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Examining an extended technology acceptance model with experience construct on hotel consumers' adoption of mobile applications

Yu-Chih Huang^a, Lan Lan Chang^b, Chia-Pin Yu ^c and Joseph Chen^d

^aNational Chi-Nan University, Department of Tourism, Leisure and Hospitality Management, Nantou, Taiwan;

^bAsia University, Department of Leisure and Recreation Management, Taichung, Taiwan; ^cSchool of Forestry and Resource Conservation, National Taiwan University, Taipei, Taiwan; ^dSchool of Public Health, Indiana University Bloomington, Bloomington, USA

ABSTRACT

Given the accelerating adoption of apps and mobile technology in the hospitality and tourism industry, it is critical to understand customer experience of mobile apps as emerging marketing platforms to promote services and products. The objective of this research is to develop an integrative model that extends the Technology Acceptance Model (TAM) with the experience construct and to examine the antecedents that influence hotel consumer behavioral intentions toward mobile app usage. The findings of this study show that perceived ease of use and perceived usefulness have positive impacts on hotel consumers' experiences of mobile apps, and perceived usefulness and user experience influence hotel apps acceptance by customers. The findings of this study can be used as valuable input for the development of constructive future smartphone applications within the hospitality industry and for design of strategies for hotel mobile commerce marketing programs to enhance engaging and interactive hotel consumer experiences.

KEYWORDS

Hospitality industry; mobile applications; experience economy; technology acceptance model; behavioral intentions



摘要

鉴于应用程序和移动技术在酒店业和旅游业的应用日益普及，了解移动应用程序作为新兴营销平台的客户体验对于推广服务和产品至关重要。本研究的目的是建立一个整合模型，将技术接受模型

(TAM) 与经验建构相结合，并检视影响酒店消费者使用移动应用程序为意向的前因。研究结果表明，感知的易用性和感知的有用性对酒店消费者的移动应用体验有积极的影响，感知的有用性和用户体验对酒店应用接受度有影响。本研究的结果可作为酒店业未来智能手机应用开发的宝贵投入，也可用于酒店移动商务营销计划的策略设计，以增强酒店消费者的参与和互动体验。

Introduction

Technical innovations in the tourism industry profoundly influence the production, distribution, and consumption of hospitality and tourism products and services (Buhalis & Amaranggana, 2015; Werthner & Klein, 1999; Xiang, Magnini, & Fesenmaier, 2015).

CONTACT Chia-Pin Yu  simonyu@ntu.edu.tw  School of Forestry and Resource Conservation, National Taiwan University, Taipei, Taiwan

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With the increasing popularity of mobile devices, mobile commerce provides consumers with the ability to search for hotel and travel information from any location at any time. The service providers in the hospitality and tourism industries also utilize mobile technology to enhance brand awareness (Kim & Adler, 2011), enrich tourist experience and overall tourist satisfaction (Lee, Lee, & Ham, 2013), and increase customer loyalty (Kim, Park, & Morrison, 2008). Hospitality and tourism businesses have begun to develop smartphone phone applications (apps) to communicate marketing messages to consumers that influence travel decision-making and consuming behavior (Eden & Gretzel, 2012). Smartphone technologies support new communication patterns between travelers and service providers, entailing a consumer experience co-creation that affects consumer purchase decisions (Dickinson et al., 2014; Wang, Li, & Li, 2013).

Numerous international hotel brands, such as Marriott International, Mandarin Oriental, and Intercontinental Hotel Group, have used smartphone applications to provide travel information, property details, room reservations, and promotional offers (Kim, 2012). Wang, Xiang, Law, and Ki (2016) suggest that the adoption of mobile technology and its association with apps have transformed hotel service by facilitating the management functions of marketing and distribution. Additionally, the use of hotel mobile applications not only increases consumer loyalty but also enhances traveler interaction (Adukaite, Reimann, Marchiori, & Cantoni, 2013). Specifically, travel-related applications facilitate marketing functions, distribution, advertising, ancillary services, product personalization, destination guiding, and consumer relationship management (Chen, Murphy, & Knecht, 2016; Morosan & DeFranco, 2015). Furthermore, the potential of mobile apps in the hotel industry is strategically important to reduce administrative and communication costs for information dissemination (Rivera, Gregory, & Cobos, 2015).

Xiang, Wang, O'Leary, and Fesenmaier (2015) indicated that it is critical to understand customers' experiences of mobile apps and their influence on behavioral intentions. The framework of the Technology Acceptance Model (TAM) has received considerable attention from information technology scholars, and significant research efforts have been directed to study user acceptance for various technology applications. The TAM, rooted in the psychological theory of reasoned action and the theory of planned behavior (Ajzen & Fishbein, 1980), has been applied to explain consumer acceptance of information technology in numerous contexts, such as e-learning (Cheung & Vogel, 2013; Schoonenboom, 2014); social media usage (Ayeh, 2015; Rauniar, Rawski, Yang, & Johnson, 2014); web commerce (Ashraf, Thongpapanl, & Auh, 2014; Escobar-Rodríguez & Carvajal-Trujillo, 2014); entertainment technology (Dogruel, Joeckel, & Bowman, 2015); healthcare (Ahlan & Ahmad, 2015); and mobile commerce (Baptista & Oliveira, 2015; Joo & Sang, 2013).

Although TAM has empirically explained the acceptance and usage of information technology in various contexts, many extensions to the original TAM have been proposed to improve understanding of user acceptance behavior in specific contexts (e.g., Agag & El-Masry, 2016; Gamal Aboelmaged, 2010; Muñoz-Leiva, Climent-Climent, & Liébana-Cabanillas, 2017). As Im and Young Im and Hancer (2014) suggested, because TAM mainly focuses on the individual's cognitive characteristics, for technology that users voluntarily choose to use, a hedonic perspective of the acceptance of information technology needs to be studied further. Recent research has extended the TAM to incorporate hedonic constructs as a theoretical underpinning in understanding user experience of information technology. For example, Childers, Carr, Peck, and Carson (2001) extended

TAM by adding perceived enjoyment; Hsiao, Chang, and Tang (2016) extended TAM by adding satisfaction; Jung, Perez-Mira, and Wiley-Patton (2009) incorporated flow experience; and Wendy Zhu and Morosan (2014) studied TAM by integrating playfulness. Various scholars have suggested expansion of the TAM research framework to incorporate an experience economy perspective in explaining consumer usage of information technology. For example, McLellan (1999) in educational technology, Seo (2013) in electronic sports, and tom Dieck, Jung, and Rauschnabel (2018) in science festival augmented reality. However, empirical studies that integrate TAM and experience economy aspects to investigate consumer information technology usage in tourism and hospitality contexts remain limited. Morosan and DeFranco (2016) indicated that mobile app experience is critical in the context of hospitality and tourism marketing, but the mechanism of consumers' intention development remains unknown. Mobile apps play an important role in fostering customer involvement, which in turn contributes to brand loyalty, and the first challenge in using mobile apps is to capture customer attention (Sprosen, 2014; Zhao & Balague, 2015). As mobile technology advances, the mobile service environment plays a crucial role in connecting customer and hotel, such as booking a hotel and requesting services (Ozturk, Nusair, Okumus, & Hua, 2016). In order to sustain the success of hospitality businesses, Lee and Jeong (2012) indicated a careful design of service environments is necessary, particularly in physical and virtual aspects. Scholars (e.g., Dube & Helkkula, 2015; Liu, Li, Chen, & Balachander, 2017) call for more research to explore product design strategies and investigation of the role of mobile environments on customers' mobile app experiences. Lee (2018) further indicated that it is important to understand customer service experience and how the mobile platform is designed to meet their needs and enhance engagement behavior. In this context, given the wide adoption of the extended TAM model in understanding user experience in human and technology interaction, the experience economy model is considered to be a valuable framework for understanding users' experiences (Jung, tom Dieck, Lee, & Chung, 2016; tom Dieck et al., 2018). Therefore, building a conceptual model to investigate users' intentions to use hotel apps by accessing their experiences provides advantages to hospitality research. To this end, the objective of this research is to develop an integrative model that extends TAM with an experience construct and examines the antecedents that influence hotel consumer behavioral intentions toward mobile apps usage based on user experience. This study extends the current literature by incorporating the experience construct and TAM to investigate hotel consumers' smartphone apps experiences. From a theoretical point of view, this research empirically examines the proposed model in understanding significant factors influencing customers' intentions, explaining the importance of mobile commerce to the hospitality business. While a concern of TAM is that it is used to explain user intention to accept new technology, limited research articulating consumer experience and adoption was found in the context of Taiwan mobile apps studies, particularly in the hospitality business. The TAM is still considered a useful model in explaining behavior from an information system perspective, and modified models of TAM are popular in consumer contexts of research (Mo Kwon, Bae, & Blum, 2013). In this regard, from a managerial perspective, the findings of this study provide a structural understanding of using mobile applications in developing promotion and design strategies for hotel marketers and service providers in Taiwan.

Literature review

Technology acceptance model

Davis (1989) proposed TAM for explaining users' behavioral intentions and usage of information technology, suggesting that the TAM demonstrated a substantial proportion of the variance of consumer behavior intentions to use a technological innovation. TAM postulates that imperative determinants of technology acceptance and behavioral intentions are perceived ease of use, perceived usefulness and attitude (Venkatesh, 2000; Venkatesh & Davis, 2000). Previous studies suggested that perceived usefulness and perceived ease of use are depicted as having a direct effect on behavioral intentions concerning information technology but omitted the construct of attitude due to it being a weak predictor of behavioral intention in specific contexts, such as smartphone shopping (Agrebi & Jallais, 2015), electronic mail systems (Szajna, 1996), online learning (Saadé & Bahli, 2005), e-commerce (Pavlou, 2003), and mobile commerce (Wu & Wang, 2005). Moreover, Davis (2003) pointed out that consumer usage and acceptance of information technology relies on the theoretical constructs of perceived ease of use and usefulness, suggesting the exclusion of the attitude construct in TAM. Perceived ease of use is defined as "the degree to which a person believes that using a particular information system would enhance his/her job performance," whereas the construct of perceived usefulness is defined as "the degree to which an individual believes that using a particular system is free of physical and mental effort" (Davis, 1989, p. 320). Pavlou's (2003) study indicated that perceived ease of use and perceived usefulness serve as direct antecedents to predicting online consumer behavioral intentions, explaining the acceptance of online transaction behavior. Consumer assessment of ease of use and usefulness of the e-vendor's website influence the consumer's behavioral intention to use a business-to-consumer website (Gefen, Karahanna, & Straub, 2003).

Over the past decades, researchers have extended TAM to incorporate additional variables in explaining online consumer behavior with empirical support such as contextual factors of gender difference (Gefen & Straub, 1997), prior technology experience (Venkatesh & Morris, 2000), information system quality (Kim, Lee, & Law, 2008), external predictors of perceived risk (Kesharwani & Singh Bisht, 2012), users' emotions (Lee, Xiong, & Hu, 2012), perceived security (Morosan, 2011), technology experience (Rivera et al., 2015), credibility theories (Ayeh, 2015), innovation diffusion theory (Lee, Hsieh, & Hsu, 2011), flow theory (Koufaris, 2002) and task-technology fit model (Lam, Cho, & Qu, 2007). Koufaris (2002) expanded TAM with flow experience to examine emotional and cognitive responses to visiting web-based shopping environments, suggesting that perceived usefulness influences the experience of online consumers, which in turn affects their behavioral intentions. Ayeh (2015) extended TAM to incorporate source credibility theories in investigating acceptance and usage of consumer-generated media in travel planning, suggesting that the perceived ease of use and usefulness proved more salient in determining online consumers' acceptance of consumer-generated media.

Previous studies have suggested that the experience aspect focuses on capturing people's interactions with the technology to the extent that they enjoy this experience (Castañeda, Muñoz-Leiva, & Luque, 2007; Morgan-Thomas & Veloutsou, 2013; Van der Heijden, 2004). According to Li, Dong, and Chen (2012) and Wu and Holsapple (2014),

such a perspective was found to be a significant predictor to outcomes related to usage and acceptance of information technology. Similarly, Ozturk et al. (2016) expanded TAM to incorporate the experiential construct of perceived hedonic value in investigating consumer behavioral intentions, suggesting that consumers desire pleasure and enjoyable experiences from the use of information technology. A study examining social media sharing experiences by Kang and Schuett (2013) identified the hedonic construct of perceived enjoyment as an influential factor affecting human and computer interaction. Wang, Liao, and Yang (2013), examining the determinants of behavioral intention of app users, suggested that consumer values of user experience played a crucial role in influencing intention to use information technology. Given the aforementioned information, it is logical to propose that the integration of the experience perspective with TAM could enrich the understanding of the determinants of consumers' behavioral intentions in information technology contexts.

Experience economy

Pine and Gilmore (1998) proposed the "experience economy" and indicated how business is conducted by focusing on customer experience. According to Pine and Gilmore (1998, p. 97), four realms of experiences across both axes of customer immersion and level of participation are identified as entertainment, education, esthetics, and escapism. The entertainment experience entails an individual's passive involvement, wherein the offerings engage customers' attention. The esthetic experience involves passive participation wherein customers are highly immersed in the environment. The educational experience entails an active participation in which a customer is absorbed by the events, and escapist experiences involve total immersion in an environment. Examples of such experiences in mobile app contexts have been described in previous studies (see Sims, Williams, & Elliot, 2007 for a review). Based on the Experience Economy model and in the context of hotel mobile app experience, the experience of entertainment occurs in the form of a passive delivery of content such as pictures; education delivers information about hotel services, for example, while escapism refers to users' active participation to escape from reality while using the app. The esthetic highlights an app experience that is attractive and pleasant. As such, these factors of a hotel mobile app influence users' mobile technology acceptance.

More recently, scholars applied the concept of experience economy to further understand consumer experiences in the hospitality and tourism contexts (e.g., Andersson, 2007; Oh, Fiore, & Jeung, 2007; Quadri-Felitti & Fiore, 2012; Song, Lee, Park, Hwang, & Reisinger, 2015). Oh et al. (2007) suggested that the experience dimension could be useful in capturing consumer lodging experience. Moreover, researchers found that the four dimensions of experience influence consumer satisfaction and behavioral intention (Hosany & Witham, 2010; Mehmetoglu & Engen, 2011; Park, Oh, & Park, 2010; Quadri-Felitti & Fiore, 2012). The four realms of experience have been treated as individual dimensions (Liu, Huang, & Li, 2018) or a higher order of construct (Manthiou, Lee, Tang, & Chiang, 2014) within various tourism-related contexts. tom Dieck, Jung, Kim, and Moon (2017) asserted that they "compared the effects of each of the four constructs on target variables and often concluded that only a few of them matter" (p.46). Moreover, Loureiro (2014) suggested that the uni-dimensionality of the experience economy construct provides more predictive power in explaining consumer experience. Thus, the

current study employed the uni-dimension of experience economy in investigating hotel consumer use of mobile apps.

Additionally, in the experience economy, service providers have become aware of the significance of creating unique consumer experiences beyond merely consuming products and services (Gilmore & Pine, 2002; Pine & Gilmore, 1998). Given online experiential marketing approaches and the inherently experiential nature of the hospitality industry, the emerging technologies offer sensory stimulations to communicate with consumers in supporting travel information search and decision-making processes (Gretzel & Fesenmaier, 2003). Past studies have suggested that these realms of experiences are useful for explaining consumer experience and consumer behavior (Lee, Bruwer, & Song, 2017; Venkatesh, Thong, & Xu, 2012). The established body of research suggests that experience dimensions have the potential to better explain consumer behavior, particularly in the research on customer memory and loyalty (Manthiou et al., 2014); experiential value (Quadri-Felitti & Fiore, 2012); satisfaction and behavioral intentions (Radder & Han, 2015); consumer involvement and brand identification (Hwang & Lyu, 2015); and perceived value and emotion (Song et al., 2015).

Hypotheses development

The application of TAM in tourism literature has primarily focused on explaining tourist's and hotel consumer's acceptance and use of information technology (e.g., Kaplanidou & Vogt, 2006; Kim, Lee, & Law, 2008; Morosan, 2010; Munoz-Leiva, Hernández-Méndez, & Sánchez-Fernández, 2012; Wang & Qualls, 2007). A study of electronic word-of-mouth in consumer-generated media by Yang (2017) found that perceived usefulness and ease of use resulted in positive behavioral intentions to participate in a virtual community. Kim (2016) found that perceived ease of use and usefulness serve as determinants to customers' behavioral intentions toward hotel tablet apps. tom Dieck et al. (2017) explored consumer acceptance and usage of social media networks in the context of luxury hotels, claiming that the perception of usefulness and ease of use indirectly predicted consumer's behavioral intention to use social media to engage with a hotel. Recent studies have therefore demonstrated that TAM is an important research framework that can be used to understand consumer experiences of hospitality websites or related hospitality information technology.

Pine and Gilmore's concept of experience economy has received considerable attention in recent studies attempting to understand user experience of technological innovations. Mathwick, Malhotra, and Rigdon (2001) claimed that the concept of experience economy is an important theoretical dimension for understanding interactions between human behavior and technology that can predict consumer preference and patronage intentions. Moreover, Jeong, Fiore, Niehm, and Lorenz (2009) indicated that the four dimensions of experience are related to the perception of pleasure and website patronage intentions. Seo's (2013) study of competitive computer gaming and virtual world consumption suggested that Pine and Gilmore's concept of experience economy is useful in conceptualizing and exploring the consumer's experiential value in the context of e-marketing. Verhagen, Feldberg, van den Hooff, Meents, and Merikivi (2011) explored users' experiential value and satisfaction with virtual words, suggesting that perceived ease of use is a direct determinant of entertainment and escapist experience, as well as an influential factor for consumer satisfaction. A study

examining virtual reality visitor experience in museums by Jung et al. (2016) indicated that the experience of education, entertainment, escapism, and esthetics deriving from virtual reality technology interaction significantly influenced visitor experience, leading to influence tourist intention.

Prior studies (Castañeda et al., 2007; Liu, Pu, Guan, & Yang, 2016; Morgan-Thomas & Veloutsou, 2013; Sheng & Teo, 2012) suggest that consumer experience plays a mediating role between technology acceptance factors and behavioral intentions. Additionally, past research investigating experiential aspects of consumer behavior has articulated the mediating role on the relationship between consumer experience and behavioral intentions (e.g., Bilgihan, Nusair, Okumus, & Cobanoglu, 2015; Hausman & Siekpe, 2009; Huang, Backman, Backman, & Chang, 2016; Jeong et al., 2009).

Given the aforementioned information, the current study proposes to investigate the mediating effect of experience with mobile apps as a link between technology acceptance and behavioral intentions. As current literature suggests, the concept of experience economy not only reflects the entertainment nature of the tourist experience but also captures the consumption experience of technology users. Therefore, the experience construct was utilized in this study for a better understanding of the use of smartphone apps in hospitality marketing. Based on the literature reviewed, the integrative model consists of TAM and the experience construct, and we believe the antecedents might positively influence behavioral intentions. The proposed conceptual model and hypotheses are shown in Figure 1.

H1: Hotel consumers' perceived usefulness of a mobile app has a positive effect on the experience of the mobile app.

H2: Hotel consumers' perceived ease of use of a mobile app has a positive effect on the experience of the mobile app.

H3: Hotel consumers' experience of a mobile app has a positive effect on the behavioral intention to use the mobile app.

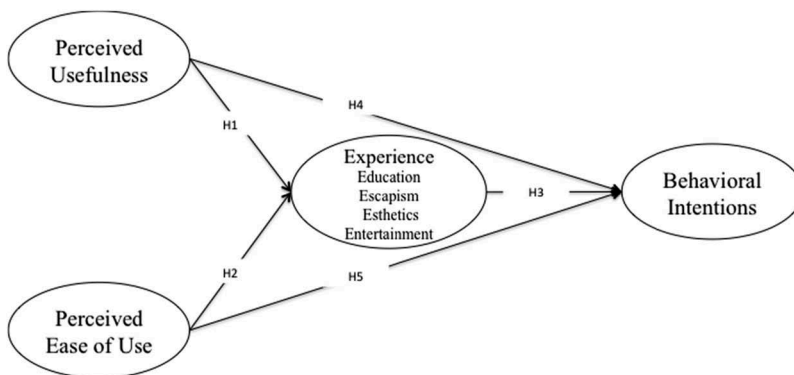


Figure 1. Proposed research conceptual model.

H4: Hotel consumers' perceived usefulness of a mobile app has a positive effect on the behavioral intention to use the mobile app.

H5: Hotel consumers' perceived ease of use of a mobile app has a positive effect on the behavioral intention to use the mobile app.

Methodology

Data collection

A quantitative survey approach (Bryman & Bell, 2015) was used to investigate smartphone application consumption experience and its impacts on tourist behavioral intentions. A self-administered survey questionnaire using closed questions was used to collect information from participants. According to the Taiwan Tourism Bureau (2015), the Kenting National Park, in the southern beach area of Taiwan, is one of the top 3 tourism destinations for domestic travel. This study conducted a survey of consumers staying in Chateau Beach Resort, Gloria Manor, and Howard Hotel in the southern beach area of Taiwan in March and April of 2015. The general managers of these resorts were contacted by the researchers in order to acquire participation agreement; after receiving the participation agreement from three resorts, three well-trained graduate students conducted an on-site survey of hotel consumers. The participants were approached in the hotel lobby and asked whether they were willing to participate in the study. Following previous studies on mobile marketing (Persaud & Azhar, 2012; Watson, McCarthy, & Rowley, 2013), the target population of the study consisted of individuals who have used smartphone apps to search for hotel and accommodation information at least once in the last six months. As suggested by Ozturk, Bilgihan, Nusair, and Okumus (2016), the participants in the study were chosen by asking screening questions regarding previous travel app experience. This convenience sampling approach was useful for collecting data where the respondents shared the characteristics of smartphone app usage for hospitality and tourism purposes (Watson et al., 2013). The study collected 490 valid samples, and the response rate of this study was 89%. Prior to conducting the survey, a pretest of the questionnaire was conducted to examine construct reliability with 133 samples. For the pilot test, tourists who have the experience of using smartphone apps in the southern part of Taiwan were recruited to participate in the pretest and to assess logical consistencies, ease of understanding, and task relevance. Suggestions about the structure of the questionnaire from pretest participants were incorporated in the revision of the questionnaire. In addition, Cronbach's alpha was used in the pilot test to identify poor items, and the correlated measure items were eliminated.

Measurements

Demographic information such as gender, age, ethnicity, marital status, highest academic achievement, residence, and current work status were collected. Each variable was measured at the categorical level, with categories consistent with those used by the Taiwan Census Bureau. Based on past TAM research (Davis, 1989; Fetscherin & Lattemann, 2008; Venkatesh & Davis, 2000), this study modified the perceived ease-of-use scale to estimate subjective

perceptions of how easy the respondents thought a hotel app was to learn and use (e.g., “I did not find it difficult to get the hotel app to do what I wanted it to do”) whereas perceived usefulness was used to assess the subjective estimation of task performance enhancement through the use of hotel apps (e.g., “I believe that using hotel apps provides useful information in trip planning”). Both perceived usefulness and perceived ease of use scales consisted of three items. The four constructs of experience economy were modified from past studies (Jeong et al., 2009; Oh et al., 2007) consisting of entertainment, education, escapist, and esthetic dimensions. The construct of education was assessed with three items, such as “the experience of using hotel apps made me more knowledgeable,” to indicate the extent to which consumers are able to acquire information and knowledge about the hotel by using the mobile app; the experience of entrainment was measured with three items (e.g., “the experience of using the hotel apps is fun”) to indicate the extent to which consumers are able to enjoy the use of hotel mobile apps for pleasure; the experience of escapism was measured with three items (e.g., “the experience of using hotel apps allows me to forget about my daily routine”) to indicate the extent to which consumers are able to be immersed in the experience; the esthetics experience was measured with four items, e.g., “the design of the hotel app is attractive” (Jung et al., 2016; Song et al., 2015). The assessment of behavioral intentions in this study was primarily based on the work of Ajzen and Driver (1992) and Kim et al. (2008), and includes items such as “I would recommend the use of hotel mobile apps to others for searching hotel and destination information.” All measurements were assessed on a seven-point Likert-type scale ranging from Strongly Disagree to Strongly Agree.

Results

In terms of demographic characteristics of the respondents, females accounted for 55.5% of the respondents as shown in Table 1, and of the respondents, 57.8% were 26 to forty-five years old. A majority of respondents (64.5%) reported college as their highest level of educational attainment; 53.8% of the respondents were currently employed in the business and service industries, while 15.3% were students. In terms of the consumer’s usage of the mobile phone app, as seen in Table 2, the results found that 68.8% of consumers had used a mobile phone for over three years. Nearly 90% of the respondents reported that they had used mobile apps within the past year. Fifty-two percent of the respondents had 1–2 types of hotel and accommodation-related apps in their mobile phone. Forty-one percent of the respondents reported that they had booked the hotel via mobile phone apps. Eighty percent of the respondents had used the mobile phone apps to search for restaurants and food, as well as tourist destinations.

According to Byrne (1998), the Structural Equation Modeling (SEM) process was adapted to examine the causal relationship among the proposed constructs of perceived ease of use, perceived usefulness, experience, and behavioral intentions. As Yoon, Lee, and Lee (2010) suggested, SEM is designed to evaluate a series of interrelated dependence relationships among a set of latent (unobserved) constructs, and hence was found to be suitable for this study. Prior to SEM, a Confirmatory Factor Analysis (CFA) was conducted to assess the convergent and discriminant validity as well as the composite reliability of the factors for each construct (Anderson & Gerbing, 1988) by using EQS software. Following Bigné, Andreu, and Gnoth (2005), the Maximum Likelihood

Table 1. Hotel consumer's social demographic traits.

Social-demographic traits	Frequency	%
Gender		
Male	218	44.5
Female	272	55.5
Age		
16-25 years old	55	11.6
25-36 years old	174	36.6
36-45 years old	164	34.5
46-55 years old	68	14.3
>55 years old	15	3.2
Education		
High school & junior high school	97	19.8
College	316	64.5
Graduate school	77	15.7
Occupation		
Farming, Fishing, and Forestry	10	2.0
Business	110	22.4
Civil Service	55	11.2
Service	154	31.4
Retired	10	2.0
Student	75	15.3
Housewife and other	76	15.5

Table 2. Hotel consumer's usage of the mobile phone app.

Hotel Consumer's Usage of Mobile Phone App	Frequency	%
Years of using mobile phone		
Less than 1 year	21	4.3
1 year	38	7.8
2 years	94	19.2
3 years	135	27.6
4 years or more	202	41.2
Years of using mobile phone apps		
Less than 1 year	39	8.0
1 year	57	11.6
2 years	131	26.7
3 years	119	24.3
4 years or more	144	29.4
Number of hotel & accommodation related apps		
1-2 types	265	52
3-4 types	126	25.7
5-6 types	68	13.9
7 types or more	42	8.4
Have booked a hotel via mobile phone apps		
Yes	201	41
No	289	59
Searching for restaurant and foods via apps		
Yes	431	88
No	59	12

Estimation was used in CFA to estimate the difference between the observed and model-implied variance-covariance matrix.

As per Satorra and Bentler's (1994) suggestion, robust statistics was reported in this study to rectify multivariate non-normality in the confirmatory factor analysis. To assess whether the covariance matrix is equivalent to the observed covariance matrix (Hoyle, 1995), a number of robust fit indices were included: Satorra-Bentler (S-B) χ^2 , Non-

Normed Fit Index (NNFI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Bollen’s (IFI) Fit Index, and Confidence Interval of RMSEA.

Examining the goodness of fit index, the values for S-B $\chi^2 = 574.68$, $p < 0.01$, NNFI = 0.934, CFI = 0.944, and RMSEA = 0.063, IFI = 0.943, 90%. Confidence Interval of RMSEA = (0.057, 0.069) demonstrated that the model had an acceptable fit because the corresponding critical values are in line with the established criteria (Bentler & Hu, 1995; Hair, Anderson, Tatham, & Black, 1995). According to Anderson and Gerbing (1988), standardized factor loading and a t-test were used to examine the convergent validity. Bigné et al. (2005) pointed out that the convergent validity can be assessed by examining whether the different items that are measuring the same construct are strongly correlated and statistically significant. As displayed in Table 3, all t values associated with each indicator on corresponding constructs were significant ($p < 0.05$), and all standardized factor loadings were greater than 0.7, suggesting each indicator estimate loading on the underlying dimension (Tabachnick & Fidell, 2007) and thus, the convergent validity of these indicators was verified (Anderson & Gerbing, 1988).

Table 3. Results of confirmatory factor analysis.

Construct/Item	Factor mean ^a	Standardized factor loading (t values ^b)	Composite Reliability	Maximal Weighted
PU (Perceived usefulness)	5.58		0.89	0.91
PU1 (Mobile app is useful information in trip planning)	5.56	0.84 (n/a)		
PU2 (Mobile app increases my productivity in trip planning)	5.56	0.90 (25.15)		
PU3 (Mobile app enables me to search travel information more conveniently)	5.64	0.84 (23.17)		
PEU (Perceived ease of use)	5.61		0.89	0.90
PEU1 (I did not find it difficult to do what I wanted it to do)	5.62	0.84 (n/a)		
PEU2 (Learning to use was easy for me)	5.60	0.88 (22.67)		
PEU3 (It is easy for me to become skillful)	5.61	0.88 (23.39)		
EDU (education)	5.37		0.79	0.86
EDU1 (The experience made me more knowledgeable)	5.49	0.74 (n/a)		
EDU2 (It was a real learning experience)	5.45	0.79 (18.09)		
EDU3 (It stimulated my curiosity to learn new things)	5.17	0.74 (15.47)		
ENT (entertainment)	5.16		0.82	0.83
ENT1 (The app experience is fun)	5.16	0.79 (n/a)		
ENT2 (The app experience was amusing to me)	5.17	0.79 (21.37)		
ENT3 (The app experience were very entertaining)	5.16	0.76 (21.03)		
ESC (escapist)	4.67		0.81	0.82
ESC1 (I completely escaped from reality)	4.60	0.75 (n/a)		
ESC2 (I forgot about my daily routine)	4.75	0.82 (18.37)		
ESC3 (I felt I was in a different world)	4.66	0.73 (16.30)		
EST (esthetics)	5.24		0.84	0.86
EST1 (The app experience provided pleasure to my senses)	5.34	0.72 (n/a)		
EST2 (The setting of app experience was attractive)	5.31	0.78 (19.63)		
EST3 (The app experience was pleasant)	5.18	0.79 (17.54)		
EST4 (I feel a real sense of harmony)	5.14	0.76 (16.40)		
BI	5.40		0.90	0.92
BI1 (I will continue to use)	5.36	0.81 (n/a)		
BI2 (I will recommend others to use)	5.40	0.92 (22.66)		
BI3 (I will use in the future)	5.43	0.88 (21.15)		

^aItems were rated on a seven-point Likert scale for each item.

^bAll tests were significant at $p < 0.001$.

Note: Satorra-Bentler $\chi^2 = 574.68$, $P < 0.01$, Non-Normed Fit Index = 0.934, Comparative Fit Index = 0.944, and Root Mean Square Error of Approximation = 0.063, Bollen’s (IFI) Fit Index = 0.943, 90% Confidence Interval of RMSEA = (0.057, 0.069).

The discriminant validity is assessed by comparing the square roots of each average variance extracted (AVE) to the corresponding correlation estimate among the latent constructs (Fornell & Larcker, 1981). As shown in Table 4, the square roots of each AVE exceeded the corresponding correlation estimates among the constructs, implying adequate discriminant validity. Following Woosnam (2011), maximal weighted alphas, a robust estimate of internal consistency, was used to examine the internal consistency of the scale. As shown in Table 3, the latent constructs demonstrated a good internal consistency with maximal weighted alphas was in excess of the 0.70 critical values. Composite reliability was also used to assess the scale reliability, and the alpha critical value of 0.7 was suggested (Bagozzi & Yi, 1988; Lance, Butts, & Michels, 2006). As displayed in Table 3, all scales in the current study had an alpha critical value of 0.8, indicating that scale reliability was considered appropriate as it exceeds the corresponding threshold values for each of the factors analyzed.

As Kline (2005) claims, once the measurement model demonstrates an acceptable fit with appropriate goodness fit indices implying the scales are reliable and valid, the proposed conceptual paths can be examined by the structural model. Further, a structural model was conducted to examine the relationship among the research constructs by assessing all the path coefficients and squared multiple correlations. The structural model demonstrated an acceptable fit with S-B $\chi^2 = 579$, $p < 0.01$, Non-Normed Fit Index = 0.934, Comparative Fit Index = 0.943, and Root Mean Square Error of Approximation = 0.063, Bollen's (IFI) Fit Index = 0.943, and 90% Confidence Interval of RMSEA = (0.057, 0.069). As displayed in Figure 2, four structural regression coefficients out of five proposed in the conceptual model were statistically significant. An examination of path estimates revealed that perceived usefulness ($\beta = .30$, $p < .05$) was a significant predictor of hotel consumer experience with mobile apps, providing support for hypothesis 1. Moreover, significant direct effects of perceived ease of use on the hotel consumer's experience of the mobile app was observed ($\beta = .30$, $p < .05$). Hypothesis 2 is supported. The conceptual model of technology acceptance model provided a detailed account of the key forces underlying judgments of hotel consumer experience of mobile apps, explaining up to 32.5% of the variance in the important driver of consumer experience of mobile apps.

In addition, the results of this study indicated that a direct relationship exists between hotel consumer experience of mobile apps and behavioral intentions to use mobile apps ($\beta = .64$, $p < .05$), providing support for hypothesis 3. Furthermore, perceived usefulness has a positive and significant direct effect on hotel consumers' behavioral intention to use

Table 4. Constructs inter-correlations and Average Variance Extracted (AVE).

Constructs	PEU	PU	EXP	BI
PEU	0.86^a			
PU	0.52 ^b	0.86		
EXP	0.34	0.29	0.92	
BI	0.29	0.27	0.37	0.87

PU: Perceived usefulness, PEU: Perceived ease of use, EDU: education, ENT: entertainment, ESC: escapist, EST: esthetics, BI: behavioral intentions.

^aThe diagonal elements are the square root of the average variance extracted (the shared variance between the factors and their measures).

^bThe off-diagonal elements are the correlations between factors.

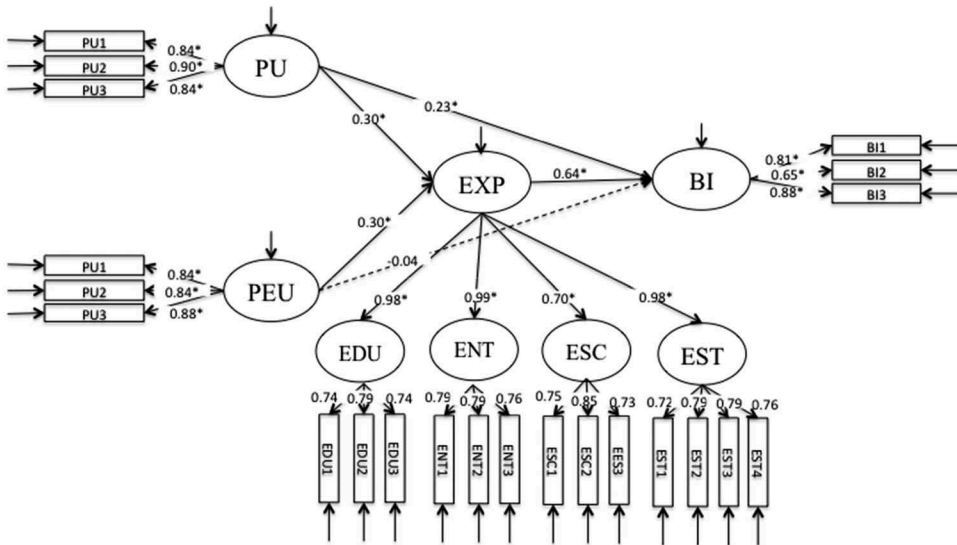


Figure 2. Structural model of testing the proposed hypotheses.

**t-tests were significant at $p < 0.05$.—Dash line indicates insignificant path. Presented are standardized coefficients. Note: Satorra-Bentler $\chi^2 = 572.86$, $P < 0.01$, Non-Normed Fit Index = 0.934, Comparative Fit Index = 0.943, and Root Mean Square Error of Approximation = 0.063, Bollen’s (IFI) Fit Index = 0.943, 90% Confidence Interval of RMSEA = (0.057, 0.069).

a mobile app ($\beta = .23$, $p < .05$). Thus, hypothesis 4 is supported. The fifth hypothesis stated that the hotel consumer’s perceived ease of use of mobile app has a significant direct effect on behavioral intention. The results revealed that perceived ease of use did not have a significant effect on behavioral intentions ($\beta = -0.04$, $p > .05$); thus hypothesis 5 is not supported. Past studies regarding TAM document inconsistent results with respect to the relationship between perceived ease of use and behavioral intentions (Tao, 2009; Yuan, Liu, Yao, & Liu, 2016). Several scholars could not validate the relationship between perceived ease of use and behavioral intentions, indicating that in certain technological contexts perceived usefulness is a more important determinant influencing an individual’s adoption of technology (Koufaris, 2002; Nysveen, Pedersen, & Thorbjørnsen, 2005; Van der Heijden, Verhagen, & Creemers, 2003). Examining the squared multiple correlations in the structural model, the results revealed that perceived usefulness, ease of use, and experience together explained 56.7% of the variability in behavioral intentions to use hotel mobile apps. Table 5 presents the results of hypotheses testing.

This study further examined whether the constructs of experience would mediate the relationship between technology factors and behavioral intentions. Following Sobel’s (1982) approach, the Sobel test was applied to examine the mediating effect of experience on the association between perceived usefulness and behavioral intentions. As suggested by Holbert and Stephenson (2003), the Sobel test of product-of-coefficient method, one of most widely used in social science with conservative statistical power and Type I error, was used to confirm the significance of mediating effects. According to MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), the product of paths involving perceived usefulness and behavioral intentions, as well as consumer experience and behavioral

Table 5. The result of hypotheses testing.

Paths	Coefficient	t value	Hypotheses
PU → EXP	0.30**	3.29	H1 supported
PEU → EXP	0.30**	3.22	H2 supported
EXP → BI	0.64**	10.60	H3 supported
PU → BI	0.23**	2.35	H4 supported
PEU → BI	-0.04	-0.442	H5 rejected

**t-tests were significant at $p < 0.05$.

PU: Perceived usefulness, PEU: Perceived ease of use, EDU: education, ENT: entertainment, ESC: escapist, EST: esthetics, BI: behavioral intentions.

intention, along with associated standard error, was used to determine the significance of the mediating effect. The result of the Sobel test reveals that the absolute z-value for the mediating effect of experience on the link between perceived usefulness and behavioral intentions is greater than 1.96 (B product-of-coefficients = 0.19, Sobel Z = 3.79), suggesting the presence of a significant mediating effect. Moreover, the direct relationship between perceived ease of use and behavioral intentions was not found to be a significant predictor of behavioral intentions. No further testing was required to determine whether the experience mediates the relationship between perceived ease of use and behavioral intentions.

Conclusions

The use of internet technology, such as smartphone apps, offers an opportunity for travelers to search for travel information, make connections with others, and make travel decisions more conveniently and cost-effectively (Arsal, Woosnam, Baldwin, & Backman, 2010). Recognizing the importance of mobile technology in hospitality and tourism (Wang, Xiang, & Fesenmaier, 2014), this study extends TAM, the dominant research model for studying technology acceptance, by incorporating the experience economy construct in understanding hotel consumer mobile app experience. The findings of this study suggest that the determinants of hotel consumer behavioral intentions with mobile apps are not only driven by cognitive beliefs, but also related to consumer experience. It could be argued that the design and features of mobile apps are critical in order to provide hotel consumers with an informational, enjoyable and immersive experience, consequently affecting their usage of mobile apps.

Discussion

The results of this study validate the research frameworks of TAM in the context of hotel consumer usage of mobile apps. The findings of this study provide empirical evidence for the proposed model and show that perceived ease of use and perceived usefulness have a positive impact on the hotel consumer experience of mobile apps. Consistent with previous studies (e.g., Kim, 2016; Mo Kwon et al., 2013; Morosan & DeFranco, 2016; Yang, 2017), the results of our research highlight the importance of perceived usefulness in determining behavioral intentions regarding mobile apps usage, suggesting that in order to increase customers' hotel app acceptance and behavioral intentions, hospitality business operators should enhance the functional aspect of the mobile apps. The results of

this study show that perceived ease of use does not drive the hotel consumers' behavioral intentions, an outcome that contradicts the works of Kim, Park, et al. (2008) and Mallat, Rossi, Tuunainen, and Öörni (2009) in mobile technology contexts. This results suggest that due to the increase use of mobile devices and the nature of tasks, user-friendly feature of mobile apps are not a significant determinate for behavioral intention.

The results of this study indicate that perceived ease of use and usefulness play an important role in determining hotel consumers' experience of mobile apps. Indeed, this study confirms findings from prior research (Lee, Chung, & Jung, 2015; Pallud & Straub, 2014; Sheng & Teo, 2012) that perceived utilitarian interface of hotel mobile apps as easy to use and effective in trip planning are shown to be direct antecedents of consumer experience. Moreover, the results of this study provide empirical support for the idea that hotel consumers who have a positive experience with mobile apps develop an interest in sharing the hotel apps experience and recommending the apps to others, which is consistent with prior studies by Jeng, Pai, and Yeh (2017), and Mohseni, Jayashree, Rezaei, Kasim, and Okumus (2018).

The results of this study also confirm that the consumer experience of mobile apps mediate the relationship between perceived usefulness and behavioral intentions, similar to findings by Sheng and Teo (2012) and Chung and Kwon (2009), implying that the perception of usefulness leads to a positive consumer experience, which in turn impacts behavioral intentions to use mobile apps. However, the results of the mediating effect on the relationship between perceived ease of use and behavioral intentions contradict the findings of prior research by Verhagen et al. (2011), which indicate that consumer experience has been found to have a mediating influence upon the link between perceived ease of use and behavioral intentions.

Theoretical contribution

As Morosan and DeFranco (2016) suggested, while mobile technology becomes an increasingly fruitful arena for research, the sporadic research focusing on hotel consumer mobile commerce has not been able to sufficiently explain the critical issues of mobile app experience within a hospitality and tourism context. This study proposed a holistic model of customers' experiences to their usage of hotel mobile apps and provided evidence for identifying the important factors that enhance customers' engagement behaviors in the context of hotel mobile application. The findings of the current study suggest that the experience economy construct is relevant within the mobile technology context and significant in influencing consumer behavioral intentions toward mobile apps usage. Additionally, the effect of perceived ease of use and usefulness on consumer behavioral intentions is indirect, as mediated by the experience economy construct.

By drawing on prior research on extensions of TAM in related contexts (e.g., Ozturk et al., 2016), this study extends the understanding of the experience economy perspective specifically in the context of mobile apps, and particularly in hospitality and tourism literature. Most importantly, to ground the examination of consumer behavior in mobile commerce within the theoretical framework of TAM (Davis, 1989), this study extends the belief-behavior approach to incorporate the experience economy aspects that influence hotel consumer technology use, thus advancing the general TAM extension literature. With few

studies examining how behavioral intentions toward usage of mobile apps are influenced in a hotel mobile service context, this study serves as a foundation by providing an insightful understanding of hotel mobile apps to a platform for both consumers and firms.

Managerial implications

Mobile technology has become a predominant distribution channel for the hotel industry in transforming the consumer experience (Ozturk, Bilgihan, et al., 2016). From the standpoint of hospitality and tourism marketing, the experiential aspect of technology use is an important construct for understanding hotel consumer behavior, which clearly shows the importance of interfacing within mobile app applications for hotel marketing managers and application developers alike. Further, the perceived ease of usefulness via experience has positively impacted hotel consumer behavioral intentions. Therefore, hospitality marketers and application developers should design more informative, enjoyable, and immersive app experiences for hotel consumers (tom Dieck et al., 2018). The findings of the study are important for hospitality managers and application designers from various disciplines that concern creating enjoyable, educational and immersive experiences through interaction with mobile apps. To create an enjoyable mobile app experience, hotels should apply various designs, such as color, photographs, animation and music that makes the mobile app experience attractive and pleasant (Page, 2013). Additionally, a hotel mobile app should be informative about functionality and quality of hotel services as well as tourism information customers may potentially needed (Tarute, Nikou, & Gatautis, 2017). Moreover, developing interactive functions such as online bidding and sharing to social media (Facebook or Instagram) may contribute to marketing exposure (Adukaite et al., 2013). The previous ideas lead to positive customers' evaluations and benefit the hotel business. Moreover, the results on user perception of mobile apps show that hotel consumers stress the importance of ease of use and usefulness, which could provide timely and relevant information in terms of mobile app design and functional features (Wang et al., 2016).

Limitations

The exploratory nature of the study collected a small sample and hence the results may not be able to be generalized to other mobile phone technologies and therefore more diverse populations could be looked at in the future. Additionally, the present study is limited to investigating the uni-dimension of four realms of experience economy affecting hotel consumers' mobile app usage. Per Loureiro's (2014) suggestion, the proposed model may be replicated using data gathered in different types of experiences by comparing the contexts of the more passive nature of entertainment and esthetics with the experience of active participation of education and escapism. Moreover, according to Morosan and DeFranco (2016), as new business applications continue to develop, it is suggested that future studies could employ the experimental approaches in obtaining an evaluation of hotel consumer technology experience in different mobile technologies such as wearable technologies. Additionally, the current study focused on hotel consumer mobile app experience from the experience economy point-of-view, and further research could

combine with other hedonic experiential factors such as consumer emotion (Jeong et al., 2009) and perceived values (Ozturk, Nusair, et al., 2016) to provide deeper insights in understanding the mechanisms that drive hotel consumer reaction to mobile technology.

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ORCID

Chia-Pin Yu  <http://orcid.org/0000-0002-7099-4026>

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