

Exploring Tourist Adoption of Tourism Mobile Payment: An Empirical Analysis

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Abstract

With recent developments in mobile technologies, tourism mobile payment(m-payment) is beginning to offer interesting and beneficial new services. This research aimed to identify the factors determining tourists' acceptance of tourism m-payment. Based on literature relating to the TAM theory, the conceptual model is developed and tested in this research. This research extends the applicability of the TAM in tourism m-payment context, by adding the system characteristics' constructs and tourism characteristics' constructs to the model. Data collected from 421 tourists in China were tested against the extended TAM, using the structural equation modeling approach. The empirical results show especially strong support for the effects of perceived security, perceived compatibility, destination m-payment knowledge, and tourist susceptibility to interpersonal influence. The findings provide a foundation for an enhanced theory on tourism m-payment adoption and for the practical development of tourism m-payment service.

Keywords: Tourism m-payment systems, Tourism m-payment adoption, Tourism mobile commerce, Technology acceptance model (TAM), Mobile payment

1 Introduction

The development of the “mobile” Internet facilitates tourism mobile commerce (M-commerce) transaction, which is defined as the use of electronic methods, means and procedures to conduct various forms of tourism business activity in cyberspace [3]. As tourism mobile commerce increases in popularity, tourism m-payment will continue to facilitate secure electronic commercial transactions between organizations or individuals [28]. In this study, tourism m-payment or tourism m-payment is defined as the use of a mobile device to conduct a tourism payment transaction in which money or funds are transferred from a payer to a receiver via an intermediary, or directly, without an intermediary in the tourist destination. This paper focuses on examining the tourist willingness to use a mobile device as a payment instrument in tourism transactions where money is transferred from a tourist to a provider in exchange for tourism products or services.

Because tourism commerce organizations may perform a competitive superiority via the provision of tourism m-payment to tourists, the issues associated with appropriate tourism m-payment usage are of critical importance [24]. Specifically, the tourist’s intention to use tourism m-payment is of considerable interest to researchers and practitioners, because payment service providers, financial institutions, trusted third parties, and systems, software and supporting service providers can benefit greatly from enhanced understanding of the key factors underlying tourists’ intention [20].

The technology acceptance model (TAM) is a well-recognized model used to interpret IS adoption behavior [4], [9], [27], [36]. According to the TAM, adoption behavior is determined by the intention to make use of a particular system, which is, in turn, affected by the perceived usefulness and the perceived ease of use of the system [37]. One major advantage of using the TAM is that it supplies a framework by which the effect of external variables on system usage can be sized up. In order to adapt the TAM to the tourism m-payment context, we integrated it with perceived destination complexity and destination m-payment knowledge. Moreover, in order to further our understanding of the tourists’ adoption behavior, we study the variables of perceived security and perceived compatibility.

The objective of this research is to explore the relationship between antecedents and tourists’ acceptance of tourism m-payment by way of the TAM framework, which is based on the survey of tourists. In particular, the objectives of this research are: (1) to look into what lead to the formation of perceived risk and how perceived security affect perceived usefulness of tourism m-payment and intention to use tourism m-payment; (2) to examine the impact of perceived compatibility on perceived usefulness and perceived security of tourism m-payment; (3) to estimate the effect of destination m-payment knowledge on perceived ease of use, perceived usefulness and perceived security of tourism m-payment; (4) to investigate the impact of perceived destination complexity on perceived usefulness and perceived security of tourism m-payment.

This article has two main contributions. From a theoretical viewpoint, we develop a model that is based on various conceptual fields which are relevant to the consumer motives for using mobile payment solutions. This allows us to draw a broader and more holistic picture of the drivers of tourist acceptance of tourism m-payment services compared to previous studies. From an empirical viewpoint, we test this model with a large sample, which enables us to conduct several stability tests in order to increase reliance in the findings. Providing credible evidence regarding the relevance of various acceptance factors is particularly important since prior studies on tourism m-payment have mainly been qualitative in nature.

2 Literature Review and Hypotheses

In this section, the theoretical background of our research is developed with the literature review of the technology acceptance theories, mobile payment system characteristics (such as perceived security and perceived compatibility), and tourism characteristics (such as destination m-payment knowledge and tourist susceptibility to interpersonal influence).

2.1 Technology Acceptance Theories

The origins of TAM can be traced to the theory of reasoned action (TRA) [2]. As a simplification to TRA, the TAM suggests that the users’ decisions to accept a new information technology are based on two rational assessments of its expected outcomes: (1) perceived usefulness (PU), defined as the degree, which a person conceives that using a system would increase his or her job performance, and (2) perceived ease of use (PEOU), defined as the degree of which a person believes that using a system would be free of effort [8]. Numerous empirical studies provide strong evidences that PU and PEOU do directly influence users’ intention of adopting a new technology [14], [21], [22]. Also, most empirical studies show that PEOU is the antecedent of PU because, through PU, PEOU indirectly influences the intention [1], [7], [32]. Based on the literature review, three hypotheses are posited:

- H1: Perceived ease of use (PEOU) has a positive effect on perceived usefulness (PU).*
H2: Perceived ease of use (PEOU) has a positive effect on behavior intention (BI).
H3: perceived usefulness (PU) has a positive effect on behavior intention (BI).

2.2 Extended TAM and External Variables

To forecast technology acceptance, earlier researches found that the external variables of a TAM can affect the beliefs of perceived ease of use and perceived usefulness [6], [23], [25], [34], [39].

Davis et al.[9] recommended that the external variables of a TAM can affect the beliefs of perceived ease of use and perceived usefulness. In this way, much research has verified the external variables of a TAM [1], [7], [14], [21], [22], [32]. To predict technology acceptance, these studies found external variables such as personal features (personal knowledge and susceptibility to interpersonal influence), and system features(perceived security and perceived compatibility) were the determining factors.

In this study, destination m-payment knowledge and tourist susceptibility to interpersonal influence as extended tourism variables of TAM are examined. And since the acceptance of tourism m-payment must be accessed from the standpoint of mobile commerce acceptance, the perceived security and perceived compatibility are judged to play an important role in the positive attitude towards usage. The following subsections provide further discussion on these extended variables.

2.2.1 Perceived Security

Besides perceived advantages, innovations usually also come with risks. Security is being defined as a threat which creates "circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service and/or fraud, waste, and abuse" [17]. Earlier research suggests that perceived security in payment systems is a significant determinant of mobile commerce success [24]. In the context of the tourism m-payment, the importance of security is emphasized. Firstly, services are inherently more difficult to evaluate and are thus perceived as more risky [16], [29], [33]. Secondly, many people have not had any previous experience with tourism m-payment systems and it increases the perceived risk of tourism m-payment services [13]. Finally, the spatial and temporal separation between buyer and seller is often associated with a relatively high loss potential when buyers are required to give detailed personal information such as their address or credit card number to the seller.

According to Kuisma et al. [19], many customers are afraid of losing money while performing transactions or transferring money over the Internet. According to Yiu et al. [40], sudden breakdown of web services may lead to unexpected losses while conducting online payment. Featherman and Pavlou [10] found that a high frequency of website breakdowns and disconnections inhibits m-payment services evaluation (e.g. perceived usefulness). According to Milind [26], security risk is a significant impediment to the adoption of e-services. Similar to previous research [10], [19], [26], [40], perceived security (i.e., low perceived risk) plays a dominant role in the users' intention of adopting m-payment services. Thus, the following hypotheses are proposed:

- H4: perceived security (PS) has a positive effect on perceived usefulness (PU).*
H5: perceived security (PS) has a positive effect on behavior intention (BI).

2.2.2 Perceived Compatibility

We further extend the original TAM by including the perceived compatibility of tourism m-payment services as an additional factor. Perceived compatibility encompasses the reconcilability of an innovation with existing values, behavioral patterns, and experiences [12], [41]. In information system adoption research, the compatibility of the technology has been found as a significant determinant of mobile technology and service adoption [13]. Further, there is a reason to believe that perceived compatibility play an important role in the adoption of tourism m-payment services. And prior research that combined TAM and the perceived compatibility construct found that perceived compatibility has a direct effect on perceived usefulness: Gerhardt et al. [13] in mobile payment adoption; Wu and Wang [37] in mobile commerce acceptance; Wu et al. [38] in mobile health care, etc.

In addition perceived compatibility is the degree to which the innovation is perceived to be consistent with the potential users' previous experiences [35], and perceived security is produced by the users' perceiving potential risks from immature technology and a certain degree of uncertainty [37]. So the users' previous experiences (high compatibility) will reduce the degree of uncertainty. Thus, perceived compatibility is incorporated as a direct antecedent of perceived security. Therefore, this study hypothesis perceived compatibility as follows:

- H6: perceived compatibility (PC) has a positive effect on perceived security (PS).*
H7: perceived compatibility (PC) has a positive effect on perceived usefulness (PU).

2.2.3 Destination m-payment Knowledge

Web novices tend to rely on the most basic and attractive features of the website interface, while Web experts use their experience and can utilize their knowledge to facilitate their information processing and to differentiate between relevant and irrelevant information [18].

In the context of travel and tourism, the factors which affect tourist behaviors not only include the tourism destination image, but also include destination knowledge of tourists. Tourists with a high level of destination m-payment knowledge are likely to find the destination m-payment systems to be easier to use, to be more useful, and to be more secure than tourists lacking such knowledge. Given that the limited amount of research has been conducted on this subject, this study attempts to determine whether any relationship exists between destination m-payment knowledge and other variables. Hence, the destination m-payment knowledge is essential in tourism m-payment settings and the following hypothesis is proposed:

H8: destination m-payment knowledge (DK) has a positive effect on perceived security (PS).

H9: destination m-payment knowledge (DK) has a positive effect on perceived usefulness (PU).

H10: destination m-payment knowledge (DK) has a positive effect on perceived ease of use (PEOU).

2.2.4 Tourist Susceptibility to Interpersonal Influence

Tourist susceptibility to interpersonal influence involves two different manifestations: an informational one, the tendency to seek information from others and a normative, the willingness to conform to the others' expectations [5]. In this study, we defined the informational influence as the tourist's general tendency to accept information from others as evidence about reality. And the normative dimension is reflected when tourists comply with expectations of others to gain rewards or avoid punishments.

In addition, in the context of mobile payment, mobile devices and services allow people to move around while maintaining access to services and staying connected. Mobility, availability, and personalization, may also be important perceived benefits of mobile services [30]. Mobile services are adopted for both functional and nonfunctional reasons [31]. When members of a person's social group believe a behavior is correct, it elevates a user's standing within the group. Somebody's attitudes, behavior, and perceptions are affected by the information he or she receives from the social environment [15]. Tourist susceptibility to interpersonal influence may shape his or her confidence in or ability to use a technological system. Potential users of advanced mobile services may feel that tourism m-payment system is useful and reliable if others in their social environment say that the system is credible [22]. On the other hand, others' perceptions couldn't be affected significantly by interpersonal influences.

In the context of travel and tourism, looking for information about tourism m-payment services and the intention to follow the advice obtained there are voluntary actions that do not imply gaining rewards or avoid possible punishments by others. The informational influence makes tourists internalize information from others and appear when tourists either search for information or make inferences based upon the observation of others' behavior. Tourist susceptibility to interpersonal influence is thus expected to impact the perceived usefulness and perceived security of tourism m-payment. Consequently, we hypothesize the following:

H11: tourist susceptibility to interpersonal influence (TS) has a positive effect on perceived security (PS).

H12: to Perceived risks a positive effect on perceived usefulness (PU).

2.3 Hypothesis and Model

Based on the proposed conceptualizations, this study added perceived security, perceived compatibility, destination m-payment knowledge and tourist susceptibility to interpersonal influence as expected factors. Thus, in the context of tourism m-payment, we proposed an extended TAM having seven constructs. The model is depicted in Figure 1.

3 Methodology

This study employs a structural equation modelling (SEM) approach to develop a model that represents the relationships among the seven variables in this study. Data were collected through using a survey questionnaire comprising questions on demographics and multiple items for each variable in the research model.

3.1 Measures of the Constructs

A questionnaire survey was used to test the research model. There were three parts in the questionnaire. In the first part, the respondents were asked what kinds of the tourism m-payment system they had used. In the second part, there were demographic questions about the participants. In the third part, the questions were designed to measure the constructs in the research model. A Likert-scale with seven-point anchors was used to measure all the relationships in the study. Response options ranged from strongly disagree to strongly agree. We adapted the items

from the extant literature, and the constructs, the number of items used to measure each construct, and the sources of the items were summarized in Table 1.

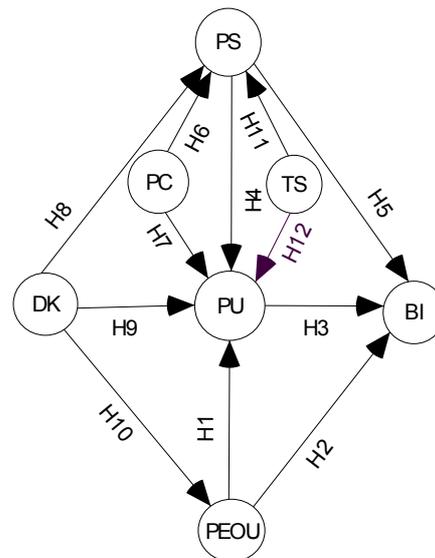


Figure 1: Proposed hypothetical model.

DK: destination m-payment knowledge, TS: tourist susceptibility to interpersonal influence, PC: perceived compatibility, PS: perceived security, PU: perceived usefulness, PEOU: perceived ease of use, BI: behavior intention

After the questionnaire was drafted, six academic experts were asked to review the questionnaire. And then the questionnaire was revised to make the wording of the items more precise according to their suggestions. After that, we conducted a pretest among 43 frequent tourism m-payment tourists. All Cronbach's Alpha exceeded the threshold value of 0.7 and indicated good reliability and the results showed good convergent and discriminant validities.

Table 1: Construct reliability, convergent validity and discriminant validity

Construct	Item number	Item loading	Source	Reliability	Factor correlations							
					AV E	PC	DK	TS	PS	PEOU	PU	
PC	3	0.793-0.837	[13]	0.86	0.67	-						
DK	4	0.729-0.854	[18]	0.87	0.63	0.06	-					
TS	3	0.84-0.89	[5]	0.90	0.75	0.01	0.01	-				
PS	4	0.792-0.829	[16]	0.89	0.66	0.01	0.62	0.64	-			
PEOU	4	0.879-0.912	[8]	0.94	0.81	0.07	0.74	0.05	0.47	-		
PU	3	0.848-0.87	[8]	0.90	0.74	0.60	0.59	0.21	0.53	0.68	-	
BI	4	0.859-0.879	[8]	0.93	0.76	0.25	0.63	0.21	0.58	0.78	0.75	-

3.2 Data Collection Procedure

This investigation used the structural equation modeling (SEM) for hypotheses testing. Due to unknown population of tourism m-payment users, a convenience sampling technique was employed for data collection in this study. A face-to-face questionnaire survey was administered in Guilin, China, a famous tourist resort. The survey was conducted at the hotel and restaurant in Guilin. Respondents were first asked whether they had ever conducted traditional e-commerce payments; if they replied in the affirmative, they were asked to participate in the survey. The screened and qualified tourists were recruited, and research assistants briefed participants about the survey to ensure each questionnaire was fully completed. Respondents were asked to circle the response which best described their level of agreement with the statements. Aside from the measurement scale, the questionnaire also included some questions regarding tourists' backgrounds and their experiences of using m-commerce.

To increase the generalizability of the results, the respondents were spread across ten popular tourism m-payment categories, including booking passenger tickets, booking entrance tickets, restaurant table reservations, mobile learning, playing mobile games, mobile stock trading, mobile map services, buying tourism products by tourism m-payment, mobile entertainment payments, taking part in mobile auctions.

To obtain a sufficient and effective sample modeling the research structure, 618 surveys were distributed, 515 of which were filled out. After removal of the incomplete forms, 421 complete and useful samples were included in this study, yielding a response rate of approximately 74.5%. The ratio of the number of observations to the number of variables (items) also approached the appropriate ratio, implying a sufficient sample for further analysis. Table 1 shows the profile of the participants.

4 Results

The statistical analyses in this section include assessing the reliability and validity of the measurement items used in this study. This is followed by testing of the hypotheses by assessing the model fit through using various fit indices and evaluating the path model.

4.1 Measurement Model

First, content validities should be relatively acceptable since the various parts of questionnaire were all adapted from the literature and have been reviewed carefully by practitioners. Next, confirmatory factor analysis in AMOS software was used to analyze construct validities, basically the analytical procedure including three stages as described below. First, a measurement model should be assessed for goodness-of-fit. The literature suggested that, for a good model fit, chi-square/degrees of freedom (χ^2/df) should be less than 3, adjusted goodness-of-fit index (AGFI) should be larger than 0.8, goodness-of-fit index (GFI), normal fit index (NFI), and comparative fit index (CFI) should all be greater than 0.9, and root mean square error (RMSE) should be less than 0.10 (Henry and Stone, 1994). Second, convergent validity is assessed by three criteria. Item loading is at least 0.7 and significant, composite construct reliability is a minimum of 0.8, and average variance extracted (AVE) for a construct is larger than 0.5 [11]. Finally, discriminant validity is assessed by the measure that the AVE of each construct should be larger than its square correlation with other constructs [11].

The indices for the measurement model indicate a good fit with χ^2/df (238.7/254=0.94), AGFI (0.945), GFI (0.957), NFI (0.972), CFI (1.00), and RMSE (0.001). The results of reliability as well as convergent and discriminant validities for this model are reported in Table 1. The item loading for these constructs ranges from 0.729 to 0.912 and is also significant at 0.01 level, construct reliability ranges from 0.86 to 0.94, and AVE ranges from 0.63 to 0.81. Moreover, the AVE of each construct is all above its square correlation with other constructs. Thus, this measurement model indicates a high degree of reliability as well as convergent and discriminant validities.

Table 2: Overall model fit indices of the research model

	χ^2/df	RMSEA	GFI	AGFI	CFI	NFI	IFI
Recommended value	<3	<0.05	>0.90	>0.80	>0.90	>0.90	>0.90
Obtained value	0.923	0.001	0.957	0.947	1.000	0.972	1.002

4.2 Structural Model

The technique of structured equation modeling was used to examine the causal structure of the proposed model in this study. The evaluation of this research model can be carried out in three steps. First, a GFI for the structural model was examined as the same GFIs applied in assessing the measurement model. Second, the standardized path coefficients and their statistical significance for the hypotheses in this model were estimated. Finally, as a measure of the entire structural equation, an overall coefficient of determination was calculated, similar to that found in multiple regression analysis.

The commonly used measures of model fit, based on results from an analysis of the structural model, are summarized in Table 2. In practice, a Chi-square/degree of freedom of less than 3, GFI, NFI, CFI greater than 0.9, an AGFI greater than 0.8 and a RMSR of less than 0.05 are considered indicators of good fit. As seen in Table 2, all goodness-of-fit statistics are in the acceptable ranges. This study examined the estimated coefficients of the causal relationships between constructs, which would validate the hypothesized effects. Figure 2 illustrates the estimated coefficients and their significance on the structural model.

Table 3: Hypothesis testing results

Hypothesis	Relation	Estimate	S.E.	C.R.	P	Results
H1	PEOU→PU	0.368	0.038	9.744	<0.001	Supported
H2	PEOU→BI	0.377	0.039	9.623	<0.001	Supported
H3	PU→BI	0.395	0.056	6.993	<0.001	supported
H4	PS→PU	0.278	0.084	3.319	<0.001	Supported
H5	PS→BI	0.192	0.043	4.452	<0.001	Supported
H6	PC→PS	-0.017	0.019	0.880	0.379	Not Supported
H7	PC→PU	0.306	0.021	14.381	<0.001	Supported
H8	DK→PS	0.498	0.036	13.783	<0.001	Supported
H9	DK →PU	0.016	0.061	0.257	0.797	Not Supported
H10	DK →PEOU	0.774	0.053	14.501	<0.001	Supported
H11	TS→PS	0.492	0.033	14.916	<0.001	Supported
H12	TS→PU	-0.005	0.049	-0.109	0.913	Not Supported

DK: destination m-payment knowledge, TS: tourist susceptibility to interpersonal influence, PC: perceived compatibility, PS: perceived security, PU: perceived usefulness, PEOU: perceived ease of use, BI: behavior intention

SEM was performed to investigate the relationship between variables which affect the intention to use tourism m-payment. As shown in Figure 2 and Table 3, Hypotheses H1, H2, H3, H4, H5, H7, H8, H10 and H11 are supported as shown by the path coefficients. However, tourist susceptibility to interpersonal influence and destination m-payment knowledge exert no impact on perceived usefulness, and perceived compatibility exerts no impact on perceived security. Therefore, Hypothesis H6, H9 and H12 are not supported as shown by the path coefficient. The following subsections provide further discussion on these results.

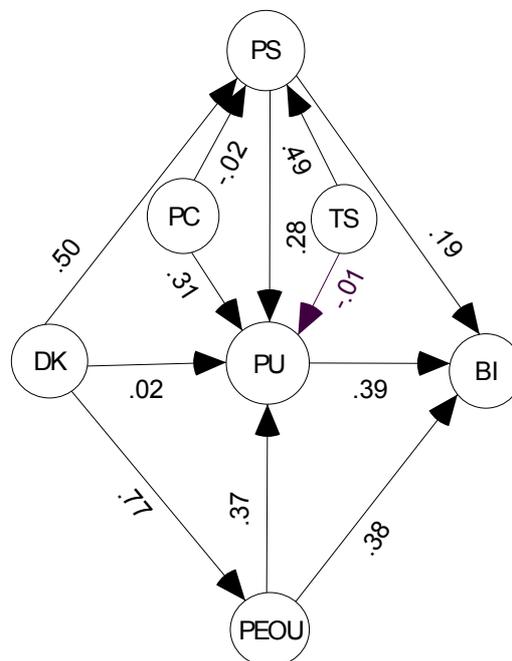


Figure 2: Results of structural equation model.

DK: destination m-payment knowledge, TS: tourist susceptibility to interpersonal influence, PC: perceived compatibility, PS: perceived security, PU: perceived usefulness, PEOU: perceived ease of use, BI: behavior intention

1. Figure 2 and Table 3 further illustrate the significant structural relationships among the study variables. Hypotheses 1 and 2 postulate that perceived ease of use has a positive influence on intention to use tourism m-payment (H2) and perceived usefulness (H1). The results show that perceived ease of use has a strong direct effect on intention to use tourism m-payment (H2: $\beta = 0.377$, $p < 0.001$) and perceived usefulness (H1: $\beta = 0.368$, $p < 0.001$). Results from the study also support that perceived usefulness is a consistently important factor in intention to use tourism m-payment (H3: $\beta = 0.395$, $p < 0.001$). Therefore H1, H2 and H3 are supported. This result is consistent with the findings of most TAM related studies. Results suggest that TAM was capable of providing an adequate explanation of tourist adoption decision making process to use the tourism m-payment (see Table 3). One of the objectives of this study is to examine the suitability of TAM in explaining tourism m-payment adoption intention in China. The hypothesized model is tested, and empirical data from this study support the suitability of TAM and its robustness to study tourist acceptance outside the U.S. context. This suggests that, in implementing a tourism m-payment system, the focus should be placed on fostering the self-confidence of individuals and their perceptions concerning the system. If tourists are struggling, they may actually believe that the system is too hard to use and that the benefits of using the system in terms of performance are outweighed by the effort of using it. Eventually, tourists may become reluctant to use the technology, thus defeating the purpose of introducing it. Future studies can extend the results of this study by investigating the area of self-confidence which addresses one's belief in one's abilities to be able to accomplish a specific task. As a future direction of research, we will include self-confidence as a factor for further investigation.
2. Hypotheses 4 and 5 focus on the impact of perceived security on perceived usefulness (H4) and behavior intention (H5). The empirical data showed that perceived usefulness of tourism m-payment (H4: $\beta = 0.278$, $p < 0.001$) in China was dependent on perceived security, and perceived security constituted significant influence over behavior intention (H5: $\beta = 0.192$, $p < 0.001$). Therefore, H4 and H5 are supported. Importantly, this finding can be used to help understand how tourists respond on system security and how they evaluate tourism m-payment system. Previous consumer behavior and information system research has highlighted the importance of perceived risk as an inhibitor on adoption of E-commerce. The majority of information systems research has focused on the importance of trust and trust building as a prerequisite to E-commerce transactions and development of business relationships. This research looked at perhaps the other side of the intention to use tourism m-payment.
3. Figure 2 shows the standardized, theoretical paths linking destination m-payment knowledge, perceived security, perceived usefulness and perceived ease of use. H8 suggests a direct path linking destination m-payment knowledge and perceived security. This path is supported by a positive estimate of 0.498 ($p < 0.001$). H9 predicted a positive relationship between destination m-payment knowledge and perceived usefulness. This relationship is not supported by the corresponding estimate of 0.016 ($p = 0.797$). H10 suggests a direct relationship between destination m-payment knowledge and perceived ease of use. H10 is supported by the positive estimate of 0.774 ($p < 0.001$). One interesting observation is that, in testing the structural model, destination m-payment knowledge only demonstrated a weak direct effect on perceived usefulness. On the other hand, destination m-payment knowledge demonstrated a significant direct effect on both perceived ease of use and perceived security. One of the possible explanations of the weak effect of destination m-payment knowledge on perceived usefulness is that, tourists with a high level of destination m-payment knowledge realize not only the advantages of tourism m-payment system, but also the disadvantages of it. As a result, positive destination m-payment knowledge may not generate an increase to perceived usefulness. One thing to note is that the relationship between destination m-payment knowledge and perceived usefulness was not significant with significance level 0.016. It means that a person with enough destination m-payment knowledge does not perceive its higher usefulness. Actually, people with plenty of destination m-payment knowledge usually have high expectation towards the information technology, and then they don't find more use for the tourism m-payment system.
4. Hypotheses 6 and 7 investigate the relationship of perceived compatibility to perceived usefulness (H7) and perceived security (H6). Perceived compatibility has a positive direct effect on perceived usefulness (H7: $\beta = 0.306$, $p < 0.001$). Although the direct effect of perceived security on perceived usefulness (H4: $\beta = 0.278$, $p < 0.001$), it should be noted that the positive effect of perceived compatibility on perceived security is not very strong (H6: $\beta = -0.017$, $p = 0.379 > 0.05$). As a result, H7 are supported while H6 is rejected. A possible explanation is that the tourism m-payment systems in China were in the early stage of diffusion and provided only limited functions to tourists. For early tourism m-payment users, the level of perceived compatibility is crucial to the users' perceived usefulness of tourism m-payment. This can be explained by the fact that the perceived compatibility gives early tourism m-payment users confidence to try complex tourism m-payment features in a variety of usage contexts. Thus, perceived compatibility has a positive effect on perceived usefulness. On the other hand, because the tourism m-payment systems in China were in the early stage, tourists particularly place emphasis on usefulness of tourism m-payment. Tourists who perceived it to be higher compatibility on a regular basis greatly reduce the frustration and make them neglect risk. Alternatively, non-significant relationship between perceived compatibility and perceived security might be the case that the compatibility perceived by tourists may not enhance their feeling of security. As a result, perceived compatibility may not be an important concern for perceived security.

5. Tourist susceptibility to interpersonal influence was found to exert a strong positive influence on perceived security ($H11: \beta=0.492, p<0.001$). However, tourist susceptibility to interpersonal influence has a weak and insignificant direct effect on perceived usefulness ($H12: \beta=-0.005, p=0.913>0.05$). Thus, $H12$ is rejected. On the relationship between tourist susceptibility to interpersonal influence and perceived usefulness, the negative effect suggests that when tourists tend to accept information from others as evidence about reality, they could find the technology less useful in that they would be unlikely to be productive and efficient by using it. The ambiguous findings with respect to the relationship between tourist susceptibility and perceived usefulness may be explained by the type of tourists influenced. When, as in our study, there are few tourists who are well-informed about the tourism m-payment technology, its usefulness is less disseminated by interpersonal influence. Another possible explanation for the unexpected result was that, in the early stage of the tourism m-payment systems, early tourism m-payment users found it imperfect and inconvenient. Therefore, the result that tourist susceptibility to interpersonal influence had no significant effect on perceived usefulness was also unexpected.

5 Discussion

This study derived three academic contributions which pave the way for advancing current knowledge of the tourism m-payment technology adoption. Meanwhile, some business implications are briefly described, which may be of interest to those who are interested in effectively developing the tourism m-payment system.

5.1 Academic Contribution and Future Research

The major contributions of this study are as follows. First, this study successfully extended TAM in the context of tourism m-payment, which has different characteristics from the other information systems. This study incorporated the system characteristics (such as perceived security and perceived compatibility), and tourism characteristics (such as destination m-payment knowledge and tourist susceptibility to interpersonal influence) which pertain to tourism m-payment, but were disregarded in the previous mobile payment studies. The research conclusions are helpful for researchers to develop and refine tourism m-payment research models in the future, as well as for managers to develop effective tourism m-payment service systems.

Second, the results of this study suggest that tourism characteristics factors impact tourist decision to adopt and use tourism m-payments. Although most contemporary mobile acceptance research has not studied the effect of scenarios factors on mobile payments adoption, Our results appear to be exactly the same as the prior research that has found significant correlations between scenarios factors and the use of mobile services [24]. The findings of this study show that scenarios factors may be important determinants to mobile services adoption and tourism characteristics factors should thus be included in the tourism m-payment adoption models.

Third, the results of empirical analysis show that perceived ease of use and perceived usefulness were determined to be significant antecedents of the intention to use tourism m-payment. Perceived security and perceived compatibility are critical determinants of the perceived usefulness of tourism m-payment. Destination m-payment knowledge and tourist susceptibility to interpersonal influence are critical determinants of the perceived security of tourism m-payment. Destination m-payment knowledge and tourist susceptibility to interpersonal influence have an insignificant effect on perceived usefulness.

5.2 Managerial Implications

Although the primary intention of this study is a confirmatory orientation, several managerial implications can be drawn. It is most important for the tourism m-payment service provider to effectively boost the number of users in the early days of tourism m-payment system. The six factors researched in this study provide a useful way to increase further market penetration of tourism m-payment services.

This study believes that perceived compatibility of tourism m-payment services is an important factor to tourists. Thus, the tourism m-payment service providers are challenged to develop and advertise tourism m-payment solutions so as to suit tourists for prior experience. The relevance of the perceived security of tourism m-payment service implies another managerially interesting insight. A positive relationship of this factor with adoption is found in this study, but the link was not so strong as results in prior research given the increasing importance of the perceived risk construct. This implies that perceived risk of tourism m-payment may not be at center stage when launching tourism m-payment services. Thus, managers need to focus on the long-term strategic aspects highlighted above in order to make tourism m-payment services a mass market reality.

In addition to perceived security and perceived compatibility, destination m-payment knowledge and tourist susceptibility to interpersonal influence are key drivers of the tourist acceptance of tourism m-payment services. While this tourist characteristic cannot be influenced by the firm, our finding can help managers in the segmentation and prioritization of potential customers. In the current early stage of the tourism market, the tourism m-payment service provider should focus on tourists who have a strong need to pay for tourism goods and tourism services in

tourism destination situation, as they are more likely to be interested in tourism m-payment services. If this group of tourists can be inspired to use tourism m-payment services, a critical mass effect may make even less mobile consumers interested in the service later on. However, it can be implied that reference groups play an important role in the diffusion of tourism m-payments. Thus, the tourism m-payment service provider needs to identify early adopters and stimulate their usage of tourism m-payment services, so that they can serve as a reference facilitating broad diffusion in the future.

The findings can provide useful recommendation to development of practice and policy making, which are customer oriented and evidence based. For tourism m-payment policy makers responsible for future strategic planning of tourism m-payment services, this study provides the following recommendations:

1. The six important antecedents (i.e., perceived usefulness, perceived ease of use, perceived compatibility, perceived security, tourist susceptibility to interpersonal influence, and destination m-payment knowledge) of user acceptance of tourism m-payment services were identified. Accordingly, to effectively evaluate the performance of tourism m-payment services, we suggest that policy makers can improve strategic planning for tourism m-payment services investments through monitoring these nine factors as performance indicators.
2. Tourism characteristics (such as destination m-payment knowledge and tourist susceptibility to interpersonal influence) significantly affect tourists' intention to use. From the key motivational force behind tourism m-payment service use, we suggest that policy makers should make plans of action on enhancing external and internal influences for tourists and continuously increasing tourists' communication and providing resources required to use tourism m-payment services for tourism m-payment adopters.
3. Adopters ranked higher scores in perceived ease of use and destination m-payment knowledge. Accordingly, we suggest that policy makers should invest more on user training.
4. Given the fact that the usage of the tourism m-payment services is completely voluntary, and that the target user group consists of a large number of people with diverse backgrounds, the findings of this study suggest that in order to attract more users to use tourism m-payment services, it is not enough to develop a useful system and make the system easy to interact with. It is of paramount importance to develop tourism m-payment services systems that provide a solid security protection for the users. This way the policy makers need not concern themselves so much with attempting to directly influence behavioral intentions. Thus, the attention of management might be more productively focused on the "development" of belief. Especially, policy makers should employ training and promotion approaches to develop people's beliefs of usefulness, ease of use, perceived security and destination m-payment knowledge, which in turn influence their behavioral intention to adopt tourism m-payment services.

For service providers responsible for developing implementation strategies for tourism m-payment services, this study provides the following recommendations:

1. Important determinants of tourism m-payment services use are perceived security, destination m-payment knowledge, perceived usefulness, and perceived ease of use. To successfully implement tourism m-payment services given constraints in resources, we suggest that service provider can set priorities based on the relative importance of the factors. In order to increase the destination m-payment knowledge of people, the service providers can organize training courses on various computer and Internet applications to increase the people's familiarity with information technologies. Even if these courses are not directly related to the tourism m-payment system itself, they can still help the people to develop positive usefulness and ease of use beliefs about the system.
2. To increase positive behavior intention towards tourism m-payment services, we suggest that service providers should develop implementation strategies that emphasize the usefulness of tourism m-payment services, security, and ease of use. Although the tourism m-payment services have been emerging as an important travel payment channel in China, its functionalities are still at an early stage of development, compared with the established traditional payment services. Hence, to gain competitive advantage, Chinese tourism m-payment services entrepreneurs ought to react quickly and embrace innovative solutions for management and operations.
3. To manipulate subjective norms, we suggest service providers that marketing strategy should seek to produce peer impact and external impact as well. For example, encouraging tourism m-payment service adopters to enhance their peer influence through various channels; endorsing tourism m-payment service by well-known stars.
4. Different providers, such as mobile operators and financial institutions, also need closer cooperation and joint standardization efforts to overcome the barriers of low acceptance rates and lack of standards.

For system developers responsible for tourism m-payment services design, this study provides the following recommendations:

1. Perceived ease of use, perceived security, perceived compatibility, and destination m-payment knowledge are key factors influencing user acceptance of the tourism m-payment services. Therefore, we suggest that system developers should provide a user-friendly interface, reinforce security mechanisms for tourism m-payment services, and design a suitable information system flow more compatible with user's work style.
2. To support tourism m-payment service adoption, we suggest that system developers could focus on developing effective user guidance, continuously improving security mechanisms, and using community of practice on Internet for promoting the tourism m-payment services and sharing use experience. The future development of tourism mobile payments should place more emphasis on user-friendly technologies such as contactless RFID, and on the usability of the payment systems.
3. In order to develop useful, easy-to-use, and trustworthy tourism m-payment services, this research indicates that system developers need to focus on some specific areas such as: deepening and broadening of the tourism m-payment services and contents; promotion of the usefulness and convenience of these services; provision of up-to-date and useful tourism information; enhancement of tourism information dissemination; sharing and integration; enhancement of m-payment knowledge of the citizens and tourists by training and education in business and society; commitment to establishing user-friendly Web sites for all tourism m-payment agencies; promotion of the availability and ease of use of the tourism m-payment services.

6 Limitations

Some limitations must, however, be considered. Firstly, the model developed in this study relied on data gathered from visitors in Guilin, China. The generalization of the findings is bounded due to the geographic limits imposed by South China as the sole study site. Future research applying the study method in other destinations will help to establish the generalization of the model. Secondly, the tourism industry is highly seasonal, and the impact of seasonal demand variation is one of the dominant policy and operational concerns of tourism interests in both the public and private sectors. The main study sampling of tourists was conducted in summer. It is possible that different sample profiles would be derived from other seasons. Further, more longitudinal, data gathering in future research will help to understand what, if any, effect seasonality has on results. Finally, we proposed a model that was intended to increase understanding of tourism m-payment services by focusing on system characteristics and tourism characteristics. Additional factors (such as age, education, level of spending, duration of visit) may play an important role. However, this study did not include these factors because the attention was focused on DK, PS, PC, TS, PU, and PEOU of the tourism m-payment services. Therefore, future research should extend to include these factors.

7 Conclusions

Our research is the first empirical effort to examine factors affecting intentions to use m-payment services in a tourism context. Thus, the results represent an important step in unraveling the intricate relationship between the key constructs. Our results support the tourism m-payment acceptance model and generally confirm our nine hypotheses. The contributions of this study to tourist acceptance research are:

First, the traditional conceptualization of TAM was successfully applied in the new tourism m-payment context.

Second, the results indicated that, in addition to perceived ease of use and perceived usefulness, tourist intention to use tourism m-payment is affected by perceived security. While perceived usefulness also is affected by perceived compatibility and perceived security, perceived ease of use is only affected by destination m-payment knowledge. In addition, perceived security is affected by destination m-payment knowledge and tourist susceptibility to interpersonal influence.

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