Mobile marketing in the 21st century: a partial least squares structural equation modelling approach

Vic-Qi Pan

YToday Sdn Bhd,
C-16-05, Kompleks Rimbun Scott (The Scott Garden),
289 Jalan Klang Lama,
58100 Kuala Lumpur, Malaysia
Email: viqipan@gmail.com

Pai-Qin Chew

Crystal Edge Sdn Bhd,
D3-U6-10, Solaris Dutamas,
No.1, Jalan Dutamas 1,
50480 Kuala Lumpur, Malaysia
Email: heakee0531@hotmail.com

Amy Shun-Gui Cheah

Q-Value Add Sdn Bhd,
46-10-12, Jalan Besi Greenlane Height,
11600 Penang, Malaysia
Email: amy_115011@hotmail.com

Choy-Har Wong

Wawasan Open University,
80 Persiaran Green Hill,
30450 Ipoh, Perak, Malaysia
Email: wongch2008@gmail.com

Garry Wei-Han Tan*

Asia e University,
Dataran Kewangan Darul Takaful,
No 4, Jalan Sultan Sulaiman,
50000 Kuala Lumpur, Malaysia
Email: FOWLER_1982@yahoo.com
*Corresponding author

Abstract: Mobile marketing (m-marketing) adoption has not been a preferred selection among consumers although the benefits are tremendous. As the cost of implementing the system can be expensive the study explores on the factors that influence the decision of consumers to adopt m-marketing. Using technology acceptance model (TAM), the framework was extended with social influence (SI), personal innovativeness in information technology (PIIT) and perceived enjoyment (PE). The data was collected from 108 users using self-administered questionnaire and subsequently tested using SmartPLS. Only PIIT is a non-significant construct based on the investigation. The findings bring significant benefits to marketers who wish to integrate m-marketing in their advertising budget. In addition, the study provides unprecedented methods in reaching to mobile consumers.

Keywords: mobile marketing; technology acceptance model; SmartPLS; perceived enjoyment; social influence; personal innovativeness in information technology; PIIT; Malaysia.

Reference to this paper should be made as follows: Pan, V-Q., Chew, P-Q., Cheah, A.S-G., Wong, C-H. and Tan, G.W-H. (2015) 'Mobile marketing in the 21st century: a partial least squares structural equation modelling approach', *Int. J. Modelling in Operations Management*, Vol. 5, No. 2, pp.83–99.

Biographical notes: Vic-Qi Pan received her Bachelor of Marketing from Universiti Tunku Abdul Rahman. She is a Youth Coordinator at a technology startup named YouthsToday.com, a sponsorship and event matching platform for youths and brands. She has engaged over 200 youth and volunteers by connecting them with interactive experiences in 2014 with augmented reality technology in digital devices from the South East Asia largest augmented reality hunt.

Pai-Qin Chew received her Bachelor of Marketing from the Universiti Tunku Abdul Rahman. She graduated in 2013 and has joined Crystal Edge since as a Professional Conference Organiser. She has been exposed to different sorts of events and is actively involved in organising events scaling from a niche 20 high level profession breakfast session to a 500 attendees seminar to a two-day conference and she is also exposed to VIP management. She is also supporting the regional office for outbound conferences and events in Singapore, Thailand and Vietnam.

Amy Shun-Gui Cheah earned her Bachelor of Marketing degree from Universiti Tunku Abdul Rahman in 2013. She was exposed to sourcing experience from her previous role as Supply Chain Officer with SAM Meerkat (M) Sdn Bhd. Subsequently, she joined a global sourcing solutions company named Q-Value Add SdnBhd as Order Processing Officer. She is also involved in logistics field by handling local and overseas inbound and outbound shipments.

Choy-Har Wong is an Administrative Staff at the Faculty of Business and Finance, Universiti Tunku Abdul Rahman, Malaysia. She received her Bachelor of Business (Hons) in Accounting from Wawasan Open University, Malaysia.

Garry Wei-Han Tan is currently pursuing his PhD degree at Asia e University, Malaysia. He obtained his Master of Science in Management from University of Edinburgh, UK, in 2008 and in 2005, a Bachelor in Economics (Hons.) from University of Malaya, Malaysia. He also holds two insurance diplomas with

Honours from LOMA Society, USA. In addition, he is also the SiRC visiting scholar at Wee Kim Wee School of Communication and Information, Nanyang Technology University, Singapore.

1 Introduction

The rapid technology advancement of mobile technologies has increased the number of users using mobile devices (m-devices) (Kumari et al., 2014). As m-devices are said to be third screen communication (Deans and Gray, 2010), marketers are adopting this new opportunity to deliver information regarding their products and services to their potential target market. According to Pousttchi and Wiedemann (2006), mobile marketing (m-marketing) adopts mobile communication techniques in promoting goods, services and ideas. Similar sentiment was echoed by Deans and Gray (2010), whereby m-marketing is attributed to the evolution of e-commerce by using mobile medium as a form of marketing communications. There are varieties of technological platforms that support m-marketing applications. They include the engagement of multimedia message service (MMS) and short message service (SMS) (Park et al., 2008). Keshtgary and Khajehpour (2011) concluded that SMS brings about 90% of the revenue for mobile market. Many researches on mobile technologies have been conducted to date and have proven the benefits of m-devices. M-devices for example were found to be an attractive media to communicate directly with consumers who are always on-the-go. While m-marketing benefits are potential, and the adoption is said to be increasing (Becker, 2005), marketers have only little understanding of the factors affecting m-marketing (Vantanparast and Butt, 2010). M-device is viewed as a necessary component among the Malaysian society for communication. In order to communicate with their friends, colleagues and family members, Malaysians are gradually adopting m-devices as compared to wired line (Sheeren and Rozumah, 2009). According to Tan et al. (2011), the population of Malaysia is about 28 millions. Statistics by Malaysia Communication and Multimedia Commission (2012) pointed out that there are above 35 million mobile phone subscribers in Malaysia. With mobile subscriber penetration rates above 100%, the acceptance towards m-marketing in Malaysia remains uncertain. Similarly, there are a numbers of mobile researches which focused on one single element of research such as mobile credit card (Tan et al., 2014a), mobile payment (Teo et al., 2015), mobile shopping (Wong et al., 2015a) and mobile banking (Teo et al., 2012). However, there is a serious neglecting on the acceptance of m-marketing (Bauer et al., 2005).The studies on m-marketing so far focused on specific viewpoints (Gao et al., 2013; Goneos-Malka et al., 2014; Ström et al., 2014). Wong et al. (2015b) concluded that consumers have negative attitudes towards the acceptance of advertisement on m-devices. Thus, to what extent can the consumers accept m-marketing remained unclear (Gao et al., 2010). Hence, in this paper, we intend to explore on the factors that influence consumers' acceptance of m-marketing. The structure of the research paper is based on the subsequent followings. Relevant theoretical models pertaining to the adoption of m-marketing will be presented in the following section. This is follow by our research framework, hypotheses development and the description of the methodology of study. Subsequently, we report on the results and discussion of our empirical study. Lastly, the

limitations, implications, suggestions and conclusion for future studies are discussed in the final section.

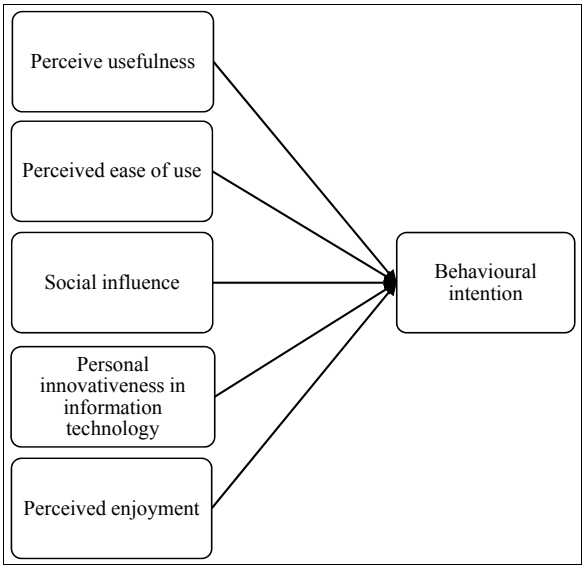
2 Literature review

2.1 Factors that drive m-marketing adoption

Numerous frameworks have been introduced to explain the influence on users' acceptance towards new technologies such as 'theory of reasoned action' (TRA) (Fishbein and Ajzen, 1975), 'theory of planned behaviour' (TPB) (Ajzen, 1985), 'technology acceptance model' (TAM) (Davis et al., 1989) and 'diffusion of innovation theory' (DOI) (Rogers, 1995). According to TAM, the behavioural intention (BI) to use an information system (IS) is dependable on user's belief. Perceived usefulness (PU) and perceived ease of use (PEOU) are the two determinants of salient belief (Sim et al., 2011). According to Pavlou (2003), the decision whether to adopt an IS relies on PU and PEOU. PU is the extent whereby an individual believes that using a particular system would improve his or her job performance (Davis, 1989). PEOU refers to the degree whereby using a particular system would require less effort based on the individual's believe (Davis, 1989). DOI on the other hand predicts and assists the success of new invention of technology by identifying the pattern of adoption (Rogers, 1995). Technology diffusion goes through five stages namely 'knowledge', 'persuasion', 'decision', 'implementation' and 'confirmation'. This multi-stages analysis provides an understanding on the process of IT diffusion and social change and how they can be solved (Brown, 1999). In addition, 'innovators', 'early adopters', 'early majority', 'late majority' and 'laggards' have been identified in the adoption process. According to Dillion and Morris (1996), DOI provides an account of how widespread use is generated from early adoption. TPB is an extension of TRA and have been widely adopted as a theory in the studies of acceptance of technology. In TRA, the belief toward a certain behaviour is determined by the individual's adoption behaviour. In their elaboration, Fishbein and Ajzen (1975) explained that individual's attitude towards the behaviour and subjective norms are influenced by BI. In TPB, an additional factor called perceived behavioural control is added. The individual's behaviour in the explanation of TPB is jointly influenced by perceived behavioural control, attitude and subjective norm. Attitude is the degree where the individual has positive or negative evaluation of behaviour; subjective norm refers to whether an individual will perform a certain behaviour due to perceived social pressure; while the individual's belief in the ease to execute behaviour defines perceived behavioural control (Ajzen, 1985). As each IS frameworks indicate pros and cons, the study applied the extended TAM to improve the forecast precision on factors influencing consumers' acceptance towards m-marketing in Malaysia. Tan et al. (2012a) explained that TAM is one the most popular model used in the explanation of new technology acceptance and thus they are considered a valid and reliable model (Sim et al., 2012). The outcomes of a certain activities performed by individuals can also be assessed clearly through their efforts as TAM is a cost-benefit model (Davis, 1989). As a result, TAM was deliberately added with three additional variables, namely social influence (SI), perceived innovation in information technology (PIIT) and perceived enjoyment (PE). The additional variables were added as consumers BI is based on the individual's intrinsic factors and also the influence from the

environment (Tan et al., 2014a; Wong et al., 2015b). Please see Figure 1 for the research model.

Figure 1 Research model



3 Hypotheses development

3.1 Perceived usefulness (PU)

PU was found to be one of the most widely studied variables in mobile technology adoptions such as mobile learning (Tan et al., 2014b), mobile music (Sim et al., 2014) and mobile payment (Leong et al., 2013). The usefulness may involve time saving and an improvement in the effectiveness in an individual's work (Tan et al., 2010). M-marketing comprises of numerous services such as retailers information, news, discounts, promotion, location and etc. In view of the features of m-devices such as ubiquitous access to information, anywhere and anytime (Chong et al., 2011), m-marketing provide benefits to consumers in everyday situations better than the traditional alternatives such as e-mail (Knutsen et al., 2005). Chen et al. (2014) explained that the built-in mobile positioning systems on m-devices can be adopted to send information about a product or service when consumers are within the vicinity of the stores. Similarly, Ismail and Razak (2011) found that PU is an important predictor in the BI to adopt m-marketing in Malaysia. According to Nysveen et al. (2005), IS which will not benefit consumers, will not likely to be favourably accepted. In this study, m-marketing is more likely to be accepted if the system is able to enhance consumers' productivity. The following hypothesis is thus proposed:

H1 PU has a significant relationship towards m-marketing adoption.

3.2 Perceived ease of use (PEOU)

According to Rogers (1995), there is a discouragement in the adoption of new when the particular system is complex. Therefore, PEOU has a vital role in determining BI (Wong et al., 2015a). PEOU has been validated as an important determinant towards the adoption of information technology (IT) such as mobile learning (Tan et al., 2014b), mobile banking (Luarn and Lin, 2005) and mobile music (Sim et al., 2014). Scholars such as Luarn and Lin (2005) and McFarland and Hamilton (2006) found that when the system requires less effort, the higher chances the system will be accepted. Within the m-marketing context, consumers attribute freedom of difficulty with the adoption of m-marketing services and believe that using m-services would be effortless (Knutsen et al., 2005). Wong et al. (2015b) for example explained that bigger visual display on m-devices help consumers to search and navigate advertising information on m-devices. Assuming other variables are constant, the easier the technology to be used, the higher the possibility of users' acceptance. The following hypothesis is thus proposed:

H2 PEOU has a significant relationship towards m-marketing adoption.

3.3 Social influence (SI)

SI is the perception whether an individual should or should not use an innovation based on the perception of others believes (Venkatesh and Morris, 2000). SI has been widely adopted in past mobile studies such banking (Teo et al., 2012) and shopping (Wong et al., 2012). SI which derives from TPB and TRA (Venkatesh et al., 2003) consists of components such as voluntariness, image and subjective norm. Image is the level in which the perception of one's image or social status is being enhanced as a result of the use of new innovation in their social system (Moore and Benbasat, 1991). Teo and Pok (2003) explained that the motivation among individuals to adopt an innovation is the desired to increase social status which they wanted to be perceived as technology savvy and trendy. Fishbein and Ajzen (1975) defined subjective norm as the perception of consumers if they should or should not perform the behaviour as a result of what other important people thinks. Influences from friends, relatives, superiors, peer groups, television and interactive media may exert influence on users' adoption towards m-marketing (Lopez-Nicolas et al., 2008). Potential adopters are exposed to their social networks in which the advantages of m-marketing are discussed. Based on the interactions, the potential adopters' decision and opinion could be affected. As SI has an important role towards the adopt intention of new technology (Karahanna and Straub, 1999), the adoption of m-marketing is likely to be influenced by this construct. The following hypothesis is thus proposed:

H3 SI has a significant relationship towards m-marketing adoption.

3.4 Personal innovativeness in information technology (PIIT)

PIIT is a trait which explains the willingness of an individual to try new technology (Agarwal and Prasad, 1998). According to Wood and Swait (2002), the acceptance of new products and services is conceptualised in consumer innovativeness in which has been used to investigate users' behaviour. Rogers (2003) found that innovative users are more positive on the acceptance of new technology. In addition, they also have a higher

tendency in developing positive beliefs on new technology particularly through the merging of information from a variety of media (Agarwal and Prasad, 1998; Gao et al., 2013). Lu and Su (2009) explained that highly innovativeness users have high risk proportion and are active searching for information on new ideas. Simultaneously, past study found that innovative users are more open-minded and have lower risk (Joseph and Vyas, 1984). Besides, Lu et al. (2008) also suggest that positive intention to use an innovation is expected to develop from individuals with higher level of innovativeness. Thus, these characteristics are important to help consumers to accept new technology which otherwise is neglected due to fear and anxiety (Wong et al., 2015b). Tan et al. (2014a) conducted a survey towards the adoption of NFC mobile credit card among consumers in Malaysia and the results indicated that PIIT has a relationship with the BI. Thus, we proposed that the PIIT might have a significant relationship toward the adoption of m-marketing. The following hypothesis is thus proposed:

H4 PIIT has a significant relationship towards m-marketing adoption.

3.5 Perceived enjoyment (PE)

PE can be defined as the extent which the usage of certain technology on activity is perceived to be enjoyable (Davis et al., 1992). According to Al-Gahtani and King (1999), PE is the degree of enjoyment when adopting m-marketing services and is an internal motivation. In the case of mobile services, consumers will experience enjoyment which derived from fun and playfulness while using such services (Hoffman and Novak, 1996). Chen et al. (2014) for example explained how iAd adopts unique and unorthodox methods such as interactive games and video contents to attract consumers' attention. Likewise, previous studies also found a positive relationship between PE and adoption and mobile services usage (Hoflich and Rossler, 2001). These findings have proven that the perception of fun, playfulness and enjoyable situations among consumers help to increase the patronage of new innovative technologies. Hence, the following hypothesis is proposed:

H5 PE has a significant relationship towards m-marketing adoption.

4 Research methodology

4.1 Sampling and data collection

The data for the study is collected from young consumers who are between 16–24 years old. There are three reasons why this group is targeted. Firstly, according to Malaysia Communication and Multimedia Commission (2012), age group of 20–24 years old have the highest subscription rate of m-devices which is at 17.3%. Secondly, according to World Health Organisation (2011), 16.7% of total employment in Malaysia is aged between 15–24 years old in which they would have the financial ability to respond towards m-marketing activities. Lastly, young consumers represent the next generation with the spending power ability and the potential to become lifetime customers (Bush et al., 2004). The study was conducted at one of the major shopping malls in Klang Valley, Malaysia. Klang Valley has a population of approximately six million people which represents 20% of the Malaysia population (Ministry of Federal Territories and

Urban Wellbeing, 2011). Klang Valley is a good sampling location because of the high population density. In addition, Klang Valley in 2010 contributes to about RM263 billions to the Malaysia's gross national income. 130 self-administered questionnaires were distributed throughout the period of two weeks. Using a systematic sampling method, every third participants who enter the mall were approached politely if they are willing to participate in the survey. The study also added an additional requirement whereby the participants must own at least an m-device (e.g., basic phone, PDA or smart phone). Once the participants have fulfilled the above requirements, they were allowed to fill out the questionnaires. At the end of the survey, 22 questionnaires were discarded due to missing data and thus the respond rate is 83.07%.

4.2 Variable measurement

The predictors and response variables of the study were adopted from mobile scholars in Malaysia such as Tan et al. (2014b) and Wong et al. (2015a). In addition, a seven-point Likert scale ranging from 'strongly disagree' to 'strongly agree' were used to measure the survey items. The sources of each of the questionnaires items are shown in Table 1.

Table 1 Constructs and sources of questionnaire items

Constructs	*Number of items*	*Sources*
Perceived usefulness (PU)	6	Tan et al. (2014b)
Perceived ease of use (PEOU)	5	Tan et al. (2014b)
Social influence (SI)	5	Tan et al. (2014b)
Personal innovativeness in information technology (PIIT)	4	Tan et al. (2014b)
Perceived enjoyment (PE)	4	Wong et al. (2015a)
Behavioural intention (BI)	3	Tan et al. (2014b)

5 Data analysis

5.1 Profile of respondents

Table 2 summarised the profile of respondents. 56.5% of the respondents were female while 43.5% were male. 64.8% of the respondents are between 21 to 24 years old while 35.2% are between 16 to 20 years old. In terms of their academic level, 45.4% have a bachelor degree. Among the respondents, 87.9% owned a smart phone, 10.2% owned a basic phone and 1.9% owned a personal digital assistant. Lastly, on the reactions towards m-marketing, 25% were reported between seven to nine times, 22.2% were reported to be above ten times while 6.5% were reported to have no experience.

Table 2 Demographic profile of respondents

		Frequency	*Percent*
Gender	Male	47	43.5
	Female	61	56.5
Age	16–20 years old	38	35.2
	21–24 years old	70	64.8
Marital status	Single	102	94.4
	Married	6	5.6
Highest academic level	Secondary school	15	13.9
	College school	22	20.4
	Diploma/advanced diploma	21	19.4
	Bachelor degree	49	45.4
	Master degree	1	0.9
Devices	Basic phone	11	10.2
	Personal digital assistant (PDA)	2	1.9
	Smart phone	95	87.9
In the past one year, how many times have you reacted towards those mobile marketing?	None	7	6.5
	1–3	16	14.8
	4–6	34	31.5
	7–9	27	25.0
	More than 10 times	24	22.2

5.2 Data analysis

SmartPLS version 2.0 software (Ringle et al., 2005) was applied in partial least squares structural equation modelling (PLS-SEM) approach to analyse the research hypotheses. The main reason to use PLS-SEM is due to the suitability in analysing small sample sizes (Chin et al., 2003). Following the suggestion by Anderson and Gerbing (1988), two-steps analytical procedures were evaluated on the measurement and structural models. The bootstrapping method (5,000 resamples) was employed to test the significance level of path coefficients and loadings.

5.3 Common method variance testing

The aim of conducting Harman's single factor test is to examine the existence of common method variance as the data was collected from single respondents. Finding from the Harman's single factor test using extraction method of principal axis factoring is 27.434%, which does not exceed 50% as recommended by Delerue and Lejeune (2010). Therefore, it is deemed that no common method variance exists.

5.4 Measurement model evaluation

In the first stage, factor loadings, average variance extracted (AVE) and composite reliability (CR) were examined to assess convergent validity in according to Hair et al.

(2010). Convergent validity indicates "the extent to which different measures refer to the same conceptual construct" [Dinev and Hart, (2004), p.417]. As shown in Table 3, all factor loadings were exceeded 0.50 as proposed by Fornell and Larcker (1981). In addition, values of AVE were greater than 0.50 and CR were above 0.70 which have met the minimum cut-off points as recommended by Kline (1998) and Molina et al. (2007) respectively (Table 4). In the next stage, discriminant validity assesses "the extent to which the measure is adequately distinguishable from related constructs within the nomological net" [Dinev and Hart, (2004), p.417]. All the correlations values as presented in Table 4 were lower than the square root of the AVE. These results therefore can be assumed that both convergent and discriminant validity were established.

Table 3 Factor loadings and cross loadings

	BI	*PE*	*PEOU*	*PIIT*	*PU*	*SI*
BI1	**0.8642**	0.4556	0.4918	–0.0424	0.5638	0.4436
BI2	**0.9487**	0.4696	0.6091	–0.1929	0.7271	0.5378
BI3	**0.9471**	0.4978	0.5797	–0.1761	0.7361	0.5108
PE1	0.3425	**0.8869**	0.0689	0.2986	0.5205	–0.0140
PE2	0.4894	**0.8923**	0.1781	0.1645	0.5937	0.1340
PE3	0.5144	**0.9209**	0.1911	0.2361	0.5850	0.1224
PE4	0.4678	**0.8940**	0.1744	0.0935	0.4820	0.0897
PEOU1	0.4457	0.0972	**0.7538**	–0.2264	0.2530	0.5614
PEOU2	0.4414	0.0262	**0.7222**	–0.1903	0.2987	0.4667
PEOU3	0.5094	0.2291	**0.7694**	–0.1666	0.3127	0.4176
PEOU4	0.4058	0.1001	**0.7273**	–0.2695	0.2837	0.5048
PEOU5	0.4793	0.1933	**0.7733**	–0.2545	0.3125	0.5216
PIIT1	–0.1766	0.1655	–0.3094	**0.9226**	0.0355	–0.2772
PIIT2	–0.1133	0.1770	–0.2085	**0.8893**	0.0841	–0.2402
PIIT3	–0.0915	0.2571	–0.2290	**0.8369**	0.0998	–0.1873
PIIT4	0.0050	0.2193	–0.1558	**0.7708**	0.1194	–0.0813
PU1	0.5833	0.5193	0.2811	0.1410	**0.8028**	0.1904
PU2	0.6158	0.5205	0.3292	0.0856	**0.8434**	0.2450
PU3	0.5662	0.5109	0.2813	0.0254	**0.8205**	0.2788
PU4	0.6420	0.5334	0.2741	0.0899	**0.8672**	0.3191
PU5	0.5921	0.5098	0.2764	0.0598	**0.7862**	0.2240
PU6	0.6388	0.4142	0.4718	–0.0412	**0.8040**	0.3505
SI1	0.4105	0.1477	0.4972	–0.2398	0.2591	**0.8364**
SI2	0.4817	0.0160	0.5166	–0.2200	0.2024	**0.7888**
SI3	0.3818	0.0651	0.4868	–0.1927	0.2374	**0.7911**
SI4	0.3925	0.0942	0.5111	–0.2435	0.3237	**0.7750**
SI5	0.4462	0.0855	0.5569	–0.1888	0.2753	**0.7358**

Notes: The bold numbers are factor loadings; BI = behavioural intention; PE = perceived enjoyment; PEOU = perceived ease of use; PIIT = personal innovativeness in information technology; PU = perceived usefulness; SI = social influence.

Table 4 AVE, CR and discriminant validity

	AVE	*CR*	*BI*	*PE*	*PEOU*	*PIIT*	*PU*	*SI*
BI	0.8480	0.9435	**0.9209**					
PE	0.8075	0.9438	0.5147	**0.8986**				
PEOU	0.5618	0.8649	0.6116	0.1781	**0.7495**			
PIIT	0.7341	0.9166	–0.1558	0.2131	–0.2926	**0.8568**		
PU	0.6742	0.9254	0.7399	0.6096	0.3905	0.0724	**0.8211**	
SI	0.6179	0.8898	0.5425	0.1015	0.6562	–0.2761	0.3284	**0.7861**

Notes: AVE = average variance extracted; CR = composite reliability.
Diagonal elements (bold) are the square root of the AVE for each construct.
Off-diagonal factors demonstrate the inter-correlations.
BI = behavioural intention; PE = perceived enjoyment;
PEOU = perceived ease of use; PIIT = personal innovativeness in information technology; PU = perceived usefulness; SI = social influence.

5.5 Structural model evaluation

Figure 2 and Table 5 present the structural model results. As can be seen from the findings, the constructs of PU, PEOU, SI, PIIT and PE explained 71.29% of the variance in BI. Out of the five hypotheses, four were supported, namely PU ($\beta = 0.4849$, $p < 0.01$), PEOU ($\beta = 0.2427$, $p < 0.05$), SI ($\beta = 0.1751$, $p < 0.01$) and PE ($\beta = 0.1816$, $p < 0.05$) have significant relationship with BI. However, PIIT ($\beta = –0.1102$, $p > 0.05$) does not have significant relationship with BI. Therefore, H1, H2, H3 and H5 are supported, whereas H4 is not supported. Apart from that, PU has been reported to have the strongest influence on BI.

Figure 2 Results of structural model (see online version for colours)

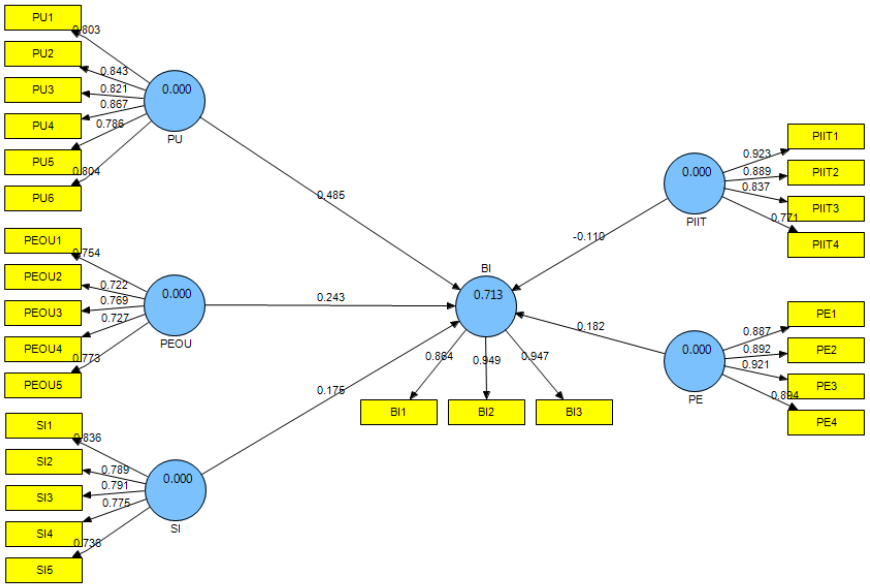


Table 5 Results of hypotheses testing

Hypotheses	*Path coefficient*	*T statistics*	*Results*
H1: PU has a significant relationship towards m-marketing adoption	0.4849	4.7171**	Supported
H2: PEOU has a significant relationship towards m-marketing adoption	0.2427	2.5731*	Supported
H3: SI has a significant relationship towards m-marketing adoption	0.1751	2.5913**	Supported
H4: PIIT has a significant relationship towards m-marketing adoption	–0.1102	1.3518	Not supported
H5: PE has a significant relationship towards m-marketing adoption	0.1816	2.1040*	Supported

Notes: $p < 0.05$*; $p < 0.01$**; PU = perceived usefulness; PEOU = perceived ease of use; SI = social influence; PIIT = personal innovativeness in information technology; PE = perceived enjoyment; BI = behavioural intention.

6 Discussion

Based on the results, PU has a significant relationship with m-marketing. Consumers perceived that using m-marketing will provide benefits in their daily lives. The finding is aligned with Tanakinjal et al. (2010) in which relative advantage also has a direct positive effect on BI to adopt m-marketing. Similarly, PEOU also shows a significant influence with BI. Users on majority found that m-marketing is easy to use. The same results collaborates finding by Revels et al. (2010) in the acceptance of mobile services and Wong et al. (2015a) on mobile shopping. Besides, SI is seen as a key inhibitor on the BI to adopt m-marketing. The finding is consistent with the study on mobile TV in Malaysia (Wong et al., 2014). Tan et al. (2010) concluded that young consumers are easily influenced by friends and family members. PIIT however is a non-significant factor in accepting m-marketing. The study is consistent with findings by Tan et al. (2015) on the adoption of personal digital assistant whereby the decision to adopt is based on rationality and benefits and not boldness and risk taking. Lastly, PE plays a vital part in determining BI. Young consumers view m-devices as their self-status in conveying personal identity. The finding is also supported by Sultan et al. (2009) in the acceptance of m-marketing.

7 Implications

The study has implications for both academicians and practitioners. In terms of the theoretical perspectives, the study has successfully extended the applicability of TAM with three additional constructs. In addition, the finding has contributed to the studies of m-marketing from the perspective of a developing nation. In terms of managerial implications, the result shows that PU has a significant relationship with BI to adopt m-marketing. Mobile marketers should focus their mobile marketing campaigns on delivering the benefits which the adoption provides, including time, effort saving, and convenience in term of receiving information and information privileges. Likewise, PEOU is also significant in this study. Mobile marketers should ensure that the

information and the procedures of using m-marketing are straight to the point and user friendly. Meanwhile, SI also plays an important role in this study. Service providers should cast their advertisement at social network sites to encourage consumers to adopt m-marketing. Besides, they can also adopt opinion leader, word-of-mouth and buzz marketing referral in their marketing strategies in order to enhance SI. PIIT however, is a non-significant factor with BI. Therefore, mobile marketers need not adopt differentiated targeting strategies in their marketing techniques. Lastly, PE is also significant with the BI. M-marketing which provides advertisements that have outside pleasure and satisfy intrinsic enjoyment would attract higher attention among consumers. Focus should be given on organising events such as games, concerts, and competitions with attractive prizes and rewards.

8 Limitations and future research directions

There are several weaknesses derive from this study. These limitations should be considered in improving future research. Firstly, the sample collected in this study is from Klang Valley and specific to young consumers whereby people from other parts of the country of different ages were excluded from the research due to time and cost constraints. Thus, the results cannot be generalised as representing Malaysia (Tan et al., 2012b). Hence, researchers may want to further research on different age groups or on multi-nationalities by expanding geographical areas for better generalisations (Lai et al., 2014). Secondly, at the same point of time the measures of constructs are collected. However, individuals' BI to accept m-marketing may change over time because of an unremitting process as an advancement of mobile technologies which will lead to the enhancement of greater experience for consumer. Hence, it is recommended to have a longitudinal research (Sit et al., 2011) in future study to evaluate m-marketing acceptance at different points of time. Finally, regarding the model of study, the independent variables chosen might be inadequate in identifying the consumers' BI to accept m-marketing. Some variables excluded in the study may be an important from the Malaysian context. Future researchers should therefore focus on other constructs such as perceived financial cost, perceived government support, perceived trust and etc.

9 Conclusions

As a conclusion, the study investigates on the acceptance of m-marketing among consumers in Malaysia. Apart from PIIT, the outcome of the results indicated that all hypotheses are accepted and supported with past research. The study serves as a guideline for future study relating to m-marketing in other emerging and established markets.

References

Agarwal, R. and Prasad, J. (1998) 'A conceptual and operational definition of personal innovativeness in the domain of information technology', *Information Systems Research*, Vol. 9, No. 2, pp.204–215.

Ajzen, I. (1985) 'From intentions to action: a theory of planned behavior', in Kuhl, J. and. Beckman, J. (Eds.): *Action-Control: From Cognition to Behavior*, pp.11–39, Springer, Heidelberg, Germany.

Al-Gahtani, S.S. and King, M. (1999) 'Attitudes, satisfaction and usage: factors contributing to each in the acceptance of information technology', *Behaviour & Information Technology*, Vol. 18, No. 4, pp.277–297.

Anderson, J.C. and Gerbing, D.W. (1988) 'Structural equation modelling in practice: a review and recommended two-step approach', *Psychological Bulletin*, Vol. 103, No. 3, pp.411–423.

Bauer, H.H., Reichardt, T., Barnes, S.J. and Neumann, M.M. (2005) 'Driving consumer acceptance of mobile marketing: a theoretical framework and empirical study', *Journal of Electronic Commerce Research*, Vol. 6, No. 3, pp.181–192.

Becker, M. (2005) *Effectiveness of Mobile Channel Additions and A Conceptual Model Detailing the Interaction of Influential Variables* [online] http://www.iloopmobile.com/news/mb_research_111705.htm (accessed 30 January 2015).

Brown, K.M. (1999) [online] http://hsc.usf.edu/~kmbrown/difusion_of_Innovation_Overview.html (accessed 30 January 2015).

Bush, A., Martin, C. and Bush, V. (2004) 'Sports celebrity influence on the behavioral intentions of generation Y', *Journal of Advertising Research*, Vol. 44, No. 1, pp.108–118.

Chen, P., Cheng, J., Yu, Y. and Ju, P. (2014) 'Mobile advertising setting analysis and its strategic implications', *Technology in Society*, November, Vol. 39, pp.129–141.

Chin, W., Marcolin, B. and Newsted, P. (2003) 'A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and an electronic email emotion/adoption study', *Information Systems Research*, Vol. 14, No. 2, pp.189–217.

Chong, A.Y.L., Chan, F.T.S. and Ooi, K.B. (2011) 'Predicting consumer decisions to adopt mobile commerce: cross country empirical examination between China and Malaysia', *Decision Support Systems*, Vol. 53, No. 1, pp.34–43.

Davis, F., Bagozzi, R. and Warshaw, P. (1989) 'User acceptance of computer technology: a comparison of two theoretical models', *Management Science*, Vol. 35, No. 8, pp.982–1002.

Davis, F.D. (1989) 'Perceived usefulness, perceived ease of use and user acceptance of information technology', *MIS Quarterly*, Vol. 13, No. 3, pp.319–349.

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1992) 'Extrinsic and intrinsic motivation to use computers in the workplace', *Journal of Applied Social Psychology*, Vol. 22, No. 14, pp.1111–1132.

Deans, K.R. and Gray, B.J. (2010) 'Third screen communication and the adoption of mobile marketing: a Malaysia perspective', *International Journal of Marketing Studies*, Vol. 2, No. 1, pp.36–47.

Delerue, H. and Lejeune, A. (2010) 'Job mobility restriction mechanisms and appropriability in organizations: the mediating role of secrecy and lead time', *Technovation*, Vol. 30, Nos. 5/6, pp.359–366.

Dillion, A. and Morris, M.G. (1996) 'User acceptance of information technology: theories and models', *Annual Review of Information Science and Technology*, Vol. 3, No. 1, pp.3–32.

Dinev, T. and Hart, P. (2004) 'Internet privacy concerns and their antecedents – measurement validity and a regression model', *Behaviour & Information Technology*, Vol. 23, No. 6, pp.413–422.

Fishbein, M. and Ajzen, I. (1975) *Beliefs, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, Vol. 18, No. 1, pp.39–50.

Gao, T., Rohm, A., Sultan, F. and Pagani, M. (2013) 'Consumers un-tethered: a three-market empirical study of consumers' mobile marketing acceptance', *Journal of Business Research*, Vol. 66, No. 12, pp.2536–2544.

Gao, T., Sultan, F. and Rohm, A. (2010) 'Factors affecting Chinese youth consumers' acceptance of mobile marketing', *Journal of Consumer Marketing*, Vol. 23, No. 7, pp.547–583.

Goneos-Malka, A., Strasheim, A. and Grobler, A. (2014) 'Conventionalists, connectors, technoisseurs and mobilarti: differential profiles of mobile marketing segments based on phone features and postmodern characteristics of consumers', *Journal of Retailing and Consumer Services*, Vol. 21, No. 6, pp.905–916.

Hair Jr., J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis: A Global Perspective*, 7th ed., Pearson Prentice Hall, New Jersey.

Hoffman, D.L. and Novak, T.P. (1996) 'Marketing in hypermedia computer-mediated environments: conceptual foundations', *The Journal of Marketing*, Vol. 60, No. 3, pp.50–68.

Hoflich, J.R. and Rossler, P. (2001) 'Mobile schriftliche kommunikation oder: e-mail fürdas handy', *Medien & Kommunikationswissenschaft*, Vol. 494, No. 1, pp.437–461.

Ismail, M. and Razak, R.C. (2011) 'The determinant factors influencing young consumers' acceptance of mobile marketing in Malaysia', *African Journal of Business Management*, Vol. 5, No. 32, pp.12531–12542.

Joseph, B. and Vyas, S.J. (1984) 'Concurrent validity of a measure of innovative cognitive style', *Journal of the Academy of Marketing Science*, Vol. 12, No. 1, pp.159–175.

Karahanna, E.D.W. and Straub, N.L.C. (1999) 'Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs', *MIS Quarterly*, Vol. 23, No. 2, pp.183–213.

Keshtgary, M. and Khajehpour, S. (2011) 'Exploring and analysis of factors affecting mobile advertising adoption – an empirical investigation among Iranian users', *Canadian Journal on Computing in Mathematics, Natural Sciences, Engineering and Medicine*, Vol. 2, No. 6, pp.144–151.

Kline, R.B. (1998) *Principles and Practice of Structural Equation Modeling*, 1st ed., Guilford Press, New York, NY.

Knutsen, L., Constantiou, I.D. and Damsgaard, J. (2005) 'Acceptance and perceptions of advanced mobile services: alterations during a field study', Paper presented at the *International Conference on Mobile Business*, Sydney, Australia, pp.326–331.

Kumari, S., Bajpai, A., Dewan, R. and Kumar, P. (2014) 'Measuring brand preferences of smartphone using TOPSIS', *International Journal of Modelling in Operations Management*, Vol. 4, Nos. 3/4, pp.193–207.

Lai, C.K.M., Tan, A.K.S., Lai, W.S. and Mangalam, N.A.A/P.P. (2014) 'Regression modelling of knowledge management success: a new dimension in Malaysian SMEs', *International Journal of Modelling in Operations Management*, Vol. 4, Nos. 1/2, pp.116–136.

Leong, L.Y., Hew, T.S., Tan, G.W.H. and Ooi, K.B. (2013) 'Predicting the determinants of the NFC-enabled mobile credit card acceptance: a neural networks approach', *Expert Systems with Applications*, Vol. 40, No. 14, pp.5604–5620.

Lopez-Nicolas, C., Molina-Castillo, F.J. and Bouwman, H. (2008) 'An assessment of advanced mobile services acceptance: contributions from TAM and diffusion theory models', *Information & Management*, Vol. 45, No. 6, pp.359–364.

Lu, H.P. and Su, P.Y.J. (2009) 'Factors affecting purchase intention on mobile shopping websites', *Internet Research*, Vol. 19, No. 4, pp.442–458.

Lu, J., Liu, C., Yu, C.S. and Wang, K. (2008) 'Determinants of accepting wireless mobile data services in China', *Information & Management*, Vol. 45, No. 1, pp.52–64.

Luarn, P. and Lin, H.H. (2005) 'Toward an understanding of the behavioral intention to use mobile banking', *Computers in Human Behavior*,Vol. 21, No. 6, pp.873–891.

Malaysia Communication and Multimedia Commission (2012) *Statistical Brief Number Eleven Handphone Users Survey 2010*, Malaysia Communication and Multimedia Commission [online] http://www.skmm.gov.my/skmmgovmy/files/attachments/HPUS%202010.pdf (accessed 30 January 2015).

McFarland, D.J. and Hamilton, D. (2006) 'Adding contextual specificity to the technology acceptance model', *Computers in Human Behavior*, Vol. 22, No. 3, pp.427–447.

Ministry of Federal Territories and Urban Wellbeing (2011) *Greater KL/KV Comprises*, Official Website of Greater Kuala Lumpur/Klang Valley [online] http://app.kwpkb.gov.my/greaterklkv/overview/ (accessed 30 January 2015).

Molina, L.M., Montes, J.L. and Ruiz-Moreno, A. (2007) 'Relationship between quality management practices and knowledge transfer', *Journal of Operations Management*, Vol. 25, No. 3, pp.682–701.

Moore, G.C. and Benbasat, I. (1991) 'Development of an instrument to measure the perceptions of adopting an information technology innovation', *Information Systems Research*, Vol. 2, No. 3, pp.173–191.

Nysveen, H., Pedersen, P.E. and Thornjornsen, H. (2005) 'Intentions to use mobile services: antecedents and cross-service comparisons', *Journal of Academy of Marketing Science*, Vol. 33, No. 3, pp.330–346.

Park, T., Shenoy, R. and Salvendy, G. (2008) 'Effective advertising on mobile phones: a literature review and presentation of results from 53 case studies', *Behaviour & Information Technology*, Vol. 27, No. 5, pp.355–373.

Pavlou, P.A. (2003) 'Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance model', *International Journal of Electronic Electronic Commerce*, Vol. 7, No. 3, pp.101–134.

Pousttchi, K. and Wiedemann, D. (2006) 'A contribution to theory building for mobile marketing: categorizing mobile marketing campaigns through case study research', Paper presented at the *International Conference on Mobile Business*, Copenhagen, Denmark.

Revels, J., Tojib, D. and Tsarenko, Y. (2010) 'Understanding consumer intention to use mobile services', *Australasian Marketing Journal*, Vol. 18, No. 2, pp.74–80.

Ringle, C.M., Wende, S. and Will, A. (2005) *Smart PLS 2.0*, University of Hamburg, Hamburg, Germany.

Rogers, E.M. (1995) *Diffusion of Innovation*, The Free Press, New York.

Rogers, E.M. (2003) *Diffusion of Innovations*, 5th ed., The Free Press, New York.

Sheeren, N.Z. and Rozumah, B. (2009) 'Mobile phone use amongst students in a university in malaysia: its correlates and relationship to psychological health', *European Journal of Scientific Research*, Vol. 37, No. 2, pp.206–218.

Sim, J.J., Kong, F.M., Lee, V.H., Tan, G.W.H. and Teo, A.C. (2012) 'Determining factors affecting broadband services adoption? An empirical analysis of Malaysian consumers', *International Journal of Services, Economics and Management*, Vol. 4, No. 3, pp.236–251.

Sim, J.J., Tan, G.W.H., Ooi, K.B. and Lee, V.H. (2011) 'Exploring the individual characteristics on the adoption of broadband: an empirical analysis', *International Journal of Network and Mobile Technologies*, Vol. 2, No. 1, pp.1–14.

Sim, J.J., Tan, G.W.H., Wong, J.C.J., Ooi, K.B. and Hew, T.S. (2014) 'Understanding and predicting the motivators of mobile music acceptance – a multi-stage MRA-artificial neural network approach', *Telematics and Informatics*, Vol. 31, No. 4, pp.569–584.

Sit, W.Y., Ooi, K.B., Loke, S.P. and Tan, G.W.H. (2011) 'TQM and service quality: a survey of commercial banking industry in Malaysia', *International Journal of Services, Economics and Management*, Vol. 3, No. 1, pp.78–91.

Ström, R., Vendel, M. and Bredican, J. (2014) 'Mobile marketing: a literature review on its value for consumers and retailers', *Journal of Retailing and Consumer Services*, Vol. 21, No. 6, pp.1001–1012.

Sultan, F., Rohm, A.J. and Gao, T. (2009) 'Factors influencing consumer acceptance of mobile marketing: a two-country study of youth markets', *Journal of Interactive Marketing*, Vol. 23, No. 4, pp.308–320.

Tan, B.I., Tan. G.W.H. and Ooi, K.B. (2011) 'King's Biscuits Berhad: crafting the next move?', *Emerald Emerging Markets Case Studies*, Vol. 1, No. 1, pp.1–4.

Tan, G.W.H., Chong, C.K., Ooi, K.B. and Chong, A.Y.L. (2010) 'The adoption of online banking in Malaysia: an empirical analysis', *International Journal of Business and Management Science*, Vol. 3, No. 2, pp.169–193.

Tan, G.W.H., Ooi, K.B., Chong, S.C. and Hew, T.S. (2014a) 'NFC mobile credit card: the next frontier of mobile payment?', *Telematics and Informatics*, Vol. 31, No. 2, pp.292–307.

Tan, G.W.H., Ooi, K.B., Hew, T.S. and Lin, B. (2014b) 'Predicting the drivers of behavioral intention to use mobile learning: a hybrid SEM-Neural network approach', *Computers in Human Behavior*, July, Vol. 36, pp.198–213.

Tan, G.W.H., Siah, W.M., Ooi, K.B., Hew, T.S. and Chong, A.Y.L. (2015) 'The adoption of PDAs for future health care system: an emerging market perspective', *International Journal of Mobile Communications*, Vol. 13, No.1, pp.1–28.

Tan, G.W.H., Sim, J.J., Ooi, K.B. and Kongkiti, P. (2012a) 'Determinants of mobile learning adoption: an empirical analysis', *Journal of Computer Information System*, Vol. 52, No. 3, pp.82–91.

Tan, G.W.H., Chua, B.H., Tan, B.I. and Ooi, K.B. (2012b) 'A case study on Japanese HRM practices in Malaysia: Japanization or localization?', *International Journal of Innovation and Learning*, Vol. 12, No. 3, pp.332–351.

Tanakinjal, G.H., Deans, K.R. and Gray, B.J. (2010) 'Third screen communication and the adoption of mobile marketing: a Malaysia perspective', *International Journal of Marketing Studies*, Vol. 2, No. 1, pp.36–47.

Teo, A.C., Tan, G.W.H., Cheah, C.M., Ooi, K.B. and Yew, K.T. (2012) 'Can the demographic and subjective norms influence the adoption of mobile banking?', *International Journal of Mobile Communications*, Vol. 10, No. 6, pp.578–597.

Teo, A.C., Tan, G.W.H., Ooi, K.B., Hew, T.S. and Yew, K.T. (2015) 'The effects of convenience and speed in m-payment usage', *Industrial Management & Data Systems*, Vol. 115, No. 2, pp.311–331.

Teo, T.S.H. and Pok, S.H. (2003) 'Adoption of WAP-enabled mobile phones among Internet users', *Omega. The International Journal of Management Science*, Vol. 31, No. 6, pp.483–498.

Vantanparast, R. and Butt, A.H. (2010) 'An empirically study of factors affecting use of mobile marketing', *UMM Summer*, pp.28–40.

Venkatesh, V. and Morris, M.G. (2000) 'Why don't men ever stop to ask for directions?Gender, social influence, and their role in technology acceptance and usage behaviour', *MIS Quarterly*, Vol. 24, No. 1, pp.115–139.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003) 'User acceptance of information technology: towards a unified view', *MIS Quarterly*, Vol. 27, No. 3, pp.425–478.

Wong, C.H., Lee, H.S, Lim, Y.H., Chua, B.H. and Tan, G.W.H. (2012) 'Predicting the consumers' intention to adopt mobile-shopping: an emerging market perspective', *International Journal of Network and Mobile Technologies*, Vol. 3, No. 3, pp.24–39.

Wong, C.H., Tan, G.W.H., Loke, S.P. and Ooi, K.B. (2014) 'Mobile TV: a new form of entertainment?', *Industrial Management & Data Systems*, Vol. 114, No. 7, pp.1050–1067.

Wong, C.H., Tan, G.W.H., Ooi, K.B. and Lin, B. (2015a) 'Mobile shopping: the next frontier of the shopping industry? An emerging market perspective', *International Journal of Mobile Communications*, Vol. 13, No.1, pp.92–112.

Wong, C.H., Tan, G.W.H., Tan, B.I. and Ooi, K.B. (2015b) 'Mobile advertising: the changing landscape of the advertising industry', *Telematics and Informatics*, Vol. 32, No. 4, pp.720–734.

Wood, S.L. and Swait, J. (2002) 'Psychological indicators of innovation adoption: cross-classification based on need for cognition and need for change', *Journal of Consumer Psychology*, Vol. 12, No. 1, pp.1–13.

World Health Organization (2011) *Health of Adolescents in Malaysia*, World Health Organization, Western Pacific Region.