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Significance of the dimensions and attributes of hotel mobile website from the perceptions of users

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ABSTRACT

Research on the application of mobile technology in the hotel industry is still in its nascent stage. Most studies on mobile technology in the hotel industry have investigated mobile applications. However, studies on mobile websites remain limited. Mobile websites are significant sources of information of smartphone users for their purchasing decisions. A well-designed and well-managed mobile website can satisfy the needs of customers, whereas a poorly managed one can make them frustrated and dissatisfied. However, a particular mobile website evaluation model for the hotel industry has yet to be developed. Moreover, studies have yet to investigate user requirements for hotel mobile websites. Hotels cannot develop an effective and efficient mobile website to satisfy the users' needs, create a favorable experience for them, and influence their intention to purchase via mobile websites without understanding users' needs with regard to mobile websites. To fill in this research gap, this study applied qualitative and quantitative research methods to collect primary data and develop a comprehensive mobile website performance evaluation model for the hotel industry. This model includes usability and functionality dimensions that have been identified from the existing literature on mobile website and hotel website evaluation. All identified dimensions and attributes were validated by a group of hotel suppliers, information technology experts, users of hotel mobile website, and smartphone users. A total of 47 attributes and 7 dimensions were rated by 456 hotel mobile website users and ranked based on their importance thereafter. The weighting scores for each dimension and attribute were analyzed using a numerical computation method. Findings indicated that users preferred an easy-to-use mobile website design and structure, as well as simple information on hotel mobile websites. Users perceived all functionality dimensions as significant. Thus, an excellent hotel mobile website should present simple information while providing users with access to detailed information if necessary.

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Research background

Mobile technologies have created a new platform and provided opportunities for the hospitality and tourism industry to communicate, promote, and provide innovative services to their target customers (Buhalis & Pistidda, 2009; Eriksson, 2002). The number of smartphone users continues to increase significantly, particularly in the Asia-Pacific, Middle East, and Africa; users in these regions account for 60% of the world's population (eMarketer, 2014). Hotel organizations must begin to shift their marketing campaigns from stationary computers to mobile devices to gain opportunities from the emergence of mobile technologies and fulfill customer needs. The mobile marketing literature identifies different tools for mobile marketing, including short message services, mobile applications, and mobile websites (Krum, 2010). Leung, Lee, Fong, and Law (2014) explained that hotels in Hong Kong have begun offering mobile applications and mobile-friendly websites to their target customers. However, mobile technology studies in the hospitality and tourism industry have generally focused on the development and evaluation of mobile applications (Beldona, Lin, & Yoo, 2012; Chen, Hsu, & Wu, 2012; Höpken, Fuchs, Zanker, & Beer, 2010; Umlauf, Pospischil, Niklfeld, & Michlmayr, 2003; Wang & Xiang, 2012), with only a few studies investigating mobile websites (Groth & Haslwanter, 2015; Stienmetz, Levy, & Boo, 2012; Venkatesh & Ramesh, 2006).

Research on mobile websites in the hospitality and tourism industry is still in its infancy. Accordingly, only a few studies have investigated the destination management organization (DMO) and the usability of mobile websites. However, hotel mobile websites have yet to be explored. The limitations of mobile devices affect the browsing experience of users; therefore, all industries must improve the designs of their mobile website to enhance user experience and provide high-quality websites to their users or customers (Zhou, 2011). Mobile websites can be developed using several methods. Pasqua and Elkin (2013) explained that each method has its own advantages and disadvantages; however, its effects on user experience have yet to be investigated. Groth and Haslwanter (2015) analyzed the effects of responsive design websites (RDWs) on the user-perceived usability and attractiveness of a DMO mobile website. Data were obtained through a user-experience experiment and post-test questionnaire. The results indicate that RDWs had a better perceived usability than classical mobile websites, although the latter exhibited better perceived attractiveness than the former. Groth and Haslwanter (2015) studied the effects of RDWs on the user-perceived usability of DMO mobile websites. Responsive design is a pure mobile website design method and does not guarantee a satisfactory website experience; thus, a website must be designed based on customer needs (Kim, 2013).

Studies on mobile technology in the hotel industry have generally focused on predicting the intentions of website users to make hotel reservations (Wang & Wang, 2010), their intentions to download information from these websites (Kwon, Bae, & Blum, 2013), their preferred functions of hotel mobile applications (Verma, Stock, & McCarthy, 2012), and the attitudes of hotel managers toward the adoption of mobile applications (Adukaite, Reimann, Marchiori, & Cantoni, 2013). The advent of smartphones has enabled users to access full-page websites using mobile browsers; however, research on mobile website in other fields indicates that smartphone users prefer to use a well-designed and tailor-made mobile website instead of a full-page one (Schmiedl, Seidl, & Temper, 2009; Yeh & Fontenelle, 2012). A well-designed mobile website is simple and provides the same service and information as desktop websites (Budiu & Nielsen, 2011; Lee, Lee, Moon, & Park, 2013; Lobo, Kaskaloglu, Kim, & Herbert, 2011). However, the extant knowledge on the development and evaluation of mobile websites in the hotel industry remains limited, whereas research on mobile websites is still on its early stages.

Hoteliers should understand the needs of mobile website users, for without which, the former cannot develop effective and efficient mobile websites that can satisfy the needs of the latter, promote favorable customer experience, and influence the intention of customers to purchase hotel products via mobile websites. To fill in this gap, this study proposes a comprehensive model for evaluating the performance of hotel mobile websites in terms of usability and functionality. In addition, this research analyzes the significance of the dimensions and attributes of hotel mobile websites from the perspective of users.

Literature review

Hotel website evaluation model: functionality approach

A website evaluation model developed under a functionality approach mainly evaluates website performance based on the content and services provided. Information and services presented on websites significantly affect user e-satisfaction (Bai, Law, & Wen, 2008; Kim, Ma, & Kim, 2006), intention to make online reservations (Morosan & Jeong, 2008; Wong & Law, 2005), and perceived usefulness of a website (Lu & Yeung, 1998). Thus, evaluating the functionality performance of hotel websites is important to ensure website usefulness.

Murphy, Forrest, Wotring, and Brymer (1996) conducted the first study that evaluated hotel websites under a functionality approach. Their study identified 32 hotel website functionality attributes based on the content

analyses of websites of 20 hotel chains operating in the USA. These authors further classified the attributes into four dimensions, namely, promotion and marketing content, service and information, interactivity and technology, and management. However, the dimensions developed in Murphy et al. (1996) study lacked clear descriptions because a few identified attributes were classified into more than one dimension. Moreover, Murphy et al. (1996) study did not conduct further tests to confirm the validity and reliability of the developed dimensions.

Chung and Law (2003) proposed a hotel website information evaluation model to assess the performance of hotel websites. This model comprises 5 dimensions with 39 attributes developed from prior literature and content analyses of Hong Kong hotel websites. The five dimensions developed included *facilities information*, *customer contact information*, *reservations information*, *surrounding area information*, and *management of website*. *Facilities information* refers to the description and information of hotel facilities and services available to guests. *Customer contact information* includes features that facilitate the interactive communication between a hotel and its customers. *Reservation information* refers to the features and information related to facilities and services available on hotel websites, thereby facilitating or enabling users to make online reservations. *Surrounding area information* includes tourist information, such as weather, surrounding attractions, and transportation. Lastly, *management of website* refers to the attributes that assist in maintaining an effective and efficient website for customers to access relevant and up-to-date information. The Chung and Law (2003) study further developed a questionnaire to invite hotel managers to rank the dimensions and attributes based on their perceived significance, calculated the importance index for each dimension based on the data collected from the questionnaire, and applied these indices to measure the performance of Hong Kong hotel websites. Although this model confirmed the dimensions and attributes from the perspective of hotel managers, it failed to consider customer needs. Hence, Law and Hsu (2005) addressed this limitation by extending the model to investigate important website dimensions and attributes from the perspective of customers. These researchers analyzed the effects of the quality of hotel website information on user intention to make online reservations. Their result indicated that reservations, facilities, and customer contact information were perceived as the most important dimensions. Moreover, the quality of the hotel website information influences customer intention to make online reservations. This model was also used to compare the perceptions of e-buyers and e-browsers on the importance level of website dimensions; however, the result failed to indicate a difference between the two types of customers (Law & Hsu, 2006). The dimensions and attributes of the hotel website developed from the hotel website functionality evaluation model of Chung and Law (2003) were further confirmed by different studies (Ip, Law, & Lee, 2012; Rong, Li, & Law, 2009; Zafiroopoulos & Vrana, 2006).

Mobile website evaluation: usability approach

Venkatesh and Ramesh (2006) first evaluated a tourism mobile website. The generalizability of the Microsoft usability guidelines (MUG) model was analyzed by extending it to other contexts (e.g., country, industry, and mobile websites). Agarwal and Venkatesh (2002) developed the MUG model, which is a website usability evaluation model originally developed by Microsoft Corporation (Keeker, 1997). This model includes five dimensions, namely, *content*, *ease of use*, *made of the medium*, *promotion*, and *emotion*, with a total of 14 sub-dimensions. Venkatesh and Ramesh (2006) indicated that users have different usability requirements for traditional and mobile websites in the banking, news, shopping, and tourism industries. The MUG model was also used to evaluate the usability of tourism mobile websites. The results indicate that *content*, *ease of use*, and *made of the medium* were the most important factors that determined the usability of tourism mobile websites. However, an emulator was used to evaluate mobile websites instead of real mobile phones. Thus, the result may fail to reflect real-life situations. Moreover, mobile technologies at that time were still immature, websites were restricted by low bandwidth and download speed, and mobile website design was simple. Accordingly, the findings of this research may be inapplicable in the current mobile technology environment.

Tung, Xu, and Tan (2009) enhanced the MUG model and asserted that several dimensions of this model lacked clear definitions. The current study clarifies the meaning of the five dimensions by analyzing 33 website usability articles to identify different website attributes. Thereafter, these attributes are mapped onto the MUG model. The enhanced MUG model (eMUG) removed *promotion* because it lacked a direct effect on website usability. Table 1 provides the definitions of all dimensions and sub-dimensions of the eMUG model. Stienmetz et al. (2012) adopted the eMUG model to evaluate the DMO mobile website usability from a study of 144 US travelers. In Stienmetz et al. (2012) study, the authors investigated the factors that affected the overall usability of the DMO mobile site and determined that *content*, *ease of use*, and *made of medium* significantly affected perceived usability. This result confirmed those of Venkatesh and Ramesh (2006).

The quality of mobile websites affects the browsing experience of users. Thus, industry practitioners should improve the mobile website design and provide high-quality sites to enhance user experience (Zhou, 2011). Various mobile website development methods are available. Pasqua and Elkin (2013) stated that each development method has advantages and disadvantages. However, the effect on user experience of different methods of mobile website development has yet to be discussed. Groth and Haslwanter (2015) analyzed the effects of the RDW method on user-perceived usability and attractiveness of a DMO mobile website. Data collected from a user

Table 1. Dimensions and sub-dimensions of the eMUG model.

Dimension/ Sub-dimensions	Meaning
Content	Extent of mobile website capability in providing information and service
Quality	Offered content is accurate and error free
Media use	Use appropriate media to communicate content
Depth and breadth	Reduce unnecessary features and information
Up to date	Provide updated information
Ease of use	Extent of effort that users need to pay in achieving a specific goal
Appearance	Provide a simple, understandable, and comfortable website template
Convenient service	Provide service to assist users with their online activities
Structure	Well-structured and organized page
Feedback	Provide clear and understandable result and feedback regarding to the user progress
Made of the medium	Provide tailor-made service and experience to users
Community	Provide opportunities for users to contribute information and be a part of the online group
Personalization	Provide unique service and information to users
Refinement	Provide updated information and promotion to the users
Emotion	Evoke emotional reaction from users
Plot	Provide interesting story line
Character strength	Ensure the privacy and security service and information
Pace	Enable users to control the flow of information

Source: Tung et al. (2009)

experience experiment and a post-test questionnaire indicated that mobile websites developed using the RDW method achieved better perceived usability than traditional mobile websites. Nonetheless, traditional mobile websites exhibited better perceived attractiveness than RDWs. Groth and Haslwanter (2015) exclusively focused on the effect of mobile RDWs on the user-perceived usability of the DMO mobile websites. Despite this situation, other mobile website design methods are available, and each method has its weaknesses and advantages. Moreover, RDW is a mobile website design method and does not guarantee satisfactory website experience; a successful website should be designed based on customer needs rather than the advantages of a mobile website design method (Kim, 2013).

Research gap

Smartphones enable users to access full websites through mobile browsers; however, mobile website research in other fields have indicated that smartphone users prefer to use a well-designed and tailor-made mobile website rather than a full-website page (Schmiedl et al., 2009; Yeh & Fontenelle, 2012). A well-designed mobile website should be simple and provide the same services and information as desktop websites (Budiu & Nielsen, 2011; Lee et al., 2013; Lobo et al., 2011). However, knowledge on developing and evaluating mobile websites in the hotel industry remains limited. Accordingly, research on mobile websites in the hospitality

industry is still in its infancy because only a few researchers have analyzed the factors that influence the usability of the DMO mobile websites. Moreover, studies have yet to investigate mobile websites in the hotel industry.

Venkatesh and Ramesh (2006) indicated that users have varying usability requirements for different mobile websites. For example, a user of a mobile tourism site has high requirements for *content* and *ease of use*, whereas a user of a mobile bank website has high usability requirements for *made for the medium* and *content*. Therefore, the results presented by Stienmetz et al. (2012) may be inapplicable in the hotel industry. Hence, further investigation on the usability requirements for hotel mobile websites is necessary. The aforementioned studies identified factors that affected user-perceived usability of tourism-related mobile websites but did not analyze the usability factors with relevant attributes. Thus, these studies were unable to evaluate the specific performance of mobile websites.

Accurate website evaluation is important for long-term success in the online business environment (Lee & Morrison, 2010; Scharl, Wöber, & Bauer, 2003). However, various studies were unable to develop a mobile evaluation model that can assess mobile website performance. Numerous hotel website evaluation models have been developed, but studies have failed to consider the limitations of mobile devices, such as small screen size, slow CPU speed, low screen resolution, short battery life (Chae, Kim, Kim, & Ryu, 2002; Kamba, Elson, Harpold, Stamper, & Sukaviriya, 1996; Sadeh, 2002; Stienmetz et al., 2012; Stöm, Vandel, & Bredican, 2014); effects of mobile website design and content (Budiu & Nielsen, 2011; Jeong & Han, 2012); and the change in user browsing behavior (Church & Oliver, 2011; Cui & Roto, 2008). Existing website evaluation models were developed by considering the traditional website context, which may be inapplicable to mobile websites. Therefore, developing a mobile website evaluation model is necessary to assess the performance of hotel mobile websites. To fill in this gap, the current study proposes a comprehensive model for evaluating the performance of hotel mobile websites under the usability and functionality approaches.

Conceptual framework

The capabilities of smartphones have changed the communication role of customers in the hotel industry. Smartphone users can control the information that they receive from various organizations. Hence, the hotel industry must understand the needs of their users and develop mobile applications based on the latter's preferences and expectations from mobile technologies (Katsura & Sheldon, 2008). Mobile websites must be evaluated from the perspective of their users. Previous studies on the adoption

of hotel mobile technologies identify *usefulness* and *ease of use* as two determinant factors that affect the intention of users to use or accept mobile technologies (Kwon et al., 2013; Morosan & DeFranco, 2014). These terms were developed from the technology adoption model of Davis (1986). Usefulness refers to the extent to which a technology or system can assist users accomplish their intended purposes. By contrast, ease of use refers to the level of effort required to use a technology for accomplishing specified goals.

Lu and Yeung (1998) defined usefulness as helpfulness and indicated that a helpful website should be easy to use and provide sufficient and detailed information to its customers. They further divided usefulness into usability and functionality. In the hotel industry, information is one of the most important factors that determine the success of hotel websites. Sufficient and effective information can affect the satisfaction of hotel customers or prompt them to make online reservations (Ip et al., 2012; Lu & Yeung, 1998). Therefore, the contents and services provided by hotel mobile websites must be analyzed and evaluated. To assess the usability performance of hotel mobile websites, the present study modifies the evaluation models for hotel website functionality developed by Chung and Law (2003), Zafiropoulos and Vrana (2006), Rong et al. (2009), and Ip et al. (2012) to assess the functionality performance of hotel mobile websites; as well as the modified eMUG model (Tung et al., 2009).

The proposed performance evaluation model for hotel mobile websites comprises the functionality and usability dimensions. In the present study, functionality is defined as the richness of information and services provided by hotel mobile websites. By contrast, usability is defined as the level of effort required to use a hotel mobile website. The present study also removes *management of website* from the existing evaluation models for hotel website functionality (Chung & Law, 2003; Ip et al., 2012; Rong et al., 2009; Zafiropoulos & Vrana, 2006), as well as *community*, *refinement*, *plot*, and *character strength* from the eMUG model (Tung et al., 2009). The reason is that these dimensions were either duplicated or unrelated to the current model's aims and definition. Figure 1 illustrates the conceptual framework of the current study.

Methodology

This exploratory study aims to develop a performance evaluation model for mobile websites for the hotel industry. The hotel industry lacks a performance evaluation model for mobile websites, and existing research on mobile website evaluation generally assesses mobile websites in terms of usability (i.e., website design and navigation) rather than functionality (i.e., information and service provided by the mobile website). Thus, this



Figure 1. Conceptual framework. Adapted from Chung and Law (2003) and Tung et al. (2009)

study employs qualitative and quantitative research methods in collecting primary and secondary data, thereby facilitating the development of a comprehensive performance evaluation model for mobile websites for the hotel industry.

Instrument development

The literature on mobile website and hotel website evaluation was reviewed to identify the dimensions and attributes of the evaluation model. Mobile technologies and website features are rapidly changing; hence, a content analysis of current hotel mobile websites was conducted to determine their most current attributes and develop an accurate evaluation model. The data collection method has been adopted by numerous website evaluation researchers (Chung & Law, 2003; Hashim, Murphy, & Law, 2007) and can

be used to collect the latest attributes from hotel mobile websites. The following attributes were added into the model after analyzing the contents of 87 Hong Kong hotel mobile websites in May 2015: customer review, restaurant reservation, shuttle bus schedule, currency converter, link to smartphone function (e.g., making phone calls, sending e-mails, and accessing Google Maps), and express check-in and check-out services.

A focus group interview was conducted to ensure validity of the identified dimensions and attributes. The present study aims to develop a performance evaluation model for hotel mobile websites from the users' perspectives. However, the development of mobile websites may actually be affected by several factors, such as technology environment, hotel industry, and preferences of smartphone users. Therefore, hotel customers, smartphone users, IT experts, and hospitality scholars were invited to provide their comments and opinions on the dimensions and attributes identified from the literature and the results of the content analysis. Thereafter, a modified conceptual framework with 4 functionality dimensions (19 attributes) and 3 usability dimensions (28 attributes) was established. [Figure 2](#) presents the modified



Figure 2. Modified conceptual framework.

conceptual framework, which comprises the functionality and usability dimensions, as well as the related attributes. All attributes were assessed through content analysis of 88 Hong Kong hotel mobile websites and a group of hotel mobile website stakeholders. Therefore, the modified conceptual model is applicable to the hotel industry and can accurately evaluate the performance of hotel mobile websites.

A questionnaire was developed based on the dimensions and attributes identified from Stage 1. A qualifying question was asked in the first stage to eliminate the unqualified respondents. Only smartphone users who used their smartphones to access a mobile website of a hotel or an online travel agency that provided hotel information and reservation services in the past 12 months would qualify as survey respondents. In the second stage, the respondents were asked to rate the importance of each dimension, sub-dimension, and attribute using a 5-point Likert scale ranging from 1 (very unimportant) to 5 (very important). The respondents were allowed to select N/A (“not applicable”) as their response. In the last stage, the demographic information and smartphone usage behavior of the respondents were collected.

Target samples

This study aims to determine the level of perceived importance of the dimensions and attributes from the perspective of a hotel mobile website user. Thus, target respondents were smartphone users who accessed a mobile website of hotels and/or online travel agents that provided hotel information and reservation services (e.g., Hotels.com or Agoda) in the past 12 months. Given the unknown population of the users of hotel mobile website, snowball and convenience sampling methods were employed to identify the target respondents. Online questionnaires were sent to friends and relatives of the researchers. Each respondent was asked to forward the questionnaire to other respondents who may have used smartphones to access hotel mobile websites.

Reliability testing

Hashim et al. (2007) proposed a framework to develop a hospitality website evaluation model. This framework emphasized the significance of assessing the reliability of instruments. Therefore, prior to the analysis of the perceived importance of each dimension and attribute in the proposed model, a reliability test was conducted to ensure internal consistency. The Cronbach’s α reliability test was used in the present study because it is the most popular reliability test used by researchers (Hinton, McMurray, &

Table 2. Cronbach's α -value of each dimension and attribute.

Dimension	Cronbach's α	Sub-dimension	Cronbach's α	Attribute	
Functionality	0.805	Reservation information	0.719	Check room rate	
				Check room availability	
				View/cancel reservation	
				Online/real-time reservation	
		Customer contact information	0.712		Special request
					Contact detail
					Hotel direction
		Facilities information	0.814		Customer review
					Feedback/survey
					Hotel descriptions
Hotel facilities					
Hotel promotion					
Guest room facilities					
Restaurant					
Usability	0.754	Surrounding information	0.703	Frequent guest program	
				Shuttle bus schedule	
		Ease of use	Convenience service	0.934	Restaurant reservations
					Location transportation
		Structure			General information of the city
					Access mobile websites through search engines
					Link to full website page
					Simple (easy) input method
					Link to smartphone function (e.g., call, email and Google map)
					Search box
Language options					
Currency converter					
Pop-up window blocker					
Consistent content					
Appearance			Allow users to control the flow of information (avoid auto refresh)		
			Menu bar to access necessary functions		
			Labels for relevant information		
			Show the "home" key in each page		
			Provide an expandable menu		
			Vertical scrolling		
			Restrict to three levels of navigation (three-clicks rule)		
			Information can fit to the screen without zoom in or out		
			Simple descriptions for icon		
			Appropriate amount of space between icons		
Content	Feedback	Up to date	0.733	Bulleted information presentation	
				Provide error message	
				Updated information	
Personalization	Quality	Media use	0.773	Photo of hotel	
				Virtual tour	
				No animation	
				Validity link	
				Express check-in and check-out services	
				Location-based service	

Brownlow, 2014). Table 2 presents the Cronbach's α values of each dimension and attribute in the proposed model.

Table 2 shows that all dimensions and attributes had Cronbach's α values above 0.70 and reached the lower limit for the accepted level of the Cronbach's α reliability test (Hair, Anderson, Tatham, Black, & Babin, 2006). This result indicated that all dimensions and attributes in this model exhibited internal consistency.

Findings and discussion

A total of 456 questionnaires were collected at the end of 2015. Table 3 summarizes the main characteristics of the respondents. Among the respondents, 49.1% were male, and 50.9% were female. The majority of the respondents are between 35 and 44 years (30.9%), and over 40% accessed mobile websites 1 to 3 h a day. Approximately 70% of these respondents were smartphone users for over 4 years.

Importance of functionality dimensions and attributes

Table 3 shows the perception of users on the importance of the functionality dimensions and attributes of hotel mobile websites. Functionality is divided into four sub-dimensions, namely, *reservation*, *customer contact*, *facilities*, and *surrounding information*. Table 4 shows that all functionality dimensions have mean values above 4.0, thereby indicating that the users perceived these dimensions as important. The respondents regarded *reservation information*

Table 3. Demographic profile of the respondents.

Variable (<i>n</i> = 456)	Number	%
Gender		
Male	224	49.1
Female	232	50.9
Age		
18 or below	4	0.9
19–24	44	9.6
25–34	136	29.8
35–44	141	30.9
45–54	81	17.8
55 or above	59	11
Frequency of access of mobile website (per day)		
Less than 1 hour/s	55	12.1
1–3 hours	190	41.7
4–6 hours	113	24.8
More than 6 hours	98	21.5
Length of smartphone use	23	5
Less than 1 year		
1–3 year/s	105	23
4–6 years	150	32
More than 6 years	178	39

Table 4. Users' perception on the importance of the functionality dimensions and attributes of hotel mobile websites.

Sub-dimension	Overall (n = 456)		Attributes	Overall (n = 456)	
	Mean	SD		Mean	SD
Reservation information	4.52	0.714	Check room rate	4.71	0.542
			Check room availability	4.64	0.651
			View/cancel reservation	4.4	0.778
			Online/real-time reservation	4.34	0.807
			Special request	3.68	1.113
Customer contact information	4.39	0.681	Contact details	4.55	0.647
			Hotel direction	4.42	0.83
			Customer review	4.23	0.845
			Feedback/survey	3.7	1.083
Facilities information	4.38	0.72	Hotel descriptions	4.48	0.704
			Hotel facilities	4.29	0.796
			Hotel promotion	4.25	0.895
			Guest room facilities	4.2	0.844
			Restaurant	3.71	1.048
			Frequent guest program	3.66	1.034
			Shuttle bus schedule	3.53	1.2
			Restaurant reservation	3.34	1.218
Surrounding information	4.02	0.818	Location transportation	3.99	0.964
			General information of the city	3.97	0.895

as most important (mean score = 4.51), followed by *customer contact information* (mean = 4.39), *facilities information* (mean = 4.38), and *surrounding information* (mean = 4.02). Law and Hsu (2005) showed that users perceived *reservation* and *surrounding information* as the most and least important functionality dimensions of hotel websites, respectively.

Mobile Commerce Daily (2015) reported that Hotels.com conducted over 25% of its transactions in 2014 through mobile devices and forecasted an increase in the number of hotel bookings conducted through mobile devices in the future. This finding explains why users perceive *reservation information* as the most important dimension of hotel mobile websites and suggests that users perceive hotel mobile websites as important resources for searching hotel information and making room reservations. For *surrounding information*, Kaikkonen (2007) and HotelNewsNow (2014) argued that users tend to seek for specific information on mobile websites because *surrounding information* is indirectly related to the core products and services of hotels. Users could easily access this information from other tourism-related mobile applications or websites. Thus, they would perceive *surrounding information* as the least important functionality dimension of hotel mobile websites. Nevertheless, researchers still perceive *surrounding information* as important in determining the overall performance of hotel mobile websites. Therefore, hotel managers must not overlook this information on their mobile websites.

Although no difference was observed in the perceived importance of *reservation information* and *surrounding information* in the mobile and desktop websites of hotels, the perceived importance of *customer contact information* and *facilities information* slightly varied. Users regarded *customer contact*

information (mean = 4.39) as more important than *facilities information* (mean = 4.38) on hotel mobile websites. This variance may be attributed to the different objectives of users for browsing hotel mobile and desktop websites. ComScore Mobile Travel Advisor (2012) reported the search for hotel addresses or directions as the most popular hotel-related activities on mobile devices. Therefore, the respondents perceived *customer contact information* as more important than *facilities information* on hotel mobile websites.

Reservation information refers to the information and services that enable users make online reservations. This dimension includes five attributes. The respondents identified *check room rate* (mean = 4.71) as the most important attribute on hotel mobile websites, followed by *check room availability* (mean = 4.64) and two other attributes related to reservation management. *Special request* (mean = 3.68) was perceived as the least important attribute in this sub-dimension. Most travelers are sensitive to the prices of hotel accommodations; thus, their purchase intentions are significantly affected by price (Chiang & Jang, 2007; Kim et al., 2006). Travelers tend to search for and compare hotel room rates using different channels to support their purchasing decisions. Therefore, users perceived room rate as one of the three critical reservation information on hotel mobile websites. The number of travelers who use hotel mobile websites for room reservations recently increased (Linton & Kwortnik, 2015). This development explains why users perceived *check room availability*, *view/cancel reservation*, and *online/real-time reservation* as important attributes of hotel mobile websites.

Customer contact information refers to the information and services that facilitate interactive communication between hotels and customers. This sub-dimension includes four attributes. The *feedback/survey* received 3.70 points, while the other three attributes received mean scores of over 4.00 points. Therefore, the respondents viewed these three attributes of hotel mobile websites as important. The respondents specifically considered *contact details* as a significantly important attribute. This outcome indicated that users tend to use hotel mobile websites to search for room rates and availability and communicate directly with hoteliers for inquiries. However, the screen size of smartphones restricts users from searching for detailed information on mobile websites (Shrestha, 2007). Users expect to find information immediately on mobile websites (Lobo et al., 2011). Therefore, they may prefer to contact hotels to find specific information immediately and exert limited effort in searching on hotel mobile websites, even if hotels provide a considerable amount of information on their mobile websites. Accordingly, hotels must provide accurate and detailed contact information on their mobile websites.

Facilities information includes eight attributes related to the facilities and services available in a hotel. The respondents considered *hotel description* (mean = 4.48), *hotel feature* (mean = 4.29), and *hotel promotion* (mean = 4.25)

the top three important attributes in this dimension, but not *restaurant reservation* (mean = 3.34).

Surrounding information refers to the local tour information and has only two attributes. These two attributes have mean values above 3.0, thereby indicating their perceived importance by mobile website users. *Surrounding information* was regarded as the least important dimension because users can search for local tour information using other sources.

Importance of usability dimensions and attributes

Usability refers to the level of effort that users need to exert to accomplish their specific goals in using hotel mobile websites. When users exert minimal effort to achieve their goals in using a particular mobile website, they perceive the website as having a favorable usability performance. In the current study, the required level of effort to use a hotel mobile website was measured using three sub-dimensions, namely, *ease of use*, *content*, and *personalization*. The sub-dimensions comprise 28 attributes, which were collected from the mobile website technology literature and content analyses of hotel mobile websites. The attributes under the sub-dimensions of *ease of use* and *content* were further divided into three to four sub-categories to further illustrate the usability performance of hotel mobile websites. The respondents were requested to rate their perceived importance of the usability dimensions but were not required to rate the perceived importance of the sub-categories. Table 5 presents the user-perceived importance of each usability dimension. The respondents regarded *ease of use* (mean = 4.43) as the most important usability dimension followed by *content* (mean = 4.34). *Personalization* (mean = 3.85) was perceived as the least important usability dimension of hotel mobile websites. This outcome is consistent with the findings of Stienmetz et al. (2012), that is, users preferred a simple and convenient experience when using hotel mobile websites.

Ease of use refers to how a website enables users achieve their goals. This dimension is further divided into four sub-categories, namely, *appearance*, *convenience service*, *structure*, and *feedback*. *Convenience service* refers to any service or function on a mobile website that enables users in their online activities. This sub-category includes 7 attributes; *access mobile website through search engine* (mean = 4.27) has the highest mean value and *currency converter* (mean = 3.45) received the lowest mean value. *Structure* refers to the organization and structure of a mobile website. This dimension includes 9 attributes that have mean values above 3.50, thereby indicating that users viewed these attributes as important. *Appearance* includes 4 attributes related to the template of a hotel mobile website; these attributes received mean scores ranging from 3.64 to 4.06. Therefore, the respondents perceived all attributes as important, with “information must fit the screen and does not

Table 5. Users' perceptions on the importance of the usability dimensions and attributes of hotel mobile websites.

Dimension/Sub-dimension	Overall (n = 456)		Attributes	Overall (n = 456)				
	Mean	SD		Mean	SD			
Ease of use—convenience service	4.43	0.732	Access mobile websites through search engines	4.27	0.859			
			Link to full website page	4.07	0.932			
			Simple (easy) input method	4.07	0.946			
			Link to smartphone function (e.g., calls and Google Maps)	3.96	1.042			
			Search box	3.92	0.971			
			Language options	3.64	1.299			
			Currency converter	3.45	1.29			
			Pop-up window blocker	4.09	0.941			
			Consistent content	4.09	0.855			
			Allow users to control the flow of information (avoid auto refresh)	4.08	0.954			
Ease of use—structure			Menu bar to access necessary functions	3.92	0.981			
			Labels for relevant information	3.91	0.911			
			Show the “home” key in each page	3.87	1.008			
			Provide an expandable menu	3.74	0.965			
			Vertical scrolling	3.59	1.137			
			Restrict to three levels of navigation (three-clicks rule)	3.54	1.093			
			Ease of use—appearance			Information can fit the screen without zooming in or out	4.06	0.952
						Simple descriptions for icons	3.88	0.999
						Appropriate amount of space between icons	3.85	1.041
						Bulleted information presentation	3.64	1.11
Ease of use—feedback			Provide error messages	3.77	1.095			
			Updated information	4.62	0.662			
Content – Up to date	4.34	0.764	Photo of hotel	4.46	0.737			
Content—media use								
Content—quality			Virtual tour	3.56	1.075			
			No animation	3.31	1.306			
Personalization	3.85	0.934	Validity link	3.98	1.162			
			Express check-in and check-out service	4.08	0.912			
			Location-based service	3.87	1.008			

require zooming in or out” as the most important attribute. Feedback refers to the capability of a hotel mobile website to provide clear results about the progress of the user in performing an online activity. This sub-category includes one attribute that the respondents viewed as important for hotel mobile websites.

Content refers to the capability of mobile websites to provide information and services to users. This dimension is divided into three sub-categories, namely, *quality* (one attribute), *media use* (four attributes), and *up-to-date* (one attribute). Among these attributes, *updated information* (mean = 4.62) was viewed as the most important and *no animation* (mean = 3.31) as the least important. Given that smartphones allow users to load high-resolution

images significantly faster than before, the respondents considered *no animation* as the least important attribute.

Personalization refers to the unique customized services and information provided by hotel mobile websites to their users. This sub-dimension includes two attributes, both of which are perceived as important for hotel mobile websites. Table 4 shows that the respondents perceived *express check-in and check-out services* (mean = 4.08) as more important than *location-based service* (mean = 3.87) in terms of the usability performance of hotel mobile websites. This result agrees with the findings of Linton and Kwortnik (2015), who determined that customers are willing to use mobile services for convenience (e.g., for checking in or out and reserving hotel rooms) but are not keen on using automatic geolocation services, which utilize their current locations without their permission. These researchers also determined that customers were willing to share their information when receiving a certain value in return. For example, customers were willing to share their location information when searching for attractions around hotels they are staying in. Wang and Wang (2010) argued that hotels should be aware of the privacy and permission issues of location-based services. Mak, Nickerson, and Sim (2015) suggested that hotels should improve the privacy levels and settings of their mobile websites. In summary, hotels must ask permission from their customers prior to providing any location-based service, including location identification, personalized advertising, and offers. These hotels must only provide location-based services that can actually benefit their customers.

Conclusion and implications

This study aimed to build a comprehensive evaluation model to assess hotel mobile website performance based on the functionality and usability approaches. Although the literature on hotel website evaluation models is extensive, the findings were restricted by the limitations of smartphones. Hence, users behaved differently when using either a mobile or a desktop website when searching and browsing (Okazaki, 2012). Moreover, different requirements of mobile website were assumed. Thus, new evaluation models should be built specifically for mobile websites. The findings presented in this study proved the assumption and indicated the differences in the user requirements of mobile websites.

Users' perceived *reservation information*, *customer contact information*, and *ease-of-use* as the three most important dimensions on hotel mobile website. Among the 47 attributes, users perceived *check room rate*, *check room availability*, and *contact detail* as the top three most important functionality attributes. *Update information*, *photo of hotel*, and *access mobile website through a search engine* were the top three most important usability attributes. These results indicated that users preferred an easy-to-use mobile

website design and structure that will reduce their effort to immediately find specific information. However, they also preferred simple information presented on hotel mobile websites. Users favoring simple information on mobile websites do not mean that hotels should present limited information. On the contrary, findings showed that users perceived all functionality dimensions as important for a hotel mobile website. Hence, a very good hotel mobile website should provide simple information and enable users to retrieve detailed information when necessary. Moreover, hotels should update their mobile website information regularly to ensure that the information presented is updated. Location-based service is one of the features of mobile technologies. However, this study determined that users perceived *location-based service* as less important than *express check-in and check-out services*. This perception may imply that users are concerned with their personal data being exploited by the hotel or used by third parties while accessing the location-based service on mobile websites. Therefore, hotels should ask permission from users prior to providing this type of service, as well as inform users on the type of data being collected and how it will be used. Accordingly, enabling users to choose the type of service and information to receive and provide is important.

An accurate website evaluation is crucial to long-term success in the online business environment (Lee & Morrison, 2010; Scharl et al., 2003). Regular evaluation of mobile websites is necessary to maintain its performance and formulate a successful mobile marketing strategy. The proposed hotel mobile website evaluation model comprises the functionality and usability dimensions that comprehensively reflect performance. Each dimension in the model comprises the associated attributes that could express the specific performance of a mobile website. The proposed model was developed from the perspective of hotel mobile website users. Therefore, applying this model to assess hotel mobile websites will enable managers to collect detailed, accurate, and specific information, thereby facilitating the development of a mobile website that satisfies user requirements and expectations. The developed evaluation model can also be used as a management tool for hotel organizations to develop, monitor, and improve their hotel mobile website, thereby attracting hotel reservations or building long-term relationships with customers.

Although the present study obtained viable results, the questionnaire used to collect the user-perceived importance of each dimension and attribute in hotel mobile websites was available only in English. Thus, the respondents were limited to hotel mobile website users who can read and understand English. This limitation could explain why more respondents were from Western regions (305) than from Asia (151). The unbalanced sample region may also limit the generalizability of the study results. A benchmark for the performance of hotel mobile websites has not been developed. Future studies may apply the proposed model to analyze the performances of different hotel mobile websites,

as well as develop an industry benchmark for mobile websites that can assist various industries assess the performance of their mobile websites.

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