Assessing the Visibility of Hotels on Smartphones: A Case Study of Hotels in Hong Kong

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Abstract Although smartphones are gradually becoming the primary Internet access device for travellers to research and purchase hotel accommodations, the readiness of the hotel industry to the mobile consumerism era has not been fully examined. Using hotels in Hong Kong as a case study, this exploratory study assesses the visibility of hotels on smartphones by: (1) examining the visibility of all Hong Kong hotel websites on smartphones using different operating systems; and (2) examining the availability of smartphone apps developed by all Hong Kong hotels in different smartphone application stores. The empirical findings suggest that more than half of Hong Kong hotels have optimised their websites for iOS- and Android-operated smartphones. Nevertheless, only a handful of hotels developed smartphone apps for connecting with customers. The Chi Square test results demonstrate that star rating and brand affiliation are associated with the visibility of hotels on smartphones. Managerial implications are discussed.

Keywords Smartphone · Visibility · Mobile websites · Smartphone apps · Hotels

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1 Introduction

With power-efficient processors, user-friendly interfaces, high-speed Internet access, high-resolution touchscreen displays as well as productivity-enhancing applications, smartphones have been evolving into powerful gadgets supporting a wide range of information services for customers (Wang et al. 2012; Want 2009). As the functionality and services available on smartphones have been substantially expanded, smartphones are gradually becoming the primary Internet access device in both developed and developing countries (eMarketer 2012a, b). Some studies have even posited that smartphones are irreversibly changing consumers' daily lives and their way of accessing the Internet.

Despite their short history in tourism and hospitality, smartphones have been increasingly used to research and purchase hotel accommodation and other tourism-related products because they match travellers' needs for mobility and ubiquitous information support. Based on an analysis of more than 300 million visits to 31 hotel websites worldwide in late 2012, Adobe Systems Incorporated found that nearly one-sixth of traffic to those websites came from smartphones and tablets (eMarketer 2012c). Another market report conducted by eMarketer (2012d) also estimated the figure of consumers booking travel on smartphones and tablets would increase to 36.7 million in 2016, up from approximately 16 million in 2012.

Since the emergence and prevalence of smartphones reflect a shift toward a mobile-centric behavioural pattern, a substantial body of studies have been conducted to understand the extent of travel-related capabilities offered by smartphones (Lashkari et al. 2010), their impact on travellers' touristic experience (Wang et al. 2012), and the level of adoption by tourism suppliers (Liu and Law 2013). Though the issues pertinent to the application of smartphones in tourism and hospitality have been widely examined, no empirical studies have yet been found in the hotel context compared to a plethora of prior studies on the travel domain (Dickinson et al. 2012; Liu and Law 2013; Wang and Xiang 2012). While more hotel queries occur through smartphones and tech-savvy customers expect hotels to keep up with the technological advancement, the understanding pertinent to visibility of hotels on smartphones remains unknown.

Another limitation among prior studies is found in their focus on smartphone applications (apps) only (Dickinson et al. 2012; Liu and Law 2013; Wang et al. 2012; Wang and Xiang 2012). Scholarly attention towards the visibility of websites on smartphones or mobile website is, however, scant. According to the Adobe 2012 Mobile Consumer Survey (Adobe Systems Incorporated 2012), online consumers use their smartphones to connect with brands and make a purchase via both company websites and/or smartphone apps. Lobo (2011) claimed that users might find it difficult to access desktop websites in smartphones, and thereby result in dissatisfaction. As the visibility of a website on smartphones is a crucial determinant affecting consumers' online experience as well as their subsequent behaviour, it would be useful to examine if hoteliers optimise their mobile website in order to avoid irritating consumers with incompatible functions.

In the era of mobile consumerism, travellers have been, and will continue to be, more dependent on smartphones for researching and purchasing hotel accommodations. Nevertheless, the readiness of the hotel industry to the mobile consumerism era has not been fully examined. Using hotels in Hong Kong as a case study, this exploratory study aims to provide an answer to the research question of "How visible are hotels in the smartphone era?" through: (1) examining the visibility of all Hong Kong hotel websites on smartphones using different operating systems; and (2) examining the availability of smartphone apps developed by all Hong Kong hotels in different smartphone application stores. To date, knowledge on the application of smartphones in the hotel industry is rather limited. As the functionality of smartphones and their associated applications appear to become a new wave of innovation supporting the continuous development of tourism and hospitality, this study would contribute to the literature by exhibiting the readiness of hotels in encountering this innovation wave.

2 Literature Review

In view of their ubiquity and advanced computational capabilities for information exchange and repositories, smartphones are now an inseparable partner from travellers (Dickinson et al. 2012). Indeed, the tourism and hospitality industry is particularly suitable for the adoption of smartphones because tourism is an information intensive industry in which people search for a large amount of information, particularly in unfamiliar environments (Kurata 2012). Since travellers generally collect and review various forms of information before and during the trip in order to minimise the risk of making wrong decisions, smartphones with increased capacity in communication and connectivity provide a wide range of support for routine (e.g., planning and reservation) and detailed travel activities (e.g., locating tourist spots and estimating waiting time of rides).

Though the application of smartphones in tourism and hospitality is still in its infancy stage, the emerging literature on travel and tourism coins the huge potential of smartphones for travellers' touristic experience transformation. Drawing on the 202 customer reviews on the 100 most popular travel-related smartphone apps, Wang et al. (2012) found that travellers with the help of smartphones could get a good value out of their trips and became more efficient in travel planning. In another study on the travel-related smartphone apps, Wang and Xiang (2012) concluded that smartphones have comprehensively extended the Internet-enabled service including information search, reservation and eCommerce, multimedia content consumption and creation, as well as social communications to the mobile platforms. In a recent survey with American smartphone and tablet owners, eMarketer (2013) reported that approximately 98 % of these owners took their devices with them on vacation. Moreover, nearly 80 % of the respondents used them all the time. This demonstrated the use of smartphones and tablets during travel cannot only

enable them to construct a better sense of travel destination, but also reconnect them with their daily lives.

Besides discussing the impact of smartphones on travellers' touristic experience, a number of academic and industry research studies noted the potential of smartphones in business applications and advocated the importance of incorporating smartphones into the tourism and hospitality industry (Rasinger et al. 2007). Dickinson et al. (2012) reviewed 164 top visitor attraction apps and demonstrated a range of technical functionalities varying from basic systems delivering web contents to mobile devices to more sophisticated context awareness tools. In an examination on the adoption of smartphone apps by airlines, Liu and Law (2013) posited that smartphone apps could be used as a strategic tool to help generate revenues, increase the efficiency of communication with customers, and enhance customer loyalty. Morell (2013) also empirically demonstrated how smartphone apps could improve the quality of customer service in theme or amusement parks through showing the exact location of rides, checking on wait times at different attractions, reserving a place in line at a ride and other ways.

In the hotel context, the application of smartphones has received much attention in the practitioner literatures (Schaal 2012; Stehle 2013). Nevertheless, there is a woeful lack of research on this issue in academic journals. Despite the existence of smartphone-related studies on the tourism domain, academic researchers largely concentrated on smartphone apps. Mobile websites, another platform for content, applications, and service on mobile devices (Lobo et al. 2011; W3C 2013), have remained under-investigated in scholarly research. As noted by Wisniewski (2011), smartphone apps are recognised as more responsive and convenient than websites from user experience perspective. However, the platform-specific nature and time-consuming cyclical update of smartphone apps make some users prefer visiting company websites via the pre-installed browsers in the smartphones (e.g., Safari on iPhone) (Wisniewski 2011).

Technically, mobile website browsing with a smartphone is similar to desktop website browsing with a desktop or a laptop computer. Yet, some researchers posed the concern regarding accessing desktop websites with smartphones. As noted by Lobo et al. (2011), desktop websites are originally designed for a large monitor. Due to the relatively small screen size, smartphones are limited in some features and unable to display some information, which is available on desktop computers. Han and Mills (2006) stressed that travellers are less likely to form a good impression about a destination which, in turn, negatively influences their decision making process if its website is not user-friendly. As the visibility of websites on smartphones plays a critical role determining the ultimate success of online business of a company, it is of importance to examine the visibility of hotel websites on different smartphones in order to sustain the company's competitiveness in the smartphone era.

Chung and Law (2003) empirically evaluated the information quality of 80 hotel websites in Hong Kong across different hotel classes. The result indicated that the websites of luxurious hotels were more comprehensive than those of mid-priced and budgeted hotels. Abrate (2011) noted the rating system indicates a

tangible commitment made by firms to particular levels of service provision and quality. Since higher star ratings relate positively to enhanced physical attributes and higher quality in all aspects (Abrate et al. 2011), hotels with higher star ratings may offer more comprehensive service and better online experience for consumers in order to maintain their service standard and reputation.

In addition to star rating, hotel's brand affiliation is another decisive factor which is frequently discussed by previous researchers in the dissimilar adoption of information technology and website effectiveness. Siguaw et al. (2000) examined the utilization of information technology in hotels from the United States, and found that chain hotels made larger investment in information technology. Klein and Saft (1985) noted that a brand name implies the creation of a standardized product or production process. Barrows and Powers (2008) suggested that chain hotels are able to acquire financial and technical support from their corporate headquarters. They have a better quality assurance policy and implementation scheme. As the management of chain hotels are more familiar with Internet technology and the way to satisfy customers' information needs, they are able to outperform their independent counterparts in terms of website functionality performance. Since star ratings and brand affiliation are found to be important factors affecting hotel's inclination to technology adoption, this study would also examine if the visibility of hotels on smartphones is associated with their star ratings and brand affiliation.

3 Research Method

3.1 Data Collection

To recap, the research objective of this exploratory study is to examine the visibility of hotels on smartphones through: (1) examining the visibility of all Hong Kong hotel websites on smartphones using different operating systems; and (2) examining the availability of smartphone apps developed by all Hong Kong hotels in different smartphone application stores. Data collection was conducted in July 2013, and all 122 hotels in Hong Kong, which are members of the Hong Kong Hotels Association, were analysed in this study. To achieve the study objectives, three major mobile operating systems were selected for analysis. According to the latest *IDC Worldwide Mobile Phone Tracker Report* (International Data Corporation 2013), the top three smartphone operating systems are Android (79.3 %), iOS (13.2 %) and Windows Phone (3.7 %) in terms of their market share in 2013. Despite the relatively low share of Windows Phone, this system posted the largest year-over-year growth among the top five smartphone platforms from 2012 to 2013. The Program Manager with IDC's Mobility Tracker Programs also posited that the increase in adopting Windows Phone will continue in the coming quarters. Since these three systems account for more than 95 % of the market share, the

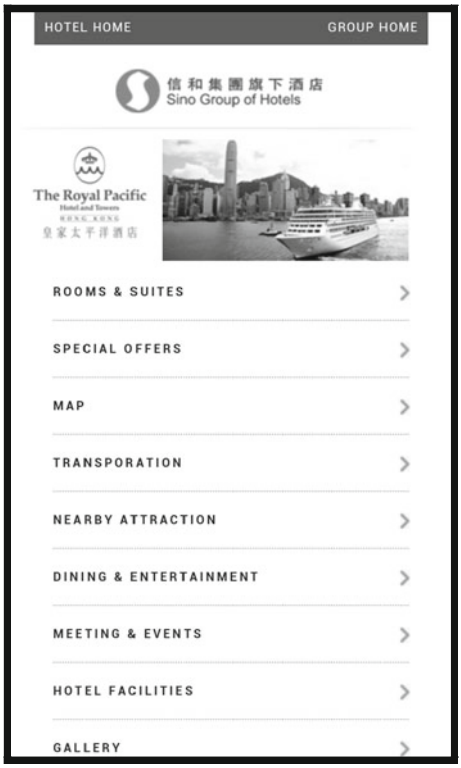

Fig. 1 Mobile website

inclusion of smartphones with these three systems could enhance the representativeness of the findings. Hence, three smartphones, which are Samsung Galaxy SIII (using Android), Apple iPhone 4S (using iOS) and Nokia Lumia 610 (using Windows Phone), were used for data collection.

To achieve the first objective, the Uniform Resource Locators (URLs) of all 122 hotel desktop websites were firstly typed in the address bars of the pre-installed browsers in the three chosen smartphones. The visibility of the hotel websites were then coded based on pre-determined trichotomous scales (i.e., 1 represents "convert to mobile website", 2 represents "convert to desktop website", and 3 represents "invisible"). Figures 1 and 2 exhibit the examples of "mobile website" and "desktop website". All coding results were cross-verified by two researchers to ensure their validity. Consequently, the coding results by multiple researchers were consistent and no variation was found.

Regarding the second objective, the smartphone apps developed by all Hong Kong hotels were searched via the designated application stores for the three operating systems (i.e., Google Play for Android; Apple App Store for iOS; Windows Marketplace for Windows Phone). The names of the 122 hotels were typed in the search bars of those smartphone application stores. The availability of the smartphone apps was recorded based on the written instruction (1 represents

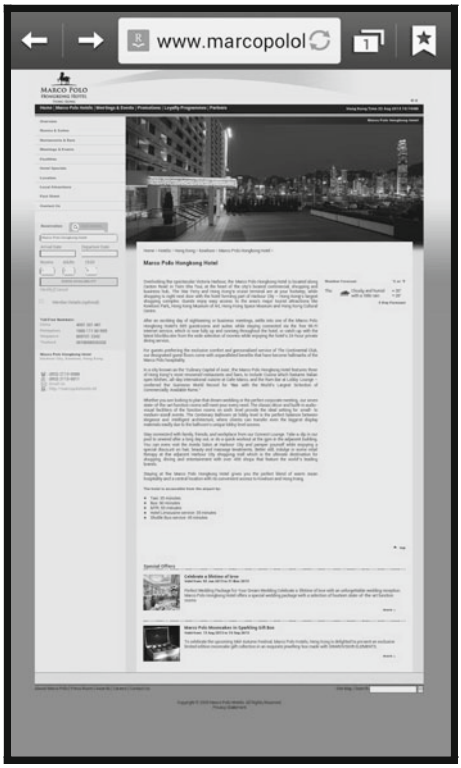

Fig. 2 Desktop website

"smartphone app is available" and 2 represents "smartphone app is unavailable"). To ensure the data validity, another round of searching was conducted on the website versions of those three application stores and no variation was found.

3.2 Data Analysis

To examine if star rating and brand affiliation are associated with the visibility of hotels on smartphones, hotels were firstly divided into three sub-groups based on the average agency ratings provided by Hotels.com, Expedia.com and Booking.com (i.e., 3-star or below, 4-star and 5-star). Hotels in the study were also divided into two sub-groups based on brand affiliation (i.e., chain and independent). Afterwards, frequency analysis was carried out to exhibit the visibility of hotel websites and availability of smartphone apps across hotels with different ratings and brand affiliation. Moreover, a number of Chi Square tests were conducted to investigate the relationship between visibility of hotels on smartphones as well as star ratings and brand affiliation.

4 Results

4.1 Visibility of Hong Kong Hotel Websites on Smartphones

Since the star ratings of five hotels could not be identified from all three sources, only 117 hotels were included for analysis in this study. Table 1 exhibits the visibility of Hong Kong hotel websites on smartphones using different operating systems.

When these 117 hotel websites were browsed on the iOS smartphone, only one hotel website was found to be invisible. More than half were directed to mobile version (n = 68, 58.1 %), and another 41 % (n = 48) were directed to the desktop version. It is surprising that the only hotel that was invisible on the iOS smartphone was a 5-star hotel. Since that hotel website has many Flash-based applications, non-support for Flash and Java by iOS makes that website invisible on that device. The visibility of hotel websites on the Android smartphone is largely similar. Except one website owned and managed by a 4-star property, nearly all hotel websites were visible on either mobile version (n = 67, 57.3 %) or desktop version (n = 49, 41.9 %). Though the majority of hotels in Hong Kong have developed mobile websites for iOS and Android smartphones, the proportion of hotels supporting Windows Phones was relatively low. Among those 115 hotel websites that are visible on the Windows Phone smartphone, only 45.2 % (n = 52) were directed to the mobile version. In contrast, users are often directed to visit the desktop version (n = 63, 54.8 %). While smartphones are gradually becoming the primary Internet access device for travellers to research and purchase hotel accommodations, the findings reflect there is still a large group of Hong Kong hotels that did not acknowledge the potential usability problem of presenting desktop website on smartphones.

Regarding the association between the visibility of hotel websites on smartphones and star ratings, dissimilar findings were found across different operating systems. As shown in Table 1, the Chi Square test result suggests there was a significant association between star ratings and mobile website for iOS ($\chi^2(4) = 8.98, p < 0.1$). Another Chi Square test also reflects the association between hotel ratings and mobile website for Windows Phone was significant ($\chi^2(4) = 11.92, p < 0.05$). However, the association with mobile website for Android was found to be insignificant ($\chi^2(4) = 6.58$, *ns*). One interesting finding is that the proportions of 4-star hotels having mobile websites for iOS (47.8 %) and Android smartphones (47.8 %) were lower than those of 3-star hotels (iOS: 57.5 %; Android: 55.0 %). One possible reason for this phenomenon is that over 80 % (80.4 %) of 4-star hotels are affiliated with local hotel chains such as Harbour Plaza Hotels & Resorts and Sino Group of Hotels. In contrast, one third (35.0 %) of 3-star hotels are affiliated with international hotel chains such as Ramada Hotels and Best Western Hotels. Given that international hotel chains generally have the advantage in financial, human and technical resources (Barrows and Powers 2008), the corporate headquarters of international hotel chains may

Table 1 Visibility of Hong Kong hotel websites on smartphones

	Total (N = 117)	Star ratings[a]				Brand affiliation[b]		
		3-star (n = 40)	4-star (n = 46)	5-star (n = 31)	χ^2 [c]	Chain (n = 96)	Indp. (n = 21)	χ^2 [c]
iOS smartphone								
Mobile Website	68 (58.1 %)	23 (57.5 %)	22 (47.8 %)	23 (74.2 %)	8.98*	58 (60.4 %)	10 (47.6 %)	1.51
Desktop Website	48 (41.0 %)	17 (42.5 %)	24 (52.2 %)	7 (22.6 %)		37 (38.5 %)	11 (52.4 %)	
Invisible	1 (0.9 %)	0 (0.0 %)	0 (0.0 %)	1 (3.2 %)		1 (1.0 %)	0 (0.0 %)	
Android smartphone								
Mobile Website	67 (57.3 %)	22 (55.0 %)	22 (47.8 %)	23 (74.2 %)	6.58	57 (59.4 %)	10 (47.6 %)	1.31
Desktop Website	49 (41.9 %)	18 (45.0 %)	23 (50.0 %)	8 (25.8 %)		38 (39.6 %)	11 (52.4 %)	
Invisible	1 (0.9 %)	0 (0.0 %)	1 (2.2 %)	0 (0.0 %)		1 (1.0 %)	0 (0.0 %)	
Windows phone smartphone								
Mobile Website	52 (44.4 %)	15 (37.5 %)	18 (39.1 %)	19 (61.3 %)	11.92**	46 (47.9 %)	6 (28.6 %)	3.36
Desktop Website	63 (53.8 %)	25 (62.5 %)	28 (60.9 %)	10 (32.3 %)		48 (50.0 %)	15 (71.4 %)	
Invisible	2 (1.7 %)	0 (0.0 %)	0 (0.0 %)	2 (6.5 %)		2 (2.1 %)	0 (0.0 %)	

Note [a] *3-star* represents hotels with 3-star level or *below*; *4-star* represents hotels with 4-star level; *5-star* represents hotels with 5-star level

[b] *Chain* represents hotels affiliated with a hotel chain; *Indp.* represents hotels not affiliated with any hotel chain

[c] $*p < 0.1$; $**p < 0.05$

provide their affiliated hotels with more support in establishing mobile websites. This may partly explain the higher percentage of 3-star hotels having mobile websites. While the mobile website was found to be associated with hotel ratings, its relationship with brand affiliation was not confirmed regardless of the operating systems (iOS: $\chi^2(2) = 1.51$, *ns*; Android: $\chi^2(2) = 1.31$, *ns*; Windows Phone: $\chi^2(2) = 3.36$, *ns*).

4.2 Availability of Smartphone Apps Developed by All Hong Kong Hotels in Smartphone Application Stores

Based on the content analysis on hotel smartphone apps available in three smartphone stores, the findings exhibited that trend of developing smartphone apps was obscure in the Hong Kong hotel industry. As shown in Table 2, one third of

Table 2 Availability of smartphone apps of all Hong Kong hotels in smartphone application stores

	Total (N = 117)	Star ratings[a]				Brand affiliation[b]		
		3-star (n = 40)	4-star (n = 46)	5-star (n = 31)	χ^2 [c]	Chain (n = 96)	Indp. (n = 21)	χ^2 [c]
iOS smartphone								
App is Available	43 (36.8 %)	10 (25.0 %)	12 (26.1 %)	21 (67.7 %)	17.44***	40 (41.7 %)	3 (14.3 %)	5.56**
App is Unavailable	74 (63.2 %)	30 (75.0 %)	34 (73.9 %)	10 (32.3 %)		56 (58.3 %)	18 (85.7 %)	
Android smartphone								
App is Available	35 (29.9 %)	10 (25.0 %)	10 (21.7 %)	15 (48.4 %)	6.97**	33 (34.4 %)	2 (9.5 %)	5.076**
App is Unavailable	82 (70.1 %)	30 (75.0 %)	36 (78.3 %)	16 (51.6 %)		63 (65.6 %)	19 (90.5 %)	
Windows phone smartphone								
App is Available	5 (4.3 %)	2 (5.0 %)	0 (0.0 %)	3 (9.7 %)	4.32	5 (5.2 %)	0 (0.0 %)	1.143
App is Unavailable	112 (95.7 %)	38 (95.0 %)	46 (100 %)	28 (90.3 %)		91 (94.8 %)	21 (100 %)	

Note: [a] *3-star* represents hotels with 3-star level or below; *4-star* represents hotels with 4-star level; *5-star* represents hotels with 5-star level

[b] *Chain* represents hotels affiliated with a hotel chain; *Indp.* represents hotels not affiliated with any hotel chain

[c] $^{**}p < 0.05$; $^{***}p < 0.01$

Hong Kong hotels have developed smartphone apps for iOS smartphones (n = 43, 36.8 %). Despite the high market share of Android smartphones, the proportion of hotels having smartphone apps for Android is less than 30 % (n = 35, 29.9 %). For Windows Phone system, only five hotels (4.3 %) in Hong Kong were found to have compatible smartphone apps. As Windows Phone has a relatively short history comparing with that of iOS and Android (Kenlo 2012), hoteliers may avoid taking risk on making a significant investment on smartphone apps for this platform.

Same as the findings pertinent to visibility of hotel websites on smartphones, the results from Chi square tests exhibited that the association between the availability of smartphone apps and star ratings vary across different operating systems. To iOS smartphones, there was a significant association between the availability of smartphone apps and star ratings (χ^2 (2) = 17.44, $p < 0.01$). Table 2 also shows that the percentage of 4-star and 3-star or below hotels having smartphone app were 26.1 % (n = 12) and 25.0 % (n = 10) respectively, but the corresponding number of 5-star level hotels was as high as 67.7 % (n = 21). Similarly, another Chi Square test verifies the significant association between hotel ratings and the availability of apps for Android smartphones (χ^2 (2) = 6.97, $p < 0.05$). The availability rate of apps is relatively higher for hotels with 5-star level (n = 15, 48.4 %) than their counterparts with 4-star level (n = 10, 21.7 %) and 3-star level or below (n = 10, 25.0 %).

While brand affiliation was not associated with the visibility of hotel websites on smartphones, the empirical findings show there is a significant association between brand affiliation and the availability of smartphone apps. According to the "Brand affiliation" column in Table 2, the proportion of independent hotels having smartphone apps for iOS and Android smartphones was 14.3 % (n = 3) and 9.5 % (n = 2), respectively. Yet, more than one third of chain hotels had their smartphone apps for iOS (n = 40, 41.7 %) and Android smartphones (n = 33, 34.4 %). The results from another two Chi Square tests also suggest that brand affiliation were significantly associated with the availability of apps for iOS devices (χ^2 (1) = 5.56, $p < 0.05$) and Android devices (χ^2 (1) = 5.08, $p < 0.05$).

5 Discussions and Conclusions

Over the last few decades, information and communication technologies offer travellers a wide range of tools to facilitate and improve travellers' decision making process (Buhalis et al. 2011). In the post-personal computer era, this trend continues as travellers are now equipped with cutting-edge smartphones. As many people now spend more time online on their smartphones than on their computers (Kao 2013), hotel and tourism suppliers have to devise their online marketing tools and practices in order to enhance their visibility on smartphones and gain a share of the burgeoning online market.

Being one of the two proxies representing the visibility of hotels on smartphones, empirical findings in this study revealed that hotels in Hong Kong generally acknowledge and adapt to the smartphone wave by developing mobile websites for promoting, distributing, and connecting with consumers on different smartphone platforms. Yet, the exploitation of smartphone technology in the Hong Kong hotel industry is still not prevalent. As noted by Gil (2013), most desktop websites are designed for desktop monitors with 19-inch to 24-inch diagonal size. Browsing a desktop website on a smartphone with a typical 4-inch diagonal size would make the text unreadable, and eventually make a website less user-friendly. Au Yeung and Law (2004) posited that unpleasant online experiences would inevitably lead to a reduction of online sales and a loss of potential customers. It would eventually have a negative effect on the credibility of the hotel company. Since a "user-unfriendly" website would discount consumers' interest to view, purchase and re-enter it (Hasan and Abuelrub 2011), hoteliers and developers of hotel websites are necessitated to assure that their websites are smartphone-friendly and thereby able to accessible to a much larger audience. Comparing with the proportion of hotels having mobile websites, the trend of developing smartphone apps in the hotel industry is relatively less eminent. Only a handful of hotels in Hong Kong have developed their apps for smartphone platforms in general and for Windows Phone smartphones in particular. Apparently, the development cost of smartphone apps is much higher than that of mobile websites. But since smartphone users' preference is strongly in favour of smartphone apps over mobile

websites owing to their high usability (Moth 2013), there is more than enough evidence for hotels to develop their smartphone apps for distributing products to and creating a close connection with current and potential customers.

Besides exhibiting the trend of developing mobile websites and smartphone applications, this study exhibits a significant association between star ratings and mobile websites (for iOS and Windows Phone smartphones) as well as smartphone apps (for iOS and Android smartphones). Chain hotels were more likely to invest on mobile technology and develop smartphone apps than their independent counterparts. Though previous studies generally suggested that brand affiliation plays a tremendous role on the hotel's inclination towards technology adoption (Siguaw et al. 2000), website design quality (Au Yeung and Law 2004) and website information quality (Leung et al. 2013), to our knowledge, this study is the first attempt examining the association between brand affiliation and the visibility of hotels on smartphones. Au Yeung and Law (2004) posited that the discrepancy in the website usability performance could be explained by the difference in financial and technical support between chain and independent hotels. Future research may further explore whether the difference in financial resources may explain why chain hotels are capable of building different mobile interfaces in order to enhance the mobile presence for their companies.

Despite the insightful implications, this study has several limitations. First, as only member hotels of the Hong Kong Hotels Association were consulted and cross-sectional data collected in July 2013 were analysed, the generalizability of this study's findings may be limited. Besides, as other mobile operating systems, particularly BlackBerry OS by BlackBerry and Symbian by Nokia, were excluded for analysis in the current study, this study cannot claim to be widely generalizable. To redress these limitations, a natural extension of this study is to analyse hotels in other countries and different types of mobile devices should be included for analysis. Examining the quality of mobile websites and smartphone apps owned and managed by hotel companies is another direction for future research. Since the adoption of mobile websites and smartphone apps vary across hotels with different star ratings and brand affiliation, qualitative research examining the factors contributing to the difference in the adoption may certainly benefit researchers and practitioners to realise hoteliers' rationales of adopting mobile technologies.

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