



## The relationships among mobile travel application attributes, customer engagement, and brand equity

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In this study we investigated the relationships among mobile travel application (app) attributes, customer engagement, and brand equity with 518 participants who were current users of these apps. Results show that perceived usefulness, perceived price advantage, and user interface attractiveness positively influenced customer engagement with mobile travel apps, whereas perceived ease of use had no significant effect. Additionally, mobile travel app engagement was found to be significantly and positively related to brand awareness and brand loyalty. Finally, mobile travel app engagement mediated the effects of perceived usefulness, perceived price advantage, and user interface on both brand awareness and brand loyalty. Our findings indicate that improving travel app attributes enhanced customer engagement with these apps, and this, in turn, increased brand equity.

### Keywords

mobile travel application;  
mobile marketing;  
software application  
attributes; customer  
engagement; brand equity

*Mobile travel applications* (apps) are software programs specifically targeted at travelers (Choi et al., 2018). Using these apps enables travelers to search via the Internet and book accommodation, tour activities, and flights at any time (Lu et al., 2015), providing a comprehensive and personalized travel experience.

*Customer engagement* is a continuous interactive process between a customer and an object, and it plays an important role in maintaining a close relationship between the two parties (Brodie et al., 2011). Existing studies have shown that customer engagement is closely related to loyalty, word-of-mouth, and increases in sales (So & Li, 2020). Thus, studying mobile travel app engagement is of great significance for travel companies to improve user conversion rate, increase user duration, and cultivate user loyalty.

*Brand equity* is one of the most important intangible assets of an enterprise (Kim & Ko, 2012), and from a consumer perspective it refers to the different responses of consumers to brand marketing activities, owing to differences in levels of brand knowledge (Keller, 1993). Brand equity is an important variable to measure brand value. However, there are few studies on app attributes as the driving factor of brand equity.

Therefore, the purpose of this study was to fill a gap in the literature by investigating the relationships among mobile travel app attributes, customer engagement, and brand equity. The findings of this study may help marketing staff of travel companies to guide their relationship strategies to foster customer engagement and enhance brand equity.

## Theoretical Model and Research Hypotheses

### The Relationship Between Travel Application Attributes and Customer Engagement

Lee et al. (2011) stated that technology products have three main attributes: (a) product performance, (b) product appearance, and (c) product communication. Few users utilize travel apps as a tool for product communication; thus, we considered product performance and product appearance as the two main characteristics that affect mobile travel app engagement. The *product performance* of travel apps includes perceived usefulness and perceived ease of use components, and the *product appearance* of these apps relates to the user interface attractiveness (Fang et al., 2017). In addition, *perceived price advantage* is users' perception of products obtained from travel apps being well-priced, which influences their psychology and behavior relative to their purchase intention.

#### **Perceived Usefulness**

Davis (1989) proposed the technology acceptance model (TAM) to explain why people adopt new technologies. In the context of this study *perceived usefulness*, which is the core variable of the TAM, reflects users' value judgment of the usefulness of a travel app. Travel apps have many functions designed to meet the needs of travelers, including offering tailored recommendations regarding attractions, hotels, flights, restaurants, and booking services. Han et al. (2018) found that perceived usefulness had a significant positive impact on customer engagement in virtual communities, and McLean (2018) obtained similar results in the context of mobile commerce apps. Therefore, we proposed the following hypothesis:

**Hypothesis 1:** The perceived usefulness of a mobile travel application will be positively related to customer engagement.

#### **Perceived Ease of Use**

*Perceived ease of use* reflects the degree of effort required to learn to use a new technology (Davis, 1989). In this study perceived ease of use was defined as the extent to which an individual perceives the use of a travel app as effortless. If the app is simple to operate, this will motivate users to invest the mental energy to establish a positive emotional connection, which is conducive to maintaining long-term use. Davis (1989) observed that perceived ease of use positively affected users' attitude and behavioral intention, and Han et al. (2018) found that perceived ease of use positively affected customer engagement in a tourism virtual community. Therefore, we proposed the following hypothesis:

**Hypothesis 2:** The perceived ease of use of a mobile travel application will be positively related to customer engagement.

#### **Perceived Price Advantage**

*Perceived advantage* is the degree to which an individual views an innovative technology as being an improvement over an existing option. Xu and Li (2016) stated that convenience, saving money, and saving time are three dimensions of a travel app's comparative advantage. Perceived price advantage is an important factor driving users to utilize travel apps: If travel app manufacturers can provide relatively inexpensive travel products, their apps will attract more frequent use. Xu and Li found that perceived price advantage had a significant positive impact on users' purchasing attitude and behavior. Therefore, we proposed the following hypothesis:

**Hypothesis 3:** The perceived price advantage of a mobile travel application will be positively related to customer engagement.

### User Interface Attractiveness

*User interface attractiveness* is users' perception of a travel app's design. An interface design that is perceived as stylish can attract the attention of users and create an immersive experience, resulting in an increased likelihood of continued usage (Coursaris & van Osch, 2016). Further, good visual experiences stimulate positive emotions, which can increase the frequency of use of an app. Fang et al. (2017) found that user interface attractiveness had a significant positive impact on users' psychological engagement. Thus, we proposed the following hypothesis:

**Hypothesis 4:** The user interface attractiveness of a mobile travel application will be positively related to customer engagement.

### **The Relationship Between Customer Engagement and Brand Equity**

Brand equity consists of two components: *Brand awareness*, which refers to the degree to which consumers can access brand information from memory, and *brand loyalty*, which refers to a consumer's preference and attitude regarding continued use of the brand (Yoo & Donthu, 2001). According to Bandura (1986), individuals will adjust their relationship with the environment in the process of interaction according to their own needs, and, at the same time, their behavior will directly affect their cognition and emotion. When customers are engaged in using travel apps, they are interacting with the brand, which will enhance their cognition of the brand. Han and Yuan (2013) found that customer engagement had a significant positive impact on brand cognition. Therefore, we proposed the following hypothesis:

**Hypothesis 5:** Mobile travel application engagement will be positively related to customers' brand awareness.

Customer engagement allows individuals to meet their basic functional needs when realizing the practical value of an object; additionally, the process of customer engagement produces hedonic value and emotional value (Kuvykaite & Piligrimiene, 2014). According to social exchange theory (Blau, 1986), consumers are more likely to show a positive attitude and preference toward a brand if they obtain a high value experience during brand engagement. Further, Harrigan et al. (2017) found that customer engagement had a significant positive impact on customer loyalty. Therefore, we proposed the following hypothesis:

**Hypothesis 6:** Mobile travel application engagement will be positively related to customer brand loyalty.

### **The Mediating Role of Mobile Travel Application Engagement**

Stimulus–organism–response (SOR) theory was put forth by Mehrabian and Russell (1974) to show how people deal with stimuli in their external environment. Some empirical studies have applied SOR theory in the field of information systems (Chen et al., 2017; Fang et al., 2017; Zhang et al., 2014). Following SOR theory, we proposed that the attributes of a mobile travel app (stimuli) would influence customer engagement with the app (organism), and that this, in turn, would affect the app's brand equity (response). McLean (2018) found that mobile app engagement mediated the relationship between app attributes and consumers' brand attitude and brand loyalty. Thus, we can infer that mobile travel app engagement may also mediate the relationship between travel app attributes and brand equity, and we proposed the following hypotheses:

**Hypothesis 7a:** Mobile travel application engagement will mediate the relationship between customers' perceived usefulness of a mobile travel application and brand awareness.

**Hypothesis 7b:** Mobile travel application engagement will mediate the relationship between customers' perceived ease of use of a mobile travel application and brand awareness.

**Hypothesis 7c:** Mobile travel application engagement will mediate the relationship between customers' perceived price advantage of a mobile travel application and brand awareness.

**Hypothesis 7d:** Mobile travel application engagement will mediate the relationship between the user interface attractiveness of a mobile travel application and customers' brand awareness.

**Hypothesis 8a:** Mobile travel application engagement will mediate the relationship between the perceived usefulness of a mobile travel application and customers' brand loyalty.

**Hypothesis 8b:** Mobile travel application engagement will mediate the relationship between the perceived ease of use a mobile travel application and customers' brand loyalty.

**Hypothesis 8c:** Mobile travel application engagement will mediate the relationship between customers' perceived price advantage of a mobile travel application and brand loyalty.

**Hypothesis 8d:** Mobile travel application engagement will mediate the relationship between the user interface attractiveness of a mobile travel application and customers' brand loyalty.

The proposed study framework is shown in Figure 1.

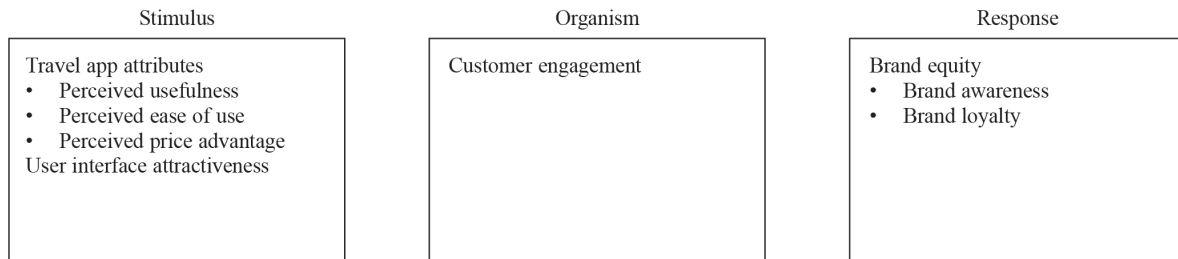


Figure 1. *Stimulus–Organism–Response Model for the Study Framework*

## Method

### Participants and Procedure

We collected data for our study through Questionnaire Star, which is China’s largest online survey platform. We received completed surveys from 653 current users of mobile apps, of which 135 responses were removed (valid recovery rate = 79.33%). Of the 518 respondents, 254 were women and 264 were men ( $M_{\text{age}} = 28.75$  years,  $SD = 1.76$ , range = 17–54). All the participants gave their informed consent to take part in the study before completing the survey. Participation was voluntary, and no gift or payment was made to the respondents.

### Measures

We used four items to measure perceived usefulness and three items to measure perceived ease of use, and these were taken from Davis (1989). There were three items used to measure perceived price advantage, which were taken from Amaro and Duarte (2015). The three items used to measure user interface attractiveness were sourced from Fang et al. (2017). We used five items to measure customer engagement, and these were sourced from Hollebeek and Chen (2014). Finally, the four brand awareness items and the four brand loyalty items were adapted from Yoo and Donthu (2001). All variables were rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

### Data Analysis

We used partial least squares path modeling to test our hypotheses via SmartPLS 2.0 software, and applied the nonparametric bootstrapping method to test the significance of the estimated effects.

## Results

### Measurement Model

Results show that all Cronbach’s alpha reliability values were greater than .70. Furthermore, the composite reliabilities ranged between .81 and .83, exceeding the recommended minimum threshold of .70 (Bagozzi & Yi, 1988). Thus, the measures had acceptable internal consistency. The measurement model statistics are given in Table 1.

**Table 1. Measurement Model Statistics**

Variables	Items	Factor loadings	Cronbach's		
			$\alpha$	CR	AVE
Perceived usefulness	This travel app can provide me with the information I need.	.82	.83	.89	.66
	This travel app can help me book the travel products I need.	.78			
	With this travel app, the whole travel process is more convenient and effective.	.84			
Perceived ease of use	I think this travel app is very useful.	.81	.82	.89	.74
	I can easily learn to use this travel app.	.84			
	This kind of travel app is easy to operate.	.90			
Perceived price advantage	This kind of travel app is easy to use.	.83	.81	.89	.72
	This travel app can provide a lower price on travel products.	.88			
	This travel app can help me save money.	.86			
User interface attractiveness	This travel app can provide discounts on travel products.	.81	.84	.90	.75
	The interface design of this travel app is beautiful.	.88			
	The interface design of this travel app is aesthetically pleasing.	.84			
Customer engagement	The interface design of this travel app is visually appealing.	.88	.81	.87	.57
	The information on this travel app attracts my attention.	.71			
	The information on this travel app stimulates my interest.	.72			
	When I use the travel app, I feel very good.	.71			
	When I use the travel app, I feel very positive.	.81			
Brand awareness	Compared with other travel apps, I spend a lot more time using this travel app.	.69	.81	.87	.63
	I can recognize the brand identity of the online travel platform.	.76			
	I can quickly recall the brand identity of the online travel platform.	.75			
Brand loyalty	I know the online travel platform very well.	.82	.82	.88	.64
	I can quickly recall some of the features of the online travel platform.	.84			
	I will continue to use the online travel platform.	.78			
	I am very loyal to the online travel platform.	.79			
	This online travel platform is my first choice.	.80			
	I will recommend this online travel platform to others.	.83			

*Note.* CR = composite reliability; AVE = average variance extracted.

The average variance extracted values of the constructs ranged between .57 and .75; thus, all were higher than the .50 threshold (Fornell & Larcker, 1981). In addition, all indicator loadings were higher than the .50 threshold, showing acceptable convergent validity (Tracey et al., 1999). The square roots of the average variance extracted measures were larger than the correlations with each latent variable, providing evidence of acceptable discriminant validity (Fornell & Larcker, 1981). The detailed results are shown in Table 2.

**Table 2. Results of the Discriminant Validity Analysis**

Variables	1	2	3	4	5	6	7
1. Perceived usefulness	.81						
2. Perceived ease of use	.62	.86					
3. Perceived price advantage	.40	.38	.84				
4. User interface attractiveness	.41	.35	.57	.87			
5. Customer engagement	.48	.40	.60	.64	.75		
6. Brand awareness	.35	.36	.41	.38	.55	.79	
7. Brand loyalty	.45	.41	.57	.56	.71	.61	.80

### Structural Equation Modeling and Hypothesis Testing

We performed a bootstrapping analysis with 5,000 resamples, generating 95% confidence intervals. Our path analysis of the structural model is shown in Figure 2. Results show that perceived usefulness, perceived price advantage, and user interface attractiveness were positively related to customer engagement with mobile travel apps, supporting Hypotheses 1, 3, and 4. Perceived ease of use was not significantly related to customer engagement with mobile travel apps; therefore, Hypothesis 2 was not supported. Customer engagement with mobile travel apps was significantly and positively related to brand awareness and brand loyalty, supporting Hypotheses 5 and 6.

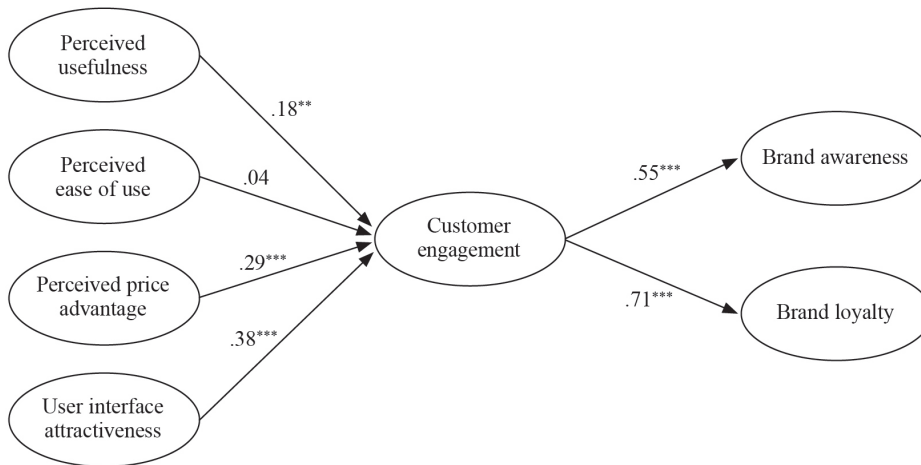


Figure 2. Path Coefficients for the Hypothesized Model

Note. \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### Mediating Effects Analysis

We conducted a bootstrapping analysis to test the significance of all likely indirect paths. The number of resamples was set at 5,000 and we calculated 95% confidence intervals. The results reported in Table 3 show mobile travel app attributes had a significant mediating effect in most of the examined relationships, other than the effect of perceived usefulness on brand awareness and brand loyalty. Therefore, Hypotheses 7a, 7c, 7d, 8a, 8c, and 8d were supported, whereas Hypotheses 7b and 8b were not.

**Table 3. Empirical Results of the Mediation Analysis**

Path	Path name	Indirect effects	<i>p</i>
PU → CE → BA	B7	.10	< .001
PU → CE → BL	B8	.13	<.001
PEU → CE → BA	B9	.02	.30
PEU → CE → BL	B10	.03	.29
PPA → CE → BA	B11	.16	< .001
PPA → CE → BL	B12	.20	< .001
UIA → CE → BA	B13	.21	< .001
UIA → CE → BL	B14	.27	< .001

*Note.* PU = perceived usefulness; PEU = perceived ease of use; PPA = perceived price advantage; UIA = user interface attractiveness; CE = customer engagement; BA = brand awareness; BL = brand loyalty.

### Discussion

For travel-related companies, an essential part of achieving success in marketing of mobile apps is understanding why and how consumers engage with these apps. Our study revealed that the perceived usefulness of a mobile travel app was positively related to customer engagement, which is consistent with the findings of previous research that perceived usefulness influenced consumers to engage with branded apps (McLean, 2018). However, the perceived ease of use of the mobile travel app was not positively related to customer engagement in our study. A reason for this finding may be that the surveyed users had already been using the travel apps for a time, such that they had mastered the functions and perceived ease of use had no further impact on their engagement levels. We also found that the perceived price advantage and user interface attractiveness of the mobile travel app were positively related to customer engagement, and that perceived price advantage influenced the attitude and behavior of users (Xu & Li, 2016). Likewise, researchers have previously found that user interface attractiveness was positively associated with psychological engagement (Fang et al., 2017). Finally, we found that mobile travel app engagement was significantly and positively related to brand awareness and brand loyalty. Previous researchers have similarly found that customer engagement was an important determinant of brand equity (Weiger et al., 2017).

There are several theoretical implications of our research. First, the various antecedents of travel app adoption have been extensively documented (Gupta & Dogra, 2017; Lai, 2015; Lu et al., 2015), yet in past studies it has not been fully explained how travel app attributes influence customer engagement. Therefore, we have extended the literature by examining the determinants of customer engagement with mobile travel apps. Second, we tested how mobile travel app engagement influences the key brand marketing variable of brand equity, which is an area that has been largely neglected in previous studies. Therefore, our findings further understanding of how mobile travel app attributes drive brand equity in the tourism context through the mediator of customer engagement.

This research has practical implications for travel companies. First, marketing staff of travel-related companies would do well to conduct user research at regular intervals, analyze user needs, and respond to their feedback by improving app functions to better meet the needs of these users. Second, managers of travel-related companies should reduce the cost of products and provide cheap travel products for users. At the same time, they should carry out regular promotion activities. Third, to maintain users' interest and enhance their comfort and experience by creating a more appealing interface, marketers and app designers in travel-related companies should use dynamic pictures, videos that are short and vivid, and informative, succinct text.

This research has some limitations. First, we used a cross-sectional research design based on survey data. To increase the accuracy of our research results, we recommend future studies use longitudinal comparative designs. Second, we focused primarily on app features and did not examine the impact of either personality characteristics (e.g., consumer innovativeness, personality traits) or social influence on mobile travel app engagement. Future research could include these factors in the proposed model. Finally, our research sample was taken from China, which means that our findings regarding the antecedents and consequences of mobile travel app engagement might have been influenced by the respondents' cultural background. Therefore, it is uncertain if our research conclusions can be extended to other cultural contexts. Further research could be conducted using randomly selected samples drawn from various cultures to increase the generalizability of our conclusions.

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