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User satisfaction with mobile websites: the impact of perceived usefulness (PU), perceived ease of use (PEOU) and trust

Muslim Amin
Management Department College of Business Administration, King Saud University, Riyadh, Kingdom of Saudi Arabia
Sajad Rezaei
International Business School (IBS), Universiti Teknologi Malaysia (UTM), Kuala Lumpur, Malaysia, and
Maryam Abolghasemi
Graduate School of Management, Multimedia University, Cyberjaya, Malaysia

Abstract

Purpose – The purpose of the study is to investigate the impact of perceived usefulness (PU), perceived ease of use (PEOU) and trust on mobile website satisfaction.

Design/methodology/approach – A total of 302 valid questionnaires were collected to empirically test the research model. Structural equation modeling (SEM) was performed to evaluate the reliability and validity of the measurement model and structural models.

Findings – The results show that there is a positive relationship between PEOU, PU and mobile users' satisfaction. PU is positively related to trust and mobile users' satisfaction. Moreover, trust positively influences mobile users' satisfaction.

Practical implications – Drawing on the technology acceptance model and trust theory, this study develops and empirically examines a model for consumers' satisfaction to use mobile services. This study contributes new insights concerning the marketing literature by examining the impact of PU, PEOU and trust on mobile users' satisfaction.

Originality/value – The contribution of the study is significant for both mobile marketers and academicians in the era of the third-generation environment. This study is among the first few attempts to integrate the TAM with trust to determine mobile user satisfaction.

Keywords Trust, Mobile satisfaction, Perceived ease of use (PEOU), Perceived usefulness (PU)

Paper type Research paper

1. Introduction

The tremendous spread of the third generation (3G) of mobile communication technologies has triggered rapid progress in mobile commerce worldwide. Mobile phones are truly unique communication devices in the global arena (Haverila, 2011) and information communication technology boosts mobile Internet services (Zhu *et al.*, 2010). Mobile marketing is developing in the retail environment (Gao *et al.*, 2013), including the various methods used by businesses to use the mobile phone as a means of

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communicating and promoting an offer to its target customers (Shankar *et al.*, 2010). Mobile commerce also comes into play. The fact is that companies are able to add value to their product and services (Ström *et al.*, 2014; Chong, 2013); all businesses see mobile technology as an opportunity. Consequently, creating customer satisfaction is the major objective for online companies wishing to increase portability, as well as obtain and maintain competitive advantage (Valvi and Fragkos, 2012; Alkhunaizan and Love, 2013). According to Zhou (2011a), although mobile phone commerce is undergoing rapid growth, it is still at the initial stage in its growth and development. Furthermore, research into user behavioral patterns plays an essential part in preserving electronic commerce on mobile devices and managing online shopping Web sites (Okazaki and Mendez, 2013; Shie *et al.*, 2013). Thus, fostering new platforms for branded consumer interactions is possible with the development of mobile communication technology (Gao *et al.*, 2010).

The issue of consumer satisfaction as a means of measuring the success of a company (Lee and Chung, 2009) has not been discussed in terms of mobile Web site satisfaction. A rapid increase in the business potential of mobile marketing has attracted researchers from various fields to contribute to the growing body of knowledge about mobile commerce as a phenomenon (Varnali and Toker, 2010). Previous research (Deng *et al.*, 2010) indicated that although mobile commerce is developing rapidly, it is still in its infancy. From a marketing perspective, mobile commerce users are seen as the ultimate target (Wang and Liao, 2007). In the past few years, most businesses have been interested in using mobile commerce applications within their organizations as a means of targeting or satisfying end customers. This has involved interacting with consumers in various ways. The issue in commerce is how to gain customer satisfaction by implementing mobile commerce and technology. Therefore, the mobile market industry is the focus of decision-makers and marketers, despite the fact that the industry is relatively new.

Moreover, it has been identified as a critical competitive strategy in maintaining strong relationships with all customers at all company touch points. According to Tao Zhou (2011), mobile service providers need to consider the perspectives of both user performance and experience to facilitate the continued use of mobile Internet. Its portability and cost make it easily accessible and a part of everyday life for most people. According to Varnali and Toker (2010), constructs including consumer-based variables influence the acceptance of mobile marketing, attitudes, trust and satisfaction and should be examined by researchers in the field of mobile marketing satisfaction. As such, the objective of this study is to investigate the impact of perceived usefulness (PU), perceived ease of use (PEOU) and trust on user satisfaction with respect to mobile Web sites. This study addresses how PU, PEOU and trust affect mobile commerce satisfaction. Customer satisfaction is an important goal for telecommunication network operators striving for outstanding economic success (Gerpott *et al.*, 2001).

1.1 Mobile marketing and new challenges

Research into mobile commerce is growing (Li and Yeh, 2010). In many countries, mobile marketing programs are subject to government rules and regulations, such as the mandatory requirement to seek prior permission from the customer before a mobile marketing message is sent (Jayawardhena *et al.*, 2009). The vast deployment of wireless networks and mobile technologies and the critical increase in the number of mobile tools

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have created, among users, a very high demand for emerging mobile commerce applications and services. Previous studies on mobile marketing have mainly concentrated on the application and success of electronic commerce Web sites and a few studies have examined factors affecting the success and satisfaction of mobile Web sites (Deng *et al.*, 2010). However, the adoption and success of mobile commerce and services have been slower than expected (Mallat *et al.*, 2008). According to Haverila (2011), there appears to be a lack of research regarding the relationship between the characteristics, as well as their relationship with customer satisfaction and purchase intent. The aim of this study, therefore, is to identify and examine the critical success factors of mobile satisfaction in Malaysia.

Increasing the satisfaction and loyalty of online customers is an issue for online retailers and service providers (Sheng and Liu, 2010). The issue of how businesses (B2C) and industry (B2B) deal with mobile commerce plays a significant part in their development and is of great interest to academics and practitioners (Steele, 2008). Mobile commerce motivates service firms to build application and market platforms to better serve customers (Ke *et al.*, 2013). Mobile Internet is defined as "wireless access to the Internet through a mobile communication network (especially using 3G technology) by means of handheld devices (e.g. mobile phones or personal digital assistants"; Zhu *et al.*, 2010, p. 346). In addition, "mobile commerce is a broad term used for mobile banking, mobile ticketing, mobile coupons, purchasing of goods and services using mobile phones" (Thakur and Srivastava, 2013, p. 52). According to Revels *et al.* (2010), there is lack of research concerning mobile phone commerce and consumer intent and satisfaction. Although most physical goods and services relating to customer satisfaction and loyalty have been explored fully in the academic literature, research on mobile telecommunications services is scarce (Turel and Serenko, 2006). According to Zhao *et al.* (2012), understanding the antecedent factors and consequences of consumer satisfaction in the mobile communications market remains on the research agenda. Increasingly, mobile marketing is becoming crucial for retail and service firms (Shankar *et al.*, 2010; Alkhunaizan and Love, 2013). Mobile commerce has begun to develop its own following of dedicated researchers and remains a popular and important topic despite the growing phenomenon of electronic commerce (Strader *et al.*, 2004).

In the technology acceptance model (TAM) constructs, PU directly influences user attitudes to online shopping systems, then indirectly influences first purchase intention (Kim, 2012). Although the TAM is negatively criticized by one team of researchers, it compares favorably to Theory reasoned action (TRA) and Theory of planned behavior (TPB) (Zarmpou *et al.*, 2012). Drawing on the TAM and trust theory, this study develops and empirically examines a model for consumers' intentions to use mobile services and customer satisfaction in Malaysia. According to Zhao *et al.* (2012), understanding the antecedents and consequences of customer satisfaction in the mobile communications market is important. This study is among the first attempts to combine the TAM with trust to assess mobile user satisfaction. It provides new insights into marketing literature by examining the impact of PU, PEOU and trust on mobile Web site satisfaction.

2. Theoretical research framework and hypothesis development

This study proposes a theoretical framework of intention to use mobile services in the context of Malaysia, which is based on the TAM (Davis, 1989b) and the commitment–

trust theory of relationship marketing proposed by Morgan and Hunt (1994) (Figure 1). Most prior research uses either the TAM or the trust model to gain an understanding of consumer purchase behavior, but few consider both trust and the TAM (Kim, 2012; Du *et al.*, 2012). Du *et al.* (2012) used the TAM as a basis for understanding consumer behavioral intention to use 3G value-added services in China. In fact, the TAM has been used to examine users' behavioral intent, acceptance and adoption of new technology by considering two of the most important constructs – PEOU and PU (Li and Yeh, 2010). In addition, the role of external variable and user attitudes is considered to be closely related to the that of TAM constructs. Several studies have modified the basic TAM in the mobile commerce or mobile service context (Lee and Jun, 2007). More recently, the TAM has been studied within the web environment to understand the acceptance of Internet-related technologies and to predict consumer purchase intentions based on their browsing (Kim, 2012).

The commitment–trust theory of relationship marketing proposed by Morgan and Hunt (1994) is considered as a basis for understanding the trust issue in marketing. In this study, we extend trust to the mobile context. The model proposed by Zarmpou *et al.* (2012) includes behavioral intention, PU, PEOU and trust as a means of examining users acceptance of mobile services. The TAM includes TRA's indirect relationship in that attitudes predict behavioral intentions to use a particular technology and partially mediate the effects of salient beliefs (PU and PEOU) (Kim, 2012). The TAM was originally developed to explain an individual's adoption of new technology in an organizational setting (Zhu *et al.*, 2010; Hess *et al.*, 2014). Thakur and Srivastava (2013) found that PU and PEOU were significant aspects of readiness to adopt a technology or use mobile commerce. The TAM has been widely used to explain adoption behavior for which there are two major determinants for a technology to be accepted (Wang *et al.*, 2014) upon which the main construct of this research framework is proposed. In the following subsections, the utilization of the TAM and trust theory in building the research model in this study is discussed.

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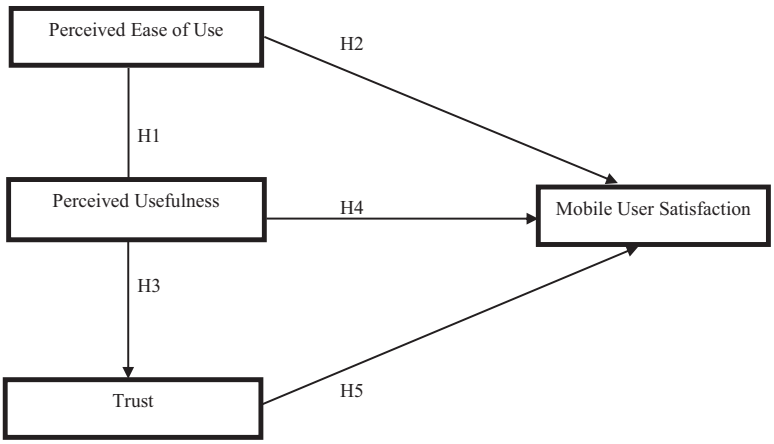

Figure 1.
Theoretical research framework

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2.1 Mobile users' satisfaction

It is evident that companies should listen to and satisfy their customers (Türkyilmaz and Özkan, 2007). Satisfaction is defined "as a consumer's post-purchase assessment and affective response to the total product or service experienced" (Lin and Wang, 2006). In this study, we define satisfaction as a mobile user's overall positive experience of, and feeling for, the mobile services provided. A substantial body of research has been conducted to assess the factors influencing the different aspects of user satisfaction (Cho *et al.*, 2011). Overall, satisfaction refers to how a customer rates the brand based on all encounters and experiences (Shin and Kim, 2008). Customer is the key issue affecting most businesses today. Most shareholders are only satisfied with the performance of a business in terms of profits. Most mobile marketing experts claim to address the issue of customer satisfaction and adoption (Alahuhta *et al.*, 2005). They believe that no matter where the target customers are and what they do, they must be provided with high value-added services. The concept of satisfaction, thus, is one of the measurements used by companies with respect to their initial vision and mission (Cho *et al.*, 2011).

Wetsch (2005) suggested that trust significantly impacted on satisfaction. User satisfaction can be among a company's most important assets. Customer, and, in this case, mobile user satisfaction could create economic value for both the business and society. Customer satisfaction is also defined as the feeling of pleasure resulting from comparing a product's continued performance to initial expectations. Previous research has indicated that customer satisfaction has a positive effect on future repurchase intent (Revels *et al.*, 2010). Most customers prefer to shop using an online market rather than an offline market. The reason for buying online relates to the concept of usability. Therefore, this study argues that PU, PEOU and trust have a positive impact on mobile user satisfaction.

2.2 Perceived ease of use

Drawing from the literature on information technology (IT), PEOU has been identified as a main construct for examining and assessing user acceptance of a particular technology. An important motivational factor for consumers' technology usage intention is PEOU (Revels *et al.*, 2010). PEOU usually refers to users perception of whether performing a particular technical task would require a mental effort on his or her part (Ajzen and Fishbein, 1980; Rouibah *et al.*, 2011). According to Du *et al.* (2012), personal innovativeness will directly enhance the PEOU of 3G mobile services. PEOU and PU affect consumers' initial intention to use (Montazemi and Saremi, 2013) and are the main determinants of the users attitudes (Martins *et al.*, 2014). PU is also found to be more useful than PEOU in predicting consumer attitudes to using mobile commerce. In this study, we define PEOU as the overall perception of users relating to the convenience of purchasing a mobile system via their mobile phone. The findings also concur with previous research on the TAM which consistently finds that PU is a more powerful predictor than PEOU (Yang, 2005). Moreover, users may adapt their behavior to the new technology if they perceive it to be easy, which refers to PEOU (Morosan, 2012).

Some studies have examined convenience in mobile commerce (Okazaki and Mendez, 2013). The trend of increasing mobile services has set a new challenge for service providers: how to develop more advanced and user-friendly, context-aware and personalized mobile services for users (Alahuhta *et al.*, 2005). In fact, mobile commerce allows its users to perform any transaction no matter where they are. However, we

should bear in mind that some mobile server deficiencies, such as bandwidth and lack of high-speed Internet, are barriers to user satisfaction with mobile commerce (Matos and Madeira, 2005). There must be good infrastructure in the area mobile commerce is used before customers feel happy to use it to do their shopping. On the other hand, they mostly perceive it to be easy to use if they can get it anywhere they want. Thus, PEOU is considered as one of the factors for success in terms of mobile satisfaction in the mobile industry. PEOU might have a positive effect on the PU of mobile commerce (Lee and Jun, 2007). Revels *et al.* (2010) have found that PEOU is a strong predictor of PU in the context of mobile commerce, and, similarly, Rezaei and Amin (2013) have argued that there is a positive relationship between PEOU, PU and customer satisfaction in an online shopping environment. According to Jun *et al.* (2004), online businesses need to concentrate more on friendliness and providing a user-friendly Web site. Most scholars have discussed the importance of PEOU in relation to customer satisfaction and overall loyalty. User guidance and support and user skills are significant factors in explaining the acceptance of mobile services. Thus, it is hypothesized:

H1. There is a positive relationship between PEOU and PU.

H2. There is a positive relationship between PEOU and mobile user satisfaction.

2.3 Perceived usefulness

A substantial body of research has confirmed that PEOU and PU significantly impact user attitudes, which has a relative impact on user adoption and satisfaction (Morosan, 2012; Davis, 1989b; Martins *et al.*, 2014; Detlor *et al.*, 2013; Hess *et al.*, 2014). There is a general interest on the part of customers in mobile commerce and service applications (Mallat *et al.*, 2008). PU is one of the fundamental antecedents of innovation usage, which is related to the utilitarian value that mobile technology provides to customers (Revels *et al.*, 2010). It is well known that usability is a significant quality attributed to mobile phones, and, thus, assessing usability is becoming increasingly important in the mobile phone industry (Heo *et al.*, 2009). On the other hand, PU refers to the extent to which target customers believe that using IT will create significant value for them (Rouibah *et al.*, 2011; Ajzen, 1991). PU is defined as the degree to which a user believes that using a particular system would enhance his or her job performance, which also positively impacts on the user's intention to use that system (Chen *et al.*, 2007; Ajzen, 1991). In this study, we define PU as the overall assessment and perception on the part of mobile users of the usability of 3G phones. In addition, different stages have been implemented for adding value through mobile commerce activities, which will ultimately lead to customer satisfaction and advancement (Wang and Lu, 2008). The high rates of usage of mobile devices for paying bills, searching for shopping information and even for entertainment make mobile devices very useful for people in different cultures (Matos and Madeira, 2005). Nevertheless, people weigh up the specific outcomes and advantages of mobile usage against electronic commerce.

According to Braun (2013), trust and usefulness are found to be significant predictors of intention to use social networking Web sites. PU has been confirmed as the main factor for the adoption of hotel services in the industry (Morosan, 2012) and online shopping behavioral intention (Rezaei and Amin, 2013). Mobile services aim to provide customers with flexibility of access and use of many applications; however, PU of this technology is not regarded by consumers as the main antecedent (Revels *et al.*, 2010).

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Different people may have perceptions of usage as a concept. Most people compare the advantages of using IT to offline activities in the marketplace (Rouibah *et al.*, 2011). Accordingly, the development of mobile technology and its prospective development is a part of different factors which force customers to perceive usability (Alahuhta *et al.*, 2005). In the past few years, scholars have begun to focus on several factors relating to mobile commerce (Mallat *et al.*, 2008). Moreover, when consumers surf the Web sites of mobile service providers, the most obvious question they ask relates to operator trust. PU has been found to be a significant factor affecting initial usage and continued usage (Detlor *et al.*, 2013).

The results suggest that the intention to continue using microblogging is directly affected by PU and user satisfaction (Zhao and Cao, 2012). Park *et al.* (2013) found that satisfaction plays a crucial role in determining PEOU and PU of navigation systems. Lin and Wang (2006) have claimed that trust is a critically important factor in user satisfaction and loyalty. On the other hand, if consumers find online vendors to be truthful, they are satisfied and tend to show greater loyalty. Research has found that initial trust will affect PU. Lee and Jun (2007) have found that PU and PEOU are important predictors of consumer trust in the context of mobile commerce. Moreover, consumer satisfaction is considered to be the main construct for expansion through positive word of mouth (Türkyilmaz and Özkan, 2007). Lee and Jun (2007) have argued that consumer satisfaction in a mobile commerce context can also be explained by PU, which is the key construct of the TAM. Therefore, the following hypotheses are proposed:

H3. There is a positive relationship between PU and trust.

H4. There is a positive relationship between PU and mobile user satisfaction.

2.4 Trust

A study (Rose *et al.*, 2012) found that online customer satisfaction has both a direct and indirect relationship with repurchase intention via online trust. As trust has been critically important in the profitability of online vendors, the same also applies to mobile recommendation and practice (Mallat *et al.*, 2008). In this study, we define trust as the overall perception of users concerning the trustworthiness of mobile services. Even in mobile commerce, users seem to have more trust in providing information than in an online environment. A major challenge for online marketers is to identify and understand the factors that influence customers' trust (Kautonen *et al.*, 2007) and organizational governance (Wang and Lu, 2012). The relationship between trust and TAM in the context of online shopping has rarely been investigated (Kim, 2012).

Drawing upon the literature, trust and satisfaction are two strongly related constructs (Liébana-Cabanillas *et al.*, 2013; Zhu *et al.*, 2014). Although the concept of trust is the most important attribute of e-vendors, through which consumers respond to marketing activities (Kim, 2012; Morgan and Hunt, 1994), only a few empirical studies examine this concept specifically in relation to mobile commerce (Lin *et al.*, 2013). In previous studies (Rezaei and Amin, 2013; Chen, 2013), trust has been shown as a significant factor in influencing consumer behavior toward a specific technology, especially in uncertain environments, such as e-commerce (Zarmpou *et al.*, 2012). Like online transactions, mobile commerce also involves a great degree of uncertainty and

risk. Thus, trust is critical to facilitate mobile user behavior. The growth of mobile commerce has led to a desire to better understand how trust can be built in terms of mobile devices (Li and Yeh, 2010). Customer satisfaction is, therefore, considered to influence trust and customer retention (Lin and Wang, 2006). Most people are more inclined to place their trust in mobile devices than in Internet activities and shopping. Therefore, we hypothesize:

H5. There is a positive relationship between trust and mobile user satisfaction.

3. Research methodology

The target population of this study were mobile phone users in Malaysia. A purposive sampling technique was used to distribute the questionnaires to respondents. A total of 500 questionnaires were distributed to respondents. To measure PU, three items were adapted from previous studies (Wang and Liao, 2007; Davis *et al.*, 1989; Zhou, 2011b). Three items to measure PEOU were adapted from Davis (1989a); Davis (1989c); and Zhou (2011b). Meanwhile, four items to measure trust were adapted from Zhou (2011). A 5-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5), was used to measure levels of PU, PEOU and trust. To measure mobile user satisfaction, four items were adapted from Wang and Liao (2007) and Revels *et al.* (2010). In addition, to measure customer satisfaction, a 5-point scale, ranging from "very dissatisfied" (1) to very satisfied' (5), was used.

Structural equation modeling was used to evaluate the causal model and confirmatory factor analysis (CFA) (Harrington, 2008) was performed to examine the reliability and validity of the measurement model. To enhance the validity of the measurement item of the proposed model, a pretest and a pilot survey were conducted before the main survey. The 25 sets of questionnaires were distributed among mobile phone users on the first day of the exhibition in the Klang Valley in Malaysia. Subsequently, the reliability analysis was conducted, resulting in overall Cronbach alphas of > 0.60. Based on the information and analysis derived from the pilot survey, the questionnaires were amended and improved accordingly before the actual data collection took place.

4. Results

4.1 Demographic

Table I sets out the descriptive statistics of the respondents in this study. A total of 500 questionnaires were distributed, and 302 were returned (60.4 per cent response rate). Of the respondents, 52.6 per cent were female and 47.4 per cent male. In terms of race, the sample comprised Malays (31.1 per cent); Chinese (31.5 per cent); Indians (19.9 per cent); and Iranians, Africans and Arabs (17.5 per cent).

4.2 Measurement model evaluation

A two-stage analysis procedure was utilized to test the measurement model in this study. First, CFA was used to specify the pattern in which each measure loads on a particular factor (Anderson and Gerbing, 1988; Byrne, 2001; Tatham *et al.*, 2006; Hair *et al.*, 1998; Byrne, 2013). Second, the squared multiple correlation was conducted to measure each indicator and how well an item measures a construct (Hair *et al.*, 1998; Holmes-Smith, 2001). The first run of squared multiple correlation showed that the majority of the measurement items were > 0.5, which indicated good reliability

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Demographic profile		Frequency (%)		(%)
Gender	Male	47.4	Female	52.6
Age	< 20 years	28	Between 21 and 25 years	39
	26-30 years	12	> 31 years	21
Race	Malay	31.1	Chinese	31.5
	Indian	19.9	Iranian, African and Arabian	17.5
Marital status	Single	59	Married	41
Income	Below RM3000	42.7	RM3100-5000	31.8
	RM5100-10000	19.5	More than RM10000	6.0
Religion	Muslim	43	Buddhist	11.9
	Hindus	11.6	Christians	23.5
	Other religions	9.9		
Education level	Diploma	18	Bachelor's degree	43
	Master's	24	Ph.D.	15
Occupation	Professional	21.5	Senior	23.5
	Students	21.5	Business owners	11.9
	CEO	7.6	Other occupations	13.9
Type of mobile service operators used by respondents	Maxis	24.2	Celcom	21.5
	Digi	9.9	U Mobile	3.6
	Tune talks	20.9	Other mobile users	19.9

Table I.
Summary of demographic characteristics of respondents

(Holmes-Smith, 2001). By checking the squared multiple correlations for each measurement item, one item was dropped, as the R^2 values were < 0.5. A re-run CFA was conducted, and the results of the measurement model showed a fit with the sample data. Table II shows the factor loadings, Cronbach's alpha, average variance extracted (AVE) for PU, PEOU, trust and customer satisfaction.

To test the reliability of PU, PEOU, trust and customer satisfaction instruments, the Cronbach's alpha coefficient was computed. The coefficient alpha exceeded the minimum standard of 0.70 (Nunnally and Bernstein, 1994), which indicated that it provided a good estimate of internal consistency. The coefficient alpha obtained greatly exceeded the minimum acceptable values 0.918, 0.912, 0.932 and 0.926, respectively for PU, PEOU, trust and mobile user's satisfaction and proved to have good internal consistency for each latent construct (Burton *et al.*, 1998). To assess the convergent validity for each construct, the standardized factor loadings were used to determine the validity of the three constructs (Anderson and Gerbing, 1988; Yang and Jolly, 2008). The findings indicated that each factor loading of the reflective indicators ranged from 0.855 to 0.906 and exceeded the recommended level of 0.50. As each factor loading on each construct was greater than 0.50, the convergent validity for each construct (PU, PEOU, trust and customer satisfaction) was established, thereby providing evidence of construct validity for all the constructs in this study (Anderson and Gerbing, 1988; Hair *et al.*, 1998). In addition, AVE was calculated for assessing discriminant validity for four constructs (Hair *et al.*, 1998), and the AVE ranged from 0.74 to 0.78. Table III shows the discriminant validity of the construct, as the square root of the AVE between each pair of factors is greater than the estimated correlation between factors, thus ratifying its discriminate validity (Hair *et al.*, 1998; Bagozzi and Yi, 1988).

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Research construct	Factor loadings	AVE	α
PU		*0.780*	*0.918*
This mobile site makes my work and life easier	0.891		
This mobile site allows me to easily acquire the information I need	0.890		
Overall, this mobile site is useful	0.880		
PEOU		*0.770*	*0.912*
Learning to use this mobile site is easy	0.856		
Becoming proficient in using this mobile site is easy	0.906		
Overall, this mobile site is easy to use	0.882		
Trust		*0.770*	*0.932*
Based on my experience with the mobile commerce vendor in the past, I know it is honest	0.876		
Based on my experience with the mobile commerce vendor in the past, I know it cares about customers	0.899		
Based on my experience with the mobile commerce vendor in the past, I know it is not opportunistic	0.887		
Based on my experience with the mobile commerce vendor in the past, I know it is predictable	0.859		
Mobile customer satisfaction		*0.740*	*0.926*
I am satisfied with this mobile commerce Web site	0.871		
The mobile commerce Web site is successful	0.869		
The mobile commerce Web site has met my expectations	0.855		
I feel pleased with my overall experience of using mobile services	0.875		

Table II. Validity and reliability for the dimensions of PU, PEOU, trust and mobile customer satisfaction

Research construct	PU	PEOU	Trust	Satisfaction
PU	*0.912*			
PEOU	0.645	*0.917*		
Trust	0.429	0.665	*0.932*	
Satisfaction	0.551	0.673	0.692	*0.924*

Notes: diagonal: correlation estimated between the factors; diagonal: square root of AVE

Table III. Discriminant validity of perceived usefulness, perceived ease of use, trust, and mobile customer satisfaction

4.3 Structural equation modeling

Table IV indicates that that the indices fit the model. The chi-square is significant (χ^2 = 280.075, χ^2/degrees of freedom [χ^2/df]) ratio = 3.890, p = 0.001). The chi-square value has a fundamental problem from the perspective of validity and is sensitive to the sample size (Sharma, 1996). As the Goodness-of-fit index (GFI) and Comparative fit index (CFI) values are not affected by the sample size, the GFI and CFI indicators are used to determine the model fit (Burton *et al.*, 1998). The two fit indices for CFI and Tucker–Lewis index (TLI) are greater than the 0.90 threshold for acceptability, and the GFI value of 0.890 is lower than the commonly cited threshold of 0.90; however, this value is within the recommended range (Hair *et al.*, 1998). Table IV shows the structural model and the effect of PU, PEOU and trust on customer satisfaction ($p < 0.001$). The

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results show that PEOU has a positive relationship with PU, and PEOU with mobile user satisfaction. Thus, *H1* and *H2* are supported. *H3*, which states that PU has a positive relationship with mobile user satisfaction and trust, was supported. Moreover, there is a positive relationship between PU, and trust and satisfaction, thus, *H4* and *H5* are supported.

5. Discussion and business implications

The purpose of this study is to determine the impact of PU, PEOU and trust on mobile Web site satisfaction in Malaysia. The research objectives of the study were translated into five hypotheses. Thus, the relationship between all the research antecedents and the dependent variable were found to be significant. Product designers need to consider a range of consumer tastes and preferences to design a product that achieves consumer satisfaction. As suggested by our proposed model, customer satisfaction should develop if the formation of PU, PEOU and trust is appropriately managed. Mobile user satisfaction has traditionally been used as a surrogate for the success of information systems, and, as such, has been frequently measured in previous studies (Wang and Liao, 2007). It is strongly recommended that trust should also be examined as a driving factor in the area of mobile commerce (Zarmpou *et al.*, 2012).

PU has been included as a construct in a number of surveys for different types of technology systems such as mobile payments, mobile commerce, mobile data services, application frameworks, e-CRM and, generally, technology adoption models (Zarmpou *et al.*, 2012). Recently, the potential for using mobile commerce applications led many organizations to expend substantial resources on these technologies. Mobile service providers could expand their activities and gain greater customer satisfaction by implementing the findings of this study. Based on the results and findings, this research suggests some strategies for marketing managers to enhance PEOU, PU and trust. The constraints of mobile terminals, such as small screens, inconvenient input and slow responses, may negatively affect user experience and, consequently, their satisfaction (Zhou, 2011b).

To enhance PU, managers should realize that mobile sites should make users' work and life easier, allow users to easily acquire the information they need and, more generally, be perceived as useful. Accordingly, to improve PEOU, learning to use a mobile site should be easy, becoming proficient in the use of a mobile site should be easy and, overall, a mobile site should be perceived as being easy. Moreover, to enhance trust, users' experience with the mobile commerce vendor should be that they are honest. In

Research construct	Estimate	*p*-value
PU ←PEOU	0.645	0.000*
Trust ← PU	0.665	0.000*
Satisfaction ← Trust	0.438	0.000*
Satisfaction ← PU	0.253	0.000*
Satisfaction ← PEOU	0.200	0.000*

Table IV. Standardized regression weight for the research model

Notes: chi-square (χ^2 = 280.075), CMIN/DF = 3.890, GFI = 0.890, CFI = 0.946; RMSEA = 0.09; *Significant at $p < 0.05$

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addition, mobile commerce vendors should care about their customers, should not be opportunistic and should be predictable. Therefore, an emphasis on PEOU, PU and trust would lead to consumer satisfaction with mobile commerce Web sites; mobile commerce Web sites would be successful as they would have met user expectations and users would feel pleased with their overall experience of using mobile services.

The mobile marketer should understand the importance of the convenience of the services provided. This is considered as the first variable for user satisfaction, which is referred to as "user-friendliness" in most literature. From the statistical analysis of data in the previous chapter, the target population of the study almost all agree that the mobile service provided in Malaysia is easy to use. Generally, they were satisfied with the services provided by mobile operators. Furthermore, in this study, PEOU was found to be a significant predictor of usefulness. Thus, the findings of this study are consistent with previous related studies on electronic commerce and mobile commerce. From the marketing standpoint, the service provided to target customers should be tangible. The services provided in Malaysia are a case in point. In fact, they provide services that are perceived as convenient and relatively useful for the target market segments. Therefore, marketers should target their segment based on the consumers' degree of information technology literacy.

Nowadays, online transactions and mobile transactions are tied together. In fact, to perform online transactions, customers are required to provide their phone numbers. This all makes sense in understanding and determining the critical role of trust in e-commerce. The importance of trust is highlighted in electronic and mobile commerce because of the spatial and temporal separation between the buyer and seller and because buyers are required to provide sensitive personal information, such as telephone numbers or credit card details, to the seller (Mallat *et al.*, 2008). Interestingly, the relationship between trust and satisfaction was significant. Thus, trust can be used to predict customer satisfaction among mobile users. Mobile marketers should determine their target market and allocate a reasonable marketing budget to convince their users that they are honest and trustworthy service providers. The finding is consistent with previous related studies in e-commerce, especially pertaining to online shopping.

The usefulness of a product or service is dependent upon customer intent and satisfaction. This study found a significant relationship between PU and satisfaction among mobile users. In addition, PU was found to be the main predictor factor for trust. This strengthens the rule of value and usability of technology in gaining customer satisfaction and loyalty. Marketing managers should determine the cost of operations for which users are paying and find ways of managing the value as perceived by target customers. PU is one of the basic factors of innovation usage, which is related to the utilitarian value that mobile technology provides to customers (Revels *et al.*, 2010). On the other hand, mobile service providers must examine and truly understand the importance of utilitarian value for the target market to devise an effective positioning strategy. In this way, they can manage spam messages. In fact, mobile marketers should not allow the operators to send unrelated SMS and MMS to their users. This helps to enhance the usefulness of the services provided by operators.

5.1 Limitations and directions for future research

Similar to other studies, this study has limitations that need to be addressed in future research. First, this study did not examine the role of culture in the area of mobile

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satisfaction. Despite the rapid acceptance of mobile phone use around the world, the social and cultural impacts of mobile phones have so far attracted little academic attention; however, there are a small number of research projects that deal with the social implications of mobile phone use in various countries (Park, 2005). Future research should draw on the research constructs of this study to examine the impact of culture on mobile user satisfaction in different cultures and countries. Thus, a cultural comparison is needed. The second limitation in this study concerns the type of data collection method. Future research should use a longitudinal approach to examine and determine mobile user satisfaction. Finally, future studies should compare the satisfied respondents with the dissatisfied respondents in respect of mobile satisfaction to understand the pros and cons of the marketing strategies being implemented by mobile service providers.

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Corresponding author
Muslim Amin can be contacted at: tengkumuslim@yahoo.com

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