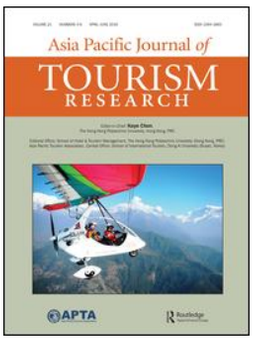

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How friendly destination websites are for mobiles? A study of destination marketing organizations in the Asia Pacific region

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ABSTRACT

The core objectives of this exploratory study are (1) to examine the friendliness of destination websites for mobiles and (2) to profile the features available in different versions of mobile destination websites. Through employing the device emulator testing approach to analyze websites of top destinations in the Asia Pacific region, this study finds that destination marketing organizations in the Asia Pacific region have been optimizing their official websites for mobiles over the past few years. A responsive web design approach is predominantly used by the analyzed destination, and more features are founded to be available in "fully mobile-friendly websites."

KEYWORDS

Mobile; destination management organizations; destination websites; mobile websites; responsive web design

Introduction

Despite their belated application in the tourism and hospitality industry, mobile technology in general and smartphones, in particular, have been increasingly utilized by travelers for researching and purchasing tourism-related products. A recent report by Criteo (2018) indicates that most travel sectors received more than one-third of bookings via mobiles in 2017. Specifically, mobiles accounted for 39% of bookings for hotels while the share of mobile bookings for cruises was as high as 44%.

In pace with the prevalence of mobile commerce in tourism and hospitality, the body of research on mobile tourism grows rapidly. As shown in Liang, Schuckert, Law, and Masiero's (2017) literature review study, researchers have made considerable progress in understanding and optimizing the application of mobile technology in the field (e.g. Chen, Murphy, & Knecht, 2016; Kang, Jang, & Jeong, 2018; Morosan & DeFranco, 2014; Wang, Park, & Fesenmaier, 2012). While a plethora of studies has been conducted over the past decade, extant studies predominantly emphasize the functionality, service, and impact brought by mobile apps (e.g. Kwon, Bae, & Blum, 2013; Lu, Mao, Wang, & Hu, 2015; Morosan & DeFranco, 2016).

Doubtlessly, mobile apps have their inherent advantages like higher level of navigability and customization. Linton and Kwortnik (2015), however, note that customers are often reluctant to use mobile apps due to privacy concerns such as leakage of personal information. To avoid being tracked by geolocation while using mobile apps, a study by Google (2016) also shows that smartphone users generally prefer mobile websites for researching and reserving accommodations to mobile apps. Although numerous studies (e.g. Cowen, 2017; Vieira & Kumar, 2018) have empirically proven that mobile websites are equally important to mobile apps, mobile website has still received scant attention by tourism scholars. *Are tourism practitioners keeping pace with the mobile consumerism era? Are tourism practitioners ready to connect with their prospective customers via mobile websites?* Answers to these two questions remain unclear at the time of this writing.

In the mobile context, many researchers underscore that the assurance of delivering a user-friendly website interface for consumers with various mobile

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screen sizes is of essence (Murphy, Chen, & Cossutta, 2016; Nebeling & Norrie, 2013). Indeed, while website browsing using mobiles is technically identical to that with desktop computers, Okazaki (2012) notes that users behave differently when they use a mobile or desktop website for information search. Some researchers also empirically verify that consumers' website visitation experience will be negatively influenced if service providers are incapable of optimizing their websites for consumers' use via mobiles (Groth & Haslwanter, 2015; Lobo, Kaskaloglu, Kim, & Herbert, 2011). Besides influencing consumers' website visitation experience, Vieira and Kumar (2018) stress that the friendliness of the eCommerce website for mobiles now also influences the corresponding business's competitiveness in the online marketplace. Since April 2015, Google employs the mobile-friendly algorithm and provides mobile-friendly websites with a ranking boost in Google's mobile search results (Schwartz, 2015). Though developing a mobile-optimized website is of utmost importance for practitioners in the field to get access to the increasingly bigger group of mobile audiences, knowledge about "how friendly tourism websites for mobiles" is still limited and incomplete until now.

To enrich insights into the readiness of destination marketing organizations (DMOs) in the Asia Pacific region to the mobile consumerism era, this exploratory study purports to examine the friendliness of destination websites for mobiles. Unlike its conception in the service quality paradigm, in this study, friendliness focuses on the compatibility and responsiveness with the viewports of various mobile devices. Adapting the definition proposed by Gallagher (1993), this study defines (mobile) friendliness as the extent to which a website can adapt the user interface of the website itself depending on users' mobile browser resolutions. Using Fielding's (2014) device emulator testing method to assess the (mobile) friendliness of websites owned by DMOs in the Asia Pacific region, the findings of this study are expected to provide additional insights into the readiness of DMOs in the Asia Pacific region to the mobile consumerism era. Besides investigating the mobile-friendliness of destination websites, this study profiles and contrasts the features available in different versions of mobile destination websites in order to generate more insights into the research topic.

Comparing with other research studies which include model testing or/and theoretical discussions, the authors acknowledge that the theoretical contribution of this exploratory study is comparatively limited. Still, being one of the first studies that focuses on mobile destination websites, this study would contribute new knowledge to the growing stream of research about the application of mobile technology in tourism and hospitality. Specifically, the findings are expected to benefit future researchers in formulating models for assessing functionality performance of mobile destination websites as well as practitioners in benchmarking their website performance in the mobile landscape.

Literature review

Mobiles/smartphones in tourism and hospitality

Mobiles and smartphones are two buzzwords which have been used interchangeably in industry and academic literatures over the past few years. Traditionally, the term "mobiles" solely includes handheld devices with limited screen size and processing power such as featured phones and personal digital assistants. But nowadays, "mobiles" also include the new generation of smartphones and tablets which are equipped with powerful processors, user-friendly user interfaces, high-speed Internet access, as well as productivity-enhancing applications (Wang et al., 2012). Despite the disagreement in terminology use across different studies, academic researchers generally agree that mobiles with increased capacity in communication and connectivity enable travelers to obtain real-time information and support a wide range of routine (e.g. searching and reserving hotel accommodations) and detailed travel activities (e.g. locating tourist attractions and estimating waiting time of rides) without time and geographical constraint (Wang, Xiang, & Fesenmaier, 2014).

In light of the growing significance of mobile technology in travel and tourism, as reflected in Liang et al.'s (2017) literature review study, the body of literature on mobiles in tourism and hospitality journals has increased drastically in the past decades. One of the two main streams among those studies on mobile tourism is to explore the mechanisms influencing travelers' intention to adopt mobiles or mobile-mediated service in travel (e.g. Kim, Chung, Lee, & Preis, 2015; Kwon et al., 2013; No & Kim, 2014; Wang & Wang, 2010). Moroson and colleagues conduct multiple studies on guests' adoption of mobile devices or/and mobile-mediated services in various hospitality

settings. In one study conducted in the context of private club, Morosan and DeFranco (2014) report that club members' perceived ease of use and perceived personalization are significant predictors of their perceived usefulness, which in turn influence their attitude and intention to adopt mobile devices for making reservations in private clubs. In another study conducted in the hotel setting, Zhu and Morosan (2014) do not only validate the impact of perceived usefulness and perceived ease of use on technology adoption but also ascertain the role of cognitive absorption (toward the technology) in the adoption of interactive mobile technologies. Besides the aforementioned, previous research has attempted to investigate factors affecting customers' predisposition to adopt mobile apps (Kwon et al., 2013), near field communication mobile payments (Ozturk, Bilgihan, Salehi-Esfahani, & Hua, 2017), and app-based mobile tour guide (Lai, 2015).

Another stream of research on mobiles in tourism and hospitality focuses on explicating the impact of smartphones on touristic experience. Through analyzing travelers' stories about their use of smartphones and tourism-related apps for traveling purposes, Wang et al. (2012) report that smartphones can mediate tourists' behavior and emotional states by addressing diversified types of information needs. Wang et al. (2014) later proposed a framework delineating the interrelationship among factors affecting travelers' adoption of smartphone in travel (e.g. cognitive beliefs and everyday use), smartphone use in travel (e.g. communication and entertainment), as well as changes in subjective perceptions and travel activities. Apart from the above two research streams, other issues such as functionalities available in mobile apps for domestic travel (Dickinson et al., 2014), millennials' perceptions toward personalized mobile advertising avoidance (Nyheim, Xu, Zhang, & Mattila, 2015) as well as the relationship between travelers' domain-specific innovativeness and patterns of smartphone use during travel (Tussyadiah, 2016) have also been investigated. Table 1 synthesizes the industry foci, technologies, or services discussed and key findings of mobile-related studies in tourism and hospitality journals.

Website usability and website (mobile) friendliness

Defined as the ease with which a customer can employ a website to achieve a specific goal (Massey, Khatri, & Montoya-Weiss, 2007), the evaluation of website usability has long been a point of concern for researchers in both management information system and tourism fields since 1990s (Law, Qi, & Buhalis, 2010). Several researchers study the question of "why website usability matters?" Flavián, Guinalíu, and Gurrea (2006) empirically verify that high website usability has a positive influence on user satisfaction, trust, and loyalty toward the website. No and Kim (2014) also test and report that travel website interface has a significant impact on one's perceived quality of a travel website and website experience. Since high website usability can encourage users to prolong the viewing time and to revisit the websites, many researchers stress the significance of developing and presenting a user-friendly business website to customers (Cyr, Head, & Ivanov, 2006).

Over the past decades, academic researchers have proposed numerous approaches for assessing the usability of tourism and hospitality websites. Using the modified heuristic evaluation technique, Au Yeung and Law (2004) introduce a five-dimension usability hazard index (including language, layout and graphics, information architecture, user interface and navigation, and general) and apply it to evaluate usability performance of 77 Hong Kong hotel websites. Qi, Law, and Buhalis (2008) conduct a similar study with Chinese destination management organization websites. Their empirical investigation results show that China's DMO websites had medium problems in the areas of "website layout" and "information architecture." Although a substantial body of research on website usability has been conducted, the existing knowledge was mostly derived from the examination of desktop websites while scholarly attention toward the usability performance of mobile websites is limited. Besides the scarcity of research on mobile websites, the compatibility and friendliness of destination websites for viewports of various mobile devices have never been investigated in prior studies.

Lee and Kozar (2012) recently synthesize past studies and develop an integrated instrument for measuring website usability. Among all constructs pertinent to website usability, the researchers report that navigability and readability are exceptionally critical in influencing one's purchase intention while these two constructs are affected by the consistency of the user interface. Indeed, when the layout and component of a website are coherent across different devices, users can often navigate the site easily,

Table 1. Summary of mobile-related studies in tourism and hospitality journals.

Author (year)	Industry focus	Technology/ Service discussed	Key findings
Wang and Wang (2010)	Hotel	Mobile hotel reservation services	Perceived value is a predictor in explaining customers' predisposition to adopt mobile hotel reservation services. Besides, information quality, system quality, perceived fee, and technological effort are the critical factors influencing individual's perceived value of mobile hotel reservation services
Stienmetz et al. (2013)	Destination management organizations	Mobile websites	Ease of use and content contribute most significantly to the overall usability of mobile DMO websites. Travelers highly value mobile DMO websites that are well structured and organized, offer convenient services, and have an easy-to-understand appearance
Wang et al. (2012)	Tourism in general	Mobile applications	Smartphones and travel-related apps can change tourists' behavior and emotional states by addressing a wide variety of information needs. Specifically, the instant information support of smartphones empowers tourists to solve problem, share, and store experiences effectively
Kwon et al. (2013)	Hospitality in general	Mobile applications	Consumers are more likely to download mobile apps if (1) they can find company information, (2) they can do transaction, (3) they enjoy using smartphones, (4) they are confident in using smartphones, and (5) they perceive the app is easy to use
Dickinson et al. (2014)	Tourism in general	Mobile applications	Smartphone apps that focus on domestic travel generally provide users with five major functionalities – information delivery, mutual sharing, context detection, real-time communication among devices and tagging
Eriksson (2014)	Tourism in general	Mobile travel services in general	Five categories of mobile travelers in Finland were identified based on their usage of mobile (i.e. non-users, info-seekers, checkers, bookers, and all-rounders). Also, the differences in individual characteristics, barriers, and channel strategies among those groups were found
Morosan (2014)	Airline	Mobile devices	In line with the theorem of technology acceptance model, one's perceived usefulness, perceived ease of use, and trust influence attitudes, which in turn, influence customers' intentions to use mobile phones to purchase ancillary services in air travel
Morosan and DeFranco (2014)	Private club	Mobile devices	Club members' perceived ease of use and perceived personalization were significant predictors of their perceived usefulness, which in turn influence their attitude and intentions to adopt mobile devices for making reservations in private clubs
No and Kim (2014)	Tourism in general	Travel information on smartphones	Travelers' intention to use travel information on smartphones was affected by their perceived usefulness, ease of use, social influence, and satisfaction with sites. Satisfaction with travel websites was drawn based upon their website usage experience, which in turn was determined by its quality, value, and interface
Wang et al. (2014)	Tourism in general	Mobile device and mobile applications	Travelers' smartphone use in travel is shaped by five major factors (e.g. cognitive beliefs, situational facilitators, previous experiences, and everyday use) for communication and entertainment, facilitation and information. Smartphone use was also found to have potential in transforming the touristic experience
Zhu and Morosan (2014)	Hotel	Mobile technologies used during the hotel stay	Besides validating the predictive power of perceived usefulness and perceived ease of use on technology adoption, cognitive absorption (towards the technology) as a multi-dimensional factor was verified to be a significant predictor of users' attitude toward interactive mobile technologies
Kim et al. (2015)	Tourism in general	Mobile websites	Value and enjoyment are found to be utilitarian benefits which positively enhance tourism shoppers' satisfaction toward mobile tourism shopping. User context is also found to fully mediate the effects of motivations (i.e. time saving

(*Continued*)

Table 1. Continued.

Author (year)	Industry focus	Technology/ Service discussed	Key findings
			and mobility) on tourism shoppers' satisfaction toward mobile tourism shopping
Lai (2015)	Destination	Add-based mobile tour guide	Informativeness and entertainment are significant antecedents affecting travelers' performance expectancy and effort expectancy toward their behavioral intention of adopting app-based mobile tour guide
Nyheim et al. (2015)	Restaurant	Advertisements disseminated via mobile applications	Restaurant smartphone app users are more likely to avoid advertisement if their level of advertising irritation is high. However, perceived personalization in advertisements appears to make app users less resistant to advertisements
Morosan and DeFranco (2016)	Hotels	Near field communication mobile payments	The robustness of UTAUT2 in explaining one's technology adoption intention is validated The strongest predictor of customers' mobile payment intention is performance expectancy, followed by hedonic motivation and habit
Rivera, Croes, and Zhong (2016)	Destinations	Mobile applications for a destination	The conjoint analysis results show that content categories and coupons are the most important attributes influencing consumers' likelihood to use a mobile application for destination. Consistent result is found in both first-time and repeat visitors
Tussyadiah (2016)	Tourism in general	Mobile devices	Travelers' technology innovativeness and tourism innovativeness have significant positive impacts on their onsite smartphone use for trip management, searching deals, searching online reviews receiving push recommendations, and social networking
Tussyadiah and Wang (2016)	Tourism in general	Push recommendations by smartphones	Tourists' confidence toward proactive recommendations by smartphones is formulated due to its perceived proactiveness, autonomy, social ability, and intelligence of smartphones. Conversely, tourists' rejection to the advices is mainly attributed to their fear of losing control over tourism experience
Wang, Xiang, and Fesenmaier (2016)	Tourism in general	Mobile device and mobile applications	Travelers' smartphone usage pattern in everyday living is associated with how they perceive the capability of smartphones, and it posed "spillover effects" on their use of devices in the travel context as well as on their tourist experience

interpret the information they find without paying extra effort and thereby establishing more trust toward the website. On the contrary, if users find it difficult to view and navigate a website across different devices, they are likely to quit and switch to competitors (Cyr et al., 2006). To take full advantage of the inevitable growth of mobile commerce, destination marketers and website developers need to ensure that their sites are compatible with an ever-expanding array of viewing devices. They also need to ensure that their sites can self-adjust its interface in order to make mobile users easily read and navigate the site with a minimum of resizing and scrolling. Although the friendliness of a website for mobiles is pivotal in determining whether website users can expose to the best website visitation experience via mobile devices, no existing study has attempted to investigate the mobile-friendliness for mobiles. In other words, to date, an answer to the research question of "how friendly destination websites for mobiles?" is still unknown yet.

Mobile website design approaches

Considering the prominent growth in mobile usage for Internet surfing, researchers from information systems field have advocated several approaches for optimizing business websites into mobile-friendly ones. Fixed-width design is one of the best traditional practices for optimizing websites for mobiles. According to Gardner (2011), this approach proposes to create a static-width website via fixing a pixel value of the width of a website based on a minimum resolution of targeted devices. In spite of the simplicity, the fixed-width layout approach requires high maintenance because continuous change in the minimum resolution is needed when new devices are released. This design approach may also increase

users' mental effort in navigation since horizontal scrolling is needed in order to read all content on the page.

Developing separate mobile websites is another approach. In brief, different HyperText Markup Language codes would be served to each device and separate uniform resource locators (URLs) are managed by using this approach (Nebeling & Norrie, 2013). Once the web server detects mobile visitors and recognizes the configuration of their mobile devices, the web server would then redirect visitors to another site which is optimized to the device being used. This approach is good for small businesses since the setup is relatively easy, but faulty redirects might happen if the scripts for detecting devices are outdated. In addition, since device variety expands exponentially, the cost of building and maintaining a distinct website for every device type becomes prohibitive.

Responsive web design (RWD) is a new web design approach introduced by Ethan Marcotte (2011) in the year 2010. Combining the capabilities of the fifth version of Hypertext Markup Language and the third version of Cascading Style Sheet, RWD aims to enable website designers to design and build adaptive sites that respond to a range of screen sizes, contexts, and device capabilities. Marcotte stresses the rationale of inventing this approach is to address the phenomena of an increasing number of diverse mobile devices and a shifting in user surfing behavior. This notion is in line with the World Wide Web Consortium (2005)'s "One Web" vision which proposes that a seamlessly integrated Internet should be formed in order to have content accessible with equal ease to desktop and mobile users. Since RWD cannot only benefit end-users by offering them a better viewing experience via adjusting the content and layout to the context of the device but also allows website designers to manage one website instead of multiple ones for desktop visitors (e.g. www.example.com) and mobile visitors (e.g. m.example.com), RWD is Google's recommended mobile website design approach.

Methodology

Website sampling

To recap, the objectives of this study are: (1) to examine the friendliness of destination websites for mobiles; and (2) to profile and contrast the features available in different versions of mobile destination websites. In this study, the top 30 tourist destinations in the Asia Pacific region (following the Euromonitor International's (2016) Top City Destination Ranking) were chosen as the sampling frame (see Table 2). Different from other destination website evaluation studies that focus on one geographical region (e.g. Au Yeung & Law, 2004), this study includes websites of multiple destinations in the Asia Pacific region for analysis. Ting, Wang, Bau, and Chiang (2013) demonstrate that the inclusion and comparison of websites from multiple regions in a study on website evaluation can enhance the breadth and depth of implications. Hence, the analysis results are thus expected to better reflect the readiness of DMOs in the Asia Pacific region to the mobile consumerism era.

Testing approach

Fielding (2014) notes that two scientific approaches can be used for testing the friendliness of the websites for mobiles. The use of device simulators provided by operating system developers is the first approach. Developer toolkits for the testing smartphone operating systems are required for testing sites' mobile-friendliness if this approach is employed. Using the built-in emulators in the desktop browser is another feasible approach. To facilitate this, the URL of each site needs to be first loaded onto the desktop browser. After the selected site is shown on the browser viewport, the emulation function from the developer tools menu can then be selected and activated. After activating the emulation function, a list of default mobile devices would be shown to the users for selection to emulate. Having selected the device to emulate, the mobile version of the site shown on the selected device will be emulated and the friendliness of the site for the chosen device can then be assessed.

In this study, the use of built-in emulators in the browser is employed for testing the friendliness of destination websites for mobiles since it is technically less cumbersome and it can cover more devices for examination. The authors acknowledge that testing a site via emulators may not provide a true reflection of how the site may work on real devices. But given that identifying usability problems among the studied destination websites is not the primary objective of this study, adding with the limitation of financial and time resources the authors have,

Table 2. List of analyzed destination websites.

City	Country	Year 2014 Arrivals ('000)	Rank [a]	Year 2018 Arrivals ('000)	Rank [a]
Hong Kong	China	25587.3	(1)	29827.2	(1)
Singapore	Singapore	22455.4	(2)	18551.2	(4)
Bangkok	Thailand	17467.8	(3)	23688.8	(2)
Macau	China	14268.5	(6)	17337.2	(5)
Shenzhen	China	11702.5	(8)	12437.3	(10)
Kuala Lumpur	Malaysia	11182.4	(9)	13434.3	(9)
Seoul	South Korea	8619.0	(13)	7731.4	(24)
Phuket	Thailand	8035.0	(15)	11949.5	(11)
Guangzhou	China	7630.1	(16)	9392.0	(18)
Pattaya	Thailand	6986.2	(18)	8620.0	(25)
Taipei	China	6692.4	(19)	9783.30	(17)
Shanghai	China	6089.7	(22)	7359.60	(26)
Tokyo	Japan	4594.5	(32)	9896.30	(14)
Beijing	China	4502.5	(34)	3766.50	(54)
Ho Chi Minh City	Vietnam	4197.7	(39)	5824.50	(39)
Delhi	India	3672.2	(45)	12505.30	(13)
Mumbai	India	3643.9	(46)	10670.10	(19)
Chennai	India	3581.2	(47)	6632.80	(45)
Zhuhai	China	2886.5	(58)	3424.50	(65)
Sydney	Australia	2853.0	(59)	4748.00	(55)
Agra	India	2483.2	(69)	8258.20	(29)
Siem Reap	Cambodia	2411.1	(72)	2703.00	(86)
Jaipur	India	2403.0	(73)	5783.40	(42)
Hanoi	Vietnam	2309.1	(77)	4644.00	(51)
Jakarta	Indonesia	2194.2	(81)	4033.00	(60)
Chiang Mai	Thailand	2127.0	(83)	3483.70	(64)
Guilin	China	1942.7	(90)	2638.30	(84)
Melbourne	Australia	1929.0	(91)	3033.10	(76)
Jeju	South Korea	1779.2	(98)	2533.20	(87)
Krabi	Thailand	1772.2	(99)	2362.10	(100)

Source: Euromonitor International (2016; 2019).
[a]Rank refers to global ranking of the corresponding city.

testing sites on built-in emulators in the desktop browser is deemed to be a practical approach that can address the goals of this study.

Google Chrome, the leading mobile Internet browser (Statista, 2019), is employed as the testing browser. Six smartphone and tablet devices, including Apple iPhone 6, Apple iPhone 6 Plus, Samsung Galaxy S5, Samsung Galaxy S7, Apple iPad, and Samsung Galaxy Tab S4, are selected in the emulator for testing. As these devices are dissimilar in brands, operating systems, and viewport sizes, the inclusion of this set of mobile devices is expected to provide an all-rounded insight into the friendliness of destination websites for mobiles.

Data collection I

To achieve the first objective, the URL of those 30 destination websites was first typed in the address bar in the emulator. The mobile-friendliness of the analyzed website was then coded using the predetermined trichotomous scale (1 = "fully mobile-friendly website," 2 = "partially mobile-friendly website," and 3 = "not mobile-friendly website"):

- *Fully mobile-friendly website:* In this study, a device-independent website which is programmed as compatible with all six testing devices is classified as a "fully mobile-friendly website." Alike what Figure 1(a) shows, a "fully mobile-friendly website" employs RWD as the design approach. Without any redirecting action, a "fully mobile-friendly website" can adapt its layout to the viewing device so that the users on different devices can view the same website with a better experience.
- *Partially mobile-friendly website:* A device-dependent website which is programmed specifically for all (or some) of the testing devices is classified as a "partially mobile-friendly website." Unlike RWD, a "partially mobile-friendly website" can adapt its interface to the viewing devices via redirecting visitors to a separate website which is optimized to the device being used (see Figure 1(b)).

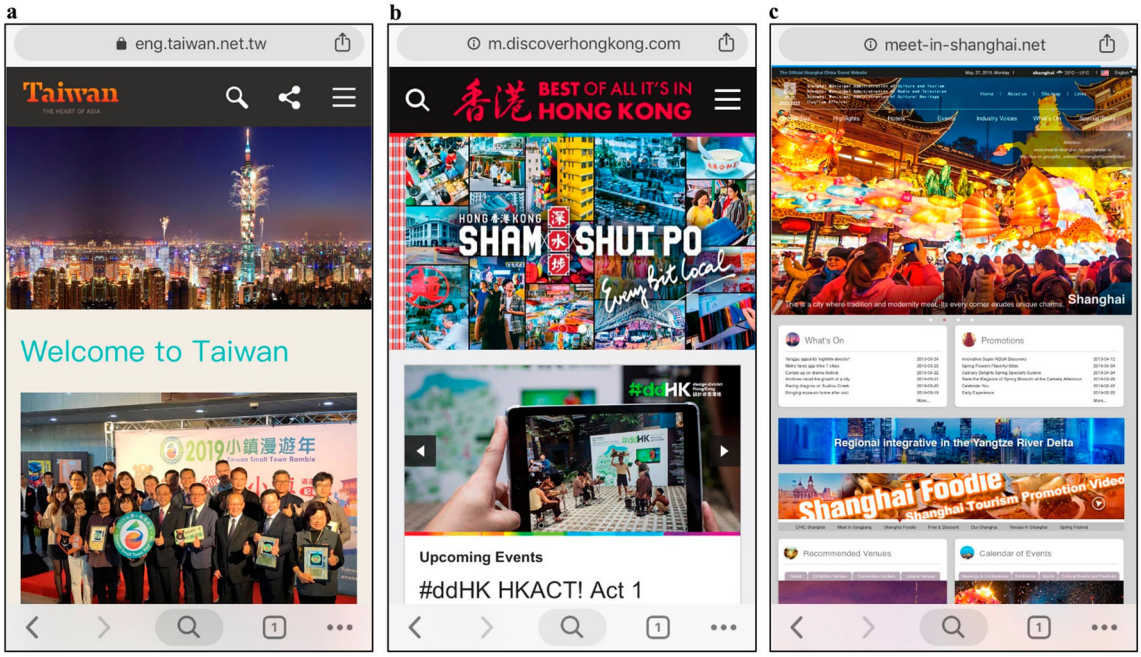

Figure 1. a. Fully mobile-friendly website, b. Partially mobile-friendly website, c. Not mobile-friendly website.

- *Not mobile-friendly website:* A website which is not programmed specifically for any of the testing devices is classified as a "not mobile-friendly website." As shown in Figure 1(c), a "not mobile-friendly website" refers to those which cannot adapt its interface to any testing device. It represents that users cannot view all features or information at a glance without zooming in and out when they visit the website using mobile devices.

As highlighted in the studies by Leung, Law, and Lee (2016) as well as Morrison, Taylor, and Douglas (2004), most of the website evaluation studies include only one evaluation at a particular point in time. In spite of their significant findings and discussions, prior studies can only give a cross-section snapshot. To examine the progress in optimizing the friendliness of destination websites for mobiles, two empirical evaluations were conducted at two different time points (i.e. May 2016 and May 2019). These two time points were chosen because the size of mobile users, as well as mobile travel bookings, increased significantly between the years 2016 and 2019. According to DataReportal (2019), the number of global mobile users increased by over 134% between years 2016 (3.79 billion) and 2019 (5.11 billion). Another report by Phocuswright (2019) also unveils there is a steep rise in mobile travel bookings between 2016 and 2018. Since the size of the mobile users as well as mobile commerce in travel and tourism changed drastically between years 2016 and 2019, it will be of value to examine whether DMOs in the Asia Pacific region kept pace with the mobile consumerism era through optimizing their destination websites for mobiles over these two different time points.

For each empirical investigation, it was conducted by the lead author and one research assistant who received an intensive training session before the task. Two investigators first reviewed and coded those 30 destination websites independently. The coding results were then cross-verified. Krippendorff's alpha was calculated based on their coding results to ensure their reliability, and the outcome value is 0.93, which is higher than the threshold of 0.7 needed to indicate reasonably good inter-coder reliability (Krippendorff, 1987). Regarding those inconsistent cases, the consensus in website coding was reached after having another round of website review and further discussions by the two investigators.

Data collection II

After identifying all fully and partially responsive websites, the features available in those mobile-friendly

Table 3. Friendliness of analyzed destination websites for mobiles.

		Year 2016[a]			Year 2019[a]		
	Total	NMF[b]	PMF[b]	FMF[b]	NMF[b]	PMF[b]	FMF[b]
China	9 (30%)	7 (77.8%)	2 (22.2%)	–	5 (55.6%)	1 (11.1%)	3 (33.3%)
India	5 (16.67%)	4 (80%)	–	1 (20%)	1 (20%)	1 (20%)	3 (60%)
Thailand	5 (16.67%)	3 (60%)	–	2 (40%)	1 (20%)	–	4 (80%)
Australia	2 (6.67%)	–	1 (50%)	1 (50%)	–	–	2 (100%)
South Korea	2 (6.67%)	1 (50%)	1 (50%)	–	–	1 (50%)	1 (50%)
Vietnam	2 (6.67%)	2 (100%)	–	–	–	–	2 (100%)
Cambodia	1 (3.33%)	1 (100%)	–	–	–	–	1 (100%)
Indonesia	1 (3.33%)	–	–	1 (100%)	–	–	1 (100%)
Japan	1 (3.33%)	–	1 (100%)	–	–	–	1 (100%)
Malaysia	1 (3.33%)	–	–	1 (100%)	–	–	1 (100%)
Singapore	1 (3.33%)	1 (100%)	–	–	–	–	1 (100%)
Total	30 (100%)	19 (63.3%)	5 (16.7%)	6 (20%)	7 (23.3%)	3 (10%)	20 (66.7%)

[a]Year 2016: Results of empirical investigation conducted in May 2016; Year 2019: Results of empirical investigation conducted in May 2019
[b]**NMF**: Fully mobile-friendly; **PMF**: Partially mobile-friendly; **FMF**: Fully mobile-friendly.

destination websites were then profiled. Prior to the content analysis, a codebook of destination website features was first developed based on an exhaustive review of the literature (e.g. Li & Wang, 2010; Pai, Xia, & Wang, 2014) and a round of validation by three senior researchers. The finalized codebook includes 18 items for information dimension, 4 items for communication dimension, 6 items for transaction dimension, and 4 items for relationship dimension (see Table 4). The lead author and another research assistant revisited each of those mobile-friendly websites using the emulators, assessed, and coded the availability of those 32 features (0 = "no" and 1 = "yes"). The coding results were cross-compared to verify its accuracy, and no variation was found.

Findings

Friendliness of destination websites for mobiles

Table 3 shows the descriptive statistics of the friendliness of analyzed destination websites for mobiles. As exhibited in the "Year 2016" column, nearly two-third ($n = 19$; 63.3%) of those thirty destination websites did not optimize their user interfaces for the viewports of all six testing mobile devices in year 2016. This suggests that most of the DMOs in the Asia Pacific region did not acknowledge and keep pace with the mobile consumerism era in year 2016. To those eleven destination websites which were classified as mobile-friendly, five were "partially mobile-friendly" while another six were "fully mobile-friendly."

Although most of the analyzed destination websites were not mobile-optimized in the year 2016, significant progress was observed according to the results of the empirical investigation conducted in year 2019. As exhibited in the "Year 2019" column, over 70% ($n = 23$; 76.7%) of those thirty destination websites were optimized for all six testing mobile devices in year 2019. Some countries (e.g. Vietnam, Cambodia, and Singapore) have made much effort in converting their destination websites into mobile-friendly in the past few years. Although the tourism authorities of some cities in China (e.g. Shenzhen and Guilin) acknowledged and optimized their websites for mobiles in recent years, a majority of websites for top destinations in China are still not mobile-friendly.

Regarding the type of mobile website design approach chosen by the analyzed DMOs, the results

Table 4. Chi-square tests on features in different versions of mobile destination websites.

Website features/functions[a]	FMF ($n = 20$)[b] Freq.	(%)	PMF ($n = 3$)[b] Freq.	(%)	χ^{2c}
I1: Destination background information	20	(100)	2	(66.7)	6.970**
I2: Attraction information	20	(100)	3	(100)	n.s.
I3: Activities information	16	(80)	3	(100)	n.s.
I4: Transportation information	20	(100)	2	(66.7)	6.970**
I5: Accommodation information	20	(100)	2	(66.7)	6.970**
I6: Restaurant information	18	(90)	2	(66.7)	n.s.
I7: Entertainment information	17	(85)	2	(66.7)	n.s.
I8: Local weather information	11	(55)	1	(33.3)	n.s.
I9: Shopping information	16	(80)	2	(66.7)	n.s.
I10: Travel guides / brochures	19	(95)	3	(100)	n.s.
I11: Trip vacation planner	9	(45)	2	(66.7)	n.s.
I12: Travel agents	1	(5)	0	(0)	n.s.
I13: Travel tips	14	(70)	2	(66.7)	n.s.
I14: Maps and directions	18	(90)	3	(100)	n.s.
I15: Virtual tours	2	(10)	0	(0)	n.s.
I16: Themed products	18	(90)	3	(100)	n.s.
I17: Event calendar	19	(95)	2	(66.7)	3.638*
I18: Link to regional / city / area pages	17	(85)	3	(100)	n.s.
T1: Online reservations	6	(30)	0	(0)	n.s.
T2: Secure transaction	4	(20)	0	(0)	n.s.
T3: Attraction tickets	3	(15)	0	(0)	n.s.
T4: Event tickets	3	(15)	0	(0)	n.s.
T5: Travel packages	10	(50)	3	(100)	n.s.
T6: Special offers	6	(30)	2	(66.7)	n.s.
C1: Contact information	19	(95)	2	(66.7)	3.638*
C2: Online forum	0	(0)	0	(0)	n.s.
C3: Email newsletter subscription	9	(45)	0	(0)	2.218*
C4: Frequently asked questions	4	(20)	1	(33.3)	n.s.
R1: Customer loyalty programs	4	(20)	0	(0)	n.s.
R2: Cross-selling opportunities	9	(45)	0	(0)	n.s.
R3: Privacy policy	12	(60)	1	(33.3)	n.s.
R4: Web seal certification	13	(65)	2	(66.7)	n.s.

[a]**I**: information; **T**: transaction; **C**: communication; **R**: relationship.
[b]**FMF**: Fully mobile-friendly; **PMF**: Partially mobile-friendly.
[c]χ^2 refers to the chi-square value.
*$p < .05$; **$p < .01$; n.s. represents not significant.

show that RWD is predominant. Of those 23 websites which are classified as mobile-friendly, twenty are "fully mobile-friendly" which employ RWD as the design approach. As RWD is acknowledged as more beneficial to website users and developers (Marcotte, 2011), it is understandable that DMOs in the Asia Pacific region prefer using RWD to optimize their official websites for mobiles.

Some previous studies examined and reported that the technology adoption level by businesses varies across different countries (e.g. Lee, Cho, & Hwang, 2013; Zhu, Kraemer, & Xu, 2003). Despite the existence of some academic references to verify this assertion, the Chi-square test results of this study show that the mobile-friendliness of analyzed destination websites is not associated with the technological readiness (World Bank, 2018) of their affiliated countries (2016: χ^2 (16) = 22.93, $p > .05$; 2019: χ^2 (16) = 14.98, $p > .05$). As the today's world is becoming more globalized and digitized, both developing and developed countries have already acknowledged the necessity of adopting and leveraging information and communication technologies to enhance the productivity of their industries (Razavi, Ghasemi, Abdullahi, & Kashani, 2011). Considering that all countries have been making substantial investments in improving their technological infrastructure (Yadav, Sharma, & Tarhini, 2016), the trivial discrepancy in technological readiness among them may not be the potential reason explaining why the mobile-friendliness of their destination websites differ from each other.

Features available in different versions of mobile destination websites

Table 4 exhibits the frequencies of features available in those "fully mobile-friendly" and "partially mobile-friendly" websites that are analyzed in this study.

Generally speaking, both "fully mobile-friendly" and "partially mobile-friendly" websites provide rich information for their users. As shown in Table 4, a majority of features under the information dimension could be found in both "fully mobile-friendly" and "partially mobile-friendly" websites. Although these two versions of mobile destination websites are ostensibly similar, the chi-square test results show that four features (including I1, destination background information; I4, transportation information; I5, accommodation information; and I17, event calendar) are more frequently shown in "fully mobile-friendly websites." This follows Gibbs and Gretzel's (2015) assertion that "fully mobile-friendly" websites offer more types of information than their "partially mobile-friendly" counterparts.

Regarding the features under the transaction dimension, it is surprising that both "fully mobile-friendly" and "partially mobile-friendly" websites are not equipped with many transaction-related features. Only a handful of analyzed websites include the online reservation function. There are even fewer websites which can allow the users to reserve attraction and event tickets. This denotes that DMOs in the Asia Pacific region do consider their mobile websites as a portal for facilitating online transactions.

Pertinent to the features under the communication dimension, contact information and email newsletter subscription are more frequently found in "fully mobile-friendly" than in "partially mobile-friendly" websites. With regard to the relationship dimension, DMOs in the Asia Pacific region rarely feature customer loyalty programs and cross-selling opportunities into mobile websites in general and "partially mobile-friendly" websites in particular. Given that "partially mobile-friendly" websites are exclusively designed for mobile devices with the smaller screen size as mobile users who will not scrutinize site content in detail, this may partially explain why less features are offered in separate mobile websites.

Discussions

As modern smartphones are becoming more powerful in performing a variety of other functions, it is no longer a secret that travelers around the world are increasingly reliant on mobile devices to explore, research, and reserve products at the destinations (Liang et al., 2017; Wang & Wang, 2010). Considering that smartphones have been gradually replacing desktop computers as the primary Internet access device for fulfilling travelers' travel need (Google, 2016), it is of utmost importance for destination marketers to ensure all touchpoints that customers use to connect with destinations via mobile devices are frictionless and friendly for mobiles.

Being one of the two proxies that represents the readiness of a business to the mobile era (Leung, Lee, Fong, & Law, 2014), the current findings unveil that DMOs in the Asia Pacific region mostly acknowledge and keep pace with the mobile consumerism era by optimizing their business websites for mobiles. Over 60% of destination websites that are analyzed in this study are friendly for the viewports of smartphones and tablets. The high proportion of destinations converting business websites into mobile-friendly is partially attributed to the fact that mobile shoppers put ease of use foremost when they come to mobile shopping sites. While on-the-go consumers are now ready to connect with businesses via mobiles, business can exploit the opportunity derived from the mobile commerce age only if their websites are designed as friendly for mobiles (Lobo et al., 2011). Besides, given that business website is a representation of a property that allows website visitors to infer the quality of their product, it is vital for destination marketers to assure that their websites are mobile-friendly and thereby encouraging more visitation by mobile users (Vieira & Kumar, 2018).

To the trend of mobile design approach, Gibbs and Gretzel's (2015) exploratory study states regional DMOs in the United States prefer developing separate mobile websites for employing RWD. Unlike what Gibbs and Gretzel (2015) report, this study finds that the adoption of mobile website design approaches in the Asia Pacific region is different and RWD is a preferred option by DMOs in the Asia Pacific region. The advantages derived from RWD such as an increase in website traffic and engagement metrics is one potential reason why more destinations opt for RWD (Adams, 2014). The disadvantage of developing and maintaining separate mobile websites may partially explain this phenomenon. As the variety of mobile devices and screen sizes expands exponentially, Marcotte (2011) elucidates that creating different versions of mobile websites in order to make website interface compliance with different mobile browsers is technically feasible but practically infeasible. Since this approach requires website administrators to manage and update content on different mobile websites individually, the high upfront and maintenance costs might thus entice DMOs to opt for RWD.

Regarding the functions available in different versions of mobile destination websites, this study empirically verifies that most functions in the desktop version of destination websites are not available in the mobile version. This denotes that the model or criteria used for evaluating the functionality performance of desktop websites cannot be generalized to mobile websites. Moreover, since this study empirically verifies that less information and features are offered in "partially mobile-friendly" website, it is conceptually illogical to apply the assessment criteria developed for "fully mobile-friendly" website to evaluate the functionality of "partially mobile-friendly" website. To fairly assess and contrast functionality performance among all destination websites which are partially mobile-friendly, an idiosyncratic set of assessment criteria needs to be formulated for evaluating functionality of separate mobile websites. Being one of the first studies that focus on features embedded in mobile destination websites, the current findings are expected to be useful for future researchers in formulating models for assessing and benchmarking functionality performance of mobile destination websites.

Conclusions and limitations

Though this study is exploratory in nature, the findings do contribute new knowledge to the growing stream of research on information technology and tourism in two ways. First, this study is one of the first studies which focuses on mobile destination website in general and friendliness of destination websites for mobiles in particular. As noted earlier, scholars and practitioners in the field have been conducting numerous research on consumers' usage of mobile travel services, precursors influencing travelers' intention to adopt mobiles, mobile applications or mobile-mediated service in the travel context, and impact of mobile and associated applications on travelers' touristic experience (e.g. Eriksson, 2014; Morosan & DeFranco, 2016; Tussyadiah, 2016; Wang et al., 2012). While the application of mobiles in the travel and tourism context has been extensively researched, the mobile destination website has largely been overlooked by academic researchers. Considering that mobile destination website is another crucial touchpoint that travelers often use to look for travel tips and destination-related information via mobiles (Google, 2016), the findings of this study do complement those published works on mobile tourism by exposing how DMOs in the Asia Pacific region are ready to connect with their prospective travelers via mobiles.

Second, the findings of this study provide useful information for future researchers in developing evaluation models for assessing the functionality performance of the mobile destination website. Sun, Fong, Law, and He (2017) recently reviewed published articles on website evaluation in hospitality and tourism for the period of 2000–2015. According to their findings, Stienmetz, Levy, and Boo's (2013) work is the one and only study that focuses on mobile websites and no extant study has attempted to formulate an idiosyncratic evaluation framework for assessing functionality performance of mobile destination websites. Drawing on the current findings, the criteria used for evaluating functionality performance of desktop destination websites cannot be generalized to "fully mobile-friendly" destination websites. Moreover, given that less information and services are available in "partially mobile-friendly," website future researchers may consider formulating a set of assessment criteria drawing on the findings from this study.

Besides adding new knowledge to the literature, the managerial implications of this study are also significant. This study introduces two approaches that can be used for testing mobile-friendliness of destination websites. We also employ one of those approaches and successfully found that a majority of the analyzed websites are friendly for devices with various screen sizes and operating systems. Practitioners in the field may harness the introduced approaches to test how friendly their eCommerce websites are for mobiles. Reflecting the use and diffusion of mobile website design approaches among DMOs in the Asia Pacific region is another practical contribution of this study. Since this study unveils that RWD is the preferred mobile website design option employed by destination marketers in the Asia Pacific region, destination marketers from other regions who plan to optimize their business websites using RWD may use this as a reference to support the chosen approach.

Similar to other research studies, this study has some limitations which constrain the generalizability of its research findings. First, given that only 30 destination websites in the Asia Pacific region were evaluated, the results presented in this study may not be generalized to websites managed by other destinations in other regions. Moreover, since only six

smartphone devices were included in the emulator for testing, this study cannot claim to be widely generalizable due to the wide range of mobile devices existing in the market. To redress these limitations, future researchers are advised to include more destination websites for analysis and a wider scope of mobile devices should be selected for testing. Another direction for future research is to examine factors affecting practitioners' predisposition toward adopting RWD or separate mobile website as the website optimization approach. Qualitative methodology and particularly in-depth interviews with key decision-makers is one potential approach to achieve this. Rogers' (1983) innovation diffusion theory as well as Tornatzky and Fleischer's (1990) Technology-Organization-Environment framework are deemed to be relevant for exploring this suggested topic.

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