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The influence of smart tourism applications on perceived destination image and behavioral intention: The moderating role of information search behavior

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ABSTRACT

This study aims to investigate tourist perceptions on the smart tourism application attributes, which can later influence their perceived images of a destination and enhance their future behavioral intention toward the destination. Furthermore, it investigates the moderating effect of information search on the relationship between STA attributes and perceived destination image and between perceived destination image and behavioral intention. Using the stratified and convenience sampling approaches, 1484 international tourists visiting Hong Kong participated in the survey. The results show that among six STA attributes, the attributes of smart information systems, smart sightseeing, e-commerce systems, and smart forecasting had a positive influence on tourists' perceived destination image. Consequently, tourists' perceived destination image positively enhances their behavioral intention. Furthermore, regarding the effect of information search moderation, the less time spent on information search, the more the likelihood of a relationship between STAs and perceived destination image increases. However, the more time tourists spent on information search, the more the relationship between perceived destination image and behavioral intention increases. The findings contribute to the important STA attributes to destination image perception and the moderating role of information search. The managerial implications will be suggested to tourism authorities, destination local government, and tourism enterprises to adopt a competitive strategy at a smart destination to maintain destination competitiveness and sustainability.

1. Introduction

Promoting smart tourist destinations has been inspired by the rapid growth in tourist numbers, changes in tourist behavioral patterns, and tourists' extensive use of digital technologies (Corte, D'Andrea, Savastano, & Zamparelli, 2017). For the tourism sector, the concept of smart tourism seeks to explain how each destination can customize advancements in information technology (e.g., information and communication technologies [ICTs], cloud computing, and the Internet of Things [IoT]) to facilitate interactions amongst tourists, promote the internationalization of tourism, and strengthen the quality of the tourist experience (Gretzel, Reino, Kopera, & Koo, 2015; Jovicic, 2019; Wang, Li, & Li, 2013). The provision of innovative technologies can improve the service quality of tourism providers and government officials, and enhance the positive image of a destination and improve the visitation and recommendation intentions of tourists (Kock, Josiassen, & Assaf, 2016; Papadimitriou, Apostolopoulou, & Kaplanidou, 2014). As a result, the 'smart tourism' trend has become an important topic for destination marketing organizations.

The concept of a smart tourism destination has evolved from the traditional tourism destination, which focuses on the unique geographical features of destinations (Jovicic, 2019), to associate information technology with specific destinations. For instance, tourists can engage in 'smart tourism' through seamless access to value-added services to respond their needs before (e.g., information search on price and attractions), during (e.g., direction search and e-payments) and after their trip (e.g., posting comments/pictures on social media) (Buhalis & Amaranggana, 2014). When tourists' travel experiences are

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enhanced by advancements in information technology, their experiences are improved and their perceived destination image is likely to increase, which consequently drives their intention to recommend or revisit this destination. In this regard, the attributes of smart tourism applications (STAs) involve the adoption of ICTs in a tourist destination to provide better experiences, foster businesses and destinations, and enhance the travel experience in the smart destination (Dalgic & Birdir, 2020; Gretzel, Sigala, Xiang, & Koo, 2015).

Although many studies have examined STAs (Buhalis, 2000; Buhalis & Amaranggana, 2014; Gretzel, Werthner, Koo, & Lamsfus, 2015; Koo, Park, & Lee, 2017), some research gaps have yet to be filled. First, the smart city concept has been implemented in many major cities, such as Brisbane, Amsterdam, Seoul, and Shenzhen. However, prior research soliciting the opinions of tourists on the concept of smart tourism remains insufficient because smart tourism development remains in its infancy, and empirical studies on this topic are rare (bib_Gretzel_and_Scarpino_Johns_2018Gretzel & Scarpino-Johns, 2018; Mehraliyev, Chan, Choi, Koseoglu, & Law, 2020; Wang, Li, Zhen, & Zhang, 2016). In addition, STAs from one destination may not be generalizable to another destination (Mehraliyev et al., 2020). Moreover, whether smart tourism can translate into meaningful experiences for tourists and create value for business networks in local communities remains unknown (Gretzel, Reino, et al., 2015). This study refers to the STAs of Wang et al. (2016) to test the outcomes in Hong Kong as a smart destination. These STA attributes are comprehensive and involve most travel activities such as online purchases and information searches for queuing times, travel flow, travel planning, and public transportation. These attributes can influence the differentiation and perceived destination image of the smart destination from the tourists' standpoint.

Second, there is a lack of research on consumers' preferences in relation to STAs, especially on the use of particular technologies (Femenia-Serra, Neuhofer, & Ivars-Baidal, 2019; Mehraliyev et al., 2020). Xia, Zhang, and Zhang (2018) highlighted the research gap between users' online experiences of mobile technologies and their perception of destination image. Mehraliyev et al. (2020) suggested incorporating the integration of new smart applications and technologies with theoretical developments. Therefore, this study uses the service-dominant logic (SDL) approach to examine how tourists' perceptions towards STAs affect the perceived image of a smart destination and behavioral intention. SDL is used to assess the tourism experience activities and relationships within the smart destination (Boes, Buhalis, & Inversini, 2016). Lastly, many sources of travel information have emerged due to the Internet, as a result of the information search behavior of tourists (Xiang & Gretzel, 2010). Information search frequency affects tourists' perceptions of STAs, perceived destination image, and behavioral intention (Money & Crotts, 2003). However, whether the time spent on information search positively or negatively affects tourists' perceptions of STAs and perceived destination image has yet to be explored. Thus, this study will use information search as the moderating variable to investigate these relationships and extend theoretical development in the field.

To address the aforementioned gaps, this study aims to 1) analyze tourists' perceptions towards the effect of STA attributes on their perceived destination image, 2) assess the influence of tourists' perceived destination image on their behavioral intention, and 3) investigate the moderating effect of information search behavior on the relationships between STAs and perceived destination image and that between perceived destination image and tourists' behavioral intention. The significance of this study lies in its theoretical and managerial implications regarding the effect of SDL approach on tourists' perceived destination image and behavioral intention via STAs. The importance of information search as a moderating factor on tourists' behavior is also investigated. Managerial implications will be discussed in terms of practical applications for various tourism industry stakeholders.

2. Literature review

2.1. Smart tourism destination and STAs

Smart tourism and smart destination are interchangeable terms and have been defined as a pervasive tour information service received in the emerging forms of information and communication technology (ICT) by tourists during a tour of a particular destination (Gretzel, Sigala, et al., 2015; Li, Hu, Huang, & Duan, 2017). Meanwhile, Hunter, Chung, Gretzel, and Koo (2015) described smart tourism as the application of new technologies to travel experience services, such as making reservations for accommodation, transportation, and restaurants. Recently, many travel destinations have attempted to use this "smart" concept because it gives smart tourism destinations a competitive advantage compared to other tourist destinations based on the uniqueness and differentiation of the product and service offering (Cornejo Ortega & Malcolm, 2020). Based on this summary of smart tourism definitions, this study defines STAs as the function of applying ICTs in tourism-related activities to enhance tourists' travel experiences in a particular destination.

Smart tourism destination research and its applications and implementations have been explored by many scholars. Buhalis (2000) summarised six key components of a smart tourist destination namely, attractions (natural, artificial, or cultural attractions), accessibility (transportation systems, available routes, airport terminals, and public transportation), amenities (accommodation, restaurants, and leisure activities), available packages (available services offered by intermediaries), activities (to stimulate tourists' visitation experiences), and ancillary services (banks and hospitals). Meanwhile, Cohen (2014) identified the smart tourism destination concept as having six distinct dimensions: smart governance (support for data openness and public involvement), smart environment (energy optimization and sustainable management), smart mobility (information and communications technology structure), smart economy (economic strategy based on digital technology), smart people (human capital), and smart living (quality of life for residents and tourists).

The use of technology in tourism can enhance tourists' experiences and promote tourism activities (e.g., the provision of relevant information and the promotion of engagement) and interactions amongst tourism stakeholders (e.g., tourism providers and tourists) (Swart, Sotiriadis, & Engelbrecht, 2019). Mobile applications are one commonly used smart tool in tourism, which assist tourists in their decision-making processes by sending them marketing (e.g., discounts and coupons), security and emergency (e.g., health monitoring and weather alerts), and service information (e.g., banking, tickets, reservations and shopping) (bib_Kennedy_Eden_and_Gretzel_2012Kennedy-Eden & Gretzel, 2012). These services offer tourists and tourist providers high accessibility and convenience. Smart tourism involves many characteristics, including website quality and the amount of information and types of messages provided, all of which affect perceived destination image (Rodriguez–Molina, Frias-Jamilena, & Castaneda-Garcia, 2015). The key components of smart tourism include effective hardware, software, network technology and equipment, tools for communication networks, access to power (i.e. USB ports), tourist trust and privacy, tourist travel behavior, tourism enterprise knowledge and training, and the physical investment (i.e. free access to Wi-Fi or applications) (Gretzel, Reino, et al., 2015). Femenia-Serra, Perless-Ribes, and Ivars-Baidal (2019) explored millennial tourists' travel experiences with smart technologies in Spain. Among 21 items asked by the study of Femenia-Serra, Perless-Ribes, and Ivars-Baidal (2019), five factors were proposed, namely, well-established technology for tourism information (e.g., free public Wi-Fi, an official website for the destination, and an official destination app), online communication with the destination (e.g., tourism office online assistance, QR codes, and video guides), innovative technology in tourism (e.g., smartphone payments, wearable technology, and electronic payments), visualization technology (e.g., augmented reality, video mapping, and virtual reality), and the technological infostructure and social media presence of the destination marketing organization (DMO) (e.g., touchscreens, official accounts on social media, and an interactive tourism office).

2.2. Service-dominant logic (SDL) and STAs

The SDL approach is an extension of past marketing studies that focuses on the production of tangible outputs, the fulfilment of transactions, and the maximization of profit (Lusch, Vargo, & Tanniru, 2010; Vargo & Lusch, 2004). When applying SDL to the tourism sector, the SDL platform examines value creation, process orientation, and relationships within smart tourism destinations (Boes et al., 2016). The platform also includes information related to the activities of tourists, the consumption of tourism products, and the status of tourism resources that connect tourists, enterprises, and organizations over various end-user devices (Vargo & Lusch, 2004; Wang et al., 2013).

Many scholars have recognised the characteristics of SDL. For instance, Vargo and Lusch (2004, p. 7) identified six SDL characteristics, namely, 1) specialized skills, knowledge or services are acquired, 2) goods are appliances for service provision, 3) customers are co-producers of the service, 4) value is perceived and determined by customers, 5) customers are active participants in co-production, and 6) economic growth is measured by the application of specialized skills and knowledge. The components of SDL include cloud services (e.g., convenient and scalable access to applications, software and data through web browsers), the Internet of Things (e.g., sensors and mobile phones) and end-user Internet service systems (e.g., individual payment systems, wireless connections and touch screens) (Huang & Li, 2011; Wu et al., 2012; Zhang, Li, & Liu, 2012). Wang et al. (2016) suggested that SDL can be used to identify the future direction of smart tourist attractions. SDL can also actualize experience creation, increase the perceived value for tourists, and develop strategic plans for destination marketing practices.

By integrating tourists' experiences using the SDL approach, the complexity of these STA categories can affect tourists' travel experience in a destination. A summary of the key attributes of the STAs used in this study is presented below. These attributes are smart information systems, intelligence tourism management, smart sightseeing, e-commerce systems, intelligent traffic, and smart forecast (Wang et al., 2016). The term '*smart information system*' means the provision of free wireless networking or Wi-Fi, QR codes, and mobile applications (Da Costa Liberato, Alen-Gonzalez, & De Azevedo Liberato, 2018; Donya-e-Eghtesad, 2016; Ghaderi, Hatamifar, & Henderson, 2018; Gretzel, Reino, et al., 2015; Wang et al., 2016). '*Intelligence tourism management*' is used to recommend the system of tourists' web browsing behaviors and their creation of travel plans (Da Costa Liberato et al., 2018; Wang et al., 2016). '*Smart sightseeing*' describes e-guides and e-tour maps (Donya-e-Eghtesad, 2016; Wang et al., 2016). '*E-commerce system*' is used to describe point-of-sale systems and PayPal (Da Costa Liberato et al., 2018; Wang et al., 2016). '*Intelligent traffic*' aims to provide information on road traffic transportation, such as e-taxi services and traffic management systems (Da Costa Liberato et al., 2018; Donya-e-Eghtesad, 2016; Wang et al., 2016). Lastly, '*Smart forecasting*' provides information on forecasting traffic flow and queuing time (Wang et al., 2016).

It is argued that the generalization of STAs will differ by destination (Mehraliyev et al., 2020). Furthermore, these STAs have not yet been tested measuring the perceived image of destination. Given the limited amount of relevant literature, this study would like to explore new insights related to the efficiency of STAs and perceived destination image from the tourists' viewpoint in the destination.

2.3. Perceived destination image

An overall destination image refers to the sum of any belief, opinion, and expression of an individual from a variety of sources over time regarding a destination that influences his/her visit intention (Crompton, 1979; bib_MacKay_and_Fesenmaier_1997MacKay & Fesenmaier, 1997). Gartner (1993) argued that destination image comprises cognitive (beliefs and knowledge of a destination), affective (feelings towards a destination), and conative (tourists act based on cognitive and affective factors) constructs. Each destination has its own image of products, service, and facilities that can be duplicated or distinguished from other destinations. For instance, some destinations have common travel characteristics, products, and service offerings; thus, those destinations can easily duplicate marketing strategies from one another to promote the same image to attract tourists. However, for smart tourism destinations, some destinations cannot implement smart destination positioning due to the constraints of digital knowledge, employees, money, and time (Gajdosik, 2019). In the latter case, the perceived image as a smart destination cannot be easily duplicated. Consequently, the values of a destination can directly and indirectly influence the co-creation process with customers (Merz, He, & Vargo, 2009). In turn, this can develop the overall perceived image toward the destination to the tourists. Some tourists express their feelings or perceived image towards a travel destination via social media and other online platforms. This notion can help destination marketers study the behavior, destination choices, electronic word of mouth of tourists, and the reputation and success of a destination (Mak, 2017).

The relationship between STAs and perceived destination image clearly exists. The formation of destination image can be influenced by travel information (such as local attractions, outdoor and cultural attractions, and price) on websites (Jeong, Holland, Jun, & Gibson, 2012). Zheng and Zhang (2015) found that tourists primarily use STAs to look for entertainment options and real-time queuing information. Improving, promoting, and adjusting the content of an online information platform are necessary to promote smart tourist destinations. The effect of an advanced technological infrastructure on tourists' behavior is examined by Da Costa Liberato et al. (2018). These technological infrastructures include ICT infrastructure, wearable technology, mobile devices, virtual reality, technological development, services based on user locations, and recommendation systems. Tourists have also addressed the importance of Internet access as a factor impacting their intention to return to a destination. Kim, Lee, Shin, and Yang (2017) investigated the effects of tourism information quality in social media on destination image. Relevance (relevance of information to travel and intention to use) is a key factor associated with cognitive and affective destination image. Completeness (accurate and detailed information) and webpage design (attractive to users) are associated with cognitive factors and added value (useful and beneficial to the users) and interestingness (information is perceived to be interesting) influences affective destination image. Xia et al. (2018) examined the effectiveness of the DMO's website based on navigation, content, and accessibility via a smartphone application. The results showed that website effectiveness can positively enhance perceived usefulness, ease of use, online experience, and destination image.

The above literature shows the importance of STA attributes on the perceived image of a destination. Common STAs include Wi-Fi access, online payments, maps, tourism products, and service information. Furthermore, the characteristics of smart tourist destinations (e.g., energy consumption, smart city governance, and smart city livelihood) may affect tourists' perceived image of a city (Chan, Peters, & Pikkemaat, 2019). However, certain kinds of STAs (e.g., smart sightseeing, intelligent traffic, and smart forecasting) have not been studied in terms of their influence on perceived destination image to tourists. Once the memorable tourism of STA experience is formed, tourists will develop their overall perceived image of a certain destination (Sharma & Nayak, 2019).

To explore the literature gap surrounding tourism activities and tourists' experience creation using the SDL approach, the following hypotheses (H1-6) are proposed:

H1. An effective smart information system application can positively enhance tourists' perceived destination image.

H2. An effective intelligence tourism management application can positively enhance tourists' perceived destination image.

H3. An effective smart sightseeing application can positively enhance tourists' perceived destination image.

H4. An effective e-commerce system application can positively enhance tourists' perceived destination image.

H5. An effective intelligent traffic application can positively enhance tourists' perceived destination image.

H6. An effective smart forecasting application can positively enhance tourists' perceived destination image.

2.4. Behavioral intention

Behavioral intention signals whether customers will remain (favourable behavior) or retreat from (unfavourable behavior) the relationship with their service providers (Zeithaml, Berry, & Parasuraman, 1996). Behavioral intention also predicts the possible future actions of individuals. In tourism research, tourist behavioral intention is commonly investigated through the willingness of consumers to visit and/or revisit, to spend or repurchase, their word-of-mouth recommendations, and their feedback to service providers (Kock et al., 2016; Ladhari, 2009).

Numerous scholars have examined the relationship between perceived destination image and behavioral intention. For instance, Qu and Qu (2015) investigated the influence of positive affective destination image on the destination choice or visit intention of tourists. Moreover, a destination image can stimulate the recommendation and visit intention behavior of tourists (Kock et al., 2016; Papadimitriou et al., 2014; Qu, Kim, & Im, 2011; Tavitiyaman & Qu, 2013). Furthermore, repeat travelers perceived a destination image more positively compared with first-time travelers (Qu et al., 2011). Chen, Chen, and Lee (2010) argued that destination marketing involves coordinating the overall perceived image of a destination and the factors of destination attraction that can shed light on tourists' destination choice. Destination images of the different ways of life, mystic places and entertainment, and activities influence the visitation behavior of tourists. The quality of destination resources (e.g. diverse attractions, rich culture, heritage, and natural resources) can also increase the likelihood of tourist re-visitation and recommendation (Chen et al., 2010). Sharma and Nayak (2019) argued that destination image plays a mediating role in the relationship between memorable tourism experience of smart tourism and behavioral intention (revisit and recommendation intention). From the mentioned literature, the following hypothesis is proposed:

H7. Perceived destination image can positively enhance tourists' behavioral intention.

2.5. Information search behavior: moderating effect

Information search in tourism behavior refers to tourist efforts (e.g., the amount of time spent) to obtain travel information (Schul & Crompton, 1983). Money and Crotts (2003) identified two categories of information search behavior: internal and external search. Internal search is based on prior experience and knowledge of a product or service, whereas external search relies on everything that does not involve individual memory, such as the Internet and magazines. Jordan, Norman, and Vogt (2013) defined information foraging as the time spent searching for information by counting the total number of links clicked and the number of search actions performed. According to Digital Information World (2019), Internet users spent 2 h and 16 min on average every day on social media in 2018, and this duration is expected to increase every year. The study showed that young people spend the most time on the Internet (16–24 years old = 3.01 h, 25–34 years old = 2.37 h, and 35–44 years old = 2.04 h), and that the amount of time spent online declines with age.

Information search behavior differs depending on the characteristics of the travelers. American tourists rely on personal sources, such as friends and relatives who have visited the particular destination. Various information channels can be accessed by consumers, including Google and TripAdvisor (Murphy & Chen, 2016). When tourists receive information (whether positive or negative) from various sources on the Internet, this information can induce or discourage their decision-making process and travel behavior. Lehto, Kim, and Morrison (2006) argued that first-time travellers spent more time online (4.08 h) when planning a trip compared with repeat travellers (3.75 h). Ramkissoon and Nunkoo (2008) obtained similar findings in their study on why first-time tourists rely more on information sources compared with tourists with previous experience of a certain destination. Knowing how to use information technology allows tourists to browse for information and do their shopping over the Internet (Liao & Cheung, 2001). A study by Li, Pan, Zhang, and Smith (2009) showed the effect of online information search on destination image. During pre- and post-survey research, the overall perceived image of the destination positively changes after information search. Increased time spent on information search can confirm, enhance, and correct respondents' cognitive and affective evaluation. According to Li et al. (2009), when tourists spend more time online, they become more confident with their use of STAs and consequently develop a positive destination image and behavioral intention. The study of Martin-Santana, Beerli-Palacio, and Nazzareno (2017) found that time spent searching for information is influenced by the level of uncertainty, the interest of the destination, and a longer the holiday duration. Furthermore, information search can increase the tourists' perceived image and improve their satisfaction and loyalty.

A previous study has shown that perceived destination image positively changed during pre- and post-information search behaviors (Li et al., 2009). However, this result did not take the onsite travel experience activities of STAs attributes into consideration. Many studies found a direct relationship between information search and perceived image of the destination (Martin-Santana et al., 2017; Ramkissoon & Uysal, 2011), but limited findings have been presented regarding the moderating role of information search in STA-related studies. The quality of information search may either harm or induce a better image of a destination, and this gap requires further exploration. With the moderating role of information search, the efficiency of STAs at different smart tourism destinations could provide new insights from the literature regarding the relationships among STAs, perceived destination image, and behavioral intention. Hence, the following hypotheses and conceptual model (see Fig. 1) are proposed:

H8a–f. Information search has a moderating effect on the relationship between STAs (a. smart information systems, b. intelligent tourism management, c. smart sightseeing, d. e-commerce systems, e. intelligent traffic, and f. smart forecasting), perceived destination image, and behavioral intention.

3. Methods

3.1. Hong Kong as a smart tourism destination

Hong Kong is the smart tourism destination chosen for this study. The Hong Kong government announced a plan to transform Hong Kong into an innovative hub for smart city development through the use of new technology (Innovation and Technology Bureau, 2016). From this perspective, six major areas were studied and presented: smart mobility, smart living, smart environment, smart people, smart government, and smart economy. According to the Office of the Government Chief Information Officer (2017), the contents of the innovative international airport, smart transportation, and free Wi-Fi were examined. However,

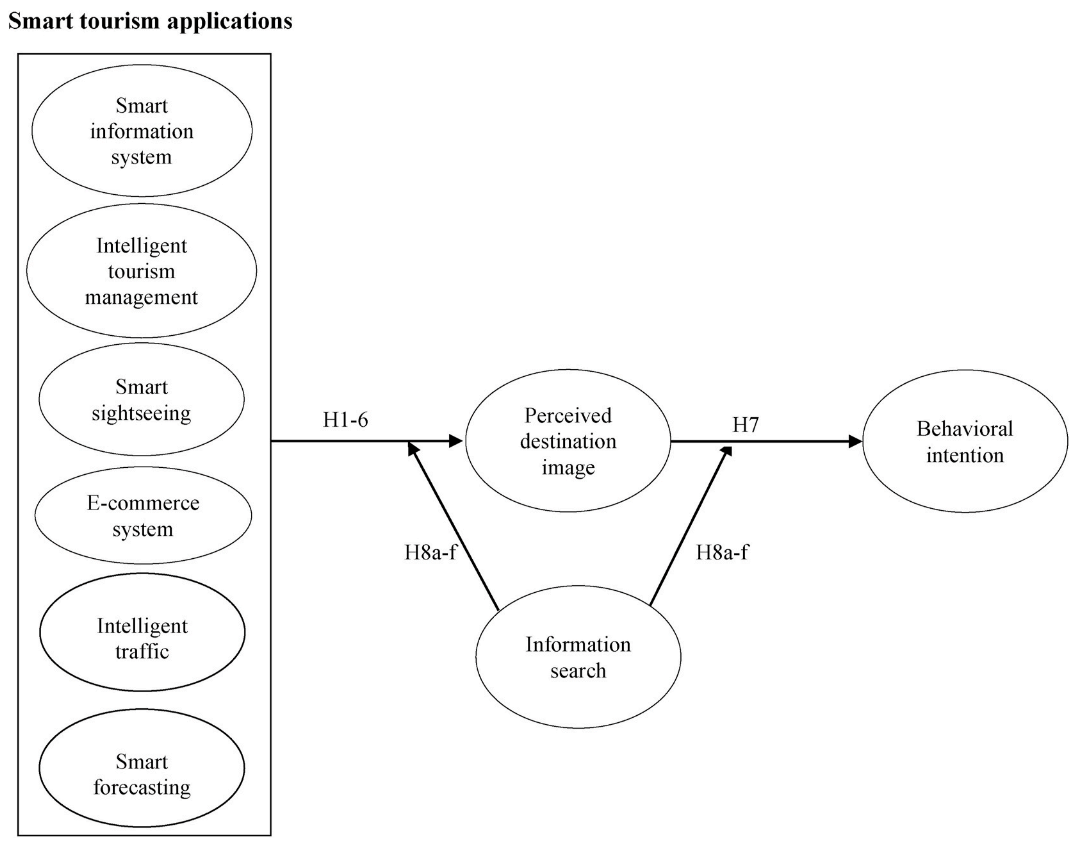

Fig. 1. Proposed conceptual model.

other tourism aspects such as safety and security issues, e-commerce systems, and smart forecasting were not studied (Office of the Government Chief Information Officer, 2017).

Tourists perceive the image of Hong Kong from various aspects (Chan & Marafa, 2016; Huang & Hsu, 2005; Jetter & Chen, 2011; Law & Cheung, 2010). For instance, Hong Kong is positively perceived for its food quality (i.e., desserts), its efficient transportation system (i.e., convenient and inexpensive), hotel quality (i.e., location, service, meeting rooms, and cleanliness), its shopping options (i.e., items worth buying and value for money), attractions (i.e., nightlife, culture, and history), and its safe and secure exhibition facilities. However, no previous study had evaluated Hong Kong from a smart city or smart destination perspective. This study explores how tourists evaluate the efficiency of STAs' and their impact on perceived destination image and behavioral intention.

3.2. Sampling and data collection

A cross-sectional approach was used to investigate this phenomenon during a certain study period. The target population comprises tourists who visited Hong Kong and used STAs between July and August 2019. A combination of proportionate stratified sampling (i.e., an equal number of samples from different locations) and convenience sampling approaches was used for the sample recruitment. In the proportionate stratified sampling approach, 500 respondents per site were recruited at three major tourist attractions, namely, 1) Tsim Sha Tsui Haborfront Area; 2) Mong Kok; and 3) Victoria Peak, Hong Kong Disneyland, and Ocean Park (Hong Kong Tourism Board, 2018). Consequently, a total of 1500 responses were collected. Han, Kiatkawsin, Kim, and Lee (2017) support using convenience sampling with large numbers of a target population, which in this case was international tourists visiting Hong Kong. The screening question (e.g., did you use any smartphone/electronic device for travel information search online?) was introduced to the potential respondents. If their answer was affirmative, they were invited to participate in the survey.

Three research assistants were involved in the data collection. They were trained how to approach potential respondents. The questionnaires were distributed, and the respondents were informed about the purpose of the study and the confidentiality and voluntary nature of their participation. If the respondents were a group of friends or couples, then only one or two were invited to participate in the survey. The respondents were given approximately 3–10 min to complete the survey either via an iPad (online link) or a hard copy of the questionnaire. The data were collected on weekdays and weekends starting from the afternoon up to 9:00 p.m. between July and August 2019. Among the 1500 returned responses, data screening was conducted, yielding 1484 valid responses or a 98.93% response rate. Souvenirs were given to the participants who completed the survey.

3.3. Instrument and data analysis

The survey instrument was divided into two sections and was written in English before being translated to Chinese. Back-translation was performed to assess the validity of the questions asked and the practical meaning of words (Moswete & Darley, 2012). The smart destination application questions in Section I were adapted from Wang et al. (2016), namely smart information systems (2 items), intelligence tourism management (3 items), smart sightseeing (4 items), e-commerce systems (4 items), intelligent traffic (3 items), and smart forecasting (2 items). Respondents were asked to assess the effectiveness of each STA attribute during their trip. In addition, four items of perceived destination image were adapted from Hosany, Ekinci, and Uysal (2007), and three items of behavioral intention were adapted from Papadimitriou et al. (2014). These items were measured on a 7-point Likert-type scale (1 = strongly disagree to 7 = strongly agree). Section II presented the demographic characteristics and travel behaviors (i.e. age, gender, education, monthly income, occupation, geographic origin, and frequency of visiting Hong Kong) of the respondents. The degree of information search was measured by using the number of hours spent on the Internet. Close-ended questions were asked in this section. The survey instrument was validated by academics in the hospitality and tourism fields. A pilot test was conducted among 50 international tourists. Given that no major concerns were raised during the pilot study, the reliability of the questionnaire items was tested using Cronbach's alpha. The reliability coefficients ranged between 0.80 (on smart forecasting) and 0.87 (on e-commerce systems), which meet the acceptable value of a 0.70 cutoff suggested by Hair, Black, Babin, Anderson, and Tatham (2006).

Many statistical techniques were employed for study investigation. For instance, descriptive analysis and multicollinearity testing were employed using SPSS 26. Confirmatory factor analysis (CFA) and structural equation modelling (SEM) with LISREL version 8.80 were performed to achieve the objectives. Descriptive analysis was used to explore the respondents' demographic profiles. Given that this study includes many independent and dependent variables, the multicollinearity issue with the variance inflation factor (VIF) was tested. All items were included in the collinearity diagnostics in the regression. The VIF scores ranged from 1.51 to 3.43, thereby meeting the acceptable level of less than 5 (Groebner, Shannon, Fry, & Smith, 2005). Therefore, multicollinearity is not a concern. CFA was performed to explore the reliability and validity of each construct, including their construct reliability (CR), average variance extracted (AVE), and discriminant validity (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). SEM performs better on mediation analysis compared with regression (Lei & Jolibert, 2012). Therefore, SEM was employed to measure the data and to analyze the relationships amongst these constructs and to test the hypotheses.

4. Results

4.1. Demographic characteristics

Table 1 presents the demographic characteristics of the respondents. From a total of 1484 respondents, 692 (46.60%) respondents are male, and 792 (53.40%) are female. The 18–30 age group represents 48% (n = 713) of the respondents and the 31–45 age group represents 37.60% (n = 558). Most of the respondents have a bachelor's degree (57.00%, n = 485). Their reasons for traveling include leisure (77.42%, n = 1142), visiting friends and/or relatives (12.34%, n = 182), and business (10.24%, n = 151). The respondents' monthly income ranged from US $2001–4000 (46.60%) to US$4001–6000 (23.30%). Overall, 42.70% (n = 634) of the respondents were visiting Hong Kong for the first time, whereas the remaining respondents (57.30%, n = 850) had been to Hong Kong more than once. On the degree of information search, the majority of the respondents had spent more than 2 h (66.80%, n = 990) on the Internet while visiting Hong Kong. Close to a third had spent between 0 and 2 h (33.20%, n = 494) on the Internet during their visit.

Table 1
Respondent demographic characteristics.

Item	n	%	Item	n	%
Gender			Income (per month)		
Male	692	46.6	< US$2000	324	21.8
Female	792	53.4	US$2001–4000	691	46.6
Age			US$4001–6000	346	23.3
18–30 years old	713	48.0	> US$6001	123	8.3
31–45 years old	558	37.6	Number of visits		
46–60 years old	167	11.3	First time	634	42.7
Over than 60 years old	46	3.1	2-3 times	583	39.3
Education			>4 times	267	18.0
High school or below	215	14.5	Degree of information search		
Vocational degree	200	13.5	0–2 h	494	33.2
Bachelor degree	845	57.0	More than 2 h	990	66.8
Master degree or above	222	15.0	Confidence on inf. search		
Purpose of visit			Little confidence	35	2.4
Leisure	1142	77.42	Moderate confidence	432	29.1
Business	151	10.24	Very confidence	1017	68.5
Visit friends/ relatives	182	12.34			

4.2. Confirmatory factor analysis (CFA) of the key constructs

Table 2 presents the factor loadings of the constructs as obtained from the CFA results. The model shows a good data fit with χ^2 = 2864.75, degree of freedom (df) = 247, $p < 0.00$, comparative fit index

Table 2
Confirmatory factor analysis of constructs.

Item	Standardized loading (*t*-value)	Average variance extracted (AVE)	Composite Reliability (CR)
Smart information system (SI)		0.73	0.84
Free Wi-Fi	0.79 (30.85)		
QR code	0.91 (33.52)		
Intelligence tourism management (IM)		0.50	0.75
Accessible USB chargers	0.58 (21.72)		
Function as a smart hub	0.81 (32.26)		
Optimizing energy usage	0.72 (28.09)		
Smart sightseeing (SS)		0.60	0.86
Personal-itinerary design	0.69 (28.81)		
Intelligent-guide system	0.78 (34.11)		
E-tourism recommendation	0.82 (36.40)		
E-tour map	0.80 (35.37)		
E-commerce system (ES)		0.49	0.79
Mobile payment	0.76 (31.44)		
Online coupons	0.72 (29.22)		
Online bookings	0.73 (29.80)		
Kiosk bookings	0.57 (21.72)		
Intelligent traffic (IT)		0.62	0.82
Smart vehicle-scheduling	0.64 (26.03)		
Real-time traffic broadcast	0.90 (39.37)		
Traffic notification	0.80 (33.86)		
Smart forecasting (SF)		0.66	0.79
Tourist-flow forecast	0.82 (31.35)		
Queuing-time forecast	0.80 (30.52)		
Destination image (DI)		0.66	0.88
Virtual tourism experience	0.82 (37.56)		
Virtual travel community	0.92 (44.49)		
Smart heritage	0.76 (33.73)		
Co-create experience	0.73 (31.84)		
Behavioral intention (BI)		0.81	0.93
Say positive things	0.87 (41.47)		
Recommend to others	0.94 (47.67)		
Encourage friends to visit	0.90 (43.80)		

Chi-square (χ^2) = 2864.75, df = 247, $p < 0.00$, Comparative Fit Index (CFI) = 0.95, Goodness of Fit Index (GFI).
= 0.87, Room Mean Square Error of Approximation (RMSEA) = 0.08, Normed Fit Index (NFI) = 0.94.

(CFI) = 0.95, goodness-of-fit index (GFI) = 0.87, root mean square error of approximation (RMSEA) = 0.08, and normed fit index (NFI) = 0.94. These indices meet the criteria for the overall model fit of the sample group as suggested by Hair et al. (2006).

The assessment of reliability (on composite reliability) and construct validity (on convergent and discriminant validity) of all constructs (2 items of smart information systems, 3 items of intelligence tourism management, 4 items of smart sightseeing, 4 items of e-commerce systems, 3 items of intelligent traffic, 2 items of smart forecasting, 4 items of perceived destination image, and 3 items of behavioral intention), is mentioned. Convergent validity is tested to explore the common variance of a construct with the latent constructs. The standardized factor loadings range between 0.57 and 0.94, and the t-value shows the scales between 21.72 and 47.67. These factor loading items are greater than 0.70 (except for four items: accessible USB chargers = 0.58, personal-itinerary design = 0.69, kiosk bookings = 0.57, and smart vehicle-scheduling = 0.64) and are statistically significant at the 0.01 level, thereby verifying their acceptability (Churchill, 1979). These figures also support the value of convergent validity. The AVE estimates of the constructs are above 0.50 (except for e-commerce systems, AVE = 0.49), whereas their CR ranges from 0.75 to 0.93. These values meet the rule of thumb for internal and external validity measures as proposed by Fornell and Larcker (1981).

Table 3 presents the AVE, mean, standard deviation, correlation, and the square root of all AVEs. The numbers on the diagonal line show the square root values of AVEs. All square root AVEs are greater than the values of correlation (Fornell & Larcker, 1981). For example, the square root AVE value for e-commerce systems is 0.70, which is greater than the correlation value of other constructs ranging from 0.24 to 0.55. Another example is that the square root of the AVE of behavioral intention is 0.90. This value is greater than the correlation values of other constructs (from 0.11 to 0.44). The same results apply to other pair comparisons; thus, discriminant validity exists (Hair et al., 2006). Moreover, the mean and standard deviation (SD) scores ranged between 4.71 (SD = 1.04) for smart information systems and 6.12 (SD = 0.87) for behavioral intention.

4.3. *Effect of STAs on perceived destination image and behavioral intention*

The structural paths are estimated to test the relationships between STAs, perceived destination image, and behavioral intention (Table 4). Model 1 presents the structural model fit with $\chi^2 = 3204.19$, df = 253, $p < 0.00$, CFI = 0.94, NFI = 0.94, GFI = 0.85, and RMSEA = 0.08. Since STAs – smart information systems ($\gamma = 0.18$, t-value = 5.58, $p < 0.01$), smart sightseeing ($\gamma = 0.18$, t-value = 4.87, $p < 0.01$), e-commerce systems ($\gamma = 0.26$, t-value = 6.85, $p < 0.01$), and smart forecasting ($\gamma = 0.09$, t-value = 2.69, $p < 0.01$) – affect destination image, this supports H1, H3, H4 and H6 of this study. However, intelligence tourism management and intelligent traffic do not influence perceived destination image ($p > 0.05$), thereby rejecting H2 and H5. In addition, perceived destination image positively influences tourists' behavioral intention ($\beta = 0.40$, t-value = 14.28, $p < 0.01$), thereby supporting H7. The overall R^2 of the STAs accounts for 35% of perceived destination image, whereas the overall R^2 of perceived destination image accounts for 16% of behavioral intention.

Table 4
Structural equation model results of direct and moderating effect.

Path coefficients	Standardized leading (t-value)		
	Model 1 (Full-model)	Model 2 (0–2 h)	Model 3 (>2 h)
	(n = 1484)	(n = 494)	(n = 990)
H1: SI→DI	0.18 (5.58)**	0.17 (3.10)**	0.18 (4.69)**
H2: IM→DI	0.04 (1.02)	0.01 (0.15)	0.05 (1.10)
H3: SS→DI	0.18 (4.87)**	0.25 (3.69)**	0.15 (3.63)**
H4: ES→DI	0.26 (6.85)**	0.21 (2.83)**	0.28 (6.28)**
H5: IT→DI	0.04 (1.53)	0.02 (0.44)	0.05 (1.50)
H6: SF→DI	0.09 (2.69)**	0.11 (1.99)*	0.09 (2.00)*
H7: DI→BI	0.40 (14.28)**	0.26 (5.41)**	0.46 (13.41)**
R^2 to Destination image	0.35	0.36	0.36
R^2 to Behavioral intention	0.16	0.07	0.21
Chi-square χ^2 (df)	3204.19 (253)	1198.18 (253)	2322.04 (253)
CFI	0.94	0.95	0.94
NFI	0.94	0.93	0.93
GFI	0.85	0.84	0.84
RMSEA	0.08	0.08	0.09

SI = smart information system, IM = intelligence tourism management, SS = smart sightseeing, ES = E-commerce system, IT = intelligent traffic, SF = smart forecasting, DI = destination image, BI = behavioral intention.
*$p < 0.05$, **$p < 0.01$.

4.4. *The moderating effect of information search behavior*

Table 4 further shows the moderating effect of information search on the relationship between STAs, perceived destination image, and behavioral intention, clarified in Models 2 and 3. According to Lehto et al. (2006), 2 h of Internet search is used as the cut-off criteria for low and high moderating groups when it comes to information search. Model 2 describes low information search (0–2 h per day) and explains the structural model fit with $\chi^2 = 1198.18$, df = 253, $p < 0.00$, CFI = 0.95, NFI = 0.93, GFI = 0.84, and RMSEA = 0.08. Smart safety applications – smart information systems ($\gamma = 0.17$, t-value = 3.10, $p < 0.01$), smart sightseeing ($\gamma = 0.25$, t-value = 3.69, $p < 0.01$), e-commerce systems ($\gamma = 0.21$, t-value = 2.83, $p < 0.01$), and smart forecasting ($\gamma = 0.11$, t-value = 1.99, $p < 0.05$) – positively affects destination image, and destination image positively influences behavioral intention ($\beta = 0.26$, t-value = 5.41, $p < 0.01$). However, intelligence tourism management and intelligent traffic are not statistically significant with perceived destination image ($p > 0.05$). The R^2 of the STAs accounts for 36% of perceived destination image, and the R^2 of perceived destination image accounts for 7% of behavioral intention.

Model 3 examines high information search (more than 2 h per day)

Table 3
Correlations and squared AVE of constructs.

Construct	AVE	Mean	SD	Correlations and squared AVE							
				SI	IM	SS	ES	IT	SF	DI	BI
Smart inf. system (SI)	0.73	4.71	1.04	**0.85**							
Intelligence tourism mgt (IM)	0.50	5.51	0.83	0.47	**0.71**						
Smart sightseeing (SS)	0.60	5.34	0.93	0.51	0.49	**0.77**					
E-commerce system (ES)	0.49	5.62	0.86	0.37	0.48	0.52	**0.70**				
Intelligent traffic (IT)	0.62	5.30	0.89	0.30	0.39	0.39	0.24	**0.79**			
Smart forecasting (SF)	0.66	5.28	0.91	0.29	0.44	0.42	0.55	0.30	**0.81**		
Destination image (DI)	0.66	4.81	1.11	0.41	0.37	0.47	0.49	0.25	0.40	**0.81**	
Behavioral intention (BI)	0.81	6.12	0.87	0.22	0.44	0.32	0.36	0.35	0.11	0.38	**0.90**

AVE = Average variance extracted, SD = Standard deviation.

and the structural model fit with $\chi^2 = 2322.04$, df = 253, $p < 0.00$, CFI = 0.94, NFI = 0.93, GFI = 0.84, and RMSEA = 0.09. Smart safety applications – smart information systems ($\gamma = 0.18$, t-value = 4.69, $p < 0.01$), smart sightseeing ($\gamma = 0.15$, t-value = 3.63, $p < 0.01$), e-commerce systems ($\gamma = 0.28$, t-value = 6.28, $p < 0.01$), and smart forecasting ($\gamma = 0.09$, t-value = 2.00, $p < 0.05$) – positively affects perceived destination image. Moreover, perceived destination image has a positive impact on behavioral intention ($\beta = 0.46$, t-value = 13.41, $p < 0.01$). By contrast, the STAs in terms of intelligence tourism management and intelligent traffic have no influence on perceived destination image ($p > 0.05$). The R^2 of the STAs accounts for 36% of perceived destination image, and the overall R^2 of perceived destination image accounts for only 21% of behavioral intention (see Fig. 2). Based on Models 2 and 3, hypotheses H8a, H8c, H8d, and H8f are supported, and H8b and H8e are rejected.

5. Discussion and implications

5.1. Discussion

This study examines the influence of STAs on perceived destination image, and of perceived destination image on behavioral intention. This study further assesses the moderating effect of information search on the

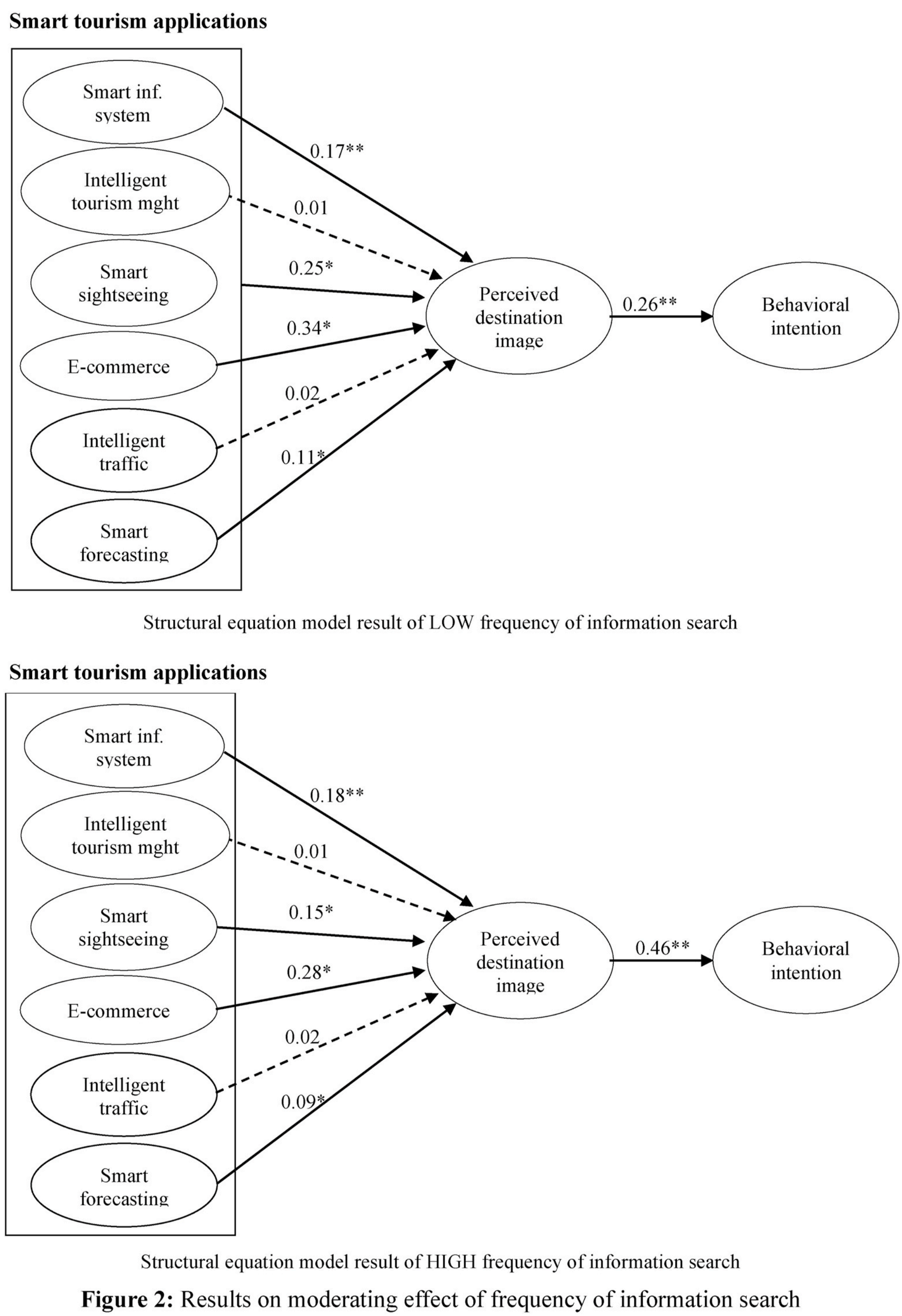

Fig. 2. Results on moderating effect of frequency of information search.

relationship between STAs and perceived destination image, and between perceived destination image and behavioral intention. The results highlight some common and new findings compared to previous studies, which contribute to the significance of the study. Hong Kong is being promoted as a smart destination, and various smart tourism application attributes have been adopted to enhance tourists' travel experiences. Among six STA attributes, four attributes - smart information systems, smart sightseeing, e-commerce systems, and smart safety - positively affect tourists' perceived destination image. However, the effectiveness of intelligence tourism management and intelligent traffic has no effect on the perceived destination image. Even though the chosen destination has the capabilities to offer smart tourism application attributes to tourists, such attributes (intelligent tourism management and intelligent traffic) could not meet the overall positive image of the destination. Tourists' perception of destination image also affects their future behavioral intention. Furthermore, information search has a moderating effect on the relationship between STAs, perceived destination image, and behavioral intention.

The implication of SDL approach aims to assess the tourism experience activities and relationships within the smart destination (Boes et al., 2016). When using the SDL approach to improve travel experiences at a smart tourism destination, STA attributes – e-commerce systems, smart information systems, smart sightseeing, and smart safety – promote a perceived positive image of the destination. E-commerce systems in the areas of mobile payments, online bookings, and kiosk bookings offer the tourists with convenience. Various mobile payment platforms such as WeChat and Alipay have been commonly used at many shopping destinations. Tourists feel confident doing online transactions and payments. Online and/or kiosk bookings are becoming more common due to the limited capacity and space for customers with regard to certain services, such as shops and restaurants. Online and kiosk bookings allow for better planning given the restricted time tourists have. For smart information systems, the effectiveness of Wi-Fi and QR codes improves the perceived positive image of a smart destination. This notion is similar to a study by Da Costa, Liberato et al. (2018). Internet access is necessary for tourists while traveling and searching for information. Tourists can access free Wi-Fi at many public locations in Hong Kong such as buses, hotel lobbies, and local shops by using their mobile devices. Many tourism enterprises provide a QR code so tourists can visit their website and receive information easily. Smart sightseeing in terms of e-tour maps, e-guides and recommendation services facilitates a good destination image. This relationship echoes current tourism business practices, which offer e-versions of products, services, and information for interested tourists. For instance, e-maps and e-directions in shopping malls give each shop's location and how to access it from one's current position.

Smart forecasting is important because many tourists are affected by tourist flow (e.g., traveling from one place to another) and queuing time. Effective time forecasts and planning encourages tourists to visit attractions and participate in travel activities. Many restaurants have queuing systems available so that customers can manage their waiting times with other activities. In the meantime, tourist flow can help to estimate the arrival times at the destinations and plan their travel activities efficiently. This study further shows the impact of tourists' perceived destination image on behavioral intention. When tourists gain a positive image of a destination as a virtual travel destination, they are able to speak positively about the destination and recommend that other people visit. This outcome is consistent with the study of Kock et al. (2016), Papadimitriou et al. (2014), and Tavitiyaman and Qu (2013).

Furthermore, tourists' information search behavior shows a moderating effect on the relationships between STAs (i.e., smart information systems, smart sightseeing, e-commerce systems, and smart forecasting), perceived destination image, and behavioral intention. Tourist groups with a high frequency of information search perceive the importance of smart information systems and e-commerce systems on destination image more than tourists with a low frequency of information search. This work supports the study of Li et al. (2009) that increased information search can improve the perceived image of a destination. When tourists use e-commerce systems (e.g., online purchases or bookings) and access smart information systems, these procedures require a certain amount of time to complete. By contrast, tourists with a low frequency of information search perceive a more positive effect when it comes to smart sightseeing and smart forecasting on the perceived destination image than tourists with a high frequency of information search. This behavior can be affected by the sources and websites that tourists browse for information search. For example, e-tour maps and queuing time forecasts can be retrieved from company websites. Tourists can access these procedures with a shorter time to complete.

In addition, there is the moderating effect of information search on the relationship between perceived destination image and behavioral intention. For tourists with a high frequency of information search, the relationship between perceived destination image and behavioral intention is greater than for tourists with a low frequency of information search. Tourists who spend a lot of time searching for information online perceive the importance of destination image. Tourists who frequently use the Internet can be skilled in browsing and searching for information. Therefore, they can gather travel information and receive information about other tourists' travel experiences more easily than those who have limited interaction with the Internet. As a result, tourists' perceived image of the destination and their behavioral intention exists.

5.2. Theoretical implications

From a theoretical perspective, these results seek to integrate the important aspects of the SDL approach with the STA attributes proposed by Vargo and Lusch (2004) and Wang et al. (2016). The current study views the mediating role of perceived destination image to assess the effectiveness of smart tourism application attributes and behavioral intention. It contributes a new insight compared to other studies (for example, Jeong and Shin (2020) used travel experiences and travel satisfaction). Regarding the generalization of STAs in different smart tourism destinations, the results show different outcomes, as argued by Mehraliyev et al. (2020). Four major attributes of STAs, namely, smart information systems, smart sightseeing, e-commerce systems, and smart safety, reflect tourists' positive perception toward a perceived destination image and consequently enhance behavioral intention. The new approach of enhancing destination image can be improved by supplementing geographical uniqueness with advancements in information technology. For instance, a tourism destination can promote its niche characteristics of smart travel attractions - hotels, restaurants, and theme parks by augmenting them with smart forecasting, intelligent traffic, and smart sightseeing. Once the perceived positive image of a smart tourism destination is established, tourists may perform certain behaviors such as saying positive things, recommending the destination to others, and encouraging friends and others to visit.

This study also contributes to understanding the moderating role of information search behavior in measuring the relationships between STAs, perceived destination image, and behavioral intention. The findings show strong and weak outcomes on the degree of information search behavior. The more time tourists spend on information search of the destinations using STAs in terms of smart information systems and e-commerce systems, the more positive their perception is toward the destination image and the greater the behavioral intention compared with tourists who spent less time on information search. Conversely, the less time tourists spend on information search of the destinations using STAs for smart sightseeing and smart forecasting, the more positive their perception toward the destination image. The time tourists spend on information search can be affected by the quality of information available online and sources of information that the tourism enterprises and destination management organizations provided. The trend of using technology and smart applications will continue to grow. Tourists will have increased opportunities to browse and visit various websites and online platforms to read comments before they make final decisions when it comes to travel planning. Examining tourist behavior regarding information search and the effect of STAs on travel experiences can measure the efficiency of smart tourism destinations and their development.

5.3. Managerial implications

These findings have practical managerial implications. STA development should be developed and prioritized based on tourists' preferences and the specific smart tourism destination in question. For instance, for shopping destinations, e-commerce systems could play an important role in enhancing the perceived destination image. Various e-commerce systems such as mobile payments, online booking, online coupons, and kiosk bookings can facilitate the convenience of tourists. Furthermore, restaurants providing kiosk bookings or online reservations allow customers to know how long they need to wait to receive service. Hotels that offer a kiosk to check-in/out can shorten guest waiting times. Providing high-quality and secure e-commerce systems and a smooth online experience can increase tourists' confidence when making online purchases and reservations. Throughout the e-commerce experience, direct and transparent communication between tourism suppliers and tourists can reinforce confidence in online business transactions. Furthermore, tourist data regarding e-commerce activity can be beneficial for future data analysis, marketing, and strategic planning.

Tourism providers should adopt new smart information systems to improve the tourist experience, enhance satisfaction, and promote future behavioral intentions. In addition, upgrading information systems regularly (e.g., QR codes and free Wi-Fi access) can facilitate travel accessibility. Hotels, restaurants, retail shops, and major attractions can provide free Wi-Fi access for customers and visitors, supplementing the e-commerce system of online payments and information search. Tourists can have more options to select products and services from tourism providers.

Accurate smart sightseeing and forecasting information must be provided to tourists. Complete and accurate information on tourist flow, queuing times, e-maps, and e-tour recommendations can help tourists prepare for their travel experience. Simple information that is easy to understand and follow is recommended. Offering alternatives to tourists can provide time flexibility, for example, e-travel guides giving time and cost of travel comparisons between one destination and another. Big data initiatives can contribute to the sharing of real-time tourist flow information and queuing time forecasts, population and traffic management, and crisis management and policymaking. Destination information can increase the efficiency of resource consumption, reduce traffic jams and waiting times for tourists, and support communication between local communities and tourists.

Perceived destination image remains a critical factor in promoting the behavioral intention of tourists. The smart destination should be able to virtually launch and facilitate tourism resources and attractions to potential tourists. These strengths can be promoted by using technology as a tool to share information with tourists, possibly helping them when making future travel plans. Support and cooperation from tourism stakeholders such as the provision of self-check-in/out services in smart airports, smart technologies in traffic enforcement and public transportation, digital payments, and one-stop-shop services throughout a city are encouraged.

Time spent on information search affects tourists' perception of STAs, perceived destination image, and behavioral intention. The effectiveness of STAs varies by the degrees of information search behavior. Jordan et al. (2013) argued that specific behaviors during a trip can be linked to different information search behaviors. Tourists who spend more time on the Internet during a trip tend to perceive the positive effectiveness of STAs, have an improved destination image, and possess an enhanced behavioral intention; the opposite is true for tourists who spend less time on the Internet searching for travel information. With more time spent on information search, tourism providers and destination organizations should focus on certain problems, such as the efficiency of emergency response systems, the accessibility of USB chargers, and efficient energy usage. Addressing these concerns can improve the value of a destination and consequently reinforce tourists' intentions to revisit and recommend a destination. Tourists can then receive valid, updated travel information that helps to provide them with a good travel experience. This positive online experience can later influence potential tourists' future travel behaviors. Tourism providers should offer the reliable information to tourists. Segmenting tourist groups by information search behaviors allows for the effective use marketing resources.

Beyond the scope of tourists' and tourism providers' perspectives, other key stakeholders (e.g., government and local communities) can participate in the promotion of smart tourist destinations. Coordination in tourism policy development, funding, and resources from the public and private sectors is necessary (Yoo, Kwon, Na, & Chang, 2017). The process of STAs execution can be periodically monitored to ensure a smooth and effective transition to smart tourism marketing decisions. The implementation of innovative tourism technology is also suggested. Success in promoting a smart tourism destination requires support from tourism stakeholders in providing a well-equipped infrastructure, supporting tourism policy and planning, as well as provision from the local communities. The proposed business and destination promotion strategies should be able to exploit the existing values and resources of the smart destination (Shafiee, Ghatari, Hasanzadeh, & Jahanyan, 2019).

5.4. Limitations and future research

This study has several limitations. First, the data were collected at the smart destination (Hong Kong) during a period of social unrest (July to August 2019). Therefore, the tourists' perceptions of the destination might have been impacted by political instability and safety concerns, possibly negatively affecting their overall perceived image. Collecting data during a different time period might yield different results and insights. Second, this study focused on tourist groups as the only target stakeholder. Future studies can explore the perceptions of other tourism stakeholders, such as governments, tourism policymakers, and tourism providers. Including these groups would broaden the scope of the study to a macro-level perspective (Boes et al., 2016). Third, a convenience sampling approach was supplemented with a proportionate stratified sampling approach for sampling recruitment. Sampling errors and data bias may have occurred, although data testing has addressed these concerns. Additional sampling approaches and different smart tourism destinations may be considered to improve the generalizability of the results. Also, the value of R^2 in measuring perceived destination image and behavioral intention is relatively low. According to Moksony (1990), the low value of adjusted R^2 is acceptable in the test of a theory in social research. Other indicators such as tourists' profiles, travel behaviors, and motivational factors can be further studied for more comprehensive results. Lastly, this study examined tourists who had already visited a smart destination. Future studies can explore other criteria to visit future smart tourism destinations. The effect of smart tourism on specific suppliers' performance, such as hotels, restaurants, and theme parks, is another area for further study (Mehraliyev et al., 2020).

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