Revisiting Customer Loyalty toward Mobile E-Commerce in the Hospitality Industry: Does Brand Viscosity Matter?

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ABSTRACT

Purpose—To better understand how to retain hospitality customers in the fierce competition among mobile applications (apps), this study proposes and empirically validates an integrative framework, which elaborates how conscious and subconscious factors, together with affective factors, may induce app loyalty and how brand viscosity moderates such effects.

Design/methodology/approach—We conducted an online survey to collect data and received a total of 268 valid responses. We split the data into two groups (brand viscosity vs. non-viscosity). Then, we performed a multi-group structural equation modeling (SEM) with Chi-square difference ($\Delta\chi2$) tests to compare the model between the two groups.

Findings—The findings support the integrative model and reveal that the influence of app satisfaction on loyalty is stronger for app users who do not stick to one brand across the website and mobile app channels. Moreover, for those with brand viscosity, habit and switching cost are two significant determinants that exert positive effects in inducing app loyalty.

Practical implication—Brand viscosity across different channels matters for the effects of habit and switching costs in shaping app loyalty. E-Commerce managers should elaborate on brand management among various booking channels and establish effective digital marketing strategies to facilitate the formation of usage habits and switching costs, and to enhance brand viscosity across channels.

Originality/value—This research advances the knowledge of app loyalty in hospitality by providing a comprehensive explanatory framework from affective, conscious, and subconscious lenses. This research is among the first to unveil the impact of brand viscosity on the links between loyalty and its determinants.

Keywords: brand viscosity; habit; switching cost; multi-group structural equation modeling; mobile app; loyalty; status quo bias theory

1. Introduction

The tremendous development of wireless communication technology has significantly transformed the global business environment, especially for mobile e-commerce (Lin and Wang, 2006; Nel and Boshoff, 2020). In the hotel industry, the mobile distribution channel accounts for more than one-third of the total hotel bookings, becoming a prevailing e-commerce channel (Hua *et al.*, 2019; Kim *et al.*, 2020). Increasing hospitality operators have supplemented their online distribution channels with mobile application (app) channels (Wu and Law, 2019). Notably, the rapidly increasing number of new mobile apps has provided consumers with a variety of choices, resulting in fierce market competition. Consequently, retaining the loyalty of existing customers is a challenge among established hospitality apps in front of the inpouring of new entrants.

However, most e-commerce studies on loyalty have focused on computer website channels (Pereira *et al.*, 2016; Roger-Monzó *et al.*, 2015). In view of the ongoing development of mobile apps and the rapid change of consumer behavior, it is crucial to conduct a timely study that investigates individuals' behaviors relating to apps. Mobile apps demonstrate significantly different characteristics from computer websites as follows: 1) Compared to time on a website (14%), people spend a considerably more time on a mobile app (84%; Kumar *et al.*, 2018). 2) Users install various apps on their mobile devices, which implies relationships with brands or channels (Kim *et al.*, 2020). 3) Apps are usually less content-rich and more personalized than websites (Taylor and Levin, 2014). Therefore, users can develop loyalty to a mobile app differently from website loyalty. Wu and Law (2019) attested that hotel guests' loyal behaviors significantly differ across using computer websites and mobile apps. Consumers who are willing to install an app on their mobile devices tend to be those who have some familiarity with the brand (Kim *et al.*, 2020). Given the importance of mobile app loyalty and its difference from a computer website, comprehending its formation in the hospitality discourse is critical.

The classic marketing and tourism literature have mostly drawn on a satisfaction-based framework to explain the formation of loyalty (Hsiao *et al.*, 2016; Ribeiro *et al.*, 2018). Scholars widely affirmed the positive link of satisfaction-loyalty and found strong evidence supporting this relationship in an e-commerce context (Ribeiro *et al.*, 2018; Wu *et al.*, 2018). However, others questioned whether satisfaction alone is enough to explain the formation of loyalty or loyal behaviors. For example, Jung and Yoon (2012) identified that, in many cases, consumers would stick to their familiar service providers even though they experienced satisfying services in other places. Kim *et al.* (2020) asserted that the association of satisfaction–loyalty significantly differs under channel familiarity and type. Extant studies (e.g., Martínez, 2015; Ribeiro *et al.*, 2018) mostly agreed that satisfaction is essentially emotional and generally regarded satisfaction as affective variable. In this

sense, the satisfaction-based framework provided an emotion-oriented logic to determining loyalty. Although such affective factors count, a holistic picture is needed by integrating the considerations of conscious and unconscious factors.

The existing e-commerce research has mostly considered separately the direct effects of satisfaction (affective), switching costs (conscious) and of usage habit (unconscious), on user loyalty (Amoroso and Lim, 2017; Ghazali *et al.*, 2016; Kim *et al.*, 2015). This study, in contrast, seeks to supplement the classic satisfaction-based model with both conscious and unconscious considerations into an integrative explanatory framework. In developing the integrative explanatory model, attention must be given to contextual factors which may potentially affect the associations between loyalty and its determinants. Considering potential hotel guests who use mobile apps for reservations need to have a particular brand of app installed first, brand may play a vital role in affecting the links between loyalty and its antecedents. Recent mobile marketing research proposed the concept of brand viscosity (Zerr *et al.*, 2017), which refers to a condition wherein a consumer sticks to a brand of a platform for online purchasing across different channels. To date, limited research has empirically investigated brand viscosity across different channels and no prior research has examined the moderating effect of brand viscosity on the relationships among satisfaction, switching cost, habit and loyalty in an integrative framework. Considering the potential influence of brand viscosity in the hospitality context, whether the formation of app loyalty varies across users with and without brand viscosity is worthy of further investigation.

As a further development based on the conventional satisfaction-based framework, we propose and empirically test an integrative explanatory framework. It elaborates how unconscious variables (habit) and conscious variables (switching cost) affect app loyalty in the hospitality industry and how brand viscosity moderates such effects. The relative importance of the influential factors for app loyalty are also compared. This research contributes to the knowledge of mobile app loyalty formation as follows: (1) It provides an integrative explanatory framework with considerations from affective, conscious, and unconscious perspectives. (2) It unveils the role of brand viscosity as a moderating factor on the interrelationships.

2. Literature review and hypothesis development

2.1 Mobile app loyalty in the hospitality industry: Why it matters?

Customer loyalty is a critical topic in hospitality, which has never been left out of date (Rather and Hollebeek, 2019; Wang, 2019; Milman *et al.*, 2020). Loyalty to a mobile app often represents the intention to reuse, the desire to recommend, a tolerance for a high cost, and the hesitation of switching to another app (Wu and Law, 2019). With the

development of mobile technology and the advent of smartphone, abundant hotel apps have emerged in the global market, including Online Travel Agencies (OTAs) and apps provided by hotel groups, resulting in increasing competition (Ozturk *et al.,* 2016). While OTAs have become the primary point of entry for hotel bookers searching for hotels via mobile devices, hotel groups also expect app investments to bring in enhanced customer experience and loyalty. For example, Hilton Group achieved 30% of hotel bookings via its mobile app channels with more than 100 million loyal members (Travel weekly, 2019).

It should be noted that customers are likely to browse through multiple apps when using mobile devices for hotel booking. Gu and Kannan (2021) asserted that the hospitality apps market is more competitive than other sectors as the searching cost is lowered by multiple app introductions. Such competitive environment further increases the necessity for hotel app operators to consider how to win more customers, and how to comprehend app loyalty and its influential factors. In the mobile app purchasing context, although there is limited statistic to support the costs difference between new and loyal users, eMarketer (2017) reported that the average cost for acquiring a user who makes a purchase via an app exceeds USD 64.96, and considering the competitive nature of the hotel apps market, this number can be much higher, thus making the achievement of hotel app loyalty even matters.

Previous studies tried to model the antecedents of mobile app loyalty in non-tourism contexts, relevant findings involve perceived value usefulness, ease of use, and enjoyment (Kumar *et al.,* 2018), self-efficacy and customer satisfaction (Thakur, 2018). In tourism and hospitality, scholars have made some efforts in comprehending app loyalty and satisfaction. For example, Ozturk *et al.* (2016) asserted that compatibility, convenience, and perceived ease of use could make mobile hotel bookers loyalty to a certain app, while Castañeda *et al.* (2019) identified determinants of tourism app loyalty, including perceived value, hedonism, social influence, habits, effort expectancy, and usefulness of information. Wu and Law (2019) indicated the mediating role of app satisfaction between usability and functionality and hotel app loyalty. Recent hospitality research by Kim *et al.* (2020) examined the relationships among value, attitude, app satisfaction, and reuse intention (app loyalty) in mobile hotel reservations. Considering the vital role of mobile apps as a booking channel in the hospitality industry, the potential difference in the formation of loyalty compared with websites and other channels, and the fierce competition in hotel apps market, we believe that further research efforts on the formation of mobile app loyalty is needed.

2.2 Satisfaction-loyalty gap

Consumer satisfaction and loyalty have been the core concerns for business practitioners. E-commerce studies commonly regarded website satisfaction as the principal precursor

of website loyalty (Pereira *et al.*, 2016; Wu and Law, 2019). For example, in the context of website hotel booking, Ali (2016) asserted that web-satisfaction has a significant positive impact on web-loyalty, which is also supported by Wu and Law's (2019) work. Despite this, some scholars questioned the efficacy of such effect (Guchait *et al.,* 2019; Rather and Hollebeek, 2019). Satisfied customers can be a good start of the loyalty campaign but not the end. Rather and Hollebeek (2019) found that the direct effect of customer satisfaction on loyalty is minor compared with other factors such as brand identification and brand trust. Guchait *et al.* (2019) indicated that loyalty could also be generated in unsatisfying service situations if compensation was accepted. Kumar *et al.* (2013) found that integrative models with moderators and other antecedents besides satisfaction could further explain the formation of customer loyalty. Emerging hospitality research on mobile app loyalty also highlighted the satisfaction–loyalty gap and affirmed the presence of moderators on the relationship between app satisfaction and loyalty (Wu and Law, 2019; Wu *et al.*, 2018). For example, Wu and Law (2019) identified the moderating effects of perceived value for time/money on the satisfaction-loyalty link in a hotel app context.

Previous literature conceptualized satisfaction as an emotional response as a result of assessing expectation with product/service performance (Hsiao *et al.*, 2016; Martínez, 2015). However, conscious and subconscious cognitive variables may also play key roles in supplementing the effect of satisfaction on loyalty (Kumar *et al.*, 2013). Ghazali *et al.* (2016) found that an increase in switching costs might help maintain the level of customer loyalty even under a moderate level of customer dissatisfaction. Amoroso and Lim (2017) suggested that habit exerts a stronger effect than satisfaction on determining loyalty in the e-commerce context considering mobile devices. In this sense, integrating conscious and subconscious variables with an affective variable can provide a rich and holistic portrayal of the satisfaction-based loyalty model. Please see our proposed research framework as illustrated in Figure 1.

(Insert Figure 1 about here)

As scholars extensively documented the positive and significant influencing effect of satisfaction on loyalty in previous tourism and hospitality literature (Ribeiro *et al.*, 2018; Wu *et al.*, 2018), including studies on mobile app loyalty (Wu and Law, 2019), the below hypothesis is proposed that:

H1: App satisfaction has a positive relation to app loyalty.

2.3 Status-quo bias (SQB) theory

The status-quo bias theory, originating from the decision-making literature, was proposed by Samuelson and Zeckhauser (1988) to explain why people disproportionately stick with an incumbent option rather than a new alternative. According to the SQB theory, individuals tend to be biased toward maintaining the status quo (Polites and Karahanna, 2012). The SQB has been widely applied as a theoretical foundation in previous research to investigate individuals' resistance towards adopting new products and services (Kim and Kankanhalli, 2009; Lin *et al.*, 2015; Nel and Boshoff, 2020). As indicated by the SQB literature, the status-quo effect can be the results of mechanisms such as rational decision-making, cognitive misperception, and psychological commitment (Samuelson and Zeckhauser, 1988; Kim and Kankanhalli, 2009).

Both rational decision-making and cognitive misperception of loss aversion explain the conscious considerations of relative costs of switching to a new alternative (Kim and Kankanhalli, 2009). Such switching costs can be broken down into transition costs and uncertainty costs (Polites and Karahanna, 2012). Transition costs involve the time, fees and efforts required in changing to a new product/service, while uncertainty costs refer to the psychological uncertainty or perception of risks associated with the new alternative (Kim and Kankanhalli, 2009). As switching cost is estimated by individuals' cognitive processing (Lin *et al.*, 2015) and it involves the conscious evaluation of costs and benefits regarding the change of using a product/service, this study regards switching costs as a conscious variable that represents the rational decision-making and cognitive misperception mechanisms informed by the SQB theory. Previous studies have manifested the conscious consideration by online consumers to maintain their status quo (Lin *et al.*, 2015; Nel and Boshoff, 2020). For instance, when considering an alternative online channel, consumers may evaluate the relative costs and potential gains of the change; if perceived switching costs outweigh potential gains, then consumers would continue using the incumbent channel rather than the alternative (Nel and Boshoff, 2020).

The SQB literature suggests that conscious consideration (e.g. switching cost) alone cannot adequately explain status quo effect (Kim and Kankanhalli, 2009), and psychological commitment to the incumbent product/service may also result in status quo bias (Lin *et al.*, 2015). Such psychological commitment has been generally regarded as subconscious factor (e.g. habit) in emerging SQB studies (Lin *et al.*, 2015; Nel and Boshoff, 2020). For example, Lin *et al.* (2015)) indicated that online users tend to stick with a system may be because they have always been using it in the past, while Nel and Boshoff (2020) asserted that mobile buyers' continued usage of the incumbent mobile website for purchasing without giving much thought can be explained by the presence of

subconscious habit . As such, in this study, usage habit of a mobile app is regarded as a subconscious variable on the basis of the SQB theory.

Subconscious mechanism: Usage habit of mobile apps

Habit refers to actions that have become a routine response to specific cues without conscious decisions to act (Verplanken, 2006). It has been considered as an inertia condition of saving cognitive effort in the decision-making process (Amoroso and Lim, 2017), and consumers' habitual behaviors have been widely investigated in previous studies including e-commerce context (Gefen, 2003; Hsiao *et al.*, 2016; Nel and Boshoff, 2020). The formation of habit is a developmental outcome of satisfactory experiences (Aarts *et al.*, 1998). A consumer's shopping habit reflects his/her history of interacting with service suppliers (Polites and Karahanna, 2012). A satisfactory purchasing experience generates favorable feelings toward purchasing actions, thereby increasing the tendency to become a shopping routine-habit (Amoroso and Lim, 2017; Hsiao *et al.*, 2016). In the case of mobile apps, forming a habit with smartphones is highly possible given that these devices have become an integral part of people's daily lives in the current mobile Internet world, and satisfied app using experience would lead to repetitive usage behavior, thus shaping habit (Amoroso and Lim, 2017).

Marketing literature generally acknowledged the importance of habit in predicting consumer loyalty toward online channels (Amoroso and Lim, 2017; Hsiao *et al.*, 2016). This is because habit enables online consumers to stick to the status quo, thereby saving the costs of reassessment of past decisions (Nel and Boshoff, 2020; Polites and Karahanna, 2012). As stated previously, subconscious factor such as usage habit is another important psychological mechanism resulting in status quo bias. Prior SQB literature has empirically examined how subconscious habit affects individuals' continued usage of an existing product/service (Lin *et al.*, 2015; Nel and Boshoff, 2020; Polites and Karahanna, 2012). Usage habit can play a critical role in inhibiting acceptance behavior of new products/services (Polites and Karahanna, 2012). Nel and Boshoff (2020) suggested that habit can reinforce the maintenance of the status quo in the online purchasing environment. In the mobile app context, it was found that the using habit of a mobile app has a positive effect on the continuance usage of the app (Hsiao *et al.*, 2016). Moreover, habit makes consumers blind to novelty and thus trump satisfaction in predicting continuance intention (Lafley and Martin, 2017).

In summary, the above reasoning gives rise to the following hypotheses:

H2: App satisfaction has a positive relation to habit.

H3: Habit has a positive relation to app loyalty.

Conscious mechanism: Switching cost of using mobile apps

Switching cost refers to the cost incurred when a customer switches from one supplier to another (Kim and Kankanhalli, 2009). The switching cost for one app over another can take various forms, e.g. the time and efforts spending on learning the new app and the rewards program that has to be given up on switching to another app. In effect, switching cost can increase the possibility of using a service/product continually (Wang *et al.*, 2011), and will lead to the maintenance of the status quo if perceived costs of a change exceed the benefits (Polites and Karahanna, 2012). Although considerable research contended a positive influence of habit on switching cost, the present study argues that a high perceived switching cost may also lead to habitual actions, because habit formation is inseparable from past usage experiences (Carlsson and Löfgren, 2006). As Pollak (1970) asserted that past usage experience affects current psychological preferences and demand, thus habit is formed. If switching cost emerges during prior usage experience, it would likely to reinforce the usage habit. For example, in the context of airline industry, frequent flyer programs could increase switching costs for customers, thus leading to habit formation (Carlsson and Löfgren, 2006). As for the current study context, the perceived switching costs generated during past booking experience would enhance the usage habit of the incumbent app.

Given that switching cost makes changing suppliers costly for consumers, it can be an efficient influential factor to loyalty (Wang *et al.*, 2011). Scholars asserted that high switching costs could mitigate consumers' sensitivity to price and performance (Nel and Boshoff, 2020). Conversely, consumers with low perceived switching costs are susceptible to price differences and likely to defect to competitors. Thus, increasing switching costs to retain customers has become a crucial strategy for industry practitioners (Ghazali *et al.*, 2016). Recent e-commerce research contended that online switching cost has a direct and positive effect on customer loyalty towards an online service (Chuah *et al.*, 2017; Nel and Boshoff, 2020). Nel and Boshoff (2020) argued that future studies should consider the role of switching costs when investigating consumer loyalty on mobile platforms. A high level of perceived switching costs discourages mobile users from switching to alternatives and keep using the current channel.

According to SQB theory, if customers estimate the potential losses from switching to be larger than the potential gains, they tend to be in favor of the incumbent product/service (Polites and Karahanna, 2012). In the context of current research, the status quo bias can be illustrated with the following example. Consider a hotel booker already owns one app and some personal reservation information (e.g. name and mobile number) has been kept in that app. Owning to loss aversion and the conscious consideration of transition and uncertainty, costs of switching to a new app are likely

weighted more heavily than potential gains. As such, the relative attractiveness of the incumbent app will increase, leading to a lower possibility of switching and a higher loyalty. Based on the above theoretical discussions, we propose the following hypotheses:

H4: Switching cost has a positive relation to habit.
H5: Switching cost has a positive relation to app loyalty.

2.4 Brand viscosity and its moderating effect

"Viscosity" is a widely used term in the literature focusing on individuals' online behaviors (Li *et al.*, 2018; Wang *et al.*, 2019). Under the context of user behavior relating to computer websites, scholars proposed and employed *user viscosity* to describe the ability of an online platform in gluing its users (Li *et al.*, 2018). In recent years, several studies on information technology and digital marketing have acknowledged the importance of user viscosity (Li *et al.*, 2018; Wang *et al.*, 2019; Zerr *et al.*, 2017). In the digital brand management context, Zerr *et al.* (2017) adjusted the term "viscosity" into "brand viscosity," suggesting the capability of a brand to adapt itself across different contexts. Different from user viscosity, brand viscosity highlights the central task of context-sensitive brand management in the digital world (Zerr *et al.*, 2017). That is, consumers would stick to a brand across different channels for online purchasing if they achieve brand viscosity. By contrast, consumers would switch from different brands when using different online channels under the non-brand-viscosity condition.

In the present study, we employ the term *brand viscosity* rather than *user viscosity* to represent the condition that hotel guests would stick to one specific brand for online reservations either from computer websites or mobile apps. In this sense, brand viscosity in this study differs from app loyalty in two major aspects: First, brand viscosity represents potential hotel guests' loyalty to a brand for online hotel booking (e.g., Expedia) either from one channel or from another channel. Then, app loyalty refers to the willingness to reuse an app for hotel reservations. Second, brand viscosity describes the behavioral fact that the is most often used computer website and mobile app by a potential hotel guest are the same brands (e.g., Expedia). Then, app loyalty, following the attitudinal approach described in prior literature (Ribeiro *et al.*, 2018), refers to mobile users' psychological commitments, such as the willingness to reuse (Wu and Law, 2019). Brand viscosity can be generated through various manners, including OTA loyalty programs.

In the literature on mobile apps, interests in viscosity toward an app are emerging, acknowledging the interrelationships between switching cost, user habit, viscosity, and app loyalty (Li *et al.*, 2018; Xu, 2019). A high level of viscosity implies stronger

associations between usage habit/ switching costs and loyalty (Xu, 2019). However, limited research has empirically concerned the effect of viscosity on the relationships among switching cost, habit, app satisfaction, and app loyalty, and less attention is placed on brand viscosity across different online channels. As previously stated, the role of brand viscosity (whether online consumer sticks to the same brand across websites and mobile apps) remains underexplored. Thus, the knowledge on the potential moderating effect of brand viscosity, whether the direct and indirect associations between the variables of interest differ significantly with and without brand viscosity, is still little.

Existing studies revealed that for consumers with viscosity, their perceived switching costs tend to have larger influence on continued usage behavior and unlikely to switch to other competitors (Li *et al.*, 2018; Yang *et al.*, 2017). Likewise, the viscosity of a brand across different channels (e.g., Expedia website and app) implies habitual behaviors of choosing the brand for online booking and a high tendency of reusing the mobile app. While under the circumstances where users failed to form brand viscosity, app satisfaction as a driving force for app loyalty might be more salient than habit and switching cost because satisfaction always serves as the firsthand affective evaluation derived from a consumptive experience (Ribeiro *et al.*, 2018). In this sense, we can attenuate the predicting effect of app satisfaction on app loyalty in the context where brand viscosity exists, with habit and switching costs exerting significant influence. Following the above discussions, we propose the following hypothesis:

H6: Brand viscosity moderates the relationships among (a) app satisfaction, (b) habit, (c) switching costs, and (d) app loyalty.

3. Methodology

3.1. Sample and procedure

With the largest smartphone user population and a large proportion of mobile booking penetration than other countries, China has become the leading mobile travel market in the world (Phocuswright, 2017). The online travel booking payments in China have amounted to USD 252 billion in 2019 (Statista, 2020), in which over 65% bookings were via mobile devices (Travel Daily, 2017). Travel Daily (2017) reported that Chinese travelers showed apparent preferences to use mobile apps for booking rather than mobile websites, with over 81% of the mobile travel bookings were via mobile apps. Thus, China is an ideal context to study mobile users' behavior on hotel booking.

In this study, an online survey via Sojump (www.sojump.com) was conducted. Sojump is the largest company in China that specializes in online data collection. Similar to other online survey platforms (e.g., Qualtrics), Sojump has a sample pool that

comprises more than 2.6 million participants with diverse demographic backgrounds (Zhang and Zhao, 2019). Before conducting the final survey, a group of potential hotel guests, industry practitioners, and academic experts were invited to assess the content validity of the research instrument. Then, the wording and question sequence were modified accordingly. Two screening questions were formulated to filter qualified participants (i.e. who have hotel booking experience via mobile apps and websites in the past year): 1) "Have you ever booked a hotel room via websites in the past 12 months?" 2) "Have you ever booked a hotel room via mobile applications in the past 12 months?" With these two screening questions, the respondents retained for analysis were those who both used website and mobile app for hotel booking in the past year. We collected and retained a total of 268 usable questionnaires for further data analysis. To determine whether using the same brand from a website to a mobile app (brand viscosity) influences mobile bookers, the respondents were also asked to indicate whether the mobile app and the website they used most often are the same brands (1 = yes, 2 = no).

3.2. Measures

The survey instrument consisted of the following six sections: satisfaction with a mobile app (app satisfaction), loyalty to a mobile app (app loyalty), habit, switching cost, brand viscosity, and respondents' demographics. The original questionnaire was in English. Thus, the English version was translated into Mandarin Chinese by using the back-translation method. Five bilingual scholars ensured the conceptual equivalence in the Chinese context.

Satisfaction with mobile app by using three items was adapted from Kim *et al.* (2015) which was conducted in mobile tourism purchasing context. For example: "Overall, I am satisfied with this app." Then, loyalty to a mobile app was assessed with a four-item scale from Lin and Wang (2006). Scholars widely employed and validated the e-loyalty scale proposed by Lin and Wang (2006) in the e-commerce context, including studies on mobile app loyalty (Wu *et al.*, 2018; Wu and Law, 2019). An example item is: "My preference for this app would not willingly change." For habit, three items from Gefen's (2003) research on online purchasing were adopted. To fit our research context, the wording of the measurements was modified accordingly. For example: "When I need to book a hotel room through mobile devices, this app is the first one I will try." A three-item measurement scale from Deng *et al.* (2010) and Gefen (2002) were adapted to assess switching costs, which was widely used in e-commerce field, including mobile purchasing context. The wording was also amended by academics in hospitality management area. An example measurement item is: "Switching to another app would cause too many problems."

All items for the above four constructs were examined by using a seven-point Likert-

type scale (1 = strongly disagree, 7 = strongly agree). Table 1 shows the details of the measurement items. Brand viscosity was measured by using a binary categorical variable. We coded this variable as 1 for those who indicated that their most often used mobile app and website for hotel booking were the same brands (brand viscosity). For those who said that their most often used app and website are not the same brands (non-viscosity), we coded it as 2.

3.3 Data analysis

The collected data were analyzed using SPSS 26.0 software package and AMOS 26.0. Descriptive analysis was carried out first to assess the sample distribution. The multiple-group SEM was performed in several steps: 1) the measurement models were estimated and compared to test invariance; 2) the SEM model was then estimated in both groups to assess its fitness; 3) a constrained SEM model was estimated, and compared with a series of unconstrained models to assess the equality of parameters.

4. Results

4.1. Descriptive analysis

Among the 268 mobile app users, 51.1% were male, and 48.9% were female. In terms of age, more than half were between 26 and 35 (59.7%), and the rest were from 16 to 25 (26.9%) and 36 to 45 (11.2%). More than half of the respondents held a Bachelor's degree or higher. Moreover, 51.5% had a monthly income between RMB 5,001 (USD 770) and RMB 15,000 (USD 2,311). At the time of the data collection (January 2018), the exchange rate was approximately RMB 6.49 = USD 1. The statistical distribution of the scale measurements is shown in Table 1. It has been observed that the skewness value lies between -1.261 and -0.065 and kurtosis values falls into the range of -1.037 and 0.885, thus suggesting acceptable normality (West *et al.*, 1995).

The means, standard deviations, and correlations among the four variables are illustrated in Table 2. The results revealed that the correlations between every two factors were significant at the 0.05 confidence level. Table 1 shows the findings of the confirmatory factor analysis (CFA) of the four factors, the tests of reliability and validity. The Cronbach's alpha values for the latent variables of habit, switching cost, satisfaction to a mobile app, and loyalty to a mobile app were 0.964, 0.872, 0.943, and 0.907, respectively. Each alpha value exceeded the benchmark of 0.70 (Nunnally and Bernstein, 1994), demonstrating a high level of internal consistency. All the factor loadings were greater than 0.50, and all the average variance extracted (AVE) values exceeded the recommended value of 0.50, indicating good convergent validity (Table 1). The square roots of the AVE values were greater than the corresponding correlation coefficients (Table 2), suggesting an adequate discriminant validity (Fornell and Larcker, 1981).

This study employed a series of techniques to minimize common method variance (CMV). First, the use of web-based survey platform and respondent anonymity reduced the likelihood of socially desirable responses. Second, attention check questions were randomly inserted into the online questionnaire, such that those questionnaires filled casually could be identified and discarded. Finally, the potential CMV during the data analysis was examined by Harman's single-factor test (Podsakoff and Organ, 1986). A multi-factor structure with first factor accounting for less than 50% of the total variance was shown following the exploratory factor analysis (EFA). Meanwhile, the CFA results suggested good discriminant validity. Hence, CMV cannot be considered as a serious threat to the present research.

(Insert Tables 1 and 2 about here)

4.2. Measurement model and invariance test

According to Hu and Bentler (1999), the value of comparative fit index (CFI) should exceed 0.90 to suggest a good model fit. Moreover, the root mean square error of approximation (RMSEA) should be less than 0.80 to indicate a reasonable model fit (Byrne, 2010). Following the above rules and the results of CFA, the measurement model suggested a good fit to the data (Chi-square $= 130.766$ [$p < 0.01$], $df = 57$, $\chi^2/df = 2.294$; GFI $= 0.935$, CFI $= 0.980$, NFI $= 0.965$, TLI $= 0.972$, RMSEA $= 0.07$).

Following Byrne (2010), prior to the multi-group SEM analysis, we performed a multi-group CFA to examine measurement invariance. The unconstrained model was estimated first, generating an excellent model fit: $\chi^2/df = 1.845$, Chi-square $= 210.341$ ($p < 0.01$), $df = 114$; GFI $= 0.897$, CFI $= 0.974$, NFI $= 0.945$, TLI $= 0.964$, RMSEA $= 0.056$. Then, the CFA model was constrained by equaling measurement weights. The constrained CFA model also showed a good fit to the data: Chi-square $= 234.010$ ($p < 0.01$), $df = 123$, $\chi^2/df = 1.903$; GFI $= 0.886$, CFI $= 0.970$, NFI $= 0.939$, TLI $= 0.962$, RMSEA $= 0.058$. The results of the model comparison indicated a significant difference between the constrained and unconstrained CFA models (Δ Chi-square $= 23.670$, Δ $df = 9$, $p < 0.05$), suggesting that the results failed to achieve a full measurement invariance. Thus, a step-by-step approach was employed to determine where the source of non-equivalence lies (Byrne, 2010; Sihombing, 2015). According to Byrne (2010), the first step is to assess for the invariance of measurement weights relative to each subscale separately. The results yielded a non-significant change between the unconstrained model and the model only constrained measurement weights for switching costs (Δ Chi-square $= 5.342$, $df = 2$, Δ CFI $= 0.001$, $p > 0.05$), and the model only constrained for satisfaction (Δ Chi-square $= 0.661$, $df = 2$, Δ CFI $= 0.000$, $p > 0.05$), suggesting a partial measurement invariance (Byrne, 2010). The subsequent analysis is to test the interesting model parameters one at a time.

The findings showed that at least one item on each factor is invariant, implying that the results achieved a partial measurement invariance, and a multi-group analysis can continue (Byrne, 2010; Steinmetz *et al.*, 2009).

4.3. Structural model and multi-group SEM

With an acceptable fit in the measurement model, structural equation model (SEM) with combined datasets was conducted using Amos 26.0. The structural model yielded a reasonable model fit to the data as the measurement model: Chi-square = 130.766 ($p <$ 0.01), df = 57, $\chi2/df$ = 2.294; GFI = 0.935, CFI = 0.980, NFI = 0.965, TLI = 0.972, RMSEA = 0.07. In line with our proposed hypothesis, the results of SEM suggested that app satisfaction (*βeta* = 0.50), habit (*βeta* = 0.26), and switching costs (*βeta* = 0.19) positively influenced app loyalty. All three variables were significant antecedents of app loyalty. Moreover, as expected, app satisfaction (*βeta* = 0.49) and switching cost (*βeta* = 0.45) significantly affected habit. The results of SEM with combined datasets provided support for H1 to H5 (Figure 2).

(Insert Figure 2 about here)

Subsequently, a multi-group SEM with the Chi-square difference ($\Delta\chi2$) test was carried out to assess the moderating effect of brand viscosity on the hypothesized model. The first step is to compute the unconstrained model for brand viscosity and non-viscosity groups ($\chi2/df$ = 1.85, $p <$ 0.001). The next step is to constrain the factor loadings, path coefficients, and covariances to be equal across both groups and to examine the constrained model, with $\chi2/df$ = 1.87($p <$ 0.001). It can be observed that the $\chi2$ difference between the unconstrained and constrained models was significant ($\Delta\chi2$ = 29.19, Δdf = 14, $p <$ 0.05), suggesting the brand viscosity and non-viscosity groups were significantly different at the model level (Byrne, 2010). On the basis of sufficient evidence of a moderating effect of brand viscosity, we conducted a series of multi-group SEMs to identify which path coefficient is significantly different across the two groups. To do so, Byrne's (2010) manual pinpoint technique was used, with the unconstrained model compared with models constraining one path of interest at a time. Table 3 summarizes the results of the moderating effects of brand viscosity and multi-group SEM analysis with Chi-square differences.

(Insert Table 3 about here)

All the path coefficients appeared significantly different across the brand-viscosity and non-brand-viscosity groups (Table 3). This finding supported H6, indicating that brand viscosity moderated the links among app satisfaction, switching costs, habit, and app loyalty. The results showed that the positive predicting effects of habit (*βeta* = 0.30)

and switching costs ($\beta eta = 0.22$) on app loyalty were only significant for those users with brand viscosity (i.e., those who use the same brands for hotel booking via a mobile app or a website). Notably, for those who do not use the same brands for online hotel booking, habit ($\beta eta = 0.14$, $p > 0.05$) and switching costs ($\beta eta = 0.12$, $p > 0.05$) did not show a significant effect on app loyalty. This result can be attributed to that non-brand-viscosity hotel bookers are more likely to browse around different apps as there is no viscosity towards any particular brand of app. When consumers shop around, their share of wallet with any app will be reduced by other competitive apps (Gu and Kannan, 2021), and the influence of switching costs and habit becomes very limited. Although the predicting effect of app satisfaction on app loyalty was consistently significant across the two groups, such effect appeared much stronger for the non-brand-viscosity group than the brand-viscosity group (Figure 3). The above discrepancies suggested that satisfaction toward a mobile app plays a crucial role in inducing users' loyalty toward an app for those with no brand viscosity. For those with brand viscosity, we could not overlook the influential effects of habit and switching cost on app loyalty.

(Insert Figure 3 about here)

Interestingly, the association of switching cost → habit ($\beta eta = 0.51$) was stronger in the brand viscosity group than the non-brand-viscosity group, whereas the link of app satisfaction → habit ($\beta eta = 0.43$) appeared significantly weaker for those users with brand viscosity. As previously stated in the literature review, conscious factor (switching costs) that was generated during past experience can reinforce the formation of subconscious factor (usage habit). This study found that the conscious factor (switching costs) not only directly affects loyalty, but also indirectly determines loyalty through subconscious mechanism (usage habit). These results further implied that for those who do not necessarily stick to one brand for hotel booking, the satisfaction level is of great importance either for inducing app loyalty or for shaping the using habit of a mobile app. For those who would choose the same brands for hotel booking from computer websites to mobile apps, the role of switching costs is particularly important for habit formation.

5. Discussion and conclusion

5.1. Conclusion

This study revisits the formation of app loyalty in the hospitality context by integrating both conscious (perceived switching costs), and subconscious (usage habit) lenses. An integrative model was developed based on SQB theory, which incorporated three antecedents to loyalty, i.e. app satisfaction, habit, and switching costs, as well as the moderating role of brand viscosity.

The empirical data confirmed the antecedents of app loyalty: app satisfaction, habit, and switching costs. The results affirmed a positive predicting effect of app satisfaction on app loyalty, which is in line with previous studies (Wu *et al.*, 2018). The direct influences of switching costs and habit on app loyalty offered further support for SQB theory (Samuelson and Zeckhauser, 1988; Polites and Karahanna, 2012). Perceived switching costs and usage habits of a mobile app prompt potential hotel guests to maintain the status quo and enhance loyalty (Lafley and Martin, 2017). This study also identified two determinants of usage habit toward mobile apps: app satisfaction and perceived switching costs. In line with our proposed hypothesis, app satisfaction positively induces usage habits, which is consistent with prior research on online purchasing (Amoroso and Lim, 2017; Hsiao *et al.*, 2016).

The effect of switching costs on usage habits suggests a nuanced relationship between conscious and subconscious factors in determining app loyalty. Although considerable prior research has examined the effect of habit on switching costs (Hong *et al.*, 2008), the current research proposed and empirically validated the significantly positive impact of conscious factor (switching costs) on subconscious factor (habit). This finding is consistent with what Carlsson and Löfgren (2006) asserted that switching costs could lead to the formation of usage habit, thereby determining loyalty. This study found subconscious (habit) and conscious factors (switching costs) are two determinants together with affective factor (satisfaction) in affecting app loyalty. When switching costs (conscious factor) directly influence app loyalty, it also indirectly determines loyalty through the effect of habit (subconscious). As Chuah *et al.* (2017) contended, perceived costs to switch from the current service provider to another can facilitate the continuance to use the existing service providers as a routine.

The results of this study show that the moderating effects of brand viscosity are empirically evident, which affect the strength/significance of the relations among switching costs, habit, app satisfaction, and app loyalty. Moreover, the predicting effects of switching costs and habit on app loyalty are only significant in the group of mobile users with brand viscosity. This finding suggests that for mobile users who stick to the same brands (e.g., Expedia) across computer and mobile channels, switching costs and usage habits are of utmost importance. SQB theory can theoretically support this claim (Samuelson and Zeckhauser, 1988; Polites and Karahanna, 2012). However, the insignificant effects of switching costs and habit on app loyalty for those with no brand viscosity question the validity of using status quo premise across different online contexts. The finding of this study further confirms the necessity to mind context-sensitivity in the digital marketing world (Zerr *et al.*, 2017), aligning with viewpoints of value-in-context on the basis of service-dominant logic (Wu *et al.*, 2018). Furthermore, a plausible explanation for the insignificant effects, as indicated by Gu and Kannan (2021), might be

related to the more competitive environment of hotel apps market. With the lowered search costs by multiple app introductions, customers with no brand-viscosity are likely more benefits-oriented who may shop around different apps and websites, thus the influences of switching costs and habit on app loyalty can be largely attenuated.

In this study, brand viscosity reinforces the transmission process of app satisfaction leading to loyalty and the association between app satisfaction and usage habit for those who do not stick to the same brands across computer and mobile channels. This finding suggests that when potential hotel guests do not have any preference toward a particular brand across computer websites and mobile apps, the affective influence from satisfying experience is dominant in determining loyalty (Ribeiro *et al.*, 2018). For those who stick to the same brands for online hotel booking, conscious and subconscious factors (e.g., switching costs and habit) supplement the influential effect of satisfaction. These factors may well explain the situation wherein some dissatisfied mobile users may still stick to their existing options rather than switch to alternatives (Wu and Law, 2019).

5.2. Theoretical implications

This research advances the existing body of literature through several fronts. First, although previous e-commerce studies documented the influence of satisfaction, habit, or switching costs on loyalty, these effects were often examined independently (Amoroso and Lim, 2017; Ghazali *et al.*, 2016; Hua *et al.*, 2019: Kim *et al.*, 2015) and there's a lack of holistic portrait of the formation of app loyalty in the hospitality context. This study thus contributes to existing hospitality literature by developing a theoretical framework integrating affective, conscious, and subconscious lenses. Supplementing the classic satisfaction-based model with the considerations of conscious (switching costs) and subconscious (habit) factors can advance the understanding of how these factors relate to one another in determining hotel app loyalty.

Second, while the importance of user viscosity towards one particular online channel has been widely acknowledged in prior e-commerce studies (Wang *et al.*, 2019; Zerr et al., 201), no work has empirically considered the effect of brand viscosity across different channels. Considering the nature of hospitality context, hotel bookers likely make hotel reservations across computer website and mobile app channels (Hua *et al.*, 2019; Wu and Law, 2019), it is crucial to understand the role of brand viscosity. As such, another contribution of this study lies in unveiling the moderating role of brand viscosity on the relationships between app loyalty and its determinants, for which little other research exists. This research is the first attempt to examine whether the relationships of app loyalty and its antecedents differ across brand-viscosity and non-brand-viscosity groups, which offers important theoretical insights for future hospitality research.

Third, albeit substantial research on SQB theory affirms the significant positive impacts of conscious (switching costs) and subconscious factors (habit) in determining loyalty (Lin *et al.*, 2015; Nel and Boshoff, 2020; Polites and Karahanna, 2012), the findings of this study question the efficiency of the use of SQB theory across different online contexts, as the status quo effect is only salient for users who have a particular preference for a brand across different online channels. For those without brand viscosity (use different brands when booking across websites and mobile apps), switching cost and habit have little influence on app loyalty. Such findings provide continued support for Zerr *et al.*'s (2017) argument that it is important to mind context-sensitivity in the e-commerce area. These initiatives expand the existing work of SQB theory in the hospitality literature, by revealing a more nuanced understanding of its application in online hotel booking context.

Finally, although prior literature conducted substantial efforts to investigate website loyalty for online purchasing (Pereira *et al.*, 2016; Roger-Monzó *et al.*, 2015), relatively fewer have explored mobile app loyalty. As asserted by recent research, shaping potential hotel guests' loyal behaviors differs between the computer website context and mobile app context (Kim *et al.*, 2020; Milman *et al.*, 2020: Wu and Law, 2019). Thus, the present study provides significant empirical pieces of evidence to comprehend app loyalty for hotel reservations.

5.3. Practical implications

The findings of the present research also suggest managerial implications for industry practitioners. We found that mobile users' app satisfaction significantly determines their app loyalty, especially for new users who have not yet established a long-term relationship with an app. Hospitality practitioners are thus encouraged to provide an enjoyable and satisfying experience with the app, thereby cultivating future customer loyalty relationships (Wu and Law, 2019; Kim *et al.*, 2020). Meanwhile, brand viscosity across different online booking channels (e.g., computer websites and mobile apps) matters for cultivating loyalty. As potential hotel guests who have a particular preference for a brand (e.g., Expedia) are more susceptible to switching costs and usage habits than those who do not have brand viscosity across channels, practitioners should elaborate on brand management among various booking channels and develop digital marketing strategies about the formation of usage habits, the increase of switching costs, and enhancement of brand viscosity.

Two suggestions can be helpful for hotel managers to cultivate APP user habits. First, the auto-remembering of hotel bookers' preferences can facilitate the process of cultivating usage habit (Amoroso and Lim, 2017). Second, entertaining and socializing elements (Huang *et al.*, 2020) can be considered to increase hotel bookers' mental

association (unconscious habit) with an app. App notification with recent promotion information could recall users' previous using experience; hence a mobile app can send customers notifications (messages on mobile devices) as memory milestones for an enhancement of association (Kim, 2014). Moreover, the findings of this study affirm that hotel bookers' usage habits of a mobile app can positively facilitate their loyalty towards that app. App service providers need to think about how to influence potential hotel guests' habitual actions because they can further utilize these habit formation strategies to further enhance loyalty. For instance, app service providers can enhance their automatic reaction to influence hotel bookers' habitual actions. According to users' last use, more automatic settings, reminders and preferences can be built in. A habit could be a core area and a long-lasting factor that deserves service providers' attention in shaping app loyalty.

This study suggests that the conscious factor (switching costs) not only affects app loyalty but also has a positive impact on the formation of usage habit. To increase hotel bookers' perceived switching costs, industry practitioners need to encourage them to create personal accounts across online channels with preference settings and other vital information (Ghazali *et al.*, 2016). Although the enhancement of membership and loyalty program alike practices are not new to practitioners, a set of periodical incentives such as purchasing coupons and free upgrading could increase the switching cost of hotel bookers. To reinforce the brand viscosity, app developers need to facilitate a smooth transfer from one type of device to another. The compatibility among different versions (app versus website, mobile devices versus desktop) needs to be ensured for users. Moreover, either for OTAs or hotel groups, strategies of awarding frequent bookers across their brand of channels (from websites to apps) can be considered for nurturing brand viscosity. As this study contends that for those bookers without brand viscosity (i.e. do not stick to the same brand for booking), the positive impacts of habit and switching costs are very limited.

5.4. Limitations and directions for future research

There are a few limitations of this study that deserve further research efforts. First, we assess and validate the proposed integrative model via the study context of China. Potential Chinese hotel guests' mobile habits and switching behavior might differ from those from other countries with different cultures and mobile app market characteristics. Further studies may replicate the proposed model and conduct a comparative study between Western and Oriental contexts, and between a mature app market and a developing app market. Second, in this research, we examine brand viscosity as a moderator and identify the differences in construct relationships between brand viscosity and non-brand-viscosity groups. Future research may delve into the understanding of brand viscosity in the online hotel booking context, such as exploring potential determinants of brand viscosity of online channels. Third, although the sample size is

adequate for this study, using larger sample size in replication studies would be useful. Future studies can expand the sample size for both groups (brand viscosity and non-brand-viscosity), which could potentially provide more robust outcomes.

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