The role of perceived values in explaining Vietnamese consumers' attitude and intention to adopt mobile commerce

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Abstract

Purpose – This study discusses and tests the direct and indirect effects of utilitarian, hedonic and social values integrated into the theory of planned behaviour (TPB) to achieve a deeper understanding of consumers' intention to adopt mobile commerce in the context of a developing country, Vietnam.

Design/methodology/approach – Based on self-administered survey data of 382 Vietnamese consumers, a structural equation modelling approach with latent constructs is used to test the hypotheses.

Findings – Perceived values explain consumer attitudes, subjective norms and behavioural intentions in the mobile commerce context. In particular, they help to increase the explained variance of the intention to adopt mobile commerce by about 9.58 per cent compared with the TPB. Finally, a cross-effect on consumer attitudes from subjective norms is also found.

Research limitations/implications – Future studies would benefit from investigating other variables (e.g. innovativeness or trust) and using actual behaviour (e.g. online purchases).

Practical implications – Business managers should pay attention to different forms of consumer values to understand how and why consumers adopt mobile commerce in a developing country.

Originality/value – This study fills the gap in the literature by simultaneously investigating the role of utilitarian, hedonic and social value in a TPB model in the mobile commerce context.

Keywords: intention to adopt, mobile commerce, utilitarian value, hedonic value, social value, Vietnam

Introduction

In recent years, the development of mobile devices (e.g. smartphones and tablets) and mobile technologies (e.g. 3G, 4G and 5G) has motivated mobile commerce (MC) to develop a global scope (Celik, 2016; Kalinic and Marinkovic, 2015; Lu, 2014). MC encompasses commercial transactions conducted via mobile apps or mobile versions of electronic commerce (EC) websites. As an evolutional business model, MC is believed to be more effective than traditional EC, because consumers can conduct transactions through wireless connections anytime and anywhere (Lu, 2014). However, a comprehensive understanding of the factors affecting consumers' intention to adopt MC is limited due to its new, developing and evolutionary nature (Sun and Chi, 2017; Zhang *et al.*, 2012), while such knowledge is important for mobile service providers to provide customized/personalized services for consumers (Celik, 2016; Ovčjak *et al.*, 2015; Sanakulov and Karjaluoto, 2015).

The theory of planned behaviour (TPB; Ajzen, 1991) has been used by many scholars to examine consumers' adoption of MC (Gerpott and Thomas, 2014; Nabavi *et al.*, 2016; Ovčjak *et al.*, 2015; Zhang *et al.*, 2012). Theoretically, the TPB or the reasoned action approach (Fishbein and Ajzen, 2011) is one of the most-used cognitive models to explain and predict all kinds of human behaviours, including e-commerce acceptance and the use of technology (Ajzen, 2012; Gerpott and Thomas, 2014; Ovčjak *et al.*, 2015; Zhang *et al.*, 2012). Competing theories of technology adoption, such as the technology acceptance model (TAM; Davis, 1989), the model of information systems success (MISS; DeLone and McLean, 1992) and the unified theory of acceptance and use of technology (UTAUT; Venkatesh *et al.*, 2003) are mostly based on the TPB (Benbasat and Barki, 2007), and none of them has shown an outstanding role compared with the TPB (Bagozzi, 2007; Benbasat and Barki, 2007; Khalifa *et al.*, 2012; Mathieson, 1991; Pavlou *et al.*, 2007; Taylor and Todd, 1995). Examples include extended versions of TAM social expectations and control elements, similar to the TPB (King and He, 2006; Marangunić and Granić, 2014; Schepers and Wetzels, 2007; Williams *et al.*, 2015). Practically, competing models (e.g. the TAM, MISS and UTAUT) were originally developed to explain user adoption in organizational contexts. It can be noted that they are not well adapted to predicting the adoption of non-organizational technology, such as MC (Kim and Han, 2011; Pedersen *et*

al., 2002). Following the same line of thought, the authors choose the TPB as the theoretical framework in which to investigate the role of perceived values in consumers' intention to adopt MC.

However, because of the divergent results, including the weak exploratory or predictive power of the TPB (Ajzen, 1991; Armitage and Conner, 2001), there have been calls to duplicate and extend this model to different research areas, including MC (Zhang *et al.*, 2012). One critical issue in the TPB is whether and how different individual factors, such as perceived consumer values, personal values, self- and social identity, personality or other individual constructs, are related to attitude, subjective norms and perceived specific facets of behavioural outcomes (Gerpott and Thomas, 2014; Ovčjak *et al.*, 2015; Sanakulov and Karjaluoto, 2015). Among these variables, the roles of personality (e.g. Big Five factors) and personal values (Schwartz, 1992) have been widely investigated in the MC context (Gerpott and Thomas, 2014; Ovčjak *et al.*, 2015; Zhang *et al.*, 2012).

In contrast, it appears that relatively few studies have investigated global consumers' perceptions of MC values (i.e. utilitarian, hedonic and social value) and their behavioural intentions as they apply to the MC context (Gerpott and Thomas, 2014; Kim *et al.*, 2013; Zhang *et al.*, 2012). Those values have proved to be critical in explaining general shopping behaviour (Babin *et al.*, 1994; Sweeney and Soutar, 2001) and play an increasingly important role in the process of decision making regarding online purchases (Cheah *et al.*, 2015). Therefore, this study investigates whether and how three types of perceived consumer values (i.e. utilitarian, hedonic and social values) simultaneously influence consumers' attitude towards and intention to adopt MC (Kim *et al.*, 2011; Kim *et al.*, 2013). Thus, this study contributes to the literature by integrating these three different dimensions of perceived values as general constructs into the TPB to explain the intention to adopt MC. A broader and integrated view of perceived values can provide further knowledge regarding the determinants of MC adoption (Celik, 2016; Nabavi *et al.*, 2016; Ovčjak *et al.*, 2015).

There is widespread acceptance that social value is considered to be an important antecedent of a wide range of online behaviours (Kim *et al.*, 2011; Kim and Han, 2009), but the role of social value in the MC context is underexplored. Thus, the integration of social value into the TPB may provide an additional explanation for the intention to adopt

MC. Social value also constitutes a form of beliefs stemming from social expectations (Ajzen and Fishbein, 2000). Thus, this study includes a direct effect of social value on subjective norms. Finally, as most of the previous studies have postulated a causal relationship from subjective norms to attitude (Brubaker and Fowler, 1990; Miniard and Cohen, 1981; Oliver and Bearden, 1985), this study includes a crossover effect from subjective norms on consumer attitudes as a minor part of the theoretical framework.

According to eMarketer (2016), Vietnam is a promising mobile commerce market, because smartphone use is rising and consumers are acquiring the habit of researching purchases on their phone. Particularly, the number of people using smartphones among mobile phone users increased from 78 per cent in 2016 to 84 per cent in 2017 in the key cities. Meanwhile, up to 75 per cent of people under the age of 35 use smartphones for all purposes: entertainment, information searches, social networking, shopping and so on (Nielsen, 2017a). It can be said that the increase in the proportion of smartphone users in Vietnam, along with the development of the Internet and 3G/4G mobile networks, constitutes fertile ground for MC to flourish. Furthermore, a report by Appota (2017) showed that Vietnam is among the fastest-growing mobile advertising countries at about 35 per cent per year. Vietnam has also witnessed the emerging application of MC to business. According to the Vietnam E-Commerce Association (2017), more than 49 per cent of businesses in Vietnam receive orders through mobile applications, and this number is expected to increase rapidly in the next year. Therefore, moving to the mobile platform is an inevitable trend of e-commerce in Vietnam, especially when consumers' needs (utilitarian, hedonic and social) are met by mobile services. These features make Vietnam an interesting context in which to investigate and test the role of consumers' perceived values in explaining their attitude towards and intention to adopt MC. This study uses survey data and structural equation modelling to test a proposed model and hypotheses.

Conceptual framework

Theory of planned behaviour and the intention to adopt mobile commerce

According to the TPB, intention is a function of three key variables: consumer attitude, subjective norms and perceived behavioural control (Ajzen, 1991). Previous studies

(Gerpott and Thomas, 2014; Ovčjak *et al.*, 2015; Zhang *et al.*, 2012) have demonstrated that the TPB and TAM are the most widely used models to explain mobile services' adoption. According to the TAM, the intention to adopt is influenced by perceived usefulness (i.e. the extent to which an individual believes that her/his work performance will be improved when using technology) and perceived ease of use (i.e. the extent to which an individual believes that using new technology requires the minimum amount of effort) (Davis, 1989). Because the TAM includes only internal attitudinal factors, it should be extended to include external factors, such as individual differences and values (e.g. perceived values), facilitating conditions (e.g. perceived behavioural control) and social influence (e.g. subjective norms) (Malhotra and Galletta, 1999; Zhang *et al.*, 2012). Compared with the TAM, the TPB emphasizes the power of subjective norms, which is important because the consumers in a society will be affected by other groups of consumers (Celik, 2016; Li *et al.*, 2012; Pavlou and Fygenson, 2006). As evidence for the outstanding role of the TPB over the TAM in the mobile service context, Hung and Chang (2005) demonstrated that the TPB was superior to the TAM in terms of its ability to explain consumers' acceptance of MC services. Because the TPB is thought to outperform the TAM in explaining consumer behaviour in various contexts (Hung and Chang, 2005; Mathieson, 1991; Taylor and Todd, 1995), the authors expect the TPB also to be dominant in explaining MC adoption and thus choose the TPB as the fundamental theoretical framework for this research.

It is worth noting that the TPB is not free of limitations. For example, while perceived behavioural control is expected to have an impact on actual behaviour (Fishbein and Ajzen, 2011), the TPB suggests that intention mediates the direct effects of attitude and subjective norms on actual behaviour. However, the value–attitude–behaviour approach (Homer and Kahle, 1988) does not include intention and indicates that attitude has a strong direct impact on behaviour. In addition, the empirical evidence demonstrates that attitude and subjective norms have stronger effects on the actual use of mobile services than perceived behavioural control does (Hung and Chang, 2005). Another limitation stems from the fact that the TPB is designed to explain consumers' intention and behaviour in a general context, generating the need to modify or extend the TPB with

greater relevance when applying it to a specific context (Pavlou and Fygenson, 2006; Terry *et al.*, 1999). Intention is the most important indicator of MC adoption (Gerpott and Thomas, 2014; Kalinic and Marinkovic, 2015) and individuals' actual use of new technologies (Turner *et al.*, 2010). Therefore, similar to previous research in the MC context (Chong *et al.*, 2012; Wei *et al.*, 2009; Zarmpou *et al.*, 2012), this study employs the intention to adopt MC as the outcome variable. Intention is defined as an individual's subjective probability that he or she will use MC (Zarmpou *et al.*, 2012).

Consumer attitude predisposes one to perform or not perform a behaviour (Ajzen, 1991) and is defined as a psychological tendency that is expressed by evaluating a particular entity or object with some degree of favour or disfavour (Eagly and Chaiken, 1993). The positive relationship between attitude and intention has been confirmed well in different areas of technology usage (Nabavi *et al.*, 2016; Pavlou and Fygenson, 2006), including mobile Internet service technology (Ovčjak *et al.*, 2015; Sanakulov and Karjaluoto, 2015) and MC adoption (Zhang *et al.*, 2012). Therefore, the first hypothesis is as follows:

H1: Attitude has a positive effect on the intention to adopt MC.

Subjective norms are defined as the perceived social pressures or expectations to perform or not perform the behaviour in question (Ajzen, 1991, p. 188). According to the TPB, consumers have a tendency to disseminate and obtain knowledge about mobile shopping through interactions with people in their online shopping context (Ajzen, 1991). Therefore, opinions from relevant others strongly influence consumers' intention to adopt MC. Subjective norms have been found to affect positively consumers' intention to adopt MC in different cultures, such as China, the United States (Chong *et al.*, 2012), Malaysia (Wei *et al.*, 2009) and Hong Kong (Khalifa and Shen, 2008). More recently, a meta-analysis conducted by Zhang *et al.* (2012) showed a high positive correlation between subjective norms and the intention to adopt MC. Therefore, this study suggests that:

H2: Subjective norms have a positive effect on the intention to adopt MC.

Perceived behavioural control (PBC) expresses the personal perceptions of the availability or lack of resources and the opportunities to perform a behaviour (Ajzen, 1991). Pedersen (2005) argued that PBC reflects internal and external constraints and is

directly related to both the intention to use and the actual use of mobile commerce services. Several studies have confirmed that consumers who have high control over their e-commerce behaviours also intend to use e-commerce, social commerce or MC (e.g., Khalifa and Shen, 2008; Pedersen, 2005). Therefore, this study suggests that:

H3: Perceived behavioural control has a positive effect on the intention to adopt MC.

The relationship between attitude and subjective norms has been discussed via the mechanism of the crossover effect (O'Keefe, 2015). The correlation between consumer attitude and subjective norms has been found to be relatively high, above 0.40 (e.g., Rivis and Sheeran, 2003; Terry *et al.*, 1999). Shimp and Kavas (1984) found a complex set of interdependencies between attitudinal and normative variables for both belief measures and global measures. They also found that the relative influence on intention varied from normative dominance with crossover effects to attitudinal superiority without such effects. Although a link from attitude to subjective norms has been found (Shimp and Kavas, 1984), most previous studies have postulated a causal relationship from subjective norms to attitude (Brubaker and Fowler, 1990; Miniard and Cohen, 1981; Oliver and Bearden, 1985; Shepherd and O'Keefe, 1984; Shimp and Kavas, 1984; Vallerand *et al.*, 1992). The direction of the causal relationship can be explained by social learning or social cognitive theory (Bandura, 1986; Vries et al., 1995). Further, empirical evidence of a significantly direct effect from subjective norms to attitude is found in the TPB literature (Shepherd and O'Keefe, 1984; Shimp and Kavas, 1984; Vallerand *et al.*, 1992). Thus, in line with previous studies, the authors predict that there is a causal relationship between subjective norms and attitude in the MC context. Furthermore, because MC is a new and innovative service in Vietnam, they predict that consumers will base their own decisions on important people's actions and ideas (friends, family and colleagues) to form their attitude and intention towards MC adoption. Thus, the hypothesis is as follows:

H4: Subjective norms have a positive effect on attitude.

Perceived consumer values as extended variables

Although the TPB has successfully explained intentions and behaviours in different contexts, its predictive power differs from study to study and from context to context (Armitage and Conner, 2001). Thus, the inclusion of extended variables besides the TPB

variables has often been suggested to explore the reasons for the differences and to increase the predictive power of the model (Eagly and Chaiken, 1993; Taylor and Todd, 1995; Venkatesh *et al.*, 2003). In the mobile service setting, consumer value variables, such as usefulness, ease of use, cost, perceived monetary value and mobility (i.e. utilitarian value), enjoyment, flow, playfulness, pleasure and arousal (i.e. hedonic value) (Gerpott and Thomas, 2014; Zhang *et al.*, 2012), social interaction, social bonding, image, self-concept and social value (Li *et al.*, 2012; Lu, 2014) are included to enhance the exploratory or predictive power of the TPB. Furthermore, using MC may cost consumers time, money and effort, and, when they calculate the benefits and costs of adopting MC, consumer values are formed (Zeithaml, 1988). Thus, perceived consumer values are suggested to influence MC adoption. Vietnamese consumers need at least two things to conduct MC: (1) a cellular connection (3G, 4G) and (2) a smartphone with a cellular-enabled or WiFi-enabled connection. Hence, the perceived cost of engaging in mobile shopping is the total of the perceived cost of those two things. Consumers might perceive the cost of mobile Internet access as being much higher than that of wired Internet because of its high price and limited data capacity. In addition, the average price of a smartphone with a cellular connection is still high compared with the monthly average income of Vietnamese people. As a result, the authors assume that Vietnamese consumers will adopt MC in cases in which the benefits that they receive outweigh the costs that they bear.

Some well-established theories emphasize the dominant role of consumer values in explaining attitude (Homer and Kahle, 1988; Kim *et al.*, 2013; Wu and Lu, 2013), which, in turn, has an impact on behaviour and thus supports the integration of values into the TPB. For example, the general value–attitude–behaviour (VAB) hierarchical framework indicates that values, explicit (i.e. utilitarian and social value) or implicit (i.e. hedonic value), are determinants of attitude and consumption behaviours (Homer and Kahle, 1988). In other words, values and value orientations cause changes in consumers' attitudes that are compatible with their values. In the same vein, the dual process theory of values suggests that individuals with high perceptions of extrinsic and intrinsic values have a greater intention to adopt IS and dual-purpose systems (i.e. hedonic and utilitarian) such as MC (Turel *et al.*, 2007; van der Heijden, 2004; Wu and Lu, 2013). Thus, the authors suggest that values are theoretically important predictors of consumers' attitudes and

behaviours. To sum up, this study integrates three consumer values (utilitarian, hedonic and social value) into the TPB to generate a deeper and broader insight and to increase the exploratory power for the intention to adopt MC in Vietnam.

Consumer values are perceived as the difference between the benefits/quality and the sacrifices necessary to possess/use a product or service generally (Zeithaml, 1988) or in an online context specifically (Kim *et al.*, 2013; Parks and Guay, 2009). Traditionally, consumer values include utilitarian and hedonic values (Babin *et al.*, 1994; Kim *et al.*, 2013). Traditional wisdom describes shopping's utilitarian value as task-related, rational and related to quality, efficiency and effectiveness, while shopping's hedonic value is linked to the multisensory, fantasy, fun and emotive aspects of an individual's experience (Babin *et al.*, 1994). In the online shopping context, utilitarian value relates to the effectiveness and efficiency resulting from the use of online services, such as gathering information easily, increasing effectiveness at work or the ability to use them anytime and anywhere, while hedonic value represents the fun or pleasure derived from using the online services, including the experience of pleasure, entertainment, passion or innovation (Kim and Han, 2009, 2011; Turel *et al.*, 2007).

Sweeney and Soutar (2001) indicated that consumers not only assess products/services through their utilitarian and hedonic value but also address their concerns about the social value of using a product/service or the ability of the product/service to increase their social self-concept and social well-being (Kim *et al.*, 2013). In other words, consumers' motivations for buying and consuming a product/service in the online context depend on the manner in which they view themselves or wish to be viewed by others (Kim *et al.*, 2013). In this way, consumers' social value differs from subjective norms, which were previously defined as the perceived social pressures or expectations of others regarding the performance of a specific behaviour (e.g. mobile shopping).

Utilitarian value is probably the most important factor influencing Internet shopping (Kim *et al.*, 2013), mobile data services' acceptance (Al-Debei and Al-Lozi, 2014) and online purchasing attitudes and behaviours (Kim *et al.*, 2011). In recent years, the evolution of Internet and mobile technologies in developing countries such as Vietnam has provided consumers with knowledge that supports them in making rational and calculated assessments of the trade-off between the functional benefits and the sacrifices (To *et al.*,

2007) of using MC. Obviously, Vietnamese consumers easily recognize the effectiveness and efficiency that result from the use of an MC service. An example of a utilitarian attribute of MC is that it helps to reduce consumers' time and effort in seeking product information and comparing products or provides vouchers that save consumers money when purchasing online on mobile devices. Furthermore, the mobility value (purchasing anytime and anywhere) could motivate consumers to use MC, enhancing its utilitarian value (Kalinic and Marinkovic, 2015). Thus, through the use of MC, Vietnamese consumers form an intensified positive attitude towards MC and an intention to adopt MC further (Kim *et al.*, 2013; Kim and Han, 2011). Thus, the following hypotheses are suggested:

H5: Utilitarian value has a positive effect on the intention to adopt MC.

H6: Utilitarian value has a positive effect on the attitude towards using MC.

Although most perceived values concerning online services and commerce are related to utilitarian value, hedonic value is also sought by consumers (Kim and Han, 2011; Sweeney and Soutar, 2001). In contrast to utilitarian value, hedonic value is primarily non-instrumental, experiential and affective (van der Heijden, 2004). Kim and Han (2011) argued that consumers engage with hedonic value when the activity of using MC is evaluated in its own right aside from its instrumental values. Hedonic value is derived from consumers' feelings about the affective state that MC generates, and it is more subjective and personal than utilitarian value because it stems from a need for sensual pleasure, fantasy, fun and playfulness (Kim and Han, 2011). Thus, van der Heijden (2004) recommended that an innovative system such as MC should focus on hedonic content to satisfy users' hedonic dimension and develop a positive attitude towards the system. Vietnamese consumers purchase online for hedonic purposes (Nielsen, 2017b). MC is not only a utilitarian but also a hedonic system. Therefore, MC is expected to engender a positive attitude because it meets the hedonic needs of Vietnamese consumers (Kim *et al.*, 2013; Kim and Han, 2009, 2011). Furthermore, research on MC has empirically suggested that hedonic value relates to attitude and intention (Kim and Han, 2011; Li *et al.*, 2012). Thus, the next two hypotheses are as follows:

H7: Hedonic value has a positive effect on the intention to adopt MC.

H8: Hedonic value has a positive effect on the attitude towards using MC.

It has been argued that social value is transmitted, reinforced and internalized and can serve as a consistent guide for behaviours (e.g., Perrucci and Perrucci, 2014). The intention to adopt MC depends on the manner in which consumers view themselves or wish to be viewed by others (i.e. social value). With the ubiquitous presence of mobile devices, mobile technologies and mobile services, users can gain social value by expressing their views on MC and influencing their peers; they also can obtain social approval for or support their social status by their brand and product choices in the MC context (Li *et al.*, 2012). Previous studies have shown that social value is an important factor in the field of mobile services (Kim and Han, 2009; Pihlström and Brush, 2008; Turel *et al.*, 2007; Yang and Jolly, 2006). Recent meta-analysis studies (Gerpott and Thomas, 2014; Nabavi *et al.*, 2016; Ovčjak *et al.*, 2015; Sanakulov and Karjaluoto, 2015; Zhang *et al.*, 2012) have revealed that perceived values significantly increase the predictive power of the TAM and UTAUT in different online contexts. Social value is an important factor affecting consumers' attitude, motivations and behaviours in different contexts, such as information systems, mobile services and mobile shopping (Kim and Han, 2009; Pihlström and Brush, 2008; Turel *et al.*, 2007; Yang and Jolly, 2006). Vietnamese consumers might believe that they would gain higher social status, enhance their social image and improve their sense of involvement by using advanced mobile services such as MC, because MC is an innovation trend in online purchasing and is accepted and welcomed by the global community (Sun and Chi, 2017): therefore, consumers might have a positive attitude towards the adoption of MC, leading to the further intention to adopt MC. Based on the discussion above, the next two hypotheses are proposed:

H9: Social value has a positive effect on the intention to adopt MC.

H10: Social value has a positive effect on the attitude towards using MC.

Finally, it is thought that the normative beliefs regarding different social references can combine to produce overall perceived social pressures (Fishbein and Ajzen, 2011). Because social value stems from social expectations, which are considered to be a form of normative belief (Fishbein and Ajzen, 2011), social value may have a direct association with subjective norms. In addition, being social, feeling social and being influenced by others socially can be part of a higher-order social construct or personality, such as

extraversion or agreeableness (Parks and Guay, 2009; Schwartz, 1992). Therefore, this study contributes to the literature through the last hypothesis:

H11: Social value has a positive effect on subjective norms.

The arguments above postulate positive associations between perceived values (i.e. utilitarian, hedonic and social) and attitude and between attitude and behavioural intention. Therefore, attitude could be a mediator that bridges the effect of perceived values and the intention to adopt MC. This perspective is also shared by the VAB framework, indicating that value causes a change in consumers' evaluation (i.e. attitude), which, in turn, has an impact on their behaviour (Homer and Kahle, 1988). Thus, this study proposes that:

H12: Utilitarian value (a), hedonic value (b) and social value (c) have indirect effects on the intention to adopt MC via attitude.

Based on the proposed hypotheses, the research model is presented in Figure 1.

[Insert Figure 1 here]

Methods

Subjects and sample

To assess the scales and test the proposed hypotheses, a survey questionnaire was developed to collect data. The survey questionnaire was translated into Vietnamese and then translated back into English by a language instructor. The two English versions of the questionnaire were compared to ensure that the translation and wording used in the Vietnamese version were consistent with the original. The Vietnamese survey questionnaire was pre-tested with 30 MC users and 2 university professors whose main research area is electronic commerce and Internet technologies.

Customers of the three biggest communication providers in Vietnam (VNPT, Mobifone and Viettel) were the main respondents. To collect data, this study conducted a self-administered survey at stores. To increase the response rate, the authors offered the respondents incentive gifts, such as keychains and T-shirts. To minimize bias in answering the survey, the respondents were clearly informed that the study concerned MC. The authors also emphasized that the study only focused on the personal opinions of the respondents and that there were no right or wrong answers. A total of 400 customers

agreed to take part in the survey. Of the 400 surveys collected, 18 were rejected because of missing data. Thus, data from the 382 remaining surveys were used for analysis (the response rate was 95.5 per cent). The typical respondents were female (52.76 per cent) and married (68.06 per cent), and they had been educated for 12 years (96.86 per cent). Their average age was 35 years, ranging from 20 to 50, and their average income per month was about USD 350. The sample characteristics are presented in Table 1.

[Insert Table 1 here]

Measurements

This study measures responses on a 5-point Likert scale, on which 1 = totally disagree, 3 = neither disagree nor agree and 5 = totally agree. The attitude, subjective norm and perceived behavioural control measurements are adopted from Taylor and Todd (1995). The utilitarian value measurement is adopted from Sirdeshmukh *et al.* (2002). This measurement has been widely employed to measure utilitarian value in previous studies (Kim *et al.*, 2013; Kim and Han, 2009, 2011). The hedonic value measurement is taken from Sweeney and Soutar (2001). The social value measurement is adopted from Perse (1990). Finally, the behavioural intention measurement comes from Davis (1989). The measurements and their sources are presented in Table 2.

[Insert Table 2 here]

The mean values of the measurement constructs are quite high, ranging from 2.38 (hedonic value) to 3.66 (perceived behavioural control) on a 5-point Likert scale, with standard deviations ranging from 0.53 (perceived behavioural control) to 0.79 (hedonic value).

Analysis results

Validation of measures: reliability and validity

The constructs are assessed to ensure internal consistency and convergent and discriminant validity by performing the Cronbach's alpha test, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) using SPSS and AMOS.

The Cronbach's alpha test shows that all the values are higher than 0.70, ranging from 0.82 (behavioural intention) to 0.94 (utilitarian value), indicating that the original items

can be used for the next test. A confirmatory factor analysis (CFA) is conducted to examine the full measurement model, including the seven first-order constructs and their respective items. Because all the items with skewness values (-1.14 to +0.81) and kurtosis values (-0.99 to +2.47) are in an appropriate range (±2.58), it can be confirmed that they are normally distributed (Tabachnick and Fidell, 2007). The results of the CFA test, summarized in Table 3, indicate that the measurement model fits the data well [χ^2 = 542.93, p = 0.000; RMSEA = 0.04; GFI = 0.91; AGFI = 0.89; IFI = 0.97; NFI = 0.93; CFI = 0.97]. Furthermore, all of the composite reliability measures exceed the minimum value of 0.60, ranging from 0.82 (behavioural intention) to 0.94 (utilitarian value), and all the variances extracted surpass the recommended threshold of 0.50, ranging from 0.53 (behavioural intention) to 0.80 (utilitarian value). The individual item loadings on the constructs are all significant ($p < 0.001$; t-value > 6), with values ranging from 0.70 to 0.94, showing that the convergent validity of the constructs is acceptable (Anderson and Gerbing, 1988).

[Insert Tables 3 and 4 about here]

As shown in Table 4, most of the correlations are lower than 0.50, and the correlation between each of the constructs (highest value 0.48) is lower than the square root of the AVEs (lowest value 0.73), demonstrating discriminant validity (Fornell and Larcker, 1981).

Checking for common method bias (CMB)

Recent published research has stressed the potential problem of common method bias, because it may have confounding effects on the observed relationships among the constructs, particularly when the data are self-reported (as in this study).

A single-common-method factor approach is used to check for common method biases (Podsakoff et al., 2003). Although the fit indices of the common-method factor model are slightly better than those of the basic model (RMSEA: 0.03 vs 0.04; GFI: 0.93 vs 0.91; AGFI: 0.90 vs 0.89; IFI: 0.98 vs 0.87; NFI: 0.94 vs 0.93; and CFI: 0.98 vs 0.97), the correlations between the constructs are almost the same between the two models. Thus, the common-method biases are not problematic in this research (Podsakoff et al., 2003).

Hypothesis testing

Structural equation modelling analysis is carried out in three steps to clarify the contributions. In the first step, the authors estimate the direct effects of attitude, subjective norms and PBC on the intention to adopt MC (i.e. the TPB). In the second step, utilitarian, hedonic and social values are added to examine their direct and indirect effects on the intention to adopt MC. In the final step, the authors test the full model (i.e. the proposed research model) to examine the direct effects of social value on subjective norms and of subjective norms on attitude as well as to retest the indirect effects of perceived values.

Because the estimated models are nested and contain the causal relationship between TPB variables (i.e. subjective norms and attitude), this study therefore does not include the correlations between the variables of the TPB (i.e. there are no double-headed arrows connecting these variables when estimating these models in the AMOS software). Furthermore, this study aims to examine the additional role of three types of perceived values independently from the TPB variables. As utilitarian, hedonic and social values are potentially highly correlated, this study includes the estimated correlations between them with double-headed arrows connecting these variables in the direct and indirect effect model and the full model (Hair *et al.*, 2009). The three following equations describe the main structural coefficients for the full model:

$$BI = ß_1*ATT + ß_2*SN + ß_3*PBC + ß_4*UV + ß_5*HV + ß_6*SV + \varepsilon_1 \quad (1)$$

$$ATT = ß_8*UV + ß_9*HV + ß_{10}*SV + ß_7*SN + \varepsilon_2 \quad (2)$$

$$SN = ß_{11}*SV + \varepsilon_3 \quad (3)$$

BI: intention; ATT: attitude; SN: subjective norms; PBC: perceived behavioural control; UV: utilitarian value; HV: hedonic value; SV: social value.

To test the indirect effects, this study uses the general path analysis framework for indirect effects (Edwards and Lambert, 2007) justified for latent variables. This framework allows the simultaneous testing of the indirect effects based on the relevant direct effects. In the proposed model, three types of perceived values (i.e. UV, HV and SV) are suggested to have an indirect effect on the intention to adopt MC (BI) via attitude. According to Kline (2011), the necessary condition for confirming attitude as a mediator between UV, HV, SV and BI is that the direct effects of UV, HV and SV on ATT (i.e. $ß_8$, $ß_9$ and $ß_{10}$) and the direct effect of ATT on BI (i.e. $ß_1$) must be significant. The sufficient

condition is that the product of the two relevant direct effects must be significant (MacKinnon *et al.*, 2004). This means that, if UV has an indirect effect on BI via attitude, the product of $ß_1$*$ß_8$ (called $ß_{12}$) must be significant. Similarly, the products of $ß_1$*$ß_9$ (called $ß_{13}$) and $ß_1$*$ß_{10}$ (called $ß_{14}$) must be significant to confirm the indirect effects of HV and SV on BI via attitude. According to Edwards and Lambert (2007), an indirect effect contains a product of regression coefficients. Thus, it must be tested by accounting for the sampling distribution of this product using an appropriate procedure, such as bootstrapping (MacKinnon *et al.*, 2004; Shrout and Bolger, 2002). In this procedure, the *t*-value is counted by the ratio between the standardized coefficient and its standard error based on 95% bias-corrected confidence intervals (MacKinnon *et al.*, 2004).

The test results indicate acceptable fits for the three estimated models (GFI = 0.88–0.91; CFI = 0.95–0.96; TLI = 0.94–0.95; RMSEA = 0.05–0.07; AIC = 355.85–861.03). The TPB model confirms the predictive power of the TPB in the MC context; however, its predictive power (R^2 = 0.27) is less than that of the direct and indirect model (R^2 = 0.33) and the full model (R^2 = 0.34). The estimated results for the three models are shown in Table 5.

For the TPB variables across the three models, attitude has the strongest impact on the intention to adopt MC (H1: $ß_1$ = 0.29–0.38; t = 4.26–6.36; p < 0.01). Subjective norms have a positive effect on both intention (H2: $ß_2$ = 0.16–0.22; t = 2.68–3.89; p < 0.01) and attitude (H4: $ß_7$ = 0.30; t = 5.61; p < 0.01). Finally, perceived behavioural control has a significant impact on intention (H3: $ß_3$ = 0.25–0.29; t = 4.47–4.92; p < 0.01).

Regarding the direct effects of perceived values on attitude across the direct and indirect model and the full model, utilitarian value has the strongest effect (H6: $ß_8$ = 0.28–0.32; t = 5.32–5.81; p < 0.01), followed by hedonic value (H8: $ß_9$ = 0.16–0.23; t = 3.18–4.38; p < 0.01) and social value (H10: $ß_{10}$ = 0.14–0.19; t = 2.5–3.39; p < 0.05). Next, hedonic value is the most important factor explaining the intention to adopt MC (H7: $ß_5$ = 0.24–0.24; t = 4.08–4.18; p < 0.01). Utilitarian value also has a significant effect on the intention (H5: $ß_4$ = 0.16–0.16; t = 2.59–2.64; p < 0.01). However, social value has no significant effect on the intention (H9: $ß_6$ = (-0.10)–(-0.10); t = (-1.61)–(-1.63); p > 0.10). Interestingly, social value has a significant impact on subjective norms (H11: $ß_{11}$ = 0.29; t = 5.22; p < 0.01).

The indirect effects of utilitarian value (H12a: $ß_{12}$ = 0.08–0.09; t = 2.89–3.36; p < 0.01), hedonic value (H12b: $ß_{13}$ = 0.05–0.07; t = 2.30–3.10; p < 0.05) and social value (H12c: $ß_{14}$ = 0.04–0.06; t = 1.86–2.15; p < 0.10) are also confirmed across the direct and indirect model and the full model.

Therefore, this study confirms that the perceived values help to explain the formation of consumer attitude and subjective norms. In particular, they help to predict the intention to adopt MC not only by the direct effects but also by the indirect effects via attitude and subjective norms in the MC setting. The integration of the three variables of perceived values and the cross-over effect from subjective norms on attitude increases the explained variance of the intention to adopt MC from 27 per cent to 34 per cent compared with the TPB (ES = 9.58 per cent).

[Insert Table 5 here]

Competing model

Zaltman *et al.* (1982) pointed out that marketing research needs to test a proposed model with a rival model. Bagozzi (1984) also argued that testing and comparing a competing model and a proposed model in the same study will be more reliable because the subjects, research, measurements and other environmental factors are the same for both models.

The VAB framework suggests that value has an impact on attitude, which, in turn, leads to a behaviour (Homer and Kahle, 1988). In other words, attitude mediates the effect of value on behaviour. Based on the VAB framework, the authors propose a competing model (Figure 2) and compare this model with the proposed research model to understand the relationship between the perceived values and the constructs of the TPB.

[Insert Figure 2 here]

The test results of the two models, summarized in Table 6, show that they both fit the data well. However, the results of the chi-squared difference test, R^2 and AIC fit index show that the proposed research model has a statistically better fit than the competing model, indicating that the research model provides a better understanding of how perceived values are associated with attitude and behavioural intention.

[Insert Table 6 here]

Discussion and implications

This study extends previous studies (e.g., Kim *et al.*, 2011; Kim *et al.*, 2013; Kim and Han, 2009; Sweeney and Soutar, 2001) to develop a theoretical model based on the TPB framework, with utilitarian, hedonic and social values as extensive variables to explain consumers' attitude towards and intention to adopt MC in a developing country such as Vietnam. The simultaneous inclusion of three types of perceived value in the estimated models helps to explore the relative importance of each type of perceived values without an upward bias (as the two others of perceived values are controlled) to the attitude towards and intention to adopt MC (Kline, 2011). The analytical results show the reliability and validity of the constructs and a good fit of the estimated models. In addition to confirming the well-documented predictive power of the TPB model in an e-commerce context (Ovčjak *et al.*, 2015; Sanakulov and Karjaluoto, 2015), this study contributes to the literature by suggesting that consumers' perceived values have significant direct effects on their attitude, subjective norms and intention to adopt MC as well as an indirect effect on their intention through the attitudinal components of the TPB.

Main findings and theoretical implications

Attitude has the strongest effect on the intention to adopt MC, as confirmed in the literature on consumer behaviour (Armitage and Conner, 2001) and consistent with prior studies in the area of innovative information system adoption (e.g. MC) (Pavlou and Fygenson, 2006). The more positive the attitude that consumers have towards MC, the more likely it is that they will adopt MC as a shopping channel. Therefore, it is important for scholars and marketers who want to develop MC as a new channel for products or services to understand and consolidate consumer attitudes towards MC as a key role for successful business.

Subjective norms reflect the influence of important others, such as family, relatives, peers and colleagues, on consumers' decision making (e.g. MC adoption), meaning that, if these important others enjoy MC, consumers will form a positive attitude towards MC and ultimately the intention to use it. In other words, the positive results of friends and relatives using MC make consumers more willing to try MC themselves. In addition, MC

is a novel and voluntary experience for consumers. This makes the effect of subjective norms on intention more salient.

Furthermore, subjective norms are found to have a significantly positive effect on attitude, which is consistent with previous studies (Armitage and Conner, 2001; Fishbein and Ajzen, 2011; Vallerand *et al.*, 1992). It is worth noting that, though the direct effect of subjective norms on intention is quite weak, it also has an indirect effect on intention via attitude, making the total effect relatively strong and significant. Thus, it might be concluded that subjective norms play an important role in explaining the intention to adopt MC and that consumers who think positively about MC will have a positive influence on the formation of other consumers' attitude.

While most previous studies have focused only on a direct effect from subjective norms on intentions (Celik, 2016; Sanakulov and Karjaluoto, 2015; Sun and Chi, 2017; Zhang et al., 2012), this study confirms an additional indirect effect of subjective norms via attitude (Brubaker and Fowler, 1990; Miniard and Cohen, 1981; Oliver and Bearden, 1985) on intentions in the context of MC. Thus, the findings are different from those of previous studies and demonstrate the important role of subjective norms. Hence, future studies should consider examining in greater depth the role of subjective norms in explaining behavioural intentions, since the development of the Internet and especially social networks (i.e. Facebook and Twitter) exposes people to social information, especially information about social groups, friends and celebrities (Lu, 2014).

The significant effect of perceived behavioural control on the intention to adopt MC found here is consistent with some studies on MC (e.g., George, 2004; Kalliny and Minor, 2006). While some previous studies have shown a non-significant effect of PBC on intentions in the MC context (e.g., Khalifa *et al.*, 2012; Khalifa and Shen, 2008), the predictive power of PBC on intentions found in this study is also even greater than that of subjective norms, which has rarely been found in the literature. This result suggests that perceived behavioural control may have an independent effect on intentions after controlling the effects of attitude and subjective norms (Armitage and Conner, 2001). The results also reveal that the external constraints on MC behaviours (e.g. high fees for cellular connection and a lack of a cellular-enabled or WiFi-enabled mobile phones) may not be problematic in this market (Khalifa *et al.*, 2012; Khalifa and Shen, 2008).

In terms of consumer perceived values, the findings also show that utilitarian value has a stronger impact on attitude towards MC than hedonic value, while hedonic value has a stronger impact on the intention to adopt MC than utilitarian value. The findings are consistent with previous studies, confirming that consumer utilitarian and hedonic values play important roles in explaining attitude and behavioural intentions in an online shopping context (Al-Debei and Al-Lozi, 2014; Kim *et al.*, 2011; Kim *et al.*, 2013; Kim and Han, 2011). The findings are also supported by influential theories, such as VAB (Homer and Kahle, 1988) and the dual-process theory of values (Wu and Lu, 2013). The results demonstrate that consumers pursue dual purposes (i.e. utilitarian and hedonic) when considering joining a dual-purpose system like MC (Wu and Lu, 2013). Therefore, utilitarian and hedonic values should be included in future research on new distribution channels (e.g. MC and social commerce).

Social value in this study is found to have a strong positive effect on attitude. This indicates that consumers might believe that MC helps to achieve social status, image and self-concept – that is, social image congruence can be improved by using MC. Interestingly, while social value does not have a significantly direct effect on the intention to adopt MC, as found by a few studies in the online context (e.g., Kim *et al.*, 2013), it has a significant indirect effect on intention via subjective norms and attitude. This may reveal that the effect mechanism of social value on intention may be mediated by subjective norms and attitude. More specifically, consumers with a high social value will base their decisions on other important people's ideas (e.g. friends, family and colleagues) or their desired social value will be fulfilled only when they have a strong enough attitude to decide whether they should or should not adopt MC. However, social value tends to have a negative direct effect on intention, which may be caused by some moderators that can affect the social value–intention relationship, such as technological experience (Kim *et al.*, 2013), ambivalence and value or interpersonal conflict (Harreveld *et al.*, 2015). This generates a call for further research on social value in the context of MC adoption to clarify the role of this important variable in behavioural intention.

Interestingly, this study finds that social value has a strong effect on subjective norms, proving that social value is a form of normative belief that may stem from social expectations being transmitted and reinforced, thus becoming internalized and serving as

consistent guides (i.e. subjective norms) for behaviour (Fishbein and Ajzen, 2011). Social value is the manner in which consumers view themselves or wish to be viewed by others (e.g. innovative consumer, high social image and position); therefore, it is different from subjective norms, which constitute a belief about the acceptability of a specific behaviour (i.e. should or should not adopt MC) (Parks-Leduc *et al.*, 2014; Parks and Guay, 2009). In other words, social value is more general than subjective norms and occupies a more central and hierarchically important place in human personality (e.g. agreeableness, openness to experience or extraversion) and cognitive structure (e.g. subjective norms) (Parks-Leduc *et al.*, 2014). In addition, because social value is initially developed through social interactions with others, it may be consolidated and shared from generation to generation (Parks and Guay, 2009) and is important to guide consumer perceptions, judgements and behaviours (Parks-Leduc et al., 2014; Schwartz, 1992).

Finally, three types of value (i.e. utilitarian, hedonic and social value) are proved to have an indirect effect on the intention to adopt MC via attitude and subjective norms. The findings are interesting and different from those of previous studies that focused only on direct effects. The findings are also critical and make an important contribution to research on MC adoption, because they provide scholars with an understanding of what drives new distribution channel use, such as MC, and researchers could therefore develop various interventions to maximize the adoption of MC.

To sum up, this study makes several contributions to the literature on MC adoption. Firstly, the study proves the predictive power of the TPB in the context of MC adoption. Secondly, based on the TPB, the authors integrate perceived values to test not only the direct but also the indirect effect of these variables on the intention to adopt MC. Finally, the results indicate that different facets of consumer perceived values play significant roles in MC adoption (attitude and intention).

Management and marketing implications

Firstly, the results are expected to help managers and marketers in the MC sector to become aware of the factors that motivate consumers to adopt MC in the Vietnamese context. According to the TPB, managers and marketers need to have strategies to improve consumers' attitude, increase individuals' social expectations and enhance

individuals' control of MC. Attitude, with the strongest impact on the intention to adopt MC, generates the need to identify the innovation attributes of MC, which would help to develop a positive attitude towards MC. For example, belief attributes, such as incentives, high-value content, emphasis on privacy and security, and convenience, are important components that change consumers' attitude and improve their positive perceptions of MC (Muk, 2007).

Secondly, the impact of subjective norms on consumer attitude and MC intention emphasizes that Vietnamese marketers should consider the social context in which the mobile service is used as well as the normative pressures and expectations existing for both person-interactive and machine-interactive services (Nysveen *et al.*, 2005). Subjective norms are not only of importance in explaining intention; they also exert a strong indirect effect on the intention to use MC through attitude. In the context of the current study, subjective norms can be classified into peer, family and media influence. Thus, managers and marketers are urged to develop marketing strategies for each group to maximize the social influence on consumers' attitude towards and intention to adopt MC.

Thirdly, the study finds that PBC is an important antecedent of the intention to use MC. Thus, a possible marketing strategy for increasing consumers' intention to use mobile services would be to offer free use of the service for a period to learn and overcome technical knowledge barriers, increase ease of use and provide better opportunities to evaluate consumer perceived values. This would enable potential users to learn the service, thus increasing their perceived control (Nysveen *et al.*, 2005).

Fourthly, utilitarian value has a strong impact on the attitude towards and intention to adopt MC in the Vietnamese context. Thus, managers and marketers need to emphasize the utilitarian benefits of MC when developing marketing strategies. For example, businesses could emphasize a reasonable price and convenience; they could also design application interfaces or e-commerce sites that fit mobile device screens, thereby reducing efforts for consumers.

Fifthly, hedonic value is also an important factor affecting the attitude towards and intention to adopt MC. Thus, enjoyment, excitement or pleasure is a significant predictor of consumer value in the mobile service sector. As a result, when developing MC services, managers and marketers need to integrate features that incorporate fun, enjoyment and

excitement. For instance, an MC website might support features that allow users to connect with friends and relatives to share the shopping experience. However, the prioritization of importance between utilitarian and hedonic marketing may differ for MC use in Vietnam compared with other countries (e.g., Kim and Han, 2009; To *et al.*, 2007). Vietnamese consumers are hedonic-oriented rather than utilitarian-oriented (WeAreSocial, 2017); they may therefore enjoy impulsive shopping, which implies that hedonic motivation (e.g. fun and entertainment) might promote impulsive shopping among Vietnamese consumers (To *et al.*, 2007).

Finally, managers and marketers also need to be concerned with social value. MC needs to provide consumers with professional services, such as mobile banking services and mobile shopping services. When consumers use these products, their social image and position are improved (Kim and Han, 2009). Furthermore, because online services are considered to be an innovative trend (Lu, 2014), they can boost the social position of consumers. Thus, managers and marketers need to continue to introduce new services to meet the needs expressed by consumers.

Social implications

To encourage consumer use of MC based on informed decisions and legal protection, the Vietnamese Government should enact laws and statutes that clearly delineate the rights and obligations of those who participate in MC activities, along with penalties for those entities that violate the law. This would not only improve consumers' positive attitude towards MC but also make them feel that MC has become a subjective norm in Vietnam. Policy makers also need to demonstrate their important role in changing people's perceptions of the usefulness and enjoyment (i.e. utilitarian and hedonic) of MC through channels of information for consumers. Finally, authorities need to encourage technology-oriented consumers by promoting a widely available wireless Internet service at a reasonable cost to enhance perceived behavioural control. Thus, consumers will have more opportunities to obtain products/services on mobile devices, which will, in turn, increase the possibility that consumers will use MC.

Limitations and future research

This study has some limitations. Firstly, the data are collected using a convenience sampling method. Therefore, future studies should expand to include a more representative sample. Secondly, this study extends the TPB with the inclusion of utilitarian, hedonic and social value based on the previous literature and theoretical arguments (Homer and Kahle, 1988; Kim *et al.*, 2013; Zeithaml, 1988). Thus, future studies could benefit from including other variables specific to the MC context, such as trust, risk and cost (Chong *et al.*, 2012; Wei *et al.*, 2009) or perform an exploratory study to elicit other reasons behind consumers' adoption of MC. This study proposes different facets of individual differences in consumers' or users' personality, self-aspect and social identity (e.g., Gerpott and Thomas, 2014; Ovčjak *et al.*, 2015; Sanakulov and Karjaluoto, 2015). Thirdly, because this study focuses on the intention to adopt MC, the findings may be different from actual behaviour. Finally, the results presented here are based on self-reported measures of the constructs using correlation methods; thus, the causal nature of the relationships is problematic. Experimental designs should be used to address issues of causality in future studies.

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Figure 1: Research model and hypotheses

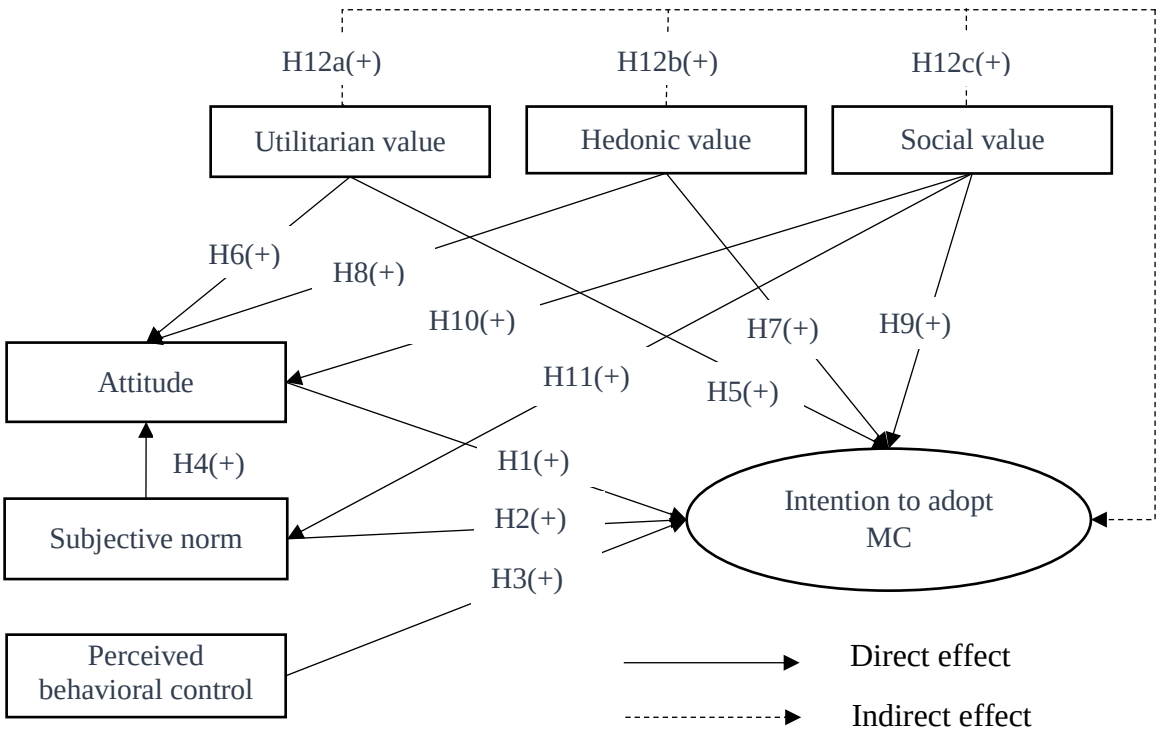

Figure 2: Competing model

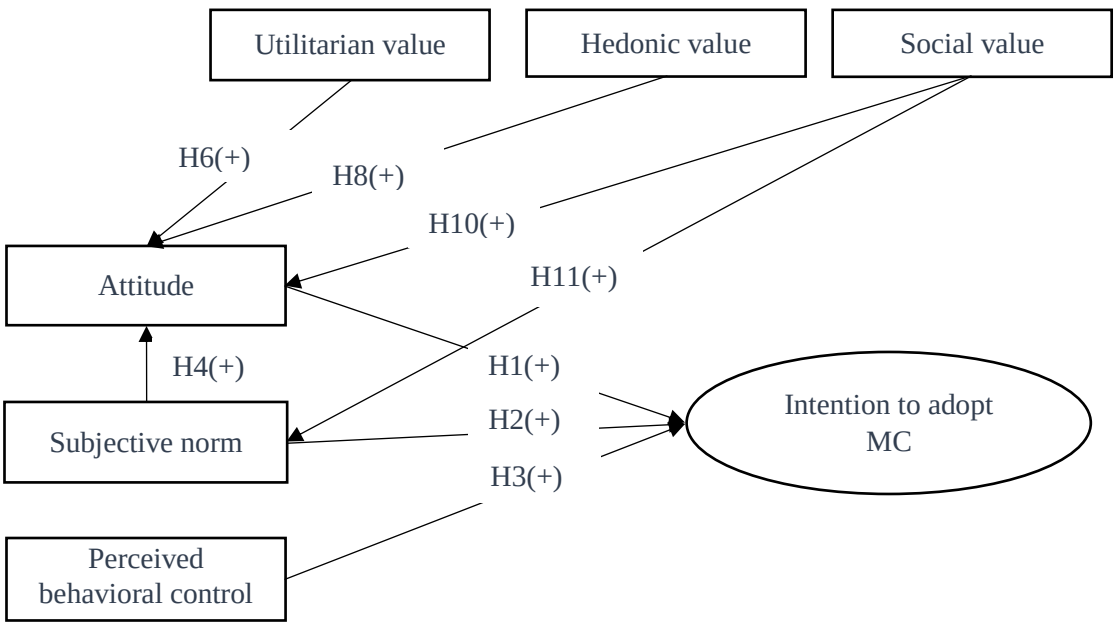

Table 1: Respondents' characteristics

Characteristics	Quantity	Percentage (%)
Gender		
Male	180	47.24
Female	201	52.76
Age		
Under 25	80	21.00
25–34	115	30.18
35–45	124	32.55
Older than 45	62	16.27
Occupation		
Student	75	19.69
Employees of state companies	89	23.36
Employees of private company	92	24.15
Self-employed business	80	21.00
Other	45	11.81

Notes. Age was directly measured by birth year, then recoded into four groups.

Table 2: Constructs measurement

Constructs	Items	Sources
Attitude (ATT)	I like the idea of using MC Using MC is a wise idea Using MC is a good idea Using MC is a positive idea	Taylor and Todd (1995)
Subjective norms (SN)	People whose opinions I value would approve of me using MC People who influence my behaviour would think that I should use MC It is expected from me that I use MC People who are important to me would agree if I use MC	Taylor and Todd (1995)
Perceived behavioural control (PBC)	If I wanted to, I could use MC I have enough resources, knowledge, and competence to make use of MC I would be able to use MC It would be possible for me to use MC	Taylor and Todd (1995)
Utilitarian value (UV)	Compared to the fee I have to pay, the use of MC would offer good value for the money Compared to the effort I need to put in, the use of MC would be beneficial to me Compared to the time I need to spend, the use of MC would be worthwhile for me Overall, the use of MC would deliver good value	Sirdeshmukh *et al.* (2002)
Hedonic value (HV)	MC would be ones that I enjoy MC would make me feel excited to use them MC would be ones that I feel relaxed about using MC would make me feel pleasant	Sweeney and Soutar (2001)
Social value (SV)	The use of MC would make people hold me in high regard The use of MC would enhance the image that others would have of me The use of MC would help me to show others who I am The use of MC would make a good impression on other people	Perse (1990)
Behavioural intention (BI)	I intend to use MC I expect that I would use MC I plan to use MC I am ready to use mobile devices to make commercial transactions	Davis (1989)

Table 3. The reliability and validity of the constructs

Constructs and indicators	Factor loadings	t – value	Cronbach's alpha	Composite reliability	Variance extracted
Attitude (ATT)			0.91	0.91	0.71
I like the idea…	0.85	19.98			
… a wise idea	0.87	20.97			
… a good idea	0.81	18.74			
… a positive idea	0.84	19.85			
Subjective norms (SN)			0.90	0.90	0.68
People whose opinions…	0.80	18.28			
People who influence…	0.73	15.95			
It is expected from me…	0.87	20.88			
People who are important…	0.90	21.75			
Perceived behavioural control			0.86	0.86	0.62
If I wanted to…	0.81	18.22			
I have enough resources…	0.79	17.54			
I would be able…	0.80	17.65			
It would be possible for me…	0.74	15.82			
Utilitarian value (UV)			0.94	0.94	0.80
…good value for the money	0.88	21.68			
…beneficial to me	0.93	23.52			
…worthwhile to me	0.94	24.02			
…deliver good value	0.84	19.91			
Hedonic value (HV)			0.93	0.93	0.76
…I enjoy	0.84	19.89			
…exciting to use them	0.91	22.57			
…relaxed about using	0.88	21.30			
…feel pleasant	0.87	20.83			

Social value (SV)			0.90	0.90	0.69
…hold me in high regard	0.86	20.35			
…enhance the image…	0.91	22.17			
…show others who I am	0.75	16.64			
…make a good impression…	0.79	17.98			
Behavioural intention (BI)			0.82	0.82	0.53
I intend to use…	0.74	15.58			
I expect that I would use…	0.75	15.93			
I plan to use…	0.70	14.46			
I am ready to use…	0.71	14.76			

Note: factor loadings and t-value are calculated from CFA test.

Table 4: Means, standardized deviation, correlations

			Correlations						
	Mean	SD	1	2	3	4	5	6	7
1. ATT	3.39	0.76	0.85						
2. SN	2.57	0.76	0.45	0.83					
3. PBC	3.66	0.53	0.38	0.22	0.78				
4. UV	3.52	0.63	0.43	0.34	0.36	0.90			
5. HV	2.38	0.79	0.26	0.34	0.28	0.20	0.87		
6. SV	3.64	0.59	0.35	0.23	0.42	0.37	0.26	0.83	
7. BI	2.88	0.67	0.52	0.40	0.43	0.39	0.42	0.25	0.73

Notes. the square root of AVEs are on the diagonal.

Table 5: Testing the hypotheses

Paths/Hypotheses		TPB model		Direct and indirect effect		Full model		Conclusion [a]
		Std. ß	t–value	Std. ß	t–value	Std. ß	t–value	
Direct effect								
ATT → BI ($ß_1$)	H1	0.38	6.36***	0.30	4.52***	0.29	4.26***	Support
SN → BI ($ß_2$)	H2	0.22	3.89***	0.16	3.07***	0.16	2.68***	Support
PBC → BI ($ß_3$)	H3	0.29	4.92***	0.26	4.47***	0.25	4.48***	Support
UV → BI ($ß_4$)	H5			0.16	2.59***	0.16	2.64***	Support
HV → BI ($ß_5$)	H7			0.24	4.08***	0.24	4.18***	Support
SV → BI ($ß_6$)	H9			–0.10	-1.61^{ns}	–0.10	-1.63^{ns}	Not support
UV → ATT ($ß_8$)	H6			0.32	5.81***	0.28	5.32***	Support
HV → ATT ($ß_9$)	H8			0.23	4.38***	0.16	3.18***	Support
SV → ATT ($ß_{10}$)	H10			0.19	3.39***	0.14	2.50**	Support
SN → ATT ($ß_7$)	H4					0.30	5.61***	Support
SV → SN ($ß_{11}$)	H11					0.29	5.22***	Support
Indirect effect [b]								
UV → ATT → BI	H12a			0.09	3.36***	0.08	2.89***	Support [c]
HV → ATT → BI	H12b			0.07	3.10***	0.05	2.30**	Support [c]
SV → ATT → BI	H12c			0.06	2.15**	0.04	1.86* [e]	Support [d]
R^2 (BI)		0.27		0.33		0.34		
Effect size (ES) (%)		–		8.22		$ES_{(FM/M2)}$: 1.50 $ES_{(FM/M1)}$: 9.58		
χ^2		285.85		725.03		665.70		
df		101		338		336		
CMIN/df		2.83		2.15		1.98		
RMSEA		0.07		0.06		0.05		
GFI		0.91		0.88		0.89		

*Notes. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; ns: non-significant; $ß_{12} = ß_8 \times ß_1$; $ß_{13} = ß_9 \times ß_1$; $ß_{14} = ß_{10} \times ß_1$; ES = $(R^2_i - R^2_{i-1}) / (1 - R^2_{i-1})$; i = 2, 3; M1: TPB Model; M2: direct and indirect effect model; FM: Full Model;* [a] conclusion for proposed research model; [b] indirect effects are tested with bootstrapping procedure in AMOS 24.0; [c] partial mediation; [d] full mediation; [e] this indirect effect is tested by an equivalent model of the research model, in which the effect of SV on SN is replaced with a double headed arrow.

Table 6: Comparing research model and competing model

Paths/Hypotheses		Research model		Competing model	
		Std. ß	t–value	Std. ß	t–value
ATT → BI	H1	0.29	4.26***	0.38	5.99***
SN → BI	H2	0.16	2.68**	0.19	3.24**
PBC → BI	H3	0.25	4.48***	0.27	4.74***
SN → ATT	H4	0.30	5.61***	0.29	5.56***
UV → BI	H5	0.16	2.64**		
UV → ATT	H6	0.28	5.32***	0.29	5.42***
HV → BI	H7	0.24	4.18***		
HV → ATT	H8	0.16	3.18**	0.17	3.35**
SV → BI	H9	–0.10	-1.63^{ns}		
SV → ATT	H10	0.14	2.50*	0.14	2.44*
SV → SN	H11	0.29	5.22***	0.29	5.21***
R^2 (Intention)		0.34		0.31	
χ^2		665.70		690.05	
df		336		339	
CMIN/df		1.98		2.04	
RMSEA		0.05		0.05	
GFI		0.89		0.89	
CFI		0.96		0.95	
TLI		0.95		0.95	
AIC		805.70		824.05	
Chi-square difference χ^2 (df), p		24.35(3), 0.000			

*Notes. * p < 0.05; ** p < 0.01; *** p < 0.001, ns: non-significant;*