Labuan Bulletin
OF INTERNATIONAL BUSINESS & FINANCE
Volume 11, 2013 **ISSN 1675-7262**

INVESTIGATING DETERMINANTS OF INTERNATIONAL TOURISTS' INTENTION TO USE MOBILE TOURISM GUIDE: THAI NATION PARKS CONTEXT

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Abstract

This study investigates the determinants of international tourists' intention to use mobile tourism guide in the context of Thai national parks. The study focuses on innovation characteristics as the determinants of international tourists' intention to use mobile tourism guide. The innovation characteristics of mobile tourism guide consist of relative advantage, compatibility, simplicity, trialability, and mobility. A convenience sampling technique is used for data collection. The 708 data sets from international tourists are analyzed by SPSS. The factor analysis results suggests that two innovation characteristics of mobile tourism guide such as relative advantage and compatibility should be grouped into one characteristic, this characteristic is named practical advantage. The results of study also evidence that the determinants of international tourists' intention to use mobile tourism guide in the context of Thai national parks are practical advantage, trialability, and mobility. The simplicity is not a determinant of international tourists' intention to use mobile tourism guide. The empirical results of this paper extend the mobile information technology research in the context of mobile tourism guide, and provide a valuable guideline for developing and implementation mobile information technology.

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JEL Classification: D83, L83, L86
Keywords: *Innovation characteristics, Intention, Mobile, Tourist, Tourism guide*

1. Introduction

Nowadays, mobile phone has become the personal information processing choice and mobile applications are currently growing rapidly in a variety of contexts; such as mobile healthcare, mobile learning, mobile game, mobile book, mobile entertainment, and mobile tourism guide. The most advantage of mobile information technology (IT) is mobility which is easy to gain information anywhere and anytime. Consequently, mobile IT services are mostly interested by mobile phone subscribers. According to Flurry Analytic (2012), the growth of mobile applications in the world is very high in the last few years, the growth rates are more than 100%. Therefore, today many businesses adopt mobile applications in their marketing, especially the businesses which have international customers. In tourism industry, the mobile tourism guide (MTG) is also emphasized by tourism agencies and government. MTG is a mobile IT application that can help travellers to access tour information on their smart phones; such as understanding the geography, gathering tour information, sharing their experience and learning something more about the places that they are visiting.

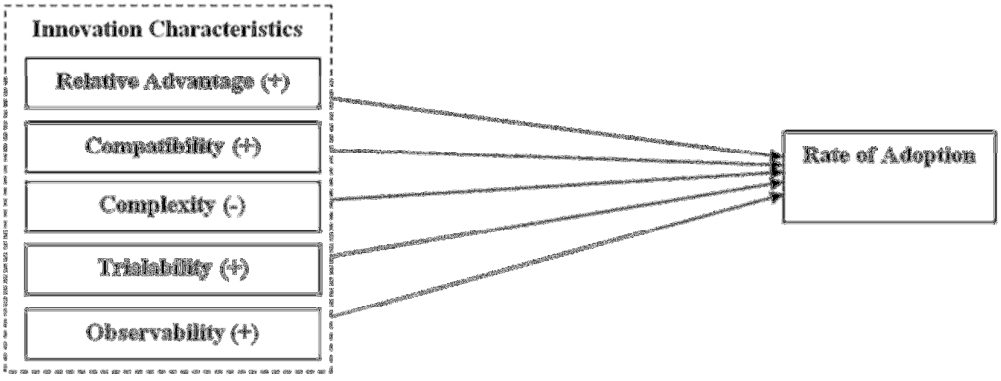
The MTG development and implementation is not easy based on user needs, efficiency of mobile phone, amount of content, and users' intention to use MTG. Therefore, literature on modern mobile-based mostly looks at the factors of users' intention to use mobile technology, in order to achieve the users' intention to use technology and success the MTG implementation. Innovation characteristics have been interested as the determinants of intention to use technology among IT researches (Dai and Palvi, 2009; Hernandez and Mazzon, 2007; Kim *et al.*, 2012; Schierz *et al.*, 2010; Thong *et al.*, 2002). However, the several previous IT studies the innovation characteristics of different technologies will influence differently on users' intention to use technology (Hernandez and Mazzon, 2007; Luo *et al.*, 2010; Rogers, 2003). For example, Dai and Palvi (2009) found the impact of compatibility on user intention to use mobile commerce in the United Stated, while it did not impact on users' intention mobile commerce in China, whereas Luo et al. (2010) found that compatibility was a factor of user intention to use enterprise instant messaging in the United Stated. In addition, mobile phone has some limitations such as the small screen, the limited memory, the processing capacity, the low-resolution displays, and the data transfer speed. Therefore, it is the challenge for achievement in terms of MTG development and MTG implementation.

As a result, there are a few previous studies which focused on international tourists' intention in the context of MTG in terms of innovation characteristics and extended mobility as an innovation characteristic. This study aims to investigate innovation characteristics as determinants of intention to use MTG among international tourists. The MTG of this study refers to a mobile IT application for international tourist to get the tour information of Thai national parks such as; attractive places, activities, maps, do & don't in Thai national parks, closed-period of Thai nation parks, climate & seasons, culture, Thai food & Thai fruit, easy Thai dialogues for international tourist, transportation, accommodation, and currency exchange rate. The findings of study will be a guideline for MTG developers, tour operators, and Tourism Authority of Thailand (TAT) in terms of MTG development and MTG implementation.

2. Innovation Characteristics

The innovation diffusion of theory (IDT) has been used since the 1960s to explain the process of innovation adoption. Following an extensive review of the literature, Rogers (2003) found five innovation characteristics that consistently proved to be determinants of the technological diffusion: relative advantage compatibility, complexity, observability, and trialability as presented in Figure 1. The instrument of these characteristics was developed by Moore and Benbasat (1991), which has been widely employed in the IT researches (Jung *et al.*, 2012; Luo *et al.*, 2010; Wang *et al.*, 2011).

Figure 1
Innovation characteristics of IDT (Rogers, 2003)

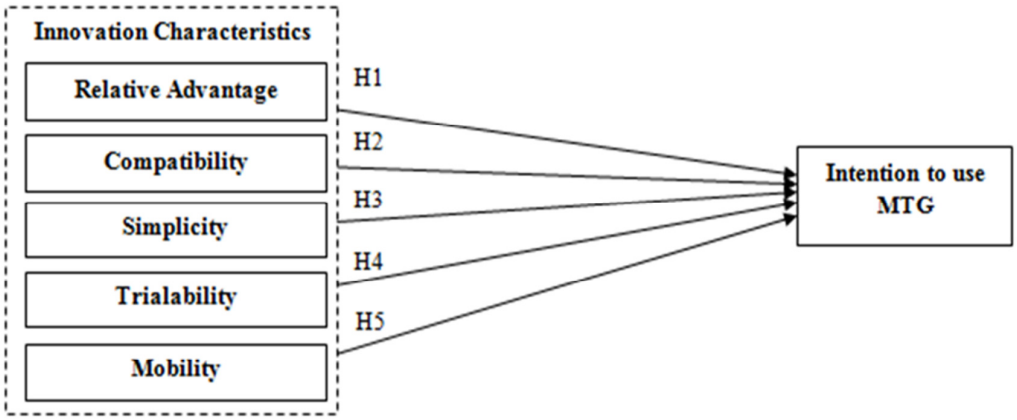


3. Research Model and Hypotheses

The research model of this study was developed based on IDT. Even though five innovation characteristics from IDT are important, in this study the observability was excluded from the research model in two reasons. Firstly, Rogers (2003) indicated that software innovations have

less observability than hardware, and only potential adopter can perceive observability. Finally, Moore and Benbasat (1991) found that the observability had constructed ambiguity problem in their examination because the original construct was quite confused. In order to study the determinants of international tourists' intention to use MTG, the research model is conducted as presented in Figure 2. In this study, the innovation characteristics of MTG consist of relative advantage, compatibility, simplicity, trialability and mobility. In addition, the study added mobility construct into innovation characteristics of MTG due to it is a general feature of mobile phone.

Figure 2
Research model



Relative advantage is defined similarly in three famous acceptance theories. First, *perceived usefulness* in Technology Acceptance Model: TAM (Davis, 1989) defined as the degree to which person believes that using a particular system would enhance his/her performance. Second, *performance expectancy* in Unified Theory of Acceptance and Use of Technology: UTAUT (Venkatesh *et al.*, 2003) is defined as the degree to which and individual believes that using the system will help him/her to attain gains in job performance. Finally, *relative advantage* in Innovation Diffusion of Theory: IDT (Rogers, 2003) is defined as the degree to which an innovation is perceived as better than the idea it supersedes; that often expressed in economic profitability, in status giving, or in other ways. In this study, relative advantage is defined as the degree which an innovation is perceived as better than available media or system; that expressed in the convenience, reducing limitation in terms of time and place, and enhancing travel effectiveness. Most IT studies found the relative advantage positively impact on users' intention (Ayeh *et al.*, 2013; Chang and Pan, 2011; Gerpott, 2011), hence it expected that there is a positive relationship between relative

advantage and intention to use MTG. The hypothesis is proposed as follows:

H1: Relative advantage has a positive impact on intention to use MTG.

Compatibility generally is defined as the degree to which an innovation is perceived in terms of being consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 2003). However, Moore and Benbasat (1991) found that should drop the needs of potential adopters from the compatibility's definition in their study because general adopters can perceived compatibility. Therefore, compatibility of this study is defined as the degree to which an innovation is perceived as being consistent with the existing values, needs, past experience of mobile phone, and past experiences of tour guide. Even though, Dai and Palvi (2009) found compatibility did not impact to intention to use mobile commerce in China, most previous studies found empirical evidence to support the role of compatibility as an important factor on intention to use technology (Gerpott, 2011; Schierz *et al.*, 2010; Xue *et al.*, 2012). Furthermore, Rogers (2003) also stated that compatibility has a positive impact in predicting intention to use technology. Therefore, it believes a higher compatibility will result in higher intention to use MTG. Hence, the hypothesis is proposed as follows:

H2: Compatibility has a positive impact on intention to use MTG.

Simplicity is also defined similarly in three famous acceptance theories. First, *perceived ease-of-use* in TAM (Davis, 1989) is defined as the degree to which person believes that using a particular system would be free of effort. Second, *effort* expectancy in UTAUT (Venkatesh *et al.*, 2003) is defined as the degree of ease associated with the use the system. Finally, complexity in IDT (Rogers, 2003) is defined as the degree to which and innovation is perceived as relatively difficult to understand and use. In this study, simplicity is defined as the degree of ease associated with the understanding and usage. Although, several previous studies did not find the association between simplicity and intention to use technology (Gerpott, 2011; Jung *et al.*, 2012; Tan and Teo, 2000); most empirical studies found the relationship between simplicity and intention to use technologies (Brown *et al.*, 2003; Kim *et al.*, 2010; Xue *et al.*, 2012). It believes that the simplicity of an innovation leads to user resistance due to a lack of user skills and knowledge in a new innovation (Rogers, 2003). Based on IDT theory and these arguments, the following hypothesis is postulated:

H3: Simplicity has a positive impact on intention to use MTG.

Trialability is defined as the degree to which an innovation may be experimented with on a limited basis (Rogers, 2003). Trialability is also defined as the degree to which innovation may be experiment before adoption (Moore and Benbasat, 1991). In the context of MTG, the trialability is defined as the degree to which innovation may be experiment before adoption in terms of usage illustration and giving trial version. The several previous researchers employed IDT, and did not study trialability attributes as independent variable in their studies (Wang *et al.*, 2011; Westrick and Mount, 2009). In addition, several previous studies found trialability did not influence on intention to use technology (Baird *et al.*, 2011; Hsu *et al.*, 2007; Liao and Lu, 2008). However, most studies based on IDT found that trialability is the key motivational factor in the adoption and diffusion of technology (Brown *et al.*, 2003; Gerpott, 2011; Hernandez and Mazzon, 2007). As Rogers (2003) suggested, the more trialability will helps individuals to adopt and implement more often and more quickly than less trialability. Thus, the following hypothesis is proposed in order to investigate the importance of trialability on international tourists' intention to use MTG.

H4: Trialability has a positive impact on intention to use MTG.

Mobility is defined as the degree of benefits which are provided by mobile technologies. Benefits are about the information access, communication, and services anytime and anywhere (Kim *et al.*, 2010). In addition, Schierz *et al.* (2010) defined the individual mobility as the degree to which an individual pursues a mobile lifestyle. In this study, mobility is defined as the degree of tour information access and services anytime and anywhere which are provided by MTG. Most studies found mobility is a key of users' mobile service adoption and influenced on intention to use technology (Kaba and Osei-Bryson, 2009; Schierz *et al.*, 2010). Thus, this study expects that the higher mobility of MTG will increase the international tourists' intention to use MTG. The hypothesis is proposed as follows:

H5: Mobility has a positive impact on intention to use MTG.

4. Data and Methodology

The study employed a survey method in order to test the hypothesized model and predict the international tourists' intention to use MTG. We designed the research methodology as follows:

A self-administered questionnaire was developed from reliable previous studies which Cronbach's's Alpha values were higher than 0.7. The study used the 7-point Likert scales which ranged from one (strongly disagree) to seven (strongly agree) to measure all questions. Before data collection process, the study conducted a pilot test to ensure that the

questionnaires were effective. In the pilot test, the questionnaire was distributed to 30 international tourists, who visited Thailand in April 2012. The purpose of the pilot test is examining questionnaire in terms of question content, wording, sequence, format and layout, question difficulty and instructions. The instrument was finalized after making minor changes based on the pilot test's feedback.

The population of this study is the international tourists visiting Thailand. According to Sekaran and Bougie (2010), for the population above one million individual users, the minimum sample size of 384 respondents is considered sufficient to test the hypothesis. Therefore, the sample size of this study is sufficient for data analysis and hypotheses testing, due to the sample size is 708.

In this study, survey respondents were the international tourists at International Departure Hall in Suvarnabhumi Airports of Thailand in May 2012. The study employed convenience sampling technique to collect data. Before distributed a questionnaire, the participants were given the MTG demonstration in terms of usage and features and had the chance to try out the MTG prototype. The total number of completed questionnaires was 708. The respondents of study consisted of males 54.5 percent of respondents and female 45.5 percent of respondent. The majority (69.8%) was aged between 11 and 40 years old, while the age of other respondents is more than 40 years old. With regard to married status, the data showed that 56.2% of the sample was married, and relationship; while 43.8% of sample used was single, widowed and divorced.

5. Data Analysis and Results

The study conducted factor analysis using a Principal Component Analysis (PCA) extraction and Promax rotation to assess the initial measurement scale. Factor Analysis results showed that the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was 0.95. Thus, the factor analysis was appropriate for the data of this study and the sample size of study is big enough for factor analysis. The Bartlett's test of sphericity value was highly significant ($p < 0.001$) and all communality values were above 0.5. All eigenvalues of this study were greater than 1 and total variance explained is 68.29%. All anti-image correlation values were greater than 0.5. Finally, all factor loading values were greater than 0.30 and the difference of factor loading and cross-loading were less than 0.20 (Hair *et al.*, 2010).

After factor analysis, the study had five factors which compose of 24 retained-items. The first component consisted of ten items: five items are originally from relative advantage (RA1, RA2, RA3, RA4 and RA5), and the other five items are originally from compatibility (COM1,

COM2, COM3, COM4 and COM5). This factor structure is related to the usefulness, fit of travel style and fit of lifestyle, thus the first component was named "practical advantage." The other components were simplicity, trialability, mobility, and intention to use MTG.

Table 1
Factor Analysis Results of Study

Construct	*Item*	*Component*				
		1	*2*	*3*	*4*	*5*
Relative advantage	*RA1*	***0.713***	*0.166*	*-0.165*	*-0.192*	*0.054*
	RA2	***0.659***	*0.060*	*-0.132*	*-0.084*	*0.091*
	RA3	***0.659***	*-0.079*	*0.036*	*-0.045*	*0.250*
	RA4	***0.696***	*-0.044*	*-0.113*	*-0.115*	*0.209*
	RA5	***0.677***	*-0.063*	*-0.054*	*-0.199*	*0.175*
Compatibility	*COM1*	***0.735***	*0.048*	*0.130*	*0.159*	*-0.144*
	COM2	***0.736***	*0.030*	*0.136*	*0.197*	*-0.167*
	COM3	***0.702***	*0.032*	*0.089*	*0.242*	*-0.181*
	COM4	***0.723***	*0.039*	*-0.016*	*-0.067*	*0.080*
	COM5	***0.643***	*0.089*	*0.058*	*0.197*	*-0.037*
Simplicity	*SIM1*	*0.045*	***0.877***	*-0.044*	*0.139*	*-0.023*
	SIM2	*-0.004*	***0.900***	*0.006*	*0.077*	*-0.010*
	SIM3	*0.055*	***0.871***	*0.000*	*-0.068*	*-0.010*
	SIM4	*0.035*	***0.845***	*0.011*	*-0.067*	*-0.017*
	SIM5	*0.094*	***0.541***	*0.083*	*0.002*	*0.054*
Trialability	*TRI1*	*0.212*	*-0.235*	***0.655***	*0.060*	*-0.075*
	TRI2	*0.089*	*0.094*	***0.720***	*-0.167*	*0.009*
	TRI3	*-0.070*	*0.057*	***0.788***	*-0.075*	*0.064*
	TRI4	*-0.099*	*-0.043*	***0.754***	*0.082*	*0.161*
	TRI5	*-0.126*	*0.140*	***0.800***	*0.037*	*0.150*
Mobility	*MOB1*	*-0.051*	*0.033*	*0.068*	*0.114*	***0.653***
	MOB2	*0.105*	*-0.150*	*0.009*	*0.179*	***0.768***
	MOB3	*0.080*	*0.004*	*0.045*	*0.168*	***0.770***
	MOB4	*0.033*	*0.027*	*0.070*	*0.038*	***0.716***
	MOB5	*0.042*	*0.161*	*0.277*	*-0.186*	***0.539***
Intention to use MTG	*INU1*	*-0.027*	*0.079*	*-0.085*	***0.761***	*0.132*
	INU2	*-0.023*	*0.130*	*-0.182*	***0.679***	*0.176*
	INU3	*-0.051*	*-0.158*	*0.208*	***0.642***	*-0.081*
	INU4	*-0.040*	*0.073*	*-0.041*	***0.818***	*0.181*

In the reliability analysis, the results show that all questions are good reliability because Cronbach's alpha values exceed the cut-off value of 0.70 (Nunnally and Bernstein, 1994; Pallant, 2011; Sekaran and Bougie, 2010) as presented in Table 2. Furthermore, Table 2 also shows the mean, minimum, maximum and standard deviation of all variables in

this study. In terms of innovation characteristics, the simplicity is the highest mean score (6.56), follows by mobility (6.37), practical advantage (6.26) and trialability (5.94). These results indicate that international tourists will give the strong perception on simplicity, mobility, practical advantage and trialability, respectively when they want to use MTG. In addition, the mean value of international tourists' intention to use MTG is very high (6.32). It indicates that if MTG is launched in market or if TAT provides the MTG for international tourists, they will be interested to use it.

Table 2
Reliability Analysis Results and
Descriptive Statistical Values of the Study

Construct	*Cronbach's Alpha*	*Mean*	*Min*	*Max*	*Std. deviation*
Practical advantage	*0.88*	*6.26*	*4.00*	*7.00*	*0.68*
Simplicity	*0.85*	*6.56*	*4.40*	*7.00*	*0.57*
Trialability	*0.80*	*5.94*	*2.60*	*7.00*	*0.91*
Mobility	*0.90*	*6.37*	*4.40*	*7.00*	*0.68*
Intention to Use MTG	*0.87*	*6.32*	*4.00*	*7.00*	*0.69*

The study used Pearson correlation coefficient for analysis the strength and direction of linear relationship between variables (Pallant, 2011). The results supported the prediction that all variables were positive related to another. Specifically, practical advantage, simplicity, trialability, mobility towards international tourists had the positive correlation with intention to use MTG ($p < 0.01$). The range of correlation coefficient value was between 0.36 and 0.65 as shown in Table 3. In addition, the results highlighted that intention to use MTG is most strongly correlated with practical advantage, trialability and mobility.

Table 3
Correlation Analysis Results and VIFs of the Study

Construct	*VIF*	*Practical advantage*	*Simplicity*	*Trialability*	*Mobility*	*Intention to use MTG*
Practical advantage	*2.09*	*1*				
Simplicity	*1.86*	*0.63***	*1*			
Trialability	*1.52*	*0.48***	*0.36***	*1*		
Mobility	*2.26*	*0.65***	*0.61***	*0.56***	*1*	
Intention to use MTG		*0.63***	*0.47***	*0.51***	*0.56***	*1*

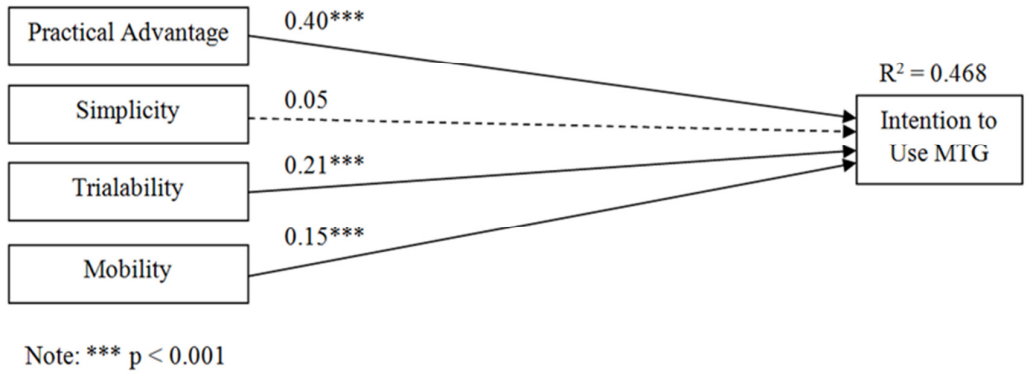
*Note: * Correlation significant at p < 0.01level; VIF, variance inflation factor*

Before path analysis, we checked the Variance Inflation Factors (VIF) in order to control the multicollinearity problem among variables. The highest individual VIF score among all variables is 2.26, hence this study did not have multicollinearity problem as presented in Table 3. For path analysis, the study employed hierarchical regression analysis to

explain the international tourists' intention to use MTG. The results shows that R-square value is 0.468 as presented in Figure 3; it indicates that the innovation characteristics can explain 46.8 percent of the variance in intention to use MTG.

The results also shows the impact of practical advantage (β = 0.40, p < 0.001), trialability (β = 0.21, p < 0.001) and mobility (β = 0.15, p < 0.001) on intention to use MTG. In contrast, the relationship between simplicity and intention to use MTG is non-significant. These results indicate that the determinants of international tourists' intention to use MTG are practical advantage, trialability and mobility. The simplicity is not a determinant of international tourists' intention to use MTG. In addition, the practical advantage, trialability and mobility positively impact on intention to use MTG; especially practical advantage is the most important determinant in the context of MTG.

Figure 3
Path analysis results



6. Discussions

Comparing our results with previous intention to use mobile IT studies, the findings of this study reveal several interesting issues in the context of MTG. First, simplicity is not a determinant of tourists' intention to use MTG. This finding confirms the several previous IT studies (Gerpott, 2011; Jung *et al.*, 2012; Tan and Teo, 2000). In contrast, this finding is inconsistent most previous IT studies' findings (Brown *et al.*, 2003; Kim *et al.*, 2010; Xue *et al.*, 2012); and famous adoption theories such as TAM (Davis, 1989), UTAUT (Venkatesh *et al.*, 2003), and IDT (Rogers, 2003). As a result, today international tourists are familiar to use mobile phone and mobile applications. This reason is evidenced by the mobile application growth in the world (Flurry Analytic, 2012). Thus, the simplicity in the context of MTG is not a determinant of international tourists' intention to use MTG. Second, the factor analysis suggests that relative advantage and compatibility should be grouped

into one characteristic in the context of MTG, this characteristics is named the practical advantage. The possible reason of this finding is that international tourists understand the mobile limitations and they do not expect a lot of travel guide information on their mobile phone. International tourists only expect the suitable tour guide information which can support their travel style and lifestyle. Third, the practical advantage of this study is the highest influence to predict in users' intention model likes previous mobile IT studies (Chang and Pan, 2011; Gerpott, 2011). Finally, most our findings are similar results of IDT (Rogers, 2003) and previous IT researches in the other contexts. The practical advantage (relative advantage and compatibility), trialability and mobility are the innovation characteristics which are the determinants of users' intention to use IT (Brown *et al.*, 2003; Gerpott, 2011; Kim *et al.*, 2010; Schierz *et al.*, 2010).

7. Contributions and Limitations

In terms of theoretical contributions, our research provides the new intention model in the context of MTG among international tourists. We develop the intention model based on innovation characteristics of IDT and extend it with mobility construct. The new model is effective to predict the international tourists' intention to use MTG. Furthermore, the findings evidence the determinants of tourists' intention to use which consist of the practical advantage, trialability, and mobility. In addition, the findings reveal that international tourists perceive relative advantage characteristic go together with compatibility characteristics. The both characteristics should be grouped into one characteristic in the context of MTG.

In practical contributions, the results provide the guidance for tourism industries and tour operators to a clear understanding in terms of MTG acceptance, MTG development and MTG implementation. First, in order to support the international tourists' intention to use MTG in the context of national parks, the MTG developers should design and develop based on the determinants' of tourists' intention to use MTG as the following: (1) The MTG developers should design and develop MTG for international tourists based on relative advantage together with compatibility, or focus on practical advantage. For example, enhancing tourist effectiveness on trekking by providing links between trekking guide and trekking map on the same screen, and saving time for travel planning by providing links between the information how to go there and map; (2) Anytime and anywhere (mobility) are interested by tourists, thus MTG developers have to know where and when tourists usually use MTG, for example, if tourists usually use MTG in forest national parks where cannot connect internet and satellite, most content should be designed in no internet-required mode; and (3) MTG should support tour contents in travel three (pre-travel, during travel, and post-

travel), in order to support international tourists' intention to use MTG. For instance, supporting the trip planning before travel, getting tour information during travel, and sharing trip experiences after travel. Second, the findings evidences that international tourists highly intend to use MTG. Therefore, the TAT could ensure the MTG acceptance among international tourists. Third, TAT should provide the MTG demonstration in terms of the MTG's features and MTG's contents and give the chance for international tourist to try out MTG. As a result, the trialability is a factor of international tourists' intention to use MTG thus increasing demonstration and experiment will increase international tourists' intention to use MTG. Finally, due to the finding of this study evidences that trialability is a key factor of international tourists' intention to use MTG. Therefore, the tour operators should provide the trial mobile application versions and demonstrations for international tourists to see the overview tour contents and features. Furthermore, the tour operators should highlight their MTG in terms of the practical advantage and mobility to international tourists by advertisements. These operations will increase the tour operations' success in MTG launching and implementation.

Although, the study conducts intention model within the specific context MTG of Thai national parks, the other mobile IT contexts and the tourism department in other countries can employ this model. In order to make more confidence in the other contexts or the other countries, the model of future studies should be re-examined in terms of reliability, validity, correlation, and path analysis.

8. Conclusion

This study develops intention model in the context of MTG based on IDT and investigates the determinants of international tourists' intention to use MTG. The findings offer new insight into original innovation characteristics in IDT that the mobility characteristic should be included in innovation characteristics of mobile IT services as a predictor toward users' intention to use technology. Furthermore, our study evidences that international tourists intend highly to use MTG. The determinants of international tourists' intention to use MTG are practical advantage, trialability and mobility. While the simplicity or ease-of-use is not a determinant of international tourists' intention to use MTG because of they are familiar mobile application today. Our intention model is found significant in predicting intention to use MTG among international tourists.

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