BI (H16: $\beta = 0.052$, $\rho > 0.05$) and PE (H11: $\beta = 0.001$, $\rho > 0.05$). Finally MPC is positively significant with BI (H15: $\beta = 0.141$, $\rho < 0.01$) and PE (H13: $\beta = 0.1$, $\rho < 0.05$). However EE did not show significant impact on EE (H14: $\beta = 0.067$, $\rho > 0.05$) and hence unsupported in this study. The bias corrected confidence intervals which contains no zero value corroborates the significant relationship of H1, H2, H4, H5, H6, H9, H12, H13 and H15 (Hair et al., 2017). The model is capable of explaining 21.2% of the variance in BI. According to Rasoolimanesh et al. (2016a,b), the value of above 20% is considered high for consumer behavior studies.

5.2.4. Examining the moderating effects

As gender and age is a categorical variable, the research model was tested using multi-group analysis (MGA). Since PLS-SEM is non-parametric in nature, the Permutation approach was adopted since the technique does not need to meet the requirement of distributional assumption (Hair et al., 2017). Prior to the employment of MGA, gender was divided into male and female for the entire data set. Age on the other hand was split into two groups using a median-split method (Hew et al., 2016b). The Permutation approach uses bootstrap sampling techniques to generate the confidence intervals and p-values. On the moderating effect of gender, the results indicates that most of the p-value is above 0.05 and such do not differ between groups. However gender moderates the linkage between WT and BI which differs significantly on a 5 percent level between female ($p^1 = -0.175$) and male ($p^2 = 0.03$). This also indicates that the path strength of female is stronger than male. The rationality goes that female often exhibits higher level of computer anxiety than male because they feel lesser competent on the internet (Schumacher and Morahan-Martin, 2001). In view of this lower competent, female requires higher trust during online transaction. Age on the other hand only moderates the linkage between FC and BI. Specifically, the statistical differences between groups was established at 5 percent level between old ($p^1 = -0.074$) and young ($p^2 = 0.119$) indicating the effect is stronger for younger consumers. Generally young consumers tend to

Table 6
Hetero-Trait-Mono-Trait (HTMT_{inference}).

Latent Construct	Original Sample (O)	Sample Mean (M)	Bias	2.50%	97.50%
EE - > BI	0.120	0.121	0.001	0.041	0.202
FC - > BI	0.116	0.118	0.002	0.037	0.212
FC - > EE	0.162	0.163	0.001	0.054	0.269
MPC - > BI	0.089	0.096	0.008	0.061	0.153
MPC - > EE	0.083	0.087	0.003	0.020	0.169
MPC - > FC	0.050	0.063	0.013	0.019	0.139
PCM - > BI	0.047	0.062	0.014	0.018	0.086
PCM - > EE	0.087	0.091	0.004	0.027	0.188
PCM - > FC	0.080	0.088	0.008	0.024	0.193
PCM - > MPC	0.202	0.199	-0.003	0.108	0.297
PE - > BI	0.096	0.098	0.003	0.031	0.184
PE - > FC	0.073	0.085	0.012	0.027	0.165
PE - > MPC	0.100	0.105	0.004	0.026	0.184
PE - > PCM	0.084	0.089	0.005	0.024	0.178
PEJ - > BI	0.360	0.360	0.000	0.277	0.441
PEJ - > EE	0.045	0.059	0.014	0.018	0.078
PEJ - > FC	0.136	0.137	0.001	0.053	0.229
PEJ - > MPC	0.161	0.160	0.000	0.072	0.250
PEJ - > PCM	0.073	0.079	0.006	0.019	0.162
PEJ - > PE	0.043	0.057	0.014	0.015	0.116
PIIT - > BI	0.104	0.106	0.002	0.025	0.192
PIIT - > EE	0.126	0.128	0.002	0.036	0.225
PIIT - > FC	0.113	0.115	0.001	0.030	0.217
PIIT - > MPC	0.149	0.150	0.001	0.054	0.238
PIIT - > PCM	0.183	0.184	0.001	0.089	0.285
PIIT - > PE	0.032	0.052	0.021	0.014	0.041
PIIT - > PEJ	0.127	0.127	0.000	0.034	0.216
PR - > BI	0.125	0.125	0.000	0.042	0.218
PR - > EE	0.057	0.072	0.016	0.014	0.128
PR - > FC	0.021	0.054	0.033	0.010	0.021
PR - > MPC	0.069	0.083	0.013	0.023	0.149
PR - > PCM	0.124	0.127	0.003	0.041	0.199
PR - > PE	0.029	0.053	0.024	0.013	0.035
PR - > PEJ	0.076	0.087	0.011	0.05	0.094
PR - > PIIT	0.138	0.137	-0.001	0.048	0.226
SI - > BI	0.169	0.167	-0.002	0.079	0.254
SI - > EE	0.027	0.051	0.024	0.007	0.039
SI - > FC	0.183	0.181	-0.002	0.088	0.284
SI - > MPC	0.064	0.070	0.006	0.021	0.151
SI - > PCM	0.255	0.254	-0.001	0.155	0.357
SI - > PE	0.089	0.094	0.005	0.032	0.188
SI - > PEJ	0.153	0.151	-0.002	0.067	0.243
SI - > PIIT	0.105	0.106	0.001	0.035	0.195
SI - > PR	0.109	0.108	0.000	0.033	0.193
WT - > BI	0.089	0.091	0.002	0.018	0.182
WT - > EE	0.018	0.042	0.024	0.009	0.021
WT - > FC	0.025	0.051	0.026	0.012	0.029
WT - > MPC	0.035	0.060	0.025	0.010	0.054
WT - > PCM	0.272	0.270	-0.002	0.153	0.390
WT - > PE	0.048	0.061	0.013	0.017	0.123
WT - > PEJ	0.025	0.048	0.022	0.010	0.031
WT - > PIIT	0.022	0.043	0.021	0.008	0.027
WT - > PR	0.042	0.056	0.015	0.014	0.117
WT - > SI	0.032	0.052	0.020	0.013	0.063

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

have higher usage of new technology in the tourism context when compared to older consumers (Mang et al., 2016). With higher usage this would translate to the need for more support especially in navigating around mobile sites effectively which ultimately increased the need for FC. Tables 8 and 9 displays the results of Permutation for both gender and age.

5.2.5. The predictive relevance and effect size

The study examines the predictive capacity of the structural model by checking Stone-Geisser's Q^2 value. The value indicates if the structural model is relevant in explaining the endogenous variable (Hew et al., 2017a). In accordance with Hair's criterion, if Q^2

Table 7
Outcome of the Structural Model Examination.

Hypotheses	PLS Paths	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values (two-tailed)	Bias corrected confidence intervals	Remarks
H2	EE -> BI ^{**}	0.113	0.114	0.041	2.759	0.006	[0.029, 0.193]	Yes
H3	FC -> BI ^{NS}	0.031	0.038	0.044	0.711	0.477	[-0.064, 0.113]	No
H15	MPC -> BI ^{**}	0.141	0.138	0.052	2.743	0.006	[0.028, 0.230]	Yes
H14	MPC -> EE ^{NS}	-0.067	-0.068	0.044	1.528	0.127	[-0.150, 0.022]	No
H13	MPC -> PE [*]	0.100	0.105	0.045	2.219	0.027	[0.005, 0.176]	Yes
H8	PCM -> BI ^{NS}	-0.078	-0.079	0.048	1.634	0.102	[-0.169, 0.021]	No
H10	PCM -> PEJ ^{NS}	0.072	0.073	0.047	1.523	0.128	[-0.026, 0.160]	No
H9	PCM -> SI ^{***}	0.244	0.246	0.049	5.004	0.000	[0.144, 0.339]	Yes
H1	PE -> BI [*]	0.103	0.104	0.041	2.506	0.012	[0.015, 0.180]	Yes
H5	PEJ -> BI ^{***}	0.353	0.352	0.040	8.734	0.000	[0.275, 0.435]	Yes
H16	PIIT -> BI ^{NS}	0.052	0.052	0.045	1.145	0.252	[-0.042, 0.134]	No
H12	PIIT -> EE [*]	0.113	0.116	0.048	2.358	0.018	[0.021, 0.208]	Yes
H11	PIIT -> PE ^{NS}	0.001	0.002	0.051	0.018	0.985	[-0.098, 0.095]	No
H6	PR -> BI [*]	-0.109	-0.111	0.043	2.561	0.010	[-0.195, -0.027]	Yes
H4	SI -> BI [*]	0.110	0.107	0.042	2.590	0.010	[0.027, 0.1930]	Yes
H7	WT -> BI ^{NS}	-0.080	-0.081	0.043	1.862	0.063	[-0.159, 0.0190]	No

Notes:

- a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.
- b.* Significant at $p < 0.05$ level.
- c.** Significant at $p < 0.01$ level.
- d.*** Significant at $p < 0.001$ level.
- e.^{NS} Not supported.

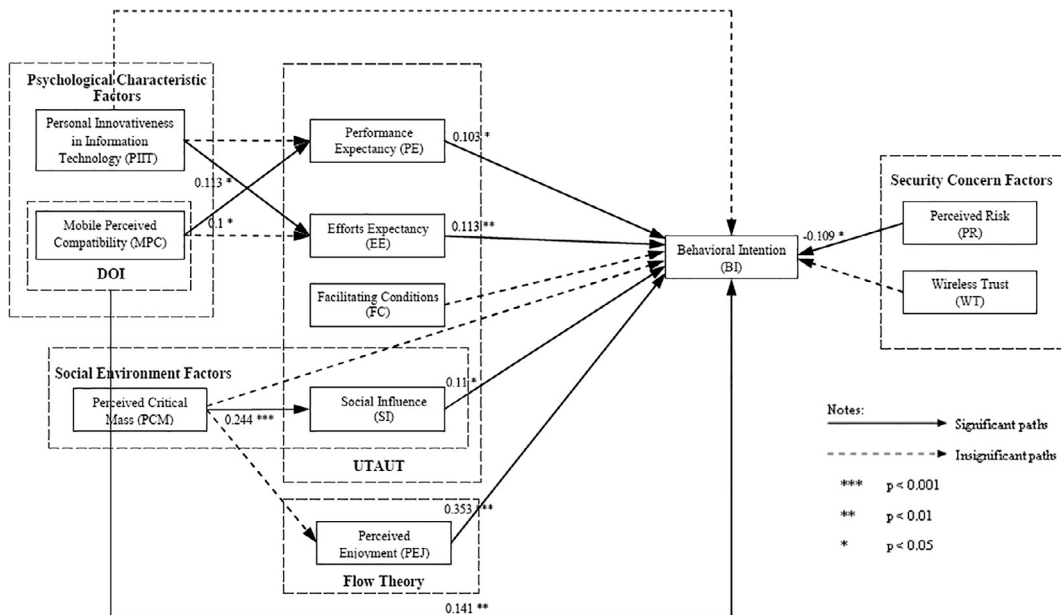


Fig. 2. Result of hypotheses testing.

greater than zero indicates the model exhibit predictive relevance, whereas Q^2 less than zero implies the model lacks predictive relevance (Hair et al., 2017). The final value of Q^2 of the cross-validated redundancy is shown under column Q^2 (1-SSE/SSO) in Table 10 is larger than zero. Thus this ascertained the support for the model's predictive relevance.

In addition, the effect size f^2 for each of the exogenous constructs is calculated in Table 11. The effect size f^2 measures how much an exogenous latent construct contributes to an endogenous construct's R^2 value (Cohen, 1988). According to Gefen and Straub (2005), if the effect size indicates weak, medium and large effect if the value ranges between 0.02 and 0.15, 0.15 and 0.35 and above 0.35. In the event if the value falls below 0.02, the endogenous construct has no effect (Kemény et al., 2016). As shown in Table 11, MPC and PEJ has a weak effect on BI with a value of 0.023 and 0.148 respectively. PCM on the other hand also has weak effect on SI

Table 8
Results of Permutation for Moderating Effect of Gender.

Hypotheses	PLS Paths	Path Coefficients (female)	Path Coefficients Original	Path Coefficients Original (Male)	Path Coefficients Original Difference (Female – Male)	Path Coefficients Permutation Mean Difference (Female – Male)	2.50%	97.50%	Permutation p-Values	Remarks
H17b	EE -> BI	0.127	0.115	0.011	-0.006	-0.172	0.163	0.880	Not supported	
H17c	FC -> BI	0.042	0.025	0.017	0.012	-0.228	0.197	0.879	Not supported	
H17k	MPC -> BI	0.216	0.097	0.119	0.001	-0.233	0.205	0.291	Not supported	
H17m	MPC -> EE	-0.049	-0.072	0.023	0.000	-0.183	0.197	0.791	Not supported	
H17l	MPC -> PE	0.147	0.101	0.046	0.002	-0.209	0.198	0.620	Not supported	
H17n	PCM -> BI	-0.085	-0.093	0.008	-0.003	-0.214	0.201	0.939	Not supported	
H17p	PCM	0.015	0.103	-0.088	-0.004	-0.212	0.192	0.398	Not supported	
	-> PEJ									
H17o	PCM -> SI	0.249	0.251	-0.003	0.005	-0.197	0.202	0.977	Not supported	
H17a	PE -> BI	0.070	0.113	-0.044	0.000	-0.174	0.163	0.610	Not supported	
H17e	PEJ -> BI	0.429	0.312	0.116	0.000	-0.179	0.174	0.193	Not supported	
H17h	PIIT -> BI	0.061	0.048	0.013	-0.003	-0.198	0.187	0.902	Not supported	
H17j	PIIT -> EE	0.172	0.088	0.084	-0.001	-0.199	0.202	0.428	Not supported	
H17i	PIIT -> PE	-0.019	0.012	-0.031	0.005	-0.199	0.206	0.800	Not supported	
H17g	PR -> BI	-0.174	-0.075	-0.099	0.003	-0.184	0.208	0.272	Not supported	
H17d	SI -> BI	0.060	0.119	-0.059	-0.003	-0.182	0.174	0.505	Not supported	
H17f	WT -> BI	-0.175	0.030	-0.205	0.007	-0.175	0.196	0.029	Supported	

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

Table 9
Results of Permutation for Moderating Effect of Age.

Hypotheses	PLS Paths	Path Coefficients Original (Old)	Path Coefficients Original (Young)	Path Coefficients Original Difference (Old – Young)	Path Coefficients Permutation Mean Difference (Old – Young)	2.50%	97.50%	Permutation p-Values	Remarks
H18b	EE -> BI	0.185	0.040	0.145	0.000	-0.160	0.155	0.073	Not Supported
H18c	FC -> BI	-0.074	0.119	-0.193	0.003	-0.165	0.181	0.035	Supported
H18k	MPC -> BI	0.133	0.133	-0.001	-0.006	-0.211	0.185	0.993	Not Supported
H18m	MPC -> EE	-0.098	-0.040	-0.058	0.004	-0.172	0.175	0.519	Not Supported
H18l	MPC -> PE	0.149	0.082	0.067	0.001	-0.178	0.176	0.451	Not Supported
H18n	PCM -> BI	-0.086	-0.099	0.014	0.005	-0.180	0.185	0.896	Not Supported
H18p	PCM	0.048	0.095	-0.048	-0.001	-0.186	0.183	0.602	Not Supported
	-> PEJ								
H18o	PCM -> SI	0.183	0.318	-0.135	0.005	-0.189	0.203	0.168	Not Supported
H18a	PE -> BI	0.145	0.049	0.096	0.004	-0.161	0.164	0.232	Not Supported
H18e	PEJ -> BI	0.346	0.349	-0.003	-0.001	-0.180	0.153	0.969	Not Supported
H18h	PIIT -> BI	-0.009	0.107	-0.116	0.001	-0.190	0.185	0.216	Not Supported
H18j	PIIT -> EE	0.108	0.128	-0.020	-0.004	-0.199	0.184	0.839	Not Supported
H18i	PIIT -> PE	-0.008	0.003	-0.011	0.004	-0.196	0.205	0.913	Not Supported
H18g	PR -> BI	-0.123	-0.112	-0.011	0.006	-0.167	0.186	0.916	Not Supported
H18d	SI -> BI	0.127	0.074	0.053	0.000	-0.153	0.159	0.535	Not Supported
H18f	WT -> BI	-0.050	-0.077	0.027	0.004	-0.162	0.170	0.719	Not Supported

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

Table 10
Predictive Relevance.

Endogenous Construct	SSO	SSE	Q ² (= 1 – SSE/SSO)	Predictive Relevance
BI	2515.00	2042.67	0.188	Q ² > 0
EE	2515.00	2476.72	0.015	Q ² > 0
PE	2515.00	2498.05	0.007	Q ² > 0
PEJ	2515.00	2504.45	0.004	Q ² > 0
SI	3018.00	2884.04	0.044	Q ² > 0

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; PE = Performance Expectancy; PEJ = Perceived Enjoyment; SI = Social Influence; WT = Wireless Trust.

Table 11
Effect Size (f²).

Predictor Construct/Dependent Construct	BI	EE	PE	PEJ	SI
EE	0.016				
FC	0.001				
MPC	0.023	0.005	0.010		
PCM	0.006			0.005	0.063
PE	0.013				
PEJ	0.148				
PIIT	0.003	0.013	0.000		
PR	0.015				
SI	0.014				
WT	0.007				

Notes:

a. BI = Behavioral Intention; EE = Effort Expectancy; FC = Facilitating Conditions; MPC = Mobile Perceived Compatibility; PCM = Perceived Critical Mass; PE = Performance Expectancy; PEJ = Perceived Enjoyment; PIIT = Personal Innovativeness in Information Technology; PR = Perceived Risk; SI = Social Influence; WT = Wireless Trust.

with a value of 0.063. The other relationships in the study have no effect.

6. Discussion

As theorised, PE has positive and significant relationship with BI, hence H1 is supported. The finding complements the work of [Ozturk \(2016\)](#) in which PE was found to have the strongest relationship with the consumers' BI of cashless payment system in the hospitality industry in the United States. [Hall \(1989\)](#) explained that Malaysians are characterized by a polychronic culture whereby they like to multitask. Thus when consumers find that the adoption improves in their travel planning while on the go, they are more likely to adopt the technology. Similarly, H2 is supported. The findings corroborate the study on mobile banking services in Thailand and Malaysia in which EE has positive and significance importance in predicting BI ([Mortimer et al., 2015](#); [Teo et al., 2015a](#)). [Liu and Yu \(2017\)](#) for example argued that most m-devices today have advanced operating system and is usually equipped with touch screen which enables the consumer to easily access to the Internet for a variety of tasks. The result for H3 however is not supported. The study is consistent with the study on mobile payment in North America using 412 restaurant customers ([Khalilzadeh et al., 2017](#)). According to the UTAUT model, FC is only significant prior to the introduction of a technology system ([Venkatesh et al., 2012](#)). However the effect will disappear after the consumers have gained experience using the device. As most consumers already have experience in purchasing other products and services using their m-devices, they have the sufficient knowledge needed to use m-devices to purchase for tourism related products and services. As such FC is not a major concern for the consumers. Interestingly SI was found to be significant with BI, hence H4 is supported. [Tan et al. \(2014a\)](#) using 156 usable respondents and an extended TAM also found that SI has significant relationship with BI to adopt Near Field Communication mobile payment in Malaysia. The findings indicated that since majority of the respondents are young consumers, the decisions are easily influenced by the opinion of their friends, families and colleagues ([Tan et al., 2014a](#)).

The research revealed that PEJ has positive significant with BI and as such H5 is supported. This is in agreement with [Wong et al. \(2015c\)](#) on mobile advertising in Malaysia. Many mobile sites today use images, audio and multi-media to provide information to consumers ([Maity and Dass, 2014](#)) and such the finding is not surprising. It is further found that PR has a negative significant influence on BI and therefore H6 is supported. Malaysian consumers are afraid that their transactions are directly bound by their phone number, social messages, photos and videos which indirectly lead to disclosure of contents ([Lai and Shi, 2015](#)). This has advanced the work of [Ozturk \(2016\)](#) which also found that PR is negatively associated with BI to adopt cashless payment system in the hospitality industry in the United States. H7 however is not supported in this study. The study implies that the consumers generally do not believe that the tourism practitioners and banks are sincere, honest in taking responsibility and keeping promises in the eventuality of any security problem or identity theft. Similarly, [Cobanoglu et al. \(2015\)](#) found that many consumers are reluctant

to trust online sellers in the hospitality industry which could be due to the absence of personal contact between employees and the customers (Alalwan et al., 2016). H8 however does not tally the result yielded by Wei and Lu (2014), as PCM has no direct significant influence over BI. One logical explanation is due to the sample size in which majority of the respondents are highly educated and as such their decisions are largely based on pure logic thinking and not the influence of the mass market. Additionally, PCM has positive significant relationship with SI. As such H9 is supported and the outcomes enrich the works of Nikou and Bouwman (2014) in their study on mobile social networking services in China. Consumers may conform to the particular action with the idea that the large majority may know something that they do not and that such large group may unlikely be wrong (Chen et al., 2016). This will be prevailing for individuals with little experience of technology. H10 however is not supported in this study which contradicts the findings from Kang and Namkung (2016) whereby PCM was found to be significant with PEJ in the study on the consumers' restaurant-information sharing in South Korea. Malaysian consumers are concerned on the usefulness of the innovations (Ooi and Tan, 2016) and less concerned on how this mass interaction will lead to their enjoyment.

On the other hand, PIIT has no direct significant relationship with BI and PE. Hence H16 and H11 is not supported in this study. The study is not in accordance with the work on mobile tourism (Tan et al., 2017) and mobile social networking sites (Liao et al., 2015). PIIT may not necessary translate to adoption and usefulness as travel is only done occasionally. Surprisingly H12 is supported whereby PIIT has positive significant relationship with EE. The study corroborates the research conducted by Lin et al. (2014) on the adoption of iPod in the United States. Higher economy status is associated with individuals with PIIT which is likely to bring positive evaluation of the ease of use features favorably (Tan et al., 2017). Similarly H15 and H13 are supported. The findings from H15 support the investigations on the adoption of mobile tourism guide among international tourists in Thailand in which MPC is significant with BI (Trakulmaykee and Benrit, 2015). The result from Ooi and Tan (2016) on smartphone credit card in Malaysia also supported H13 in which MPC is positively significant with PE. Most consumers have adopted m-devices to participate in travel online forums (Li and Wang, 2011) and as such using m-devices to purchase is not an isolated case as this is compatible with their current lifestyle. Specifically the compatibility will also lead to proper comprehension on the technology which will indirectly lead to the perception of usefulness. Surprisingly H14 is not supported which opposed the result from Ozturk et al. (2016b) in their study on mobile hotels booking in the United States using 396 travellers. As consumers have been adopting m-devices for various reasons (Cousins and Robey, 2015), the adoption does not necessary translate to the ease of use in view of the experience of using m-devices.

On the moderating effect of gender, the Permutation approach indicates that gender only moderates the linkage between WT and BI thus supporting H17f. The study was supported by Liu (2016) and Faqih (2016). Ho et al. (2017) opined that trust is not a problem of risk but more a problem of judgment and as such males have lower perception of trust as they are more confident and have higher tendency to take more risk. Finally, age only moderates the linkage between FC and BI. Hence only H18c is supported in this study. The findings of H18c enrich the works of Venkatesh et al. (2012) in UTAUT 2.

7. Theoretical, managerial, methodological and social implications

In terms of the theoretical perspectives, the study extends the UTAUT model with flow theory, psychological characteristic, social environment and security concern factors. The study indicates that the extended UTAUT is applicable in the study on tourism. The study also represents the few that examines a multidisciplinary theoretical model on the adoption of tourism related products among mobile consumers. Additionally, the study also extends the tourism, marketing and hospitality literatures from a developing country perspective. The difference between past literatures and current work can be seen by the incorporation of IT/IS models in the respective areas. The study therefore is able to give better depiction because the perspective was written from a multi-racial and multi-cultural population as opposed to many past studies conducted from uni-racial developed nations. Next, the study offers a set of managerial benefits. With better understanding on the behavior of mobile consumers and the moderating effects of gender and age, practitioners such as airline organizations, mobile developers, travel agencies and other tourism related organizations can further enhance their mobile marketing strategies. Among the methodological implications in this study is the adoption of PLS-SEM technique. The study adopted rhoA and HTMT (HTMT_{.85} and HTMT_{inference}) for reliability and discriminant validity test. Unlike past studies, the study also adopted Common Method Factor to test for CMB in order to provide greater contributions to the PLS-SEM analysis. The study also contributes by inclusion of MGA which was validated by using the Permutation approach. Finally in terms of social implications, the study helps to understand the behavior of mobile consumers. Thus this can help to increase the tourist arrival to Malaysia. Indirectly this would also lead to the increase of the country's income and employment opportunities on tourism related jobs. Accordingly Asia Pacific has been considered as the world's most preferred destinations over the last decade (Giap et al., 2016). Henceforth, there is a stiff competition among ASEAN countries to be among the global players. This study is expected to enhance Malaysia's competitiveness in South East Asia.

8. Conclusion and future study

The emergence of mobile technologies has resulted the urgency to understand the motivation of consumers to adopt m-devices to shop for tourism products. Since adopting to this alternative channel is a new research avenue, the study proposed an integrated framework by combining flow theory, psychological characteristic, social environment and security concern factors and UTAUT to study on the mobile consumers behavior. The study contributes in terms of theoretical, methodology, managerial and social implications. The research is bounded in many ways which should be addressed for future study. First, the study was conducted from the perspective of Malaysia and as such may not be able to generalize to other country settings. This is because the deployment of ICT usage behavior is dependable on the national cultures (Bankole and Bankole, 2016). Culture differences were found to affect the

adoption of IT/IS (Yuen et al., 2015). Filieri et al. (2015) for example explained that different cultural backgrounds affect trust on tourism websites. Xu-Priour et al. (2014) stressed that one of the reasons why Amazon's market share fell in China from 2006 to 2011 was due to the organization failure to understand the local culture. Tam and Oliveira (2016) further suggested to use cultural values as a moderator to explain on the usage. Second, the study was intended to focus from the customer's perspective. In reality, the diffusion of any technology innovation also depends on readiness of practitioners (e.g., merchants and sellers). Wang et al. (2016) for instance conducted a study on the readiness of hotels in Taiwan to adopt mobile hotel reservation systems. Their studies through a modified technology-organization-environment framework indicated that the readiness depends on the hotel size, technology competence, compatibility and critical mass. Thus, in order for a product or service to be accepted, the viewpoint should be adopted by both sides; merchants and consumers (Apanasevic et al., 2016). Hence, future studies should investigate from the viewpoint of merchants such as the inhibitors and enablers to sell the products and services on mobile websites.

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