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How Hotel Smartphone Applications Affect Guest Satisfaction in Applications and Re-use Intention? An Experiential Value Approach

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ABSTRACT

Today, more hotel companies attempt to use hotel apps to provide useful content about hotel facilities, events or promotions, and directions. By using experiential values in the context of hotel app experience, this study explores how hotel guests perceive hotel apps and what affects their satisfaction with those apps and their re-use intentions through Partial Least Squares Structural Equation Modeling (PLS-SEM). A total of 212 usable responses were collected for data analysis through an online survey. The results of structural analysis revealed that while service excellence and esthetic values from hotel app experiences influence guest satisfaction, the playfulness value does not. Theoretical and managerial implications are discussed.

KEYWORDS

Experiential value; guest satisfaction; hotel smartphone applications; re-use intention; PLS-SEM

Introduction

A smartphone is an easy-to-use handheld device that allows users to browse the web using high-speed access to the Internet. Smartphones are an important part of online communication and have become a necessity in private and professional lives (Derks, Bakker, Peters, & van Wingerden, 2016). The number of smartphone users has continuously increased because the smartphone industry has developed an intuitive phone interface and applications have proliferated (Martins, Costa, Oliveira, Gonçalves, & Branco, 2019). According to the Pew Research Center (2015), smartphone use in the U.S. has increased dramatically over the past few years. In 2011, only one-third of American adults owned smartphones, but in 2017 about 84% of American citizen use their smartphone every day. Moreover, smartphone users should continuously increase to 257.8 million by 2020 (Statista, 2018).

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As the mobile phone changed from a voice-based device to a multi-channel device with access the Internet, mobile applications, or app, development has surged (Purcell, Entner, & Henderson, 2010). Smartphone apps are great tools for storing large amounts of information ranging from videos to catalogs, and users can obtain useful information whenever they want by connecting to the Internet and using their apps. Smartphones have evolved to influence the hospitality and tourism industry because travelers increasingly use hotel smartphone apps to gather destination information and plan their travel efficiently (No & Kim, 2014; Wang, Xiang, & Fesenmaier, 2016).

As the demand for hotel smartphone apps increase, many U.S. hotel companies have begun using travelers' smartphones into their ordinary business. Guest experiences with hotel apps can provide valuable information to hotels because guest usage can serve as a good criterion to judge whether guest expectations are met and to analyze what is important to guests. From the hotel guest perspective, being able to see guest rooms, lobby, and the exterior appearance of buildings, as well as other guest services in the hotel apps means they can set their own expectations and the experiential value of hotel products and services. Thus, using smartphones and hotel apps may affect hotel guest satisfaction and intention to re-use.

This study applies Holbrook's (1994) experiential value conceptualization, as revised by Mathwick, Rigdon, and Malhotra (2001), to the experiential typology of hotel smartphone apps. According to Mathwick et al. (2001), experiential value can be divided into two main dimensions: intrinsic value and extrinsic value. Intrinsic values include esthetics and playfulness, which focus on the internal values of hotel app users. Hotel guests perceive content describing hotel rooms and recognize the atmosphere of facilities through their senses on a smartphone app. Extrinsic values include service excellence and customer return on investment, which stress external and visible factors encountered by hotel guests. Hotel app users perceive what they will receive as they use the hotel apps, and they will show active or inactive investment in the services.

Many researchers in the hospitality industry have begun to focus on hotel smartphone apps. However, little attention has been paid to the experiential values derived from guest experiences on hotel apps. Because pre-experience with a hotel smartphone app can help a potential guest choose a hotel (Wang, Xiang, Law, & Ki, 2016), research must focus on how experiential values, as perceived by hotel guests using hotel apps, affect guest satisfaction in applications and re-use intention.

The present study was designed to 1) develop a model explaining hotel guest re-use intentions for hotel apps by using the attributes of experiential values and guest satisfaction; 2) investigate the adequacy of experiential values within the proposed theoretical framework; and 3) identify which experiential values have more effect on hotel guest satisfaction with a hotel

app. A self-reported questionnaire was developed to test causal relationships among the latent constructs: experiential value (EV), guest satisfaction (GS), and re-use intention (RI) for hotel apps. The collected data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) to discover the effects of the entire model and to determine the fit of the theoretical model.

Literature review

Hotel smartphone app

While previous mobile technologies mainly involved interaction between users, today's smartphone technologies focus on not only communication, but also user desires and time-critical arrangements. With the rise of smartphones, users increasingly download and use software interfaces known as apps. Because of compatibility, including web-based and mobile-based characteristics, apps are categorized as a new information technology (Hur, Lee, & Choo, 2017). Apps can stimulate smartphone users to pursue both functional and hedonic values including enjoyment, entertainment, and customer satisfaction (Hur et al., 2017; Wang et al., 2016).

As people increasingly use smartphone apps, many hotel corporations have created and developed their own apps to gain a competitive advantage and to facilitate consumption of hotel-related products or service (Gibbs, Gretzel, & Saltzman, 2016; Wang et al., 2016). Hotel smartphone apps are designed to offer various useful services to hotel guests by extending computer-based online services to mobile online services (Adukaite, Reimann, Marchiori, & Cantoni, 2014; Wang & Xiang, 2012). Hotel guests primarily use hotel smartphone apps for a variety of functions such as finding information on property, guest services, reservations, transactions, and Global Positioning System (GPS) for location awareness. In addition, hotel apps provide hotel guests with systematic intelligence that upgrades app experiences with functions in mobile interfaces (Wang et al., 2016).

To encourage hotel guests to use hotel smartphone apps, hotel corporations focus on improving hotel app experiences (Gibbs et al., 2016). Hotel corporations provide their guests with unique app experiences by designing a hotel app platform that offers more efficient and innovative online service (Adukaite et al., 2014; Anuar, Musa, & Khalid, 2014). Moreover, enhancing usability and functionality of the app interface helps hotel guests access content more effectively and interact with hotel employees (Comscore, 2012). Thus, hotel app users can create their own experiences and impressions of hotel services that are fully personalized to each guest, helping them feel valued and closely connected to the hotel.

Experiential value

According to Holbrook (2000), customer value is an “interactive relativistic preference experience,” with an emphasis on the interaction between customers and products, from which that value is derived. The definition of preference refers to customers deciding to purchase products and services to achieve goals related to their individual values as well as to obtain more benefits (Wu & Liang, 2009). Thus, customer value comprises customer preferences over service attributes, performance attributes and/or the overall results of service processes.

In the process of perceiving and experiencing hotel smartphone app services, hotel guests receive stimulation. The “*sense*” experience involves stimulating the senses to create sensorial experiences. Through vision, sound, taste, scent, and touch, customers recognize the value of products and services, developing their interest in unique experiences (Schmitt, 1999). The “*feel*” experience refers stimulating feelings and making customers willing to empathize with products and services (Schmitt, 1999). Meanwhile, the “*think*” experience emphasizes engagement in elaborate and creative thinking through which customers perceive or reevaluate products and services (Yuan & Wu, 2008). Additionally, the “*act*” experience targets physical and behavioral experiences, alternative experiences to customer lifestyles and social interactions (Sung & Lee, 2015). Finally, the “*relate*” experience bypasses individual feelings and sensations by helping individuals gain a relationship with other people or groups (Schmitt, 1999).

Through these experiences, hotel app users create their own experiential value for the content and services provided by hotel apps. According to Smith and Colgate (2007), experiential value concerns the degree to which customers experience valuable moments from a product or service. Mathwick et al. (2001) segmented an experiential value scale (EVS) into two main dimensions. Extrinsic values such as “customer return on investment” and “service excellence” are based on the utilitarian nature of service or product consumption. In contrast, intrinsic values such as “aesthetics” and “playfulness” are subjective and vary from person to person. Thus, experiential values can be maximized by offerings including an abundance of memorable hotel app experiences.

Customer return on investment (CROI)

According to Mathwick, Malhorta, and Rigdon (2002), experiential value is divided into four dimensions: CROI, service excellence, esthetics, and playfulness. The conceptualization of CROI has evolved over the years and is one of several consumer behavior outcome variables derived from a high level of values and experiences (Dlačić, Arslanagić, Kadić-Maglajlić, Marković, &

Raspor, 2014). Customers basically determine the level of CROI through direct or indirect experiences. According to Mathwick et al. (2001), CROI has two indicators: efficiency of exchange and economic utility. Efficiency is the degree of perceived convenience in time and effort spent on some investment. Thus, efficiency of exchange can be measured by the utilitarian aspects of the relationship between customers and service or product providers through direct or indirect experiences (Holbrook, 2000; Kim, 2002). Economic utility is the acquisition and/or transaction of value perceived in financial savings. It measures customer satisfaction and advantages from products consumed or services rendered. Although it is hard to measure directly, utility can be analogized from individual decisions (Moffatt, 2017). According to Bolton and Drew (1991), price can be an important component of economic utility value. They also noted that good value is derived from fair price, which means that customers exchange price for products or services with value.

In terms of efficiency for a hotel smartphone app, hotel guests can save time in making a room or service reservation and gather hotel property or destination information using hotel apps. Moreover, reviewing hotel facilities in the app can help hotel guests make a quick decision (Wang et al., 2016). Many hotel corporations have also begun to apply value-added functions into their hotel apps, like mobile concierge and mobile payments (Gibbs et al., 2016). These functions optimize the efficiency of hotel app usage and hotel guest app experiences.

In terms of price, however, it is difficult to fully judge hotel guests' perceived CROI value. Hotels generally utilize a set of online distribution channels for maximizing their revenues and market share (Toh, Raven, & DeKay, 2011; Yang & Leung, 2018). Because it is easy for today's hotel guests to compare hotel room rates or promotions through various online distribution channels, price difference between online channels has become a key concern for hotel corporations and hotel guests (Choi & Mattila, 2005; Gazzoli, Gon Kim, & Palakurthi, 2008). Although hotels encourage hotel guests to book rooms and receive benefits through their own hotel apps, many online travel agencies (OTA) and third-party travel wholesalers remain playing a significant role in hotel's multi-channel distribution with various competitive price options (Thakran & Verma, 2013). They provide much more promotions and packages than hotel apps in a reasonable price every day, and their accessibility to potential guests is substantial (Morosan & Jeong, 2008). In addition, if hotel app users are not a member of a certain hotel corporation, it would be hard for them to obtain financial benefits through hotel apps.

Because customers tend to focus positive return from the financial investment such as price and expenditure for travel (Mathwick et al., 2001), perceived price parity can be one of important factors that have an effect

on customers' reactions and behavioral intentions (Etzioni, 2010). Today, more hotel guests try to book a hotel room through various online distribution channels, such as hotel websites or apps, OTAs, and travel wholesalers in order to gain price advantages. Although hotel guests can gain the efficiency from hotel app usage, price may be not helpful and effective in creating CROI value.

Service excellence

Based on Zeithaml's (1988) definitions of quality, Holbrook (1999) asserted that excellence describes both perceived quality and product or service performance. According to Oliver (1999), the dimension of service excellence is based on a standard against which judgments of product or service quality are ultimately formed. Moreover, Oliver (1999) traced a relationship between service excellence as perceived by customers and service quality determined by performance outcomes. Perceived service excellence can be easily affected by whether service providers deliver on promises to their customers. When perceived service excellence goes beyond customer expectations, the customer is satisfied and more likely to develop brand loyalty and express behavioral intention to reuse or repurchase products and services. When service performance does not meet customer expectations, however, the customer remains dissatisfied and may choose to no longer use products or services (Oliver, 1999).

For hotel smartphone apps, some smartphone app attributes are related to service excellence. The quality and compatibility of the app interface and content can affect hotel app user satisfaction. Fast download times for images and content as well as customer-oriented interfaces help save time. In addition, timely responses to hotel guest requests sent through the hotel app and appropriate feedback can also indicate service excellence (Wang et al., 2016). In using hotel apps, hotel guests can request services or communicate with hotel employees, possibly leading to a more valuable personalized experience. Ease-of-use, visual elements, and security and privacy also relate to the quality and effectiveness of a hotel smartphone app (Wang et al., 2016). Given such considerations, the following hypothesis was developed:

H1. The service excellence value of a hotel smartphone app is positively related to hotel guest satisfaction.

Esthetics

esthetics refer to a reaction to the symmetry, proportion and unity of physical material, as well as cadence or performance (Mathwick et al.,

2001; Olson, 1981; Veryzer, 1993). esthetics measures customer perception of the degree of visible attractiveness and entertainment of products and services or the physical environment, which instantly stimulates individual pleasure (Mathwick et al., 2002, 2001). judgment of esthetic value is sensory, emotional and intellectual all at once, primarily relying on the ability to discriminate at a sensory level. Therefore, through senses ranging from sight to touch, customers assign an esthetic value to an object or phenomenon and show an effective domain response to a specific occurrence.

In the hospitality industry, esthetics is becoming more and more important. The integration of quantifiable esthetic considerations into the process of the interface design is an essential step in the evolution of app design (Bauerly & Liu, 2008). According to Kumar, Purani, and Viswanathan (2018), visible physical features available on apps can be connected with the process of service delivery. Moreover, design balance and uniqueness of app interface affect app user emotional reactions and quality evaluations (Bhandari, Neben, Chang, & Chua, 2017). By experiencing esthetic factors through senses, app users can feel sensations that give rise to pleasure and reflective contemplation. Thus, hotel app users may base esthetic value on the degree of pleasure or satisfaction.

In experiencing hotel smartphone apps, the logo is one esthetic component key to hotel app design. When hotel guests install hotel apps on their smartphone, their first impression comes from the logo. This logo can help hotels differentiate their products or services, build brand awareness, and affect product choice (Small, Melewar, Pittard, Ewing, & Jevons, 2007). It offers important physical dimensions that help communicate an impression and provides messages based on individual service expectations (Rosenbaum, Massiah, & Fisk, 2011). In addition, colorfulness can explain the initial reaction of customers (Reinecke et al., 2013). Hotel guests gain their first impression of hotel brand identity through the combination of colors. Symmetry also enhances the esthetic perceptions of smartphone users (Tuch & Opwis, 2010). Symmetry makes hotel apps more attractive and serves as a cue to direct visual attention. By using symmetry in hotel apps, hotels can maintain balance and impose a regular structure and thus help hotel guests understand information and content more clearly. These esthetic factors may contribute to hotel guest value creation and guest satisfaction. Therefore, hotels must create an esthetically pleasing environment within hotel apps. Based on this discussion, the following the hypothesis was proposed:

H2. The esthetic value of a hotel smartphone app is positively related to hotel guest satisfaction.

Playfulness

Playfulness is another measure of customer use of products or services (Davis, Bagozzi, & Warshaw, 1992). The term playfulness was first suggested by Lieberman (1977), who wrote that playfulness is a multi-dimensional element, with perceived playfulness directly influencing customer attitudes and behaviors. Playfulness exists to some degree in various activities, freely engaged in and providing the feeling of attraction (Mathwick et al., 2001; Nigam, 2012). According to Ahn, Ryu, and Han (2007), playfulness is an interactive belief affecting enjoyment and cognitive immersion. The perceptions of playfulness can affect user attitude toward web usage, which offers more curiosity and more enjoyment (Moon, Kim, Moon, & Kim, 2001). Thus, in E-marketing, mobile app providers increasingly upgrade app interfaces to include enjoyable and entertaining features (Lu, Liu, & Wei, 2017).

In hotel apps, hotel guests generally expect a sense of escapism or playfulness when using the app itself and interacting with hotel employees through the apps. Many hotel companies have begun to leverage hedonic design features in their smartphone apps to provide hotel guests with playfulness value. Hotel guests who find the app playful find their attention caught and curiosity aroused, contributing to pleasure and enjoyment. Indeed, substantial evidence has demonstrated positive relationships between perceived playfulness and guest satisfaction (Nusair & Kandampully, 2008). Those who do not experience the concentration, curiosity, and enjoyment caused by a playful state may change their behavioral intentions (Kuo, Chang, Cheng, & Lin, 2015). Therefore, to help create an enjoyable service environment, hotels must develop content and components in their apps that encourage hotel guests to become involved and meet their experiential needs and wants. Along this line, positively perceived playfulness driven by hotel apps can lead to guest satisfaction and stronger behavioral intentions to use smartphone value-added services (Wang & Lin, 2012). Thus, the following hypothesis was formulated:

H3. The playfulness value of a hotel smartphone app is positively related to hotel guest satisfaction.

Customer satisfaction

As the hotel industry becomes an increasingly competitive global industry, hotel corporations must consider the growing demand for cutting-edge service (Kandampully & Suhartanto, 2000). Guest experiences originate from a combination of products and services, and customer satisfaction is the most important part of hospitality operations (Gursoy & Swanger, 2007). Satisfaction from individual experiences helps customers recognize the

quality of products or service offered by a hotel, and the overall results are based on customer standards of evaluation (Oliver, 1991). Many hospitality researchers have also identified a relationship between experiential values as perceived by the customer and customer satisfaction. This relationship can be an indicator for future behavior of customers (Gallarza & Saura, 2006; Jin, Lee, & Lee, 2015; Lee, Petrick, & Crompton, 2007).

Smartphone apps help customers obtain important factual and experiential information about products, services, or brand identity (Deloitte, 2011), which contributes to customer recognition of the hotel quality. Thus, many hotel corporations try to provide their hotel guests with distinctive experiences that are not available from competitors' smartphone app experiences. Hotel guests feel satisfied when obtaining needed information and receiving responses through hotel apps. These experiences with hotel apps can stimulate customer curiosity and provide experiential value through the senses (Deloitte, 2011).

Re-use intention

According to Oliver (1999), the customer intention to repurchase or re-use products or services involves specific and prudent attitudes based on previous experiences, especially when customers show interest in a certain product or service, and this interest spurs them to take action (Nigam, 2012). Also, the theory of planned behavior (Ajzen, 1991), which is a widely used rational-choice model, shows that people are likely to show certain behaviors if they believe their behaviors will affect an outcome they value or desire (Lam & Hsu, 2006). Positive attitudes stem from satisfaction with products or services, which then affects future behavioral intention (Chen & Tung, 2014; Chou & Hsu, 2016; Han, 2015). Thus, applying experiential values in the context of hotel app services, hotel guest experiences with a hotel app can influence their satisfaction with the app itself, leading to positive or negative attitudes and future behavioral intentions. Thus, the last hypothesis was formulated:

H4. Guest satisfaction from using hotel smartphone apps is positively related to the intention to re-use the hotel app.

Proposed model

Based on the review of relevant literature, an integrated conceptual model was formulated (See Figure 1). The current study aims to investigate the causal relationships among experiential values, guest satisfaction, and re-use intention for hotel apps. Our conceptual model theorizes that hotel guest intention to re-use hotel smartphone apps are consequences of satisfaction

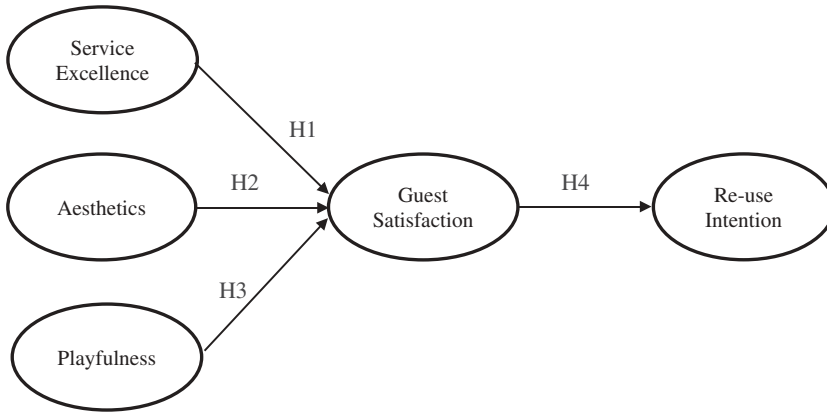


Figure 1. Proposed Model.

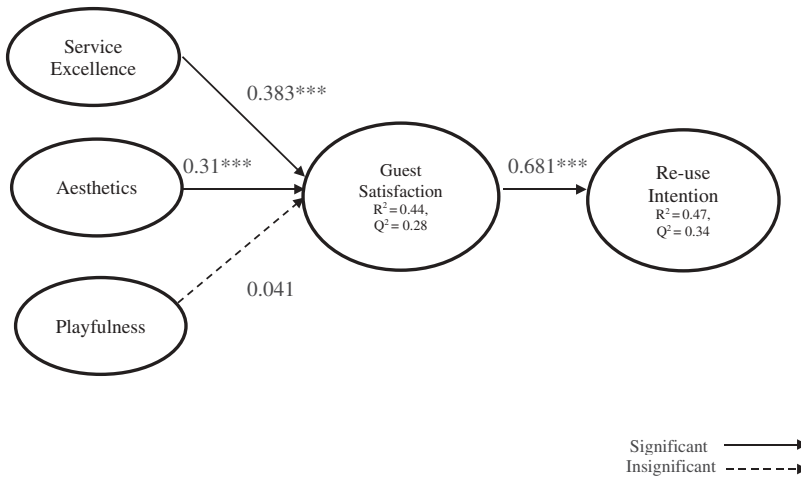


Figure 2. Hypotheses test results. Note: Standardized path coefficients are shown. ***P < .001

based on the level of perceived experiential value. The concept of experiential value is further divided into sub-categories: service excellence, esthetics, and playfulness.

Methodology

Measurement development

This study used a quantitative method to explain what hotel guests experience in using their hotel smartphone apps and whether experiential values obtained through hotel app experiences affect guest satisfaction and the intention to re-use the app. To maintain consistency with previous research, we used measures taken or adapted from existing marketing and hospitality research. The measurement items were assessed using

a 5-point Likert-type scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree) because participants find the scale readily comprehensive (Marton-Williams, 1986). Seventeen measures were used to capture the various latent constructs. Specifically, three items were used to measure service excellence, four items to measure esthetics, and four items to measure playfulness. Hotel guest satisfaction was measured with three items, and finally, three items examined intention to re-use hotel apps. The measures were modified to suit this study setting. The original questionnaire was in English (see Appendix 1).

Pilot study

We conducted a pilot study with 50 hotel smartphone app users who use any hotel smartphone app at least once a month. Based on their responses and feedbacks in the pilot survey, some measurement items were modified to better align with the context of hotel smartphone app use. We finally confirmed seventeen measurement items to measure latent constructs in the proposed model.

Data collection

A web-based survey was developed to collect data using an online market research company. The online survey was distributed to panels using the company's database system during the second quarter of 2017. Screening questions at the beginning of the survey identified target subjects who had used any hotel app at least once a month. Qualified respondents were asked to answer all questions completely and thoroughly. Data collection took about a week. A total of 250 complete responses were collected for initial data screening. In carrying out statistical analysis, it is important to consider the assumptions for the analysis and confirm that all assumptions are satisfied. The authors checked the assumptions of multivariate analysis (univariate outliers, univariate normality, and multivariate outliers) in SPSS. We inspected the z values (± 3.29) of variables for univariate and used skewness and kurtosis as well as Mahalanobis distance to find outliers in multivariate data. We deleted 38 outliers to reduce skewness and dispersion (mitigate the influence of extreme values) in the data so that the overall distribution is more centralized. In addition, we used the variance inflation factor (VIF) to discover any multicollinearity. For our current model, the VIF values were all well below 3.3 when applying the Partial Least Squares Structural Equation Modeling (PLS-SEM) (Diamantopoulos & Siguaw, 2006). Therefore, we could safely conclude there is no multicollinearity.

After deleting 38 outliers, a total of 212 usable responses were retained for data analysis. Based on various rules-of-thumbs for sample size

requirements for PLS-SEM, such as a minimum sample size of 100 or 200 (Boomsma, 1985), 5 or 10 observations per estimated parameter (Bentler & Chou, 1987), and 10 cases per variable (Nunnally, 1967), the final usable responses (212) were included in the main analysis without further data collection.

Data analysis

The collected data were first analyzed using descriptive statistics to generate respondent socio-demographic profiles. The conceptual model was then examined using PLS-SEM. SmartPLS version 3 was used to build models and to conduct the analysis (Ringle, Wende, & Becker, 2015). Following the procedures recommended by Hair, Hult, Ringle, and Sarstedt (2016), the test of structural model developed in this study consisted of a two-step procedure. The first step was to validate the measurement model and assess reliability, convergent validity, and discriminant validity. Second, PLS-SEM was used to test the adequacy of the proposed conceptual framework and the hypothesized theoretical relationships. PLS-SEM is more suitable for analysis when sample sizes are small and data are nonnormally distributed (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). We used G*Power 3.1 software to calculate the minimum sample size recommended in PLS-SEM (Ringle et al., 2015). After we input the effect size ($f^2 = 0.15$), power (0.95), and number of predictors (4), the minimum sample size was 129. Based on the G*Power calculation, the sample size of this study ($n = 212$) is enough to use PLS-SEM.

Results

Socio-demographic profile of survey respondents

Table 1 summarizes the socio-demographic characteristics of survey participants. Respondents were nearly equally distributed by gender. Their average age was a little more than 34. More than half were Caucasian/White, followed by African Americans (20%), Hispanics (15%), and Asian/Pacific Islanders(10%). Almost half held a bachelor's and/or higher degree. Almost half reported using mobile hotel apps 1–2 times per month, with a little more than 40% using the apps 3–5 times per month. The rest of the respondents used hotel apps six to ten or more times per month. Almost half of the survey participants had used hotel apps for reserving rooms, dining, or events. Also, almost one-third of the participants had used hotel apps for check in or out.

Table 1. Demographic Characteristics of the Sample (N = 212).

Characteristics	Frequency	Percentage
Gender		
Male	107	50.5%
Female	105	49.5%
Age		
Below 19	0	0
19–24	45	21.2%
25–34	93	43.8%
35–44	42	19.9%
45–54	23	10.8%
55 or over	9	4.3%
Ethnicity		
Caucasian	120	56.6%
Hispanic	31	14.6%
African American	40	18.9%
Asian/Pacific Islander	21	9.9%
Education Level		
Completed high school	16	7.5%
High school graduate	40	18.9%
Completed college	33	15.6%
Associate degree	20	9.5%
Bachelor's degree	56	26.4%
Completed postgraduate	6	2.8%
Master's degree	26	12.2%
Ph D., low or medical degree	13	6.2%
Other advanced degree beyond a master's degree	2	0.9%
Frequency in Use of Hotel Apps for a Month		
1–2 times	100	47.2%
3–5 times	87	41.0%
6–10 times	17	8.0%
Over 10 times	8	3.8%
Purpose of Using Hotel Apps		
Room/Dining/Event reservation	105	49.5%
Facility/Local information	44	20.8%
Check in/out	73	34.4%
Photo & Gallery	36	16.9%
Order room service	15	7.1%
Pay for accommodations/services	13	6.1%
Communicate with employees	22	10.4%
Give a feedback	8	3.8%
Others	11	5.2%

Measurement model test

The measurement model was estimated using SmartPLS before testing the proposed model. This approach tested for internal consistency among latent constructs and to demonstrate whether convergent and discriminant validity existed. Table 2 shows the results of the measurement model tests. After using SmartPLS for factor analysis, we deleted two items that standardized factor loadings were less than .70. Therefore, fifteen-items, with three items on the service excellence, three items on esthetics, three items on playfulness, three items on guest satisfaction, and three items on re-use intentions, were used. Each latent construct should contain at least three items that are best fit to the data

Table 2. Examining convergent validity and construct reliability.

Construct/Associated items	Standardized Item Loadings	T-value
Service Excellence ($\alpha = 0.74$, $CR = 0.85$)		
The hotel smartphone app was attentive.	0.77	24.98
The service provided by the hotel smartphone app fulfills hotel guest expectations.	0.86	43.26
The hotel smartphone app shows reliable and task-related service performance.	0.81	28.56
esthetics ($\alpha = 0.74$, $CR = 0.85$)		
The display of hotel app contents was esthetically attractive.	0.84	34.65
The hotel smartphone app was esthetically appealing.	0.82	22.47
The layout of hotel smartphone app makes it easy to get necessary information.	0.79	30.22
Playfulness ($\alpha = 0.70$, $CR = 0.83$)		
Browsing the hotel smartphone app makes hotel guests feel like they are in another world.	0.80	19.65
Browsing the hotel smartphone app is so enjoyable which makes hotel guests feel comfortable and relaxed.	0.84	29.87
The hotel smartphone app has a variety of playful factors such as ease-of-use, usefulness, and entertainment.	0.71	10.60
Guest Satisfaction ($\alpha = 0.77$, $CR = 0.87$)		
Overall, I was satisfied with my experiences with this hotel app.	0.81	33.98
I was satisfied with the quality of this hotel app contents	0.85	34.76
I felt that my experience with this hotel app was valuable.	0.82	25.56
Re-use Intention ($\alpha = 0.83$, $CR = 0.90$)		
I plan to use the hotel smartphone app when I travel in the future.	0.90	58.46
I am willing to use this hotel smartphone app again in the future.	0.90	54.10
I will recommend the hotel smartphone app to my family, friends and others.	0.80	31.17

Note: All factor loadings are significant at $p < 0.001$.

(Osborne, Costello, & Kellow, 2008). The findings show that all standardized factor loadings were higher than .70, the threshold suggested by Hair et al. (2016). To confirm the internal consistency of multiple measurement items for each construct, a composite reliability test was conducted. The values of composite reliability ranged from .83 to .90, higher than the recommended threshold of .60 (Bagozzi & Yi, 1988). The convergent validity test results are in Table 3, with AVE values for multiple constructs varying from .61 to .75, exceeding the suggested cutoff of .50 (Fornell & Larcker, 1981). Moreover, the squared root of AVE values on the diagonal were higher than the correlation coefficient between

Table 3. Correlation matrix and descriptive statistics of the constructs.

Construct	1	2	3	4	5
Service Excellence	0.66				
esthetics	0.684 (0.893)	0.67			
Playfulness	0.504 (0.626)	0.544 (0.698)	0.61		
Guest Satisfaction	0.704 (0.869)	0.691 (0.842)	0.520 (0.580)	0.67	
Re-use Intention	0.675 (0.864)	0.669 (0.825)	0.420 (0.534)	0.719 (0.874)	0.75
Mean	3.88	3.72	3.17	3.91	4.03
SD	0.77	0.92	0.94	0.90	0.96

Note: HTMT ratios are in parentheses. Average variance extracted (AVE) are on the diagonal in bold.

all the variables in the model. We also used Heterotrait-Monotrait ratios to assess discriminant validity. If the HTMT value is below 0.90, discriminant validity was considered acceptable (Gold, Malhotra, & Segars, 2001; Teo, Srivastava, & Jiang, 2008). This study had no issue with discriminant validity.

Assessment of structural model

The first step confirmed the reliability and validity of the measurement model. The next step is to test structural model and hypotheses using SmartPLS. The hypothesized causal relationships were examined using coefficient scores between constructs in the model. First, the effect of service excellence value of hotel smartphone apps on guest satisfaction was assessed. The results indicated that service excellence value of hotel apps affected guest satisfaction significantly ($\beta = .383, p < .001$), supporting Hypothesis 1. Hypothesis 2 positing that the esthetics value of hotel smartphone apps is positively related to hotel guest satisfaction was then evaluated. The results of structural analysis revealed that the esthetics value of hotel apps was a significant function of guest satisfaction ($\beta = .312, p < .001$). However, playfulness was not a significant antecedent of guest satisfaction ($\beta = .041, p > .47$), failing to support Hypothesis 3. Results showed that the playfulness value had no meaningful effect on hotel guest satisfaction. Hypothesis 4 stated that hotel guest satisfaction with hotel app usage should affect their intention to reuse the apps. As hypothesized, the results indicated that was indeed the case ($\beta = .681, p < .001$).

In addition, we considered R^2 values of the endogenous latent variables that are the predictor variables on the construct. R^2 for guest was .435 and re-use intention was .464, indicating that the model has a moderate level of variance explained by the endogenous variables. We also used the effect size to evaluate an endogenous latent variable's R^2 values. According to Chin (2010) and Cohen, (2013), values of .02, .15 and .35 indicate weak, moderate and strong effects. Results of the effect sizes (f^2) showed that service excellence (.14), and esthetics (.08) have small effects on guest satisfaction whereas playfulness (.002) has no effect on guest satisfaction. However, guest satisfaction has a strong (.87) effect on re-use intention. The Q^2 value that refers to predictive relevance for endogenous variables was calculated (Geisser, 1974; Stone & Choice, 1974). The results showed that the Q^2 value of two endogenous constructs were more than zero (.28 for guest satisfaction and .34 for re-use intention). The model's predictive relevance was supported (Hair et al., 2016)

Discussion

This empirical study provides a deeper understanding of experiential values of hotel app experiences. Specifically, this study identified the effect of various experiential values on hotel guest satisfaction and intention to re-use hotel apps. The results of PLS-SEM provide theoretical and managerial insights.

Theoretical implications

The findings of this empirical study provide a few theoretical insights. First, the concept of experiential values was extended to the use of hotel smartphone apps. Many previous studies on experiential values focused on retailing services, both online and offline (Ahn et al., 2007; Childers, Carr, Peck, & Carson, 2001; Echchakoui, 2016; Keng, Huang, & Zheng, 2007; Mathwick et al., 2002, 2001). These studies stressed the overall effect of customer retailing experience and the relative importance among experiential values. In the hospitality marketing context, some research has examined the features of experiential value and the effect of experiential value on customer satisfaction (Wu & Liang, 2009; Yuan & Wu, 2008). Past studies, however, have rarely covered experiential value applied to hotel apps. In this empirical and exploratory study, we first modified the original theoretical concept of experiential values by eliminating a somewhat irrelevant variable in the context of hotel apps. Then, the modified experiential values constructs were combined in a structural model that includes guest satisfaction in app use and re-use intentions. This empirical approach in the model development resulted in meaningful insights in how experiential value constructs affect hotel guest satisfaction.

The results of PLS-SEM revealed that while service excellence and esthetic values in hotel app experiences influenced guest satisfaction, the playfulness value did not. This result indicates that hotel guests generally do not use hotel smartphone apps for pleasure and enjoyment, mainly using them for utilitarian content and information. Although playfulness did not directly affect hotel guest satisfaction, interpretation requires some caution. Researchers have become increasingly aware of the interrelationships among hedonic factors in the digital environment and among app users. According to Kim, Kim, and Wachter (2013), app experiences help app users fulfill individual hedonic motives and needs through engaging app activities. Moreover, customers can obtain a high level of enjoyment and playfulness through app experiences that make them feel positive emotions. Continuous hedonic app experiences can also provide users with psychological engagement and utilitarian goal attainment. Thus, if hotel app users experienced enjoyment and playfulness in using hotel apps, they might gain hedonic values or benefits depending on the degree of enjoyment that they experience. Although the playfulness value from hotel app experiences did not contribute to overall hotel guest satisfaction, a variety of playfulness factors that stimulate the senses may also motivate hotel app users to use the hotel apps again.

Managerial implications

From a practical standpoint, this empirical study provides hotel corporations with many important managerial insights on how to develop hotel apps.

First, hotels must focus on upgrading the pre-arrival guest experiences. As Carlino (2015) asserted, hotel apps must help improve hotel guest experiences in a digital environment. The right technology can improve guest experience, and the hotel app gives guests an opportunity to experience hotel services even before arriving. Because hotel guests increasingly use their smartphones to collect information, they are likely to access hotel apps to obtain useful information on location, nearby tourist attractions, times for check in/out, room service, promotions, and valet parking. Thus, hotel management teams should frequently upload the latest hotel information as well as promotions and events, which will increase guest trust in the quality of hotel services. Moreover, providing private guest data storage allows hotel management to easily track guest information and travel behavior. Hotel guests can then use the hotel app more easily because hotels make it possible for guests to reserve a room and find their travel history. This can result in increased hotel credibility and enhanced the long-term relationship between guests. Hotel guests who have experienced well-organized hotel apps are more likely to invest time and effort searching for travel information on a hotel app before and during traveling. This helps hotels stay informed about trends in hotel smartphone apps and understand the latest needs of guests. Such information is also helpful in designing customized hotel apps that maximize app experiences.

Second, hotels must be responsive to hotel guests, which is critical to successful mobile marketing (Heinonen & Strandvik, 2007; Pousttchi & Wiedemann, 2007, July). Responsiveness can help customers establish their own values as well as help hotel marketers reach ideal outcomes from mobile marketing (Carroll, 2007). Hotel marketers can gather useful hotel guest responses from reviews and comments in the hotel app (Chen, Hsu, & Wu, 2012). Through positive or negative feedback from hotel guests, hotel marketers can identify which hotel smartphone app features they should sustain and develop to enhance hotel guest app experiences. Therefore, timely responses and taking appropriate actions would improve the quality of the hotel app service and give hotel guests experiential value.

Finally, as more people travel overseas, they increasingly book their hotels and search for destination information online. Currently, however, information about destinations and facilities provided by hotel apps is often insufficient, so guests turn to other information sources, searching hotel reviews or asking hotel employees for specific information about hotel facilities, promotions, and room reservations. Many hotels have begun encouraging hotel guests to use mobile messaging to find answers to their questions. For instance, several major hotel companies recently launched 24-hour instant two-way chat service. This system provides hotel guests with necessary information instantly and reduces the time and effort spent on planning their travel. Also, while at the hotel, guests can request room service, in-room

amenities, car service to the airport, and reservations for restaurants and events using the hotel app to communicate with hotel employees. Because this service interaction is in a virtual environment, rapid responses are critical to ensure that guests have a good experience and obtain value from the hotel app. This can be especially important in reducing and addressing hotel guest complaints. Therefore, hotels must consider how to design an app interface that helps hotel guests interact freely with hotel employees and establishes an instant connection to help hotel guests obtain needed information.

Conclusion

Technology-savvy hotel guests want to use hotel apps without temporal and spatial constraints to get valuable information about hotel service and products. In response, more hotels attempt to use hotel apps to provide useful content about hotel facilities, events or promotions, and directions. Hotel management must understand how hotel guests perceive hotel apps and what affects their satisfaction with those apps and their re-use intention. By using experiential values in the context of hotel app experience, this study explored the causal relationships between variables of experience values, guest satisfaction, and re-use intention through PLS-SEM. The major findings of this structural analysis should provide hotel marketers with insights that can help them develop strategies to enhance communication with their customers. Also, this empirical study may motivate researchers to further investigate how experiential values apply to hotel app experiences by differentiating target markets, segments, clienteles, as well as adding moderating variables in the proposed model.

Limitations and future research

Despite the notable theoretical and practical contributions of this study, it is not free from limitations. First, the proposed model in this study did not include moderating variables. Demographic factors may affect hotel guest decision-making. For example, while tech-savvy guests may prefer to use modern technology like computers, laptops, and mobile phones and usually have no difficulty using hotel apps, older generations may have more trouble reserving a room, requesting information, and communicating with hotel employees with a smartphone. Future research may consider adding selective moderating factors to the theoretical framework to enhance our understanding of how demographic characteristics affect the perceptions of hotel app usability.

Second, this study only focused on the role of experiential factors in using hotel apps. However, many additional elements influence overall

guest satisfaction with hotel app usage and future behavioral intention to re-use. For instance, brand awareness can be an important driver for hotel guests when judging the quality and value of hotel apps. Lin, Morais, Kerstetter, and Hou (2007) verified that overall image correlates with domestic and international tourist behaviors and decision-making processes. Thus, depending on the recognition of a hotel brand image, hotel guests may look forward differently to the quality of a hotel app service and products. In addition, familiarity with hotel smartphone app usage based on past experiences can also be a critical factor in the recognition of hotel apps. If hotel guests have great app booking experiences, they are more likely to re-use hotel apps in future reservations. Therefore, future studies must enhance our theoretical model by including these additional factors that affect hotel guest behaviors.

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Appendix 1. Summary of Variables and Measurement Items

Variables	Items	References
Service Excellence	<p>The service provided by application is attentive.</p> <p>The service provided by the hotel smartphone app fulfills hotel guest expectations.</p> <p>The hotel smartphone app shows reliable and task-related service performance.</p>	Wang et al. (2016), Wang et al. (2016)
aesthetics	<p>The display of content was esthetically attractive.</p> <p>The components of websites were esthetically appealing.</p> <p>The layout makes it easy to get necessary information.</p> <p>The layout of photographic contents is balanced.</p>	Alfakhri, Hameess, Nicholson, and Harness (2018), Mathwick et al. (2001), Small et al. (2007)
Playfulness	<p>Hedonic or playfulness value makes me feel like I am in another world.</p> <p>Browsing blogs is so enjoyable which makes me feel comfortable and relaxed.</p> <p>Information technology has a variety of playful factors such as ease-of-use, usefulness, and entertainment.</p> <p>Browsing mobile value-added services makes hotel guests forget everything else.</p>	Babin, Darden, and Griffin (1994), Davis (1989), Keng and Ting (2009), Wang and Lin (2012), Nusair and Kandampully (2008)
Guest Satisfaction	<p>Overall, hotel guests are satisfied with their experience when using the hotel smartphone app.</p> <p>Hotel guests are satisfied with the quality of restaurant services</p> <p>Compared to other hotels, I am satisfied with this hotel.</p>	Alhawas and Aburub (2016), Jani and Han (2014), Wu and Liang (2009)
Re-use Intention	<p>I plan to use hotel smartphone app when I travel in the future.</p> <p>I am willing to use mobile app again in the future.</p> <p>I will recommend the hotel to my family, friends and others.</p>	Alhawas and Aburub (2016), Jani and Han (2014)