



Empirical Research Article

The Use of Travel-Related WeChat Mini-Programs in China: An Affordance Theory Perspective

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Abstract

The travel-related applications on a smartphone help tourists make a reservation before their trip conveniently; use a map, direction guidance, and translation services during the travel; evaluate and recommend travel services communicating with others after their journey. This study examines the relationships among affordances and constraints provided by the mini-program, users' perceived value, and travel-related mini-program (TRMP) usage by analyzing the structural equation modeling. An online questionnaire was developed from the available scales in the published literature. A total of 651 TRMP users responded to the survey, and 448 valid responses were included for analysis. Affordance, including physical, cognitive, sensory, and functional affordance, significantly influenced the hedonic value of TRMP; utilitarian value except for cognitive affordance. There were negative relationships between unfamiliarity and both types of value. The utilitarian and hedonic value of TRMP significantly influenced both the exploitative and explorative use of TRMP. Travel-related mobile applications are dramatically increased in the tourism field. This research sheds light on TRMP usage, as a new and smart device, from a user's perspective based on the affordance theory. This study represents a valuable direction regarding the emerging travel-related online platforms in tourism.

Keywords

travel-related mini-program (TRMP); affordance theory; utilitarian value; hedonic value; exploitative use; explorative use

1. Introduction

The emergence of smartphones has provided a lot of convenience for travel. Various APPs began to spring up in the last ten years, among which travel-related APPs are top-rated and ranked 7th in the mobile APPs download ranking (R-Style Lab, 2018). Although travel-related APPs play an increasingly important role in travel, the APPs are used less frequently due to travel's low-frequency nature. (Cheng, Ren, Hong, Nam, & Koo, 2019). Travel-related APPs have used an average of only 2.6 times per week and keep 45% of their users over 90 days (GoodWorkLabs, 2016).

WeChat mini-program (WMP) was released by WeChat in 2017, the giant in China's instant messaging industry. WeChat is a free instant messaging service provider released by Tencent in 2011. It also incorporates mobile payments, social network services (SNSs), financial management, public services, charity services, and other services provided by third-party operators, such as food delivery. Therefore, WeChat has built an online ecosystem around Chinese people's lives. In the second quarter of 2016, more than 94% of smartphone users installed WeChat, and monthly active users reached 806 million in China (Tencent Big Data, 2016).

The WMP has several different features comparing to other APPs. It does not need to be installed or uninstalled, is fast and lightweight, and has no complicated features and advertisement

push. Thus, WMP can fit the needs of people who travel 1 to 2 times a year. Several online travel agents and travel companies have launched their mini-programs to attract travelers (e.g., Booking.com, Airbnb, C-trip, Qunar.com, TripAdvisor). More than 1 million mini-programs have been launched, covering 200 categories, and daily users have reached more than 200 million (QPSoftware, 2019). Travel-related mini-programs (TRMP) have abandoned the burdensome procedures of using past Internet products and have done a better job than websites and general apps of elevating the user experience. Additionally, TRMPs provide various functions of general apps and integrate special features such as authentication, mobile payment, information sharing, and social community.

Under the importance of mobile devices in tourism, recent studies have focused on mobile devices such as smartphones (Tussyadiah & Zach, 2012; Wang, Xiang, & Fesenmaier, 2016) and travel-related APPs (Dickinson et al., 2014; Wang et al., 2016). In travel-related Apps, numerous studies have concentrated on the use patterns and adoption of the APPs and attractive design for users; however, little is known about the lower frequency of travel APPs usage. In addition, affordance theory can explain the uses and achievements of information systems and technology based on the relationships between individuals/organizations and technical characteristics (Majchrzak & Markus, 2012). It can also incorporate information technology artifacts into analysis and align with how the

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information technology practitioners think about their challenges (Volkoff & Strong, 2017). Therefore, this study examines the relationships among affordances provided by TRMP, and constraints while using those mini-programs, and the travelers' perceived value of TRMP usage.

2. Literature Review

2.1 Affordance Theory

Gibson (1979) proposed the affordance theory in 1979, representing the physical relationship between an actor and physical artifacts in the world, reflecting possible actions on those artifacts. Norman (1988) firstly adopted the affordance

theory into the human-computer interaction field. He viewed affordance as the product's design feature that shows how the product is used. Norman (1988) thought that affordance relies more on the actor's experience and knowledge, and it can predict actors' behavior and suggest a range of possibilities. The central principle of affordance theory is that technological capabilities are not inherent to a specific technology but exist as part of the association between users and the technological artifacts within a particular domain (Treem & Leonardi, 2013). During the interaction between humans and machines, a human user performs cognitive, physical, and sensory actions and requires affordances to help with each (Hartson, 2003). Based on previous studies, Hartson (2003) classified affordance as four types: cognitive, physical, sensory, and functional affordance, according to its role in supporting users during interactions. (Table 1).

Table 1. Summary of affordance types

Affordance Type	Description	Example
Cognitive affordance	A design feature that helps users in knowing something	A button label that helps users know what will happen if they click on it
Physical affordance	A design feature that helps users in doing a physical action in the interface	A button that is large enough so that users can click on it accurately
Sensory affordance	A design feature that helps users sense something (especially cognitive affordances and physical affordances)	A label font size large enough to read easily
Functional affordance	A design feature that helps users accomplish work (i.e., the usefulness of a system function)	The internal system ability to sort a series of numbers (invoked by users clicking on the Sort button)

Source: Hartson (2003, p. 323)

2.2 Perceived Value

Perceived value was defined as “the consumer’s overall assessment of the utility of a product (or service) based on perceptions of what is received and what is given” (Zeithaml, 1988, p.14). To better understand the perceived value, numerous scholars are beginning to examine perceived value by adopting a multidimensional approach (Chiu, Wang, Fang, & Huang, 2014). Thus, the value theory is classified into utilitarian and hedonic value subsystems (Chiu et al., 2014; Chung & Koo, 2015). Utilitarian value is defined as an overall assessment of functional benefits and sacrifices (Overby & Lee, 2006). It is related to tools, rational, functional, cognitive, and means of end activities, while the hedonic value is associated with entertainment and the emotional worth of consumption (Chung & Koo, 2015). However, hedonic value is defined as an overall assessment of experiential benefits and sacrifices, such as entertainment and escapism (Overby & Lee, 2006). In this study, the utilitarian value of TRMP is defined as the overall assessment of functional benefits and sacrifices of using TRMP; In contrast, the hedonic value of TRMP is defined as the comprehensive evaluation of the experiential benefits and sacrifices of using TRMP.

2.3 Technology Constraint

Constraints and affordances are viewed as relational concepts regarded as the potential interactions between individuals and technology (Majchrzak & Markus, 2012). The affordance of technology refers to an individual or organization's action potential or organization operates a technology or information system with a specific purpose. In contrast, technology constraint refers to how an individual or organization can be restrained while using technology or a system with a particular goal (Majchrzak & Markus, 2012). The existent research related to technology constraints—*distrust, perceived risk, and unfamiliarity*—are the three factors that appeared most frequently (Barkmann et al., 2008; Sillince & Shipton, 2013; So,

Oh, & Min, 2018). TRMP is a new technology introduced to the tourism field; the research model's constraints include three dimensions.

Trust represents consumers' willingness to depend on an exchange partner (Moorman, Zaltman, & Deshpande, 1992). However, distrust of the Airbnb's business model and the host restricted travelers from choosing Airbnb (So et al., 2018). Tussyadiah and Pesonen (2018) defined distrust as the lack of interpersonal trust between host and guest and lack of trust toward technology. In this study, distrust can be defined as the lack of interpersonal trust between travelers and TRMP service providers and the lack of trust toward new technology.

Perceived risk refers to the consumer's perception of the potential for adverse outcomes in the purchase context, which is one of the main barriers for consumers to be unwilling to purchase behavior (Park & Tussyadiah, 2017). Perceived risk exists in mobile shopping because consumers cannot obtain evidence of the difference between pre-purchase assessments and actual product qualities. Besides, since mobile devices represented by smartphones are viewed as self-service technologies, mobile shopping requires consumers to take considerable responsibility (Cunningham, Gerlach, Harper, & Young, 2005). In this study, perceived risk can be defined as the subjectively determined expectation of loss using TRMP during the trips.

Given that WMP is a relatively new technology introduced to the tourism industry, travelers may have limited knowledge and information about this alternative service provider. The lack of knowledge, information, or ability to use can be perceived as a constraint in using TRMP during a trip (Tussyadiah & Pesonen, 2018). As a very fast-changing technology field, of course, many scholars have done a lot of research on people's unfamiliarity with technology. Cooper, Taft, and Thelen (2004) indicated that unfamiliarity with technology is one of the main barriers to learning with adopting the technology. Based on previous research, unfamiliarity with TRMP is defined as a lack of knowledge or ability to use TRMP for this research.

2.4 Explorative/ Exploitative Use

The concepts of exploration and exploitation are generally adopted in the organizational learning context and extended to individual learning and decision-making (Huang, Goo, Nam, & Yoo, 2017). For individuals, exploration is a deviation from existing tasks and seeking alternatives, while exploitation refers to a behavior that optimizes the performance in the current tasks (Aston-Jones & Cohen, 2005). In the information system adoption context, Burton-Jones and Straub (2006) claimed that explorative use is associated with seeking new and different system uses, while exploitative use involves the refinement of the old system and existing knowledge. Koo, Chung, and Kim (2015) indicated that user competence and perceived usefulness are positively related to the smartphone’s explorative and exploitative use. In contrast, perceived ease of use only influences exploitative use. Huang et al. (2017) argued that explorative use of smart tourism technology (STT) strongly affects travel experience satisfaction and exploitative use of STT has a positive effect on transaction satisfaction. Considering the

feature of TRMP, the current study defined the explorative use of TRMP as seeking new and different uses (e.g., translator) of the TRMP; exploitative use of TRMP as essential functions (e.g., booking) provided by TRMP.

3. Methodology

A research model is proposed in Figure 1. The measurements consist of six constructs: affordance, constraint, perceived utilitarian value, perceived hedonic value, explorative use, and exploitative use. The items of four types of affordances were derived from Hartson (2003); perceived risk and distrust were adapted from the research of So et al. (2018) and Mao and Lyu (2017); unfamiliarity was derived from Mao and Lyu (2017). The perceived utilitarian value and hedonic value were derived from Ozturk, Nusair, Okumus, and Hua (2016). Finally, the explorative and exploitative use items were Adapted from Koo et al. (2015). Each item was measured using a 7-point Likert scale ranging from strongly disagree to agree strongly.

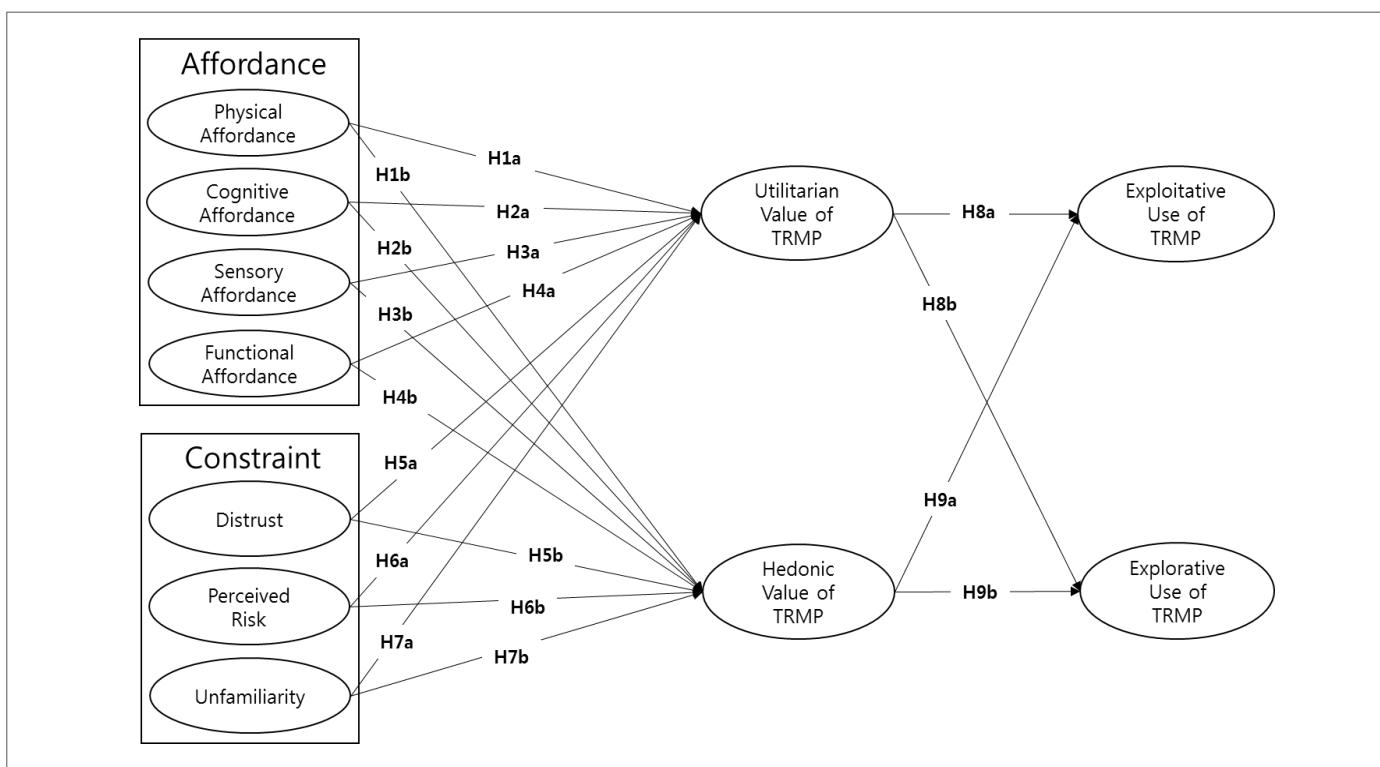


Fig. 1. Research model

4. Hypotheses Development

4.1 Relationships Between Affordance and Perceived Value

The technology affordance theory can describe how individuals understand and approach technology differently (Leonardi, Nardi, & Kallinikos, 2012). Chiu et al. (2014) studied customers’ repeat purchase intentions in the B2C e-commerce context and suggested that product information positively affects utilitarian value. Kim and Han (2011) also examined the role of utilitarian and hedonic values and their antecedents in a mobile data service environment. The results indicated that information quality positively influences both utilitarian and hedonic values. During the interaction between humans and machines, a human user performs cognitive, physical, and sensory actions and looks for these kinds of affordances to help achieve the goal (Hartson, 2003). Accordingly, the hypotheses are proposed as follows:

H1: The physical affordance provided by TRMP has a positive effect on utilitarian value (H1a) and hedonic value (H1b) of TRMP.

Cognitive affordance can be used to evaluate during the use of any technology or machine (Hartson, 2003). As a cognitive concept, value helps to describe the user’s decision-making and usage behavior, and as another cognitive concept, cognitive affordance helps the user solve problems. As a higher-level cognitive process, problem-solving interacts with many other cognitive processes, such as decision-making, inferring, and evaluating (Wang & Chiew, 2010). In other words, cognitive affordance affects the user’s evaluating behavior through the decision-making process. Therefore, the hypotheses of cognitive affordance and perceived value of TRMP can be proposed as follows:

H2: The cognitive affordance provided by TRMP has a positive effect on utilitarian value (H2a) and hedonic value (H2b) of TRMP.

Hartson (2003) argued that sensory affordance is needed in the stage of intention to act, execution of the action sequence, and to perceive the state of the world in the steps of the action model. That is to say, sensory affordance helps the user plan and execute the action of using technology and perceiving the state of these activities. Sensory affordance is in the position supporting cognitive affordance and physical affordance. For example, the button's font size and color may affect text legibility; thus, evaluate the technology. Moreover, Kim and Forsythe (2009) found that sensory enabling technologies can be increasing the hedonic value of the online shopping process by reducing perceived product risk in an online shopping context. Thus, we hypothesize:

H3: The sensory affordance provided by TRMP has a positive effect on utilitarian value (H3a) and hedonic value (H3b) of TRMP.

Furthermore, Korda and Snoj (2010) examined the development, validity, and reliability of perceived service quality in retail banking and its relationship with perceived value and customer satisfaction. Results indicated that service quality significantly influences perceived value in the context of retail banking. Moreover, Hu, Kandampully, and Juwaheer (2009) studied the relationships and impacts of service quality, perceived value, customer satisfaction, and image by adopting functional quality and technical quality two-dimension approach. Results revealed that a significant effect exists between service quality and perceived value. Therefore, the hypotheses are as follows:

H4: The functional affordance provided by TRMP has a positive effect on utilitarian value (H4a) and hedonic value (H4b) of TRMP.

4.2 Relationships Between Constraint and Perceived Value

Among the previous studies, distrust towards the host and technology is one of the barriers to peer-to-peer accommodation among American travelers (Tussyadiah & Pesonen, 2018). Järveläinen and Puhakainen (2004) also indicated that the barriers for transference to e-commerce might be caused by distrust of the online booking system itself or in the individual's skills with the system. Furthermore, (un)familiarity and (dis)trust play an important role in significant nature (Perrea, Grunert, & Krystallis, 2015). Sirdeshmukh, Singh, and Sabol (2002) examined consumer trust, value, and loyalty in relational exchanges; findings revealed that value completely mediates the effect of frontline employee trust on loyalty in the retailing context. Thus, we hypothesize:

H5: The distrust towards TRMP has a negative effect on utilitarian value (H5a) and hedonic value (H5b) of TRMP.

Also, Liang, Choi, and Joppe (2018) studied the influence on consumer repurchase intention of peer-to-peer accommodation. They found that the perceived risk of using Airbnb is negatively related to perceived value. Yang, Yu, Zo, and Choi (2016) showed that both performance and financial risk have negative effects on the perceived value of wearable devices. Kleijnen, De Ruyter, and Wetzels (2007) revealed that perceived risk negatively affects the perceived value of mobile channels. Moreover, perceived value is a function of benefits and costs in an online shopping context, and time, effort, and price can be understood as the costs of online shopping. Perceived risk can be viewed as a significant online shopping cost since it can change users' overall value towards online shopping (Chiu et al., 2014). Therefore, we hypothesize:

H6: The perceived risk of using TRMP has a negative effect on utilitarian value (H6a) and hedonic value (H6b) of TRMP.

Unfamiliarity with an environmental good can result in some biases such as information bias and methodological misspecification bias, which leads to distorted valuation (Barkmann et al., 2008). Also, a customer who has higher familiarity with online store attributes leads to greater online perceived value and helps them make a decision, resulting in more utility (Wu & Chang, 2016). On the contrary, customers' unfamiliarity with online or offline channel attributes negatively affects perceived value. Therefore, the hypotheses are proposed as follows:

H7: The unfamiliarity with TRMP has a negative effect on utilitarian value (H7a) and hedonic value (H7b) of TRMP.

4.3 Relationships Between Perceived Value and Explorative/Exploitative Use

Since travelers want to maximize value in the decision-making process, they are reluctant to use things with lower perceived value (Chung & Koo, 2015). The utilitarian value and hedonic value reflect the benefits from a cognitive perspective in a mobile shopping context (Kim, Li, & Kim, 2015). Consumers who seek utilitarian value tend to look for vital information to consider products and services before actual purchase (Deli-Gray, Gillpatrick, Marusic, Pantelic, & Kuruvilla, 2010). Consumers who seek hedonic value tend to search for different experiences that have no connection to product purchasing behavior (Kim et al., 2015). In TRMP context, users who seek utilitarian value tend to look for information related to TRMP, and users who look for hedonic value tend to seek different experiences.

Chung and Koo (2015) showed that perceived value and enjoyment (perceived hedonic value) are positively related to the travel information searches in social media usage. Moreover, information reliability on social media usage for travel information search is fully mediated by perceived value. Compared to new users, experienced users are more likely to consider technology's utilitarian value on continued usage (Limayem, Hirt, & Cheung, 2007). Venkatesh, Speier, and Morris (2002) also showed that the utilitarian value of technology (as represented by perceived usefulness) is a predictor of continued technology usage. Since the usefulness and usage of technology need to be captured at different aspects of functions, and concerning explorative and exploitative use, perceived usefulness can be viewed as a value-adding attribute of smartphone usage (Koo et al., 2015). Moreover, Kim et al. (2015) showed that both utilitarian value and hedonic value have significant influences on mobile shopping usage. Chong, Zhang, Lai, and Nie (2012) examined mobile internet acceptance from a value-based view and found that perceived value affects intention to reuse mobile services. Yang (2010) found that the hedonic or entertainment aspect of mobile shopping services is the most important driver of the US consumers' intention to use them. Accordingly, we hypothesize:

H8: The utilitarian value of TRMP has a positive effect on exploitative use (H8a) and explorative use (H8b) of TRMP.

H9: The hedonic value of TRMP has a positive effect on exploitative use (H9a) and explorative use (H9b) of TRMP.

4.4 Data Collection

The dataset was collected through an online questionnaire service company, namely Wenjuanxing.Com, the earliest and the largest online survey, examination, and voting platform in China. The online survey was conducted for 15 days, from July 16 to July 31, 2019. This research is focused on the TRMP user, a screening question to filter only the respondents who have had use TRMP

at least once. A total of 651 questionnaires were received, and 448 (68.8%) were analyzed for this research.

The data were analyzed using Statistical Package for the Social Sciences 23 and SmartPLS 3.0. First, descriptive statistics analysis was conducted to describe the demographic and general characteristics of the respondents. Second, normality tests of the constructs in the model were performed. Third, SmartPLS was used to analyze the structural equation modeling (SEM). The reason for using SmartPLS is that partial least squares (PLS) are suitable to analyze a complicated model that consists of many manifest and latent variables (Henseler, Ringle, & Sinkovics, 2009). SmartPLS does not require strict assumptions about the distribution of variables, which is the most appropriate way to exam data with asymmetric or non-standard distribution (Falk & Miller, 1992). It also requires less residual distribution and sample size, which is an advantage of a component-based

approach (Gefen, Straub, & Boudreau, 2000). Moreover, to eliminate the standard error of the hypothesis test, it is recommended to use a bootstrap process of at least 5,000 bootstrap samples so that the data samples used in the study have a reasonable representation of the population distribution; the coefficient weights between the variables can be calculated (Hair, Ringle, & Sarstedt, 2011).

5. Results

5.1 Demographic Characteristics

Of the 448 respondents, 60.3% were female, and 39.7% were male. Almost half of the respondents (49.8%) are at the age of 20 to 29, followed by 30-39 (38.6%). Most respondents (43.3%) used TRMP more than five times (Table 2).

Table 2. Demographic characteristics of respondents (n=448)

Variables	Frequency (%)	Variables	Frequency (%)
Gender		Destination of the most recent trip	
Male	178 (39.7)	Domestic	416 (92.9)
Female	270 (60.3)	Abroad	32 (7.1)
Travel party in the most recent trip		Previous experience of using TRMP	
Alone	48 (10.7)	First time	56 (12.5)
Couple	146 (32.6)	2 nd	68 (15.2)
Family	101 (22.5)	3 rd	78 (17.4)
Friends	108 (24.1)	4 th	52 (11.6)
Colleague	22 (4.9)	Over 5 th	194 (43.3)
Schoolmate	14 (3.1)	Number of trips per year	
Other	9 (2.0)	Never	9 (2.0)
Occupation		1~2	185 (41.3)
Student	59 (12.2)	3~4	186 (41.5)
Administrative/Clerical job	124 (27.7)	5 or more	68 (15.2)
Professional/specialized job	91 (20.3)	Purpose of the most recent trip	
Self-employed	32 (7.1)	Sightseeing (Study, Vacation)	358 (79.9)
Sales/Services position Technician/production worker	47 (10.5)	Business	35 (7.8)
Homemaker	11 (2.5)	Visiting Friends or Relations	31 (6.9)
Other	42 (9.4)	Others	24 (5.4)
Age		Length of the most recent trip	
10~19	10 (2.2)	1 night	37 (8.3)
20~29	223 (49.8)	2~3 nights	205 (45.8)
30~39	173 (38.6)	4~5 nights	130 (29.0)
40~49	32 (7.1)	6~7 nights	48 (10.7)
50~59	9 (2.0)	8~9 nights	10 (2.2)
60 and above	1 (0.2)	Over 10 nights	18 (4.0)
Education		Use of travel-related programs	
High School Graduate	17 (3.8)	C-trip	391 (87.3)
College Graduate	34 (7.6)	Tongcheng Lvyou	210 (46.9)
Master Degree	324 (72.3)	Yilong	136 (30.4)
Doctoral Degree	54 (12.1)	Qunar	265 (59.2)
Other	19 (4.2)	Qiongyou	37 (8.3)
Annual salary		Tuniu	155 (34.6)
Less than 50,000 Yuan	97 (21.7)	Mafengwo	106 (23.7)
50,001~60,000 Yuan	51 (11.4)	Xiaozhu Minsu	61 (13.6)
60,001~70,000 Yuan	40 (8.9)	Tujiawang	49 (10.9)
70,001~80,000 Yuan	41 (9.2)	Airbnb	111 (24.8)
80,001~90,000 Yuan	44 (9.8)	Booking	25 (5.6)
90,001~100,000 Yuan	68 (15.2)	TripAdvisor	18 (4.0)
More than 100,000 Yuan	107 (23.9)	Lvmama	48 (10.7)
		Meituan	204 (45.5)
		Other	11 (2.5)

5.1.1 Measurement Model

This study's measurement model was evaluated through validity and reliability. First, the AVE's convergent validity (average variance extracted) and CR (composite reliability) value were evaluated. The factor loadings value of all items is more

significant than 0.7, which satisfies the excellent conditions. The range of AVE values is between 0.593 to 0.771, higher than 0.5 suggested by Hair et al. (2011). The CR values ranged from 0.841 to 0.918, were greater than 0.7. Then, the reliability of the model was tested by Cronbach's α . The results showed that the values of Cronbach's α ranged from 0.717 to 0.853, which exceeded 0.7

recommended by Nunnally (1994). These results confirmed the convergent validity and reliability of the measurement model (Table 3).

The discriminant validity of the measurement model was verified by comparing the root of AVE value and the correlation

values (Carmines & Zeller, 1979). Given that all of the correlations with any other latent constructs were smaller than their AVE root values, the discriminant validity was demonstrated (Table 4).

Table 3. Analysis of reliability and convergent validity

Items		Factor Loadings	CR	Cronbach's α	AVE
Physical Affordance	When using a TRMP, the buttons on the screen are easy to select or click.	0.802	0.841	0.717	0.638
	When using a TRMP, it will immediately jump to the next page after clicking a button.	0.790			
	When using a TRMP, the page is very smooth and there is no stuttering.	0.804			
Cognitive Affordance	When using a TRMP, I know exactly what each button on the screen does.	0.840	0.855	0.746	0.663
	When using a TRMP, I know exactly what will happen after clicking a button.	0.799			
	When using a TRMP, the role of each button on the screen is easy to distinguish.	0.803			
Sensory Affordance	When using a TRMP, I sense that the size and color of the buttons are well designed.	0.811	0.849	0.733	0.652
	When using a TRMP, I sense that the font and size of the text on the button are well designed.	0.807			
	When using a TRMP, I sense that the buttons on the screen are easy to see.	0.804			
Functional Affordance	When using a TRMP, I feel that it is fully functional.	0.797	0.852	0.740	0.658
	When using a TRMP, I can find products or services that meet my needs.	0.843			
	I feel that using a TRMP can be very useful for my travels.	0.793			
Distrust	Compared to general APPs, I do not trust the TRMP.	0.828	0.855	0.780	0.695
	I do not trust online business transactions with TRMP.	0.876			
	I concern about privacy while using TRMP.	0.795			
Perceived Risk	Whether TRMP offers the money's worth is uncertain.	0.873	0.918	0.881	0.738
	Whether TRMP offers expected quality is uncertain.	0.890			
	Whether TRMP offers guests a good image is uncertain.	0.872			
	TRMP would not be effective as I think.	0.800			
Unfamiliarity	I am NOT familiar with TRMP.	0.900	0.910	0.853	0.771
	I am NOT experienced with TRMP.	0.833			
	I am NOT knowledgeable about TRMP.	0.900			
Utilitarian Value of TRMP	I accomplished just what I wanted to with TRMP.	0.818	0.881	0.798	0.713
	While I was using TRMP, I found just the tourism products or services I was looking for.	0.851			
	With TRMP, I could find the tourism products or services that I really needed.	0.863			
Hedonic Value of TRMP	TRMP is fun to use.	0.856	0.865	0.764	0.682
	The actual process of TRMP is pleasant.	0.744			
	Using TRMP is enjoyable.	0.871			
Exploitative Use of TRMP	I fully use the available TRMP features to complete my travels.	0.825	0.883	0.824	0.654
	I use most of the available TRMP features in designing my travels.	0.826			
	I make thorough use of the available TRMP features to accommodate my travels.	0.813			
	I use all the available TRMP features to help me with my travels.	0.769			
Explorative Use of TRMP	People like me would use TRMP.	0.780	0.853	0.771	0.593
	Using TRMP would improve my image among my friends and peers.	0.742			
	People who are important to me probably think that I should use TRMP.	0.762			
	My friends and peers would expect me to use TRMP.	0.795			

Table 4. Discriminant validity of factors

Factor	1	2	3	4	5	6	7	8	9	10	11
1. Cognitive Affordance	0.814										
2. Distrust	-0.28	0.834									
3. Explorative Use of TRMP	0.502	-0.359	0.77								
4. Exploitative Use of TRMP	0.514	-0.404	0.675	0.809							
5. Functional Affordance	0.643	-0.368	0.529	0.595	0.811						
6. Hedonic Value of TRMP	0.555	-0.378	0.63	0.647	0.607	0.826					
7. Physical Affordance	0.57	-0.285	0.414	0.519	0.604	0.544	0.799				
8. Perceived Risk	-0.303	0.694	-0.312	-0.376	-0.354	-0.376	-0.308	0.859			
9. Sensory Affordance	0.519	-0.241	0.474	0.525	0.522	0.522	0.523	-0.25	0.807		
10. Unfamiliarity	-0.327	0.528	-0.389	-0.468	-0.362	-0.416	-0.318	0.53	-0.293	0.878	
11. Utilitarian Value of TRMP	0.552	-0.382	0.656	0.697	0.663	0.679	0.572	-0.38	0.543	-0.477	0.844

5.1.2 Results of the Structural Model

SmartPLS was used to test the structural model. To ensure the precision of estimation, a bootstrapping procedure with a resampling of 5,000 subsamples was used to determine the statistical significance of the parameter estimates. As for the first antecedent construct of the value of TRMP, significant relationships existed between physical affordance and both utilitarian value ($\beta=0.154, p < 0.05$) and hedonic value ($\beta=0.147, p < 0.01$) of TRMP, supporting H1a and H1b. There was no significant influence between cognitive affordance and utilitarian value. However, cognitive affordance could influence utilitarian value significantly ($\beta=0.151, p < 0.01$). Thus, H2a could be supported, while H2b could not be supported. In addition, sensory affordance also positively affected both utilitarian value ($\beta=0.175, p < 0.001$) and hedonic value ($\beta=0.177, p < 0.001$), supporting H3a and H3b. Moreover, both utilitarian value ($\beta=0.340, p < 0.001$) and hedonic value ($\beta=0.245, p < 0.001$) were positively influenced by functional affordance, which supported both H4a and H4b.

In the second antecedent variable of the value of TRMP, the constraint consisted of three factors: distrust, perceived risk, and unfamiliarity. Distrust did not affect both utilitarian value and hedonic value, not supporting H5a and H5b. Similarly, perceived risk also had no effects on both types of values, not supporting H6a and H6b. However, H7a and H7b could be supported since unfamiliarity negatively affected both utilitarian value ($\beta=-0.205, p < 0.001$) and hedonic value ($\beta=-0.121, p < 0.05$) significantly.

The results also demonstrated the relationships between two different types of value of TRMP and two kinds of use of TRMP. The utilitarian value of TRMP significantly influenced both exploitative use ($\beta=0.478, p < 0.001$) and explorative use ($\beta=0.423, p < 0.001$) of TRMP, supporting H8a and H8b. Significant relationships existed between the hedonic value of TRMP and both exploitative use ($\beta=0.323, p < 0.001$) and explorative use ($\beta=0.343, p < 0.001$) and H9a and H9b were supported. Additionally, the results indicated that the R2 value of the dependent constructs was 0.542 for exploitative use and 0.493 for explorative use. Consequently, most of the hypotheses were supported (see Figure 2, Table 5).

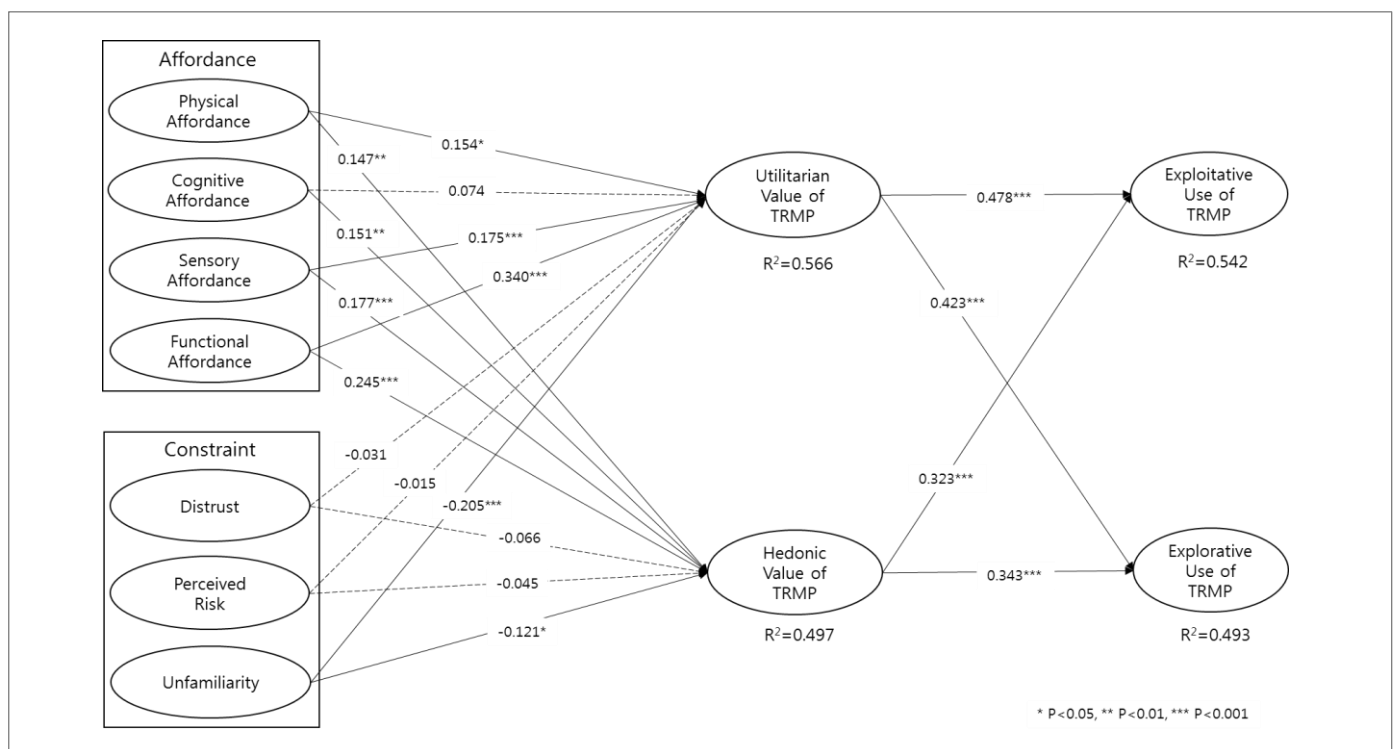


Fig. 2. Results of the structure model

Table 5. Results of the hypotheses tests

Hypotheses	Standardized Path Coefficients		
	β	P-value	Results
H1a: The physical affordance provided by TRMP has a positive effect on utilitarian value of TRMP.	0.154	0.013	Supported
H1b: The physical affordance provided by TRMP has a positive effect on hedonic value of TRMP.	0.147	0.002	Supported
H2a: The cognitive affordance provided by TRMP has a positive effect on utilitarian value of TRMP.	0.074	0.172	Not Supported
H2b: The cognitive affordance provided by TRMP has a positive effect on hedonic value of TRMP.	0.151	0.006	Supported
H3a: The sensory affordance provided by TRMP has a positive effect on utilitarian value of TRMP.	0.175	0.000	Supported
H3b: The sensory affordance provided by TRMP has a positive effect on hedonic value of TRMP.	0.177	0.000	Supported
H4a: The functional affordance provided by TRMP has a positive effect on utilitarian value of TRMP.	0.340	0.000	Supported
H4b: The functional affordance provided by TRMP has a positive effect on hedonic value of TRMP.	0.245	0.000	Supported
H5a: The distrust towards TRMP has a negative effect on utilitarian value of TRMP.	-0.031	0.554	Not Supported
H5b: The distrust towards TRMP has a negative effect on hedonic value of TRMP.	-0.066	0.215	Not Supported
H6a: The perceived risk of using TRMP has a negative effect on utilitarian value of TRMP.	-0.015	0.788	Not Supported
H6b: The perceived risk of using TRMP has a negative effect on hedonic value of TRMP.	-0.045	0.378	Not Supported
H7a: The unfamiliarity with TRMP has a negative effect on utilitarian value of TRMP.	-0.205	0.000	Supported
H7b: The unfamiliarity with TRMP has a negative effect on hedonic value of TRMP.	-0.121	0.021	Supported
H8a: The utilitarian value of TRMP has a positive effect on exploitative use of TRMP.	0.478	0.000	Supported
H8b: The utilitarian value of TRMP has a positive effect on explorative use of TRMP.	0.423	0.000	Supported
H9a: The hedonic value of TRMP has a positive effect on exploitative use of TRMP.	0.323	0.000	Supported
H9b: The hedonic value of TRMP has a positive effect on explorative use of TRMP.	0.343	0.000	Supported

6. Conclusion and Discussion

The current study examines the relationships among affordances, constraints, value provided by TRMP from the affordance theory. Findings indicated that physical affordance, sensory affordance, and functional affordance positively affected the utilitarian value of TRMP. Since affordance can be viewed as qualities in ontology, this finding was consistent with the extant study that e-service quality or information quality significantly affect perceived value (Kim & Niehm, 2009; Pearson, Tadisina, & Griffin, 2012; Wang & Wang, 2010). However, cognitive affordance had no significant influence on utilitarian value. As for the hedonic value, all of the four types of affordance had substantial effects on it. In the second antecedent variable of the value of TRMP, there were negative relationships between distrust and both kinds of value; however, they were not significant.

Moreover, the same situation existed for perceived risk. It is because users trust WeChat and believe that there is no risk in the platform provided by WeChat that is the giant of social tools in China. As another constraint factor, unfamiliarity negatively affected both utilitarian value and hedonic value significantly. This finding was consistent with the previous studies that unfamiliarity has a negative relationship with perceived value (Barkmann et al., 2008; Perrea et al., 2015; Wu & Chang, 2016). Although people are willing to believe in WeChat, people are still not very familiar with mini-programs as new stuff. Thus, for TRMP, unfamiliarity will bring negative impacts on its values.

The results also demonstrated the relationships between two different types of value and two kinds of use of TRMP. The utilitarian value of TRMP significantly influenced both exploitative use and explorative use of TRMP. Besides, significant relationships existed between the hedonic value of TRMP and both exploitative and explorative use. Findings were consistent with the previous studies that technology usage is influenced by perceived value (Chung & Koo, 2015; Limayem et al., 2007; Venkatesh et al., 2002).

This study offers some practical implications. The business opportunities of the TRMP can be said to be obvious. For travel companies, the business opportunity is to achieve user attraction

and benefit conversion through a simple tool. Particularly for startups, TRMP is a good platform. Because the TRMP is built inside WeChat, users of WeChat are likely to become potential users. In the APP era, both the APP's development cost and the cost of the acquisition of customers are high, but the TRMP may be able to improve this situation. More importantly, TRMP is unique. In the early stage of enterprise development, if an enterprise can register a large-flow hot word as a TRMP's name, it will bring a lot of exposure and click traffic to itself, which is more conducive to promoting tourism companies.

Furthermore, TRMPs are different from general APPs. They allow users, travel companies, and scenic spots to have more interactions with each other. For those travel companies, TRMPs make it easier for companies to offer customized products to travelers. The value of customization is handling complex journeys and using travel experience as a selling point. Travel companies need to strengthen their brand and train a new generation of travel consultants who need to attract tourists offline and online (especially social networks), offering rich and flexible products and relying on the mobile site to be on call. These travel consultants can keep in touch with the user through TRMPs, and they can quickly intervene when there is a problem in all stages of the trips. More importantly, recommending restaurants and destination products to travelers during the trip may be a good opportunity for upselling with this touchpoint. Travelers also have more interaction with online travel agencies (OTA) through APPs. The travelers write reviews or comments on OTAs' APPs but do not directly give feedback to the attractions. However, TRMPs enable scenic spots to interact with travelers more. Travelers can provide feedback directly to the attractions so that the attractions can be improved as quickly as possible based on this feedback, thus travel experiences will also be improved.

However, there are several limitations. First, the survey was conducted for travelers who had used TRMP, and the findings were obtained from their perspective. However, to receive more meaningful results, a study from travel companies and attractions is needed. Second, TRMP is embedded in WeChat, and because the number of WeChat users is huge, users may be affected by friends or family members around them when using

TRMP. Therefore, the influence of social influence on the usage of TRMP should be considered in future studies. Additionally, most respondents to the survey were between 20 to 40 years old, but the age difference may exist to use this technology. Therefore, future research needs to consider the influence of age on the usage of TRMP.

Declaration of competing interests


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References

- Aston-Jones, G., & Cohen, J. D. (2005). An integrative theory of locus coeruleus-norepinephrine function: Adaptive gain and optimal performance. *Annual Review of Neuroscience*, 28, 403–450.
- Barkmann, J., Glenk, K., Keil, A., Leemhuis, C., Dietrich, N., Gerold, G., & Marggraf, R. (2008). Confronting unfamiliarity with ecosystem functions: The case for an ecosystem service approach to environmental valuation with stated preference methods. *Ecological Economics*, 65(1), 48–62.
- Burton-Jones, A., & Straub, Jr., D. W. (2006). Reconceptualizing system usage: An approach and empirical test. *Information Systems Research*, 17(3), 228–246.
- Carmine, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Sage publications, Beverly Hills, CA.
- Cheng, A., Ren, G., Hong, T., Nam, K., & Koo, C. (2019). An exploratory analysis of travel-related WeChat mini program usage: Affordance theory perspective. In J. Pesonen & J. Neidhardt (Eds.), *Information and communication technologies in Tourism 2019* (pp. 333–343). Cham, Germany: Springer.
- Chiu, C. M., Wang, E. T. G., Fang, Y. H., & Huang, H. Y. (2014). Understanding customers' repeat purchase intentions in B2C e-commerce: The roles of utilitarian value, hedonic value and perceived risk. *Information Systems Journal*, 24(1), 85–114.
- Chong, X., Zhang, J., Lai, K. K., & Nie, L. (2012). An empirical analysis of mobile internet acceptance from a value-based view. *International Journal of Mobile Communications*, 10(5), 536–557.
- Chung, N., & Koo, C. (2015). The use of social media in travel information search. *Telematics and Informatics*, 32(2), 215–229.
- Cooper, C., Taft, L. B., & Thelen, M. (2004). Examining the role of technology in learning: An evaluation of online clinical conferencing. *Journal of Professional Nursing*, 20(3), 160–166.
- Cunningham, L. F., Gerlach, J. H., Harper, M. D., & Young, C. E. (2005). Perceived risk and the consumer buying process: Internet airline reservations. *International Journal of Service Industry Management*, 16(4), 357–372.
- Deli-Gray, Z., Gillpatrick, T., Marusic, M., Pantelic, D., & Kuruvilla, S. J. (2010). Hedonic and functional shopping values and everyday product purchases: Findings from the Indian study. *International Journal of Business Insights & Transformation*, 4(1), 65–70.
- Dickinson, J. E., Ghali, K., Cherrett, T., Speed, C., Davies, N., & Norgate, S. (2014). Tourism and the smartphone app: Capabilities, emerging practice and scope in the travel domain. *Current Issues in Tourism*, 17(1), 84–101.
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. Akron, OH: University of Akron Press.
- Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, 4(1), 7.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston, MA: Houghton-Mifflin.
- Good Work Labs (2016). How mobile app benefits travel and tourism industry. Retrieved October 6, 2019, from <http://www.goodworklabs.com/how-mobile-app-benefits-travel-and-tourism-industry>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139–152.
- Hartson, R. (2003). Cognitive, physical, sensory, and functional affordances in interaction design. *Behaviour and Information Technology*, 22(5), 315–338.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In R. R. Sinkovics & P. N. Ghauri (Eds.), *New challenges to international marketing* (pp. 277–319). Bingley: Emerald Group Publishing Limited.
- Hu, H. H., Kandampully, J., & Juwaheer, T. D. (2009). Relationships and impacts of service quality, perceived value, customer satisfaction, and image: An empirical study. *Service Industries Journal*, 29(2), 111–125.
- Huang, C. D., Goo, J., Nam, K., & Yoo, C. W. (2017). Smart tourism technologies in travel planning: The role of exploration and exploitation. *Information and Management*, 54(6), 757–770.
- Järveläinen, J., & Puhakainen, J. (2004). Distrust of one's own web skills: A reason for offline booking after online information search. *Electronic Markets*, 14(4), 333–343.
- Kim, B., & Han, I. (2011). The role of utilitarian and hedonic values and their antecedents in a mobile data service environment. *Expert Systems with Applications*, 38(3), 2311–2318.
- Kim, C., Li, W., & Kim, D. J. (2015). An empirical analysis of factors influencing M-shopping use. *International Journal of Human-Computer Interaction*, 31(12), 974–994.
- Kim, H., & Niehm, L. S. (2009). The impact of website quality on information quality, value, and loyalty intentions in apparel retailing. *Journal of Interactive Marketing*, 23(3), 221–233.
- Kim, J., & Forsythe, S. (2009). Adoption of sensory enabling technology for online apparel shopping. *European Journal of Marketing*, 43(9/10), 1101–1120.
- Kleijnen, M., De Ruyter, K., & Wetzels, M. (2007). An assessment of value creation in mobile service delivery and the moderating role of time consciousness. *Journal of Retailing*, 83(1), 33–46.
- Koo, C., Chung, N., & Kim, H.-W. (2015). Examining explorative and exploitative uses of smartphones: A user competence perspective. *Information Technology and People*, 28(1), 133–162.
- Korda, A. P., & Snoj, B. (2010). Development, validity and reliability of perceived service quality in retail banking and its relationship with perceived value and customer satisfaction. *Managing Global Transitions*, 8(2), 187–205.
- Leonardi, P. M., Nardi, B. A., & Kallinikos, J. (Eds.). (2012). *Materiality and organizing: Social interaction in a technological world*. Oxford: Oxford University Press.
- Liang, L. J., Choi, H. C., & Joppe, M. (2018). Understanding repurchase intention of Airbnb consumers: Perceived authenticity, electronic word-of-mouth, and price sensitivity. *Journal of Travel and Tourism Marketing*, 35(1), 73–89.
- Limayem, M., Hirt, S. G., & Cheung, C. M. (2007). How habit limits the predictive power of intention: The case of information systems continuance. *MIS Quarterly*, 31(4).
- Majchrzak, A., & Markus, L. (2012). *Technology affordances and constraints theory of MIS*. Thousand Oaks, CA: SAGE.
- Mao, Z., & Lyu, J. (2017). Why travelers use Airbnb again?: An integrative approach to understanding travelers' repurchase intention. *International Journal of Contemporary Hospitality Management*, 29(9), 2464–2482.
- Moorman, C., Zaltman, G., & Deshpande, R. (1992). Relationships between providers and users of market research: The dynamics of trust within and between organizations. *Journal of Marketing Research*, 29(3), 314–328.
- Norman, D. A. (1988). *The psychology of everyday things*. New York, NY: Basic Books.
- Nunnally, J. C. (1994). *Psychometric theory 3E*. New York, NY: McGraw-Hill Education.
- Overby, J. W., & Lee, E. J. (2006). The effects of utilitarian and hedonic online shopping value on consumer preference and intentions. *Journal of Business Research*, 59(10–11), 1160–1166.
- Ozturk, A. B., Nusair, K., Okumus, F., & Hua, N. (2016). The role of utilitarian and hedonic values on users' continued usage intention in a mobile hotel booking environment. *International Journal of Hospitality Management*, 57, 106–115.
- Park, S., & Tussyadiah, I. P. (2017). Multidimensional facets of perceived risk in mobile travel booking. *Journal of Travel Research*, 56(7), 854–867.

- Pearson, A., Tadisina, S., & Griffin, C. (2012). The role of e-service quality and information quality in creating perceived value: Antecedents to web site loyalty. *Information Systems Management, 29*(3), 201–215.
- Perrea, T., Grunert, K. G., & Krystallis, A. (2015). Consumer value perceptions of food products from emerging processing technologies: A cross-cultural exploration. *Food Quality and Preference, 39*, 95–108.
- QPSoftware. (2019). *WeChat mini programs—what is and how different are from mobile apps*. qpsoftware.net. Retrieved October 6, 2019, from <https://qpsoftware.net/blog/wechat-mini-program-all-you-need-know>
- R-Style Lab. (2018). *Most popular app store categories: Trends, tips and market insights*. Slideshare.net. Retrieved March 22, 2019, from <https://www.slideshare.net/R-StyleLab/most-popular-app-store-categories-trends-tips-market-insights>.
- Sillince, J., & Shipton, H. (2013). More than a cognitive experience: Unfamiliarity, invalidation, and emotion in organizational learning. *Journal of Management Inquiry, 22*(3), 342–355.
- Sirdeshmukh, D., Singh, J., & Sabol, B. (2002). Consumer trust, value, and loyalty in relational exchanges. *Journal of Marketing, 66*(1), 15–37.
- So, K. K. F., Oh, H., & Min, S. (2018). Motivations and constraints of Airbnb consumers: Findings from a mixed-methods approach. *Tourism Management, 67*, 224–236.
- Tencent Big Data (2016.) <http://data.qq.com/reports>
- Treem, J. W., & Leonardi, P. M. (2013). Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Annals of the International Communication Association, 36*(1), 143–189.
- Tussyadiah, I. P., & Pesonen, J. (2018). Drivers and barriers of peer-to-peer accommodation stay – An exploratory study with American and Finnish travellers. *Current Issues in Tourism, 21*(6), 703–720.
- Tussyadiah, I. P., & Zach, F. J. (2012). The role of geo-based technology in place experiences. *Annals of Tourism Research, 39*(2), 780–800.
- Venkatesh, V., Speier, C., & Morris, M. G. (2002). User acceptance enablers in individual decision making about technology: Toward an integrated model. *Decision Sciences, 33*(2), 297–316.
- Volkoff, O., & Strong, D. M. (2017). Affordance theory and how to use it in IS research. In R. D. Galliers & M.-K. Stein (Eds.), *The Routledge companion to management information systems*, New York, NY: Routledge (pp. 232–245).
- Wang, D., Xiang, Z., & Fesenmaier, D. R. (2016). Smartphone use in everyday life and travel. *Journal of Travel Research, 55*(1), 52–63.
- Wang, H.-Y., & Wang, S.-H. (2010). Predicting mobile hotel reservation adoption: Insight from a perceived value standpoint. *International Journal of Hospitality Management, 29*(4), 598–608.
- Wang, Y., & Chiew, V. (2010). On the cognitive process of human problem solving. *Cognitive Systems Research, 11*(1), 81–92.
- Wu, J. F., & Chang, Y. P. (2016). Multichannel integration quality, online perceived value and online purchase intention: A perspective of land-based retailers. *Internet Research, 26*(5), 1228–1248.
- Yang, H., Yu, J., Zo, H., & Choi, M. (2016). User acceptance of wearable devices: An extended perspective of perceived value. *Telematics and Informatics, 33*(2), 256–269.
- Yang, K. (2010). Determinants of US consumer mobile shopping services adoption: Implications for designing mobile shopping services. *Journal of Consumer Marketing, 27*(3), 262–270.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing, 52*(3), 2–22.
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