



Design and performance attributes driving mobile travel application engagement



Jiaming Fang^{a,*}, Zhirong Zhao^a, Chao Wen^b, Ruping Wang^a

^a Department of Management Science and E-business, University of Electronic Science and Technology of China, Chengdu, Sichuan, 611731, China

^b School of Business, Eastern Illinois University, 600 Lincoln Avenue, Charleston, IL 61920, USA

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ABSTRACT

Increasing people are using mobile applications (apps) for information and activities related to their travel and tourism. Therefore, customer engagement (customer attraction and retention) with mobile travel applications becomes extremely important for travel-related companies. However, there is little empirical research on what factors may drive customers' engagement of using mobile travel apps. This study proposes a research framework, based on the Stimulus-Organism-Response (S-O-R) model, to explore how and to what extent two types of app attributes (i.e., app design and app performance attributes) stimulate travel apps engagement. Based on a user acceptance testing (UAT testing) of a real travel app development project, the study uses survey data from 804 tourists to validate the proposed research model. The results reveal different effectiveness of app design and app performance attributes, and demonstrate that two app design features (i.e., user interface attractiveness and privacy/security) and three app performance attributes (i.e., compatibility, ease of use, and relative advantages) are important drivers of users' behavioral engagement of mobile travel apps. Further, psychological engagement and three types of benefit perception (i.e., hedonic benefit, utilitarian benefit, and social benefit) serially mediate the relationships. The results can be used to improve the related mobile app engagement research and the mobile travel app design.

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1. Introduction

The growing popularity of mobile technologies in recent years dramatically changes the means of service operations and delivery in the travel and tourism industry. Mobile devices nowadays have become a necessary travel kit for almost everyone. Mobile travel apps provide travel-related companies a direct channel to create and maintain the conversation with customers before, during, and after a trip (Ostdick, 2016). Further, by taking full advantage of the embedded sensors of modern mobile devices, travel-related companies are able to better understand the consumers' needs and provide innovative customized services such as location-based recommendations and context-aware services to customers, which can significantly improve customers' traveling experience (Kang, Mun, & Johnson, 2015). Mobile apps thus provide an effective

channel for travel companies to connect and forge intimate relationships with their customers (Ostdick, 2016). Actually, the mobile platform has fundamentally revolutionized the manner in which travel-related companies maintain customer relations by creating the unique, novel, and personalized travel experience (Lai, 2015; Ostdick, 2016). Travel-related companies are thus making big bets on creating and propagating their own mobile travel apps in order to retain a committed, engaged user base and boost sales. The extant literature has found evidence that consumer engagement is associated with loyalty, positive word of mouth, and sales growth (Cheung, Shen, Lee, & Chan, 2015; Kim, Kim, & Wachter, 2013; Oh, Roumani, Nwankpa, & Hu, 2017; Ray, Kim, & Morris, 2014). User engagement has also been recognized as a prerequisite for the system success (Hwang & Thorn, 1999; Peters, Işık, Tona, & Popović, 2016; Verhagen, Swen, Feldberg, & Merikivi, 2015).

Despite its very great practical importance, there is little extant research on what factors may affect users' engagement of using mobile travel apps, even though the booming development of mobile travel apps has drawn considerable research interest in identifying factors affecting app adoption (e.g., Chang, Chou, Yeh, & Tseng, 2016; Hsu & Lin, 2015; Lai, 2015; Lu, Mao, Wang, & Hu, 2015). To better study users' engagement of using mobile travel

* Corresponding author at: Department of Management Science and E-business, University of Electronic Science and Technology of China, Chengdu, Sichuan, 611731, China.

E-mail addresses: jmfang@uestc.edu.cn (J. Fang), 1529495122@qq.com (Z. Zhao), cwen@eiu.edu (C. Wen), 402885985@qq.com (R. Wang).

apps, it is important to understand the difference between adoption, continuous usage, and engagement behavior.

Technology adoption and technology engagement are conceptually different, and technology adoption can be regarded as a starting point of technology engagement (Kim et al., 2013). App adoption behavior refers to the stage in which a mobile travel app is selected for use (Pagani & Mirabello, 2011; Kim et al., 2013), while engagement behavior refers to users' continued interaction with a mobile app after adoption. A survey by Google and Ipsos (2015) shows that thirty-eight percent of respondents who download an app to complete a purchase, are likely to abandon the app immediately after the purchase task is complete. As such, besides investigating users' adoption behavior of mobile travel apps, it is also necessary and worthwhile to examine users' engagement behavior.

In addition, although both continuance usage and engagement reflect users' post adoption behavior, they are different in terms of definition and application. Continuance usage generally refers to sustained use of a product by individual users over the long-term after their initial adoption (Yoon & Rolland, 2015). Engagement, by contrast, is defined as users' continued interaction with a product. Users' engagement behavior is a particular kind of participation, and it includes both personal and interactive engagement (Oh et al., 2017). Personal engagement refers to individual engaging activities such as continuance use and referral/word-of-mouth, while interactive engagement involves socialization and active community participation, such as discussions, content sharing and problem solving. Thus, conceptually, continuance usage is a subset of behavioral engagement. Continuance behavior in general only concerns about product usage activities of an individual while engagement behavior also includes sustained value-adding social interactions such as knowledge contribution, positive word of mouth, collaboration with other users, and customer co-creation. Therefore, it is more important for companies to cultivate users' engagement behavior than to focus simply on users' continuance usage so that the company can build and maintain a vibrant online community, develop a solid customer relationship, and create a sustainable long-term competitive advantage. Accordingly, it is necessary for researchers to move beyond the user continuance behavior and investigate the engagement behavior.

An examination of the literature on consumer engagement indicates that there is a lack of consensus regarding the antecedents of the customer engagement, and few studies have examined the engagement behavior in the mobile environment. More importantly, despite prior research suggests that product attributes are critical factors driving engagement (Chou & Conley, 2009; Peters et al., 2016), no prior research has investigated the mobile app engagement behavior from the product attributes' perspective. Because customer engagement is conceptualized in literature as a context specific phenomenon, which depends on the subjects of engagement and the specific circumstances (Brodie, Hollebeek, Juric, & Ilic, 2011; Brodie, Ilic, Juric, & Hollebeek, 2013; Dovaliene, Masiulyte, & Piligrimiene, 2015), research on behavioral engagement in mobile environment are necessary in order to understand customer engagement phenomenon in more detail. In particular, the lack of knowledge on what app attributes and how these attributes stimulate users' engagement impedes academic and practical understanding on the forming process of mobile app engagement behavior, and provides limited guidance for travel app developers to design apps that can get users engaged and help travel-related companies achieve their goals. Taking into account the above mentioned reasons, we in this study seek to find the answer to the following question:

RQ: What and how do travel app attributes drive app users' engagement behavior?

To answer this question, it may not be appropriate to examine engagement behavior based on the classic technology adoption models, such as technology acceptance model, theory of planned behavior, and the unified theory of acceptance and use of technology model, because these models fail to provide theoretical justifications for examining app attributes as external stimuli (i.e., the reason why app attributes influence users' internal reactions that in turn affect behavioral engagement). In addition, the dependent variable of these model is personal use behavior rather than the behavioral manifestations of engagement. The S-O-R model (Mehrabian & Russell, 1974), by contrast, provides a feasible overarching theory for us to understand what and how app attributes driving users' engagement behavior. Drawing on the S-O-R model, we propose that product attributes of a travel app (stimuli) may affect users' internal experience and benefit evaluation (organism), which in turn may influence users' behavioral engagement intention or behaviors (response). In particular, we identify two domains of app attributes (i.e., app design attributes and app performance attributes) as critical external stimuli affecting app users' psychological engagement and benefit evaluations (i.e., utilitarian benefit, hedonic benefit, and social benefit) which further in turn lead to their behavioral engagement intention. The proposed framework was validated based on a UAT testing of a newly developed mobile travel app.

The main contributions of this study are threefold. First, our study is among the earliest to provide theoretical insights into understanding app attributes and mechanisms affecting users' behavioral engagement in the mobile environment. Second, we identify app design attributes and app performance attributes as two critical drivers of mobile travel app engagement; furthermore, we provide a better understanding of the impact of these antecedents on behavioral engagement by comparing the relative effectiveness of their sub-attributes. Third, this study adds new insights into customer engagement literature by providing evidence that psychological engagement and benefit perception as intervening constructs mediate the relationship between app attributes and behavioral engagement. Based on the findings, we propose practical implications that can be used by app developers for informed design of mobile travel apps.

The remaining sections of this study are organized as follows: Section 2 outlines our research model and depicts the theoretical development of our research hypotheses. Section 3 describes our research methodology. Section 4 presents analyses and results of the theoretical model, and section 5 discusses the theoretical and managerial implications of the research, its limitations, and the directions for future research.

2. Theoretical model and hypotheses

Perceived characteristics of a product are critical factors influencing users' engagement (Chou & Conley, 2009; Peters et al., 2016). According to the S-O-R model, environmental stimuli can lead to cognitive and affective reactions including perceptions, experiences and evaluations, which in turn cause certain psychological reactions such as attitudinal and behavioral reactions (Mehrabian & Russell, 1974). A large number of S-O-R-based empirical studies in the fields of information systems and e-commerce overwhelmingly support that attributes of a website with which users interact (e.g., better security, navigability, interactivity, and visual appeal) are salient stimuli that influence users' internal reactions and several approach behaviors, such as buying intention, repurchase, and loyalty (see Amirpur & Benlian, 2015; Chen, Huang, & Davison, 2017; Parboteeah, Valacich, & Wells, 2009). The findings of these studies suggest that the S-O-R model is appropriate in explaining product attributes as stimuli affecting users' reactions and behav-

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