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# A Framework of Implications for Smart Tourism Development in Hong Kong

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## Abstract

Smart tourism, a promising development trend for destinations, has drawn growing attention from practitioners and academics. Extant research has laid a solid theoretical foundation on the roles of technology and effects of smart tourism on tourists. However, little is known about structured and profound implications for a destination's smart tourism development. Thus, by selecting Hong Kong as a case city, this study proposes a framework of implications for smart tourism development. A qualitative approach was employed to gain insights from smart tourism stakeholders. Results shed light on nine elements that boost the smart tourism development of destinations. These nine elements serve as a significant reference for policy-making. Several theoretical and practical implications are provided for scholars, practitioners, and policy makers.

## Keywords

smart tourism; development; framework; implications; Hong Kong

## 1. Introduction

With the rapid development of new generation information technologies such as the Internet of Things (IoT) and cloud computing, the implementation of technologies in tourism has become a burgeoning direction for destinations. In recent decades, the mode of tourism has transformed from e-Tourism to smart tourism (Buhalis, 2019). Smart tourism not only influences tourists' pre-trip perceptions, decision making, and travel behavior, but also optimizes tourism practitioners' means of operation (Li, Hu, Huang, & Duan, 2017). As such, smart tourism has become an effective tool in promoting the sustainable development of tourist destinations. The United States (Jennifer, 2017), South Korea (Seoul Business Agency of Seoul Metropolitan Government, 2020), Japan (Yamagami, Hattori, Yoshiji, & Kamisaka, 2018), Dubai (Khan, Woo, Nam, & Chathoth, 2017), Singapore (Juniper Research, 2016) and several European countries (CBI, 2019; Göteborg & Co, 2019) have gradually taken the first step to leverage smart tourism to promote the development of cities. In China, smart tourism was introduced by China National Tourism Administration (CNTA) in 2011 (CNTA, 2011). This promising trend, which makes tourism a high information content, knowledge intensive, and modern service industry, is expected to be realized in 2021 (CNTA, 2011). With the support of local governments, several provincial smart tourism applications have been developed since 2018 (Beijing Tourism, 2020; People's Daily Online, 2018). During the COVID-19 outbreak in 2020 (World Health Organization [WHO], 2020a), smart tourism has provided an opportunity to upgrade and recover the local tourism industry. For example, a virtual reality show called "Cloud Visiting Dunhuang" allows more than 12 million tourists to travel virtually to Mogao Grottoes via smartphone (China Daily, 2020).

The growing smart tourism development has drawn substantial attention from academics. Scholars have laid a solid foundation of smart tourism research by exploring the subjects of technology implementation, effect of technologies on tourists and suppliers, and smart destinations (Mehraliyev, Chan, Choi, Koseoglu, & Law, 2020). Despite the extensive smart tourism research, several gaps have not been addressed. For instance, the definition of smart tourism, which is the basic theory of relevant research, remains ambiguous. Moreover, most smart tourism development projects, which are substantially initiated by the government, lack a theoretical foundation (Gretzel, Sigala, Xiang, & Koo, 2015). Given that existing smart tourism research is mostly consumer-focused (Mehraliyev et al., 2020), little is known about business models or systematic recommendations for smart tourism developers (Gretzel, Reino, Kopera, & Koo, 2015). This inadequacy is especially true in China. The smart tourism theory–practice gap is magnified with the rapid implementation of smart tourism in China. As indicated by Zhang, Li, and Liu (2012), profession tourism knowledge on tourists has been formed, but theoretical elaboration and empirical research from a macroscopic perspective are lacking. Thus, several challenges would be created followed by the rapid implementation of smart tourism projects without any framework support. In addition, as appealed by Mehraliyev, Choi, and Köseoglu (2019), the qualitative approach, which is vital for smart tourism conceptual and development research, should not be undervalued.

Hong Kong, one of the special administrative regions of China, is a charming city known worldwide for its cuisine, luxury products, and night lights (Okumus, Okumus, & McKercher, 2007). Nevertheless, Hong Kong's smart tourism is still in its infancy stage despite the rapid development of smart tourism in Mainland China. Several mobile applications, such as My Flight and HK eMobility, provide limited tourism information for tourists (Hong Kong International Airport, 2020; GovHK, 2020).

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In 2017, the Tourism Commission Commerce and Economic Development Bureau (2017) proposed smart tourism as one of the four development strategies of Hong Kong.

Smart tourism with rapid momentum encompasses an entire destination. It can be applied to scenic spots, hotels, museums, and other scenes. Moreover, it may become an important part of the all-for-one tourism in Greater China. Thus, in view of economic, socio-cultural, and environmental advantages that smart tourism brings to destinations (Buhalis, 1997), policymakers and practitioners should consider proposing relevant plans and actions to promote it. On the basis of a case study of Hong Kong, this study aims to gain insights from relevant stakeholders to provide a framework of implications for smart tourism development. This study extends the research area of smart tourism development and bridges the several gaps of smart tourism research. Results provide valuable theoretical implications and practical recommendations for scholars, policymakers, and practitioners.

## 2. Literature Review

### 2.1 Smart Concept and Smart Tourism

The high-tech relevant definition of "smart" can be traced back to 2005. It is the acronym for Self-Monitoring Analysis and Reporting Technology (Rothberg, 2005). "Smart" is usually applied to other terms, thus forming "smart +." Examples are destinations (e.g., smart city), infrastructure (e.g., smart lamppost), technologies (e.g., smart card), markets (e.g., smart economy; Gretzel, Sigala et al., 2015), and management (e.g., smart government; Mellouli, Luna-Reyes, & Zhang, 2014). In these up-and-coming phrases, smart emphasizes the all-around development of a destination ecosystem, which is driven by the interconnection and exchange of data and information with the support of technologies (Höjer & Wangel, 2015; Gretzel, Sigala et al., 2015; Li et al., 2017).

Triggered by tourists' changing behaviors and their higher requirements for travel experience, the tourism industry has inevitably been drawn to smart approaches (Li et al., 2017). Unlike early e-Tourism, which mainly relies on information communication technologies (ICTs) to provide benefits for tourism value chain (Buhalis, & Deimezi, 2004), smart tourism is of great value to an entire destination ecosystem (Gretzel, Werthner, Koo, & Lamsfus, 2015). The advancement of smart tourism is largely attributed to big data and sensor-based technologies (e.g., IoT; Gretzel, Sigala et al., 2015). However, the infrastructure and technologies built in the e-Tourism stage is indispensable for the development of smart tourism (Gretzel, Reino et al., 2015).

Smart tourism concept has been gradually introduced into industry and academia since a decade ago. In China, smart tourism was initially proposed by CNTA in 2011 as a national development strategy (Qian, 2011). Subsequently, the concept of smart tourism destination was extended from the smart city concept by Buhalis and Amaranggana (2014). Despite scholars' efforts in smart tourism research, the definition of smart tourism has not reached a consensus (Li et al., 2017). Smart tourism destination is the initial concept relevant to smart tourism. Smart tourism destination is an extended concept from smart city (Lamsfus, Martín, Alzua-Sorzabal, & Torres-Manzanera, 2015). Thus, descriptions provided by Buhalis and Amaranggana (2014), Lamsfus et al. (2015), Boes, Buhalis, and Inversini (2015), and Lopez de Avila (2015), both highlighted the technological implementation in destinations. In the concept of smart tourism ecosystem, information exchange and value co-creation were emphasized by Gretzel, Werthner et al. (2015). In addition, Gretzel, Sigala et al. (2015) identified three components and three layers in smart tourism. Data are collected, exchanged, and processed in smart experiences, smart business ecosystems, and smart destinations (Gretzel, Sigala et al., 2015). The description

of smart tourism given by Li et al. (2017) underlined the ubiquitous travel service received by tourists.

Literally, the concepts of smart tourism, smart tourism destination (smart destination), and smart tourism ecosystem are vague and sometimes confused with one another. For example, smart tourism destination was regarded as a component of smart tourism (Gretzel, Sigala et al., 2015), whereas the dynamic network in the tourism industry makes smart tourism an ecosystem (Eichelberger, Peters, Pikkemaat, & Chan, 2020). Moreover, a destination was practically considered a tourism-based ecosystem (Eichelberger et al., 2020; Gretzel, Reino et al., 2015). Although the concepts of smart tourism destination, smart tourism ecosystem, and smart tourism overlap to some extent, existing opinions on smart tourism provide possibility for a well-established definition in the future.

In this study, on the basis of the concept proposed by Gretzel, Sigala et al. (2015), smart tourism is defined as: the accumulation and circulation of data via hardware (e.g., technologies) and software (e.g., talents) elements across a smart tourism ecosystem, which assists in enhancing tourists' experiences, promoting value co-creation, and ultimately boosting the development of a tourist destination.

### 2.2 Research Domains of Smart Tourism

Smart tourism has drawn increasing attention from academics and practitioners in recent years. The amount of smart tourism research has grown tremendously since 2015 (Johnson & Samakovlis, 2019). Geographically, the research regions are South Korea mainly, and Italy, Spain, the US, and Mainland China partially (Mehraliyev et al., 2019; Ye, Ye, & Law, 2020). A quantitative approach is more often adopted than mix-method and qualitative approaches (Mehraliyev et al., 2019; Ye et al., 2020). In extant smart tourism research, hot research domains cover a) influence of smart tourism on tourists, b) technology application in tourism industry, c) analysis of user-generated data, d) smart tourism destination management and planning, and e) conceptual studies.

In line with findings of Mehraliyev et al. (2020) and Ye et al. (2020), the most popular topic is the examination of the effect of smart tourism on tourists' perception, experience, and intention by constructing structural models. For example, an integrated model was built by Lee, Lee, Chung, and Koo (2018) to investigate how perception and actual experience affect tourists' happiness. In terms of smart tourism technology application, Basili, Liguori, and Palumbo (2014) provided a detailed case elaborating a mobile application using Near Field Communication to offer mobile transaction and information query services. In addition, multiple users' generated content or data are demonstrated to be of great value for smart tourism destinations (Del Vecchio, Mele, Ndou, & Secundo, 2018). Hence, big data from social media such as Twitter and TripAdvisor have been analyzed to characterize tourists' flow (Chua, Servillo, Marcheggiani, & Moere, 2016) or reveal an online destination image (Kladou & Mavragani, 2015). Moreover, topics about smart tourism management and development in destinations are growing concerns of regional governments and scholars.

Koo, Shin, Kim, Kim, and Chung (2013) comprehensively reviewed the smart tourism development case of South Korea. Additionally, Khan et al. (2017) described the practices of Dubai and proposed a framework to address smart tourism development challenges. Apart from the aforementioned domains, several conceptual papers (Boes et al., 2015; Buhalis & Amaranggana, 2014; Gretzel, Sigala et al., 2015; Gretzel, Werthner et al., 2015; Li et al., 2017) are the essential building blocks of smart tourism research.

Despite the increasing number of published articles on smart tourism, there are some gaps in this research realm. For instance, existing studies are mainly distributed in limited regions such as South Korea and European countries. Other international tourist

destinations have been under-researched. Besides, extant studies that adopt quantitative analysis methods are dominant. This methodological bias may be related to the booming number of tourists-centric research. However, opinions from stakeholders are crucial for the development of such government driven projects. Although some scholars have been trying to extend their research on smart tourism development, most prior studies are not theory driven. Therefore, this study aims to provide systematical policy implications for smart tourism development in Hong Kong, a prominent tourism destination in Asia. Other tourism destinations worldwide with a similar background are anticipated to be benefited from the valuable experience in Hong Kong.

### 2.3 Smart Tourism Stakeholders

In smart tourism practices, several stakeholders play an instrumental role. They get involved in offering smart services, implementing smart applications (Lamsfus et al., 2015), managing and regulating the development process, and conducting research (Waligo, Clarke, & Hawkins, 2013). Werthner and Klein (1999) suggested that the smart tourism value chain has three levels, namely suppliers, intermediaries, and consumers. Suppliers include primary tourism suppliers and transportation, intermediaries are government-affiliated organizations, and tourists are consumers (Werthner & Klein, 1999). Buhalis and Amaranggana (2014) indicate that smart tourism stakeholders contain aforementioned three levels. They are tourism organizations, governments, local residents/communities, environment, and tourists (Buhalis & Amaranggana, 2014). Thus, multi-stakeholders invited in this study encompass practitioners from tourism-related industries and service industry and experts from government or management organizations. Experts from communication operations and IT industry were also targeted, because ICT-relevant companies are essential stakeholders in embedding technologies into destinations (Lamsfus et al., 2015). Think tanks are crucial as well in the policy making process (Fraussen & Halpin, 2017). Therefore, scholars engaged in tourism were invited for additional strategies.

### 2.4 A Policy Framework for Smart Tourism Development

In the commercial context, ecosystem refers to groups of economic entities and their relationships (Gretzel, Werthner et al., 2015). An emerging business-ecosystem-related concept, called entrepreneurial ecosystem, has attracted increasing attention from scholars and practitioners in recent decades (Stam, 2015). In this concept, entrepreneurship refers to high-growth start-ups, providing innovation, productivity, and employment (Mason & Brown, 2014). Stam (2015) proposed a framework to elaborate an entrepreneurial ecosystem's elements, outputs, and outcomes. In this framework, entrepreneurial activities promote innovation, thus creating value to the ecosystem (Stam, 2015). These outputs and outcomes are substantially credited to its systemic conditions (i.e., networks, leadership, finance, talent, knowledge, support service) and framework conditions (i.e., formal institutions, culture, physical infrastructure, demand; Stam, 2015).

This framework presents the structure of an entrepreneurial ecosystem from a systematic review, but also provides references for policy-makers in economic development projects (Stam & van de Ven, 2019). For example, a mixed-method study conducted in Innsbruck, Austria, demonstrated that the entrepreneurial ecosystem framework is practical for policy implications on smart tourism destination development (Eichelberger et al., 2020). Given that the tourism ecosystem is a part of the entrepreneurial ecosystem, and both of them share the same goal (i.e., a region's sustainable development), policy implications for

smart tourism destination development were provided according to the entrepreneurial ecosystem (Eichelberger et al., 2020). In the adapted policy implication framework, Eichelberger et al. (2020) extracted network as the integrated element. Remaining elements of systemic conditions are still regarded as the heart of an ecosystem (Eichelberger et al., 2020; Stam, 2015). The framework conditions are macro elements that allowing or limiting human interactions (Stam, 2015).

In this study, the aforementioned frameworks are employed as the theoretical background to structure the analyzed qualitative data from multi-stakeholders, and generate systematic implications for Hong Kong's smart tourism development.

## 3. Methodology

### 3.1 Data Sampling

A major objective of this study is to solicit insights on implications for smart tourism development in Hong Kong. Thus, a non-probability purposive sampling (Guest, Bunce, & Johnson, 2006) was adopted as an effective approach to collect data. To improve the quality of the qualitative data, the criteria for invited populations are, 1) have good knowledge of Hong Kong's tourism industry; 2) work in smart tourism-related industries, including the tourism industry, communication operation, information and technology (IT) industry, service industry, education industry, government or management organization are potential interviewees; 3) key informants of their affiliations (e.g., managers, assistant professors, and other experts who engage in smart tourism related work; Costa, 2001).

In terms of work regions of invited informants, the preset interviewees were 75% local experts and 25% from other regions (e.g., first-tier cities in Mainland China). This is to collect diverse data and learn from experienced regions. Nevertheless, the unexpected COVID-19, unsettled social events, and local experts' privacy concerns present great challenges in recruiting enough local experts. Many tourism related practitioners have resigned or taken no-pay leave at this special stage, or some of their affiliations have privacy concerns when participating in governmental-oriented projects. Considering the realistic situation, the targeted informants' regions were adjusted to achieve the original objectives as much as possible. Particularly, the proportion of informants from the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) was enlarged (i.e., experts who worked in Macau, Guangzhou, Shenzhen, Foshan, and Zhongshan). Given the enhancing collaboration and integration among cities in GBA (Luo & Lam, 2020), tourism experts from this area can provide reliable and valid opinions on Hong Kong's smart tourism development. Besides, experts from other countries (i.e., the U.S., Japan) who used to be Hong Kong residents were invited.

A total of 109 potential interviewees were contacted via email, phone, or SMS. The researcher gave a brief introduction of this study in the invitation and asked their inclination to participate in the research interview. Finally, 44 experts showed their interest and agreed to participate. Table 1 provides the frequency and percentage of interviewees' gender, work regions, industries, and interview formats.

### 3.2 Data Collection

Data were collected from December 2019 to June 2020. Face-to-face, electronic, and text interviews were scheduled at the convenience of interviewees. Owing to the impact of the COVID-19 outbreak (WHO, 2020b), 61.4% of interviews were conducted via electronic devices. Twelve participants agreed to face-to-face interviews. As requested by five participants, their interview questions were fulfilled and sent back via email. English,

Cantonese, and Mandarin were used as interview languages. Before the interview, study objectives, interview questions, risks and benefits of involvement were stated to participants. Then, semi-structured interviews (Ayres, 2008) were conducted to collect experts' insights into smart tourism development in Hong Kong. The average duration of each face-to-face or electronic interview was 40 minutes. All interviews were recorded with the consent of participants for the convenience of data review. Valid interview content was transcribed into text within English and traditional Chinese for further analysis. To ensure the reliability and validity of the translated transcripts, a series of measures were taken at stages of data collection, data transcription, and data management. At the stage of data collection, informants were recommended to use their first language for accurate narration (Smith, Chen, & Liu, 2008). A trilingual (i.e., Mandarin, Cantonese, English) researcher worked as the interviewer in order to reduce misunderstandings of dialogues. As suggested by Twinn (1997), only one translator is better to ensure the consistency among all data, and maximize the reliability and validity of translation. Thus, the interviewer transcribed the interview content into two languages independently. Highlighted by Van Nes, Abma, Jonsson, and Deeg (2010), interpretation of meaning was crucial in multi-language qualitative research. Thus, for the rigor of the transcribe process and accurate interpretation of data, another trilingual researcher double checked the transcripts. At the stage of data management, English was adopted as the medium for data analysis and research outputs.

**Table 1.** Interviewees' profile (N=44)

| Variable | Frequency (N) | Percentage (%) |
|---|---|---|
| Gender | | |
|   Female | 20 | 45.5 |
|   Male | 24 | 54.5 |
| Work region | | |
|   Hong Kong | 19 | 43.2 |
|   Macau | 3 | 6.8 |
|   Beijing | 2 | 4.5 |
|   Shanghai | 3 | 6.8 |
|   Shenzhen | 5 | 11.4 |
|   Guangzhou | 7 | 15.9 |
|   Foshan | 2 | 4.5 |
|   Zhongshan | 1 | 2.3 |
|   Japan | 1 | 2.3 |
|   U.S. | 1 | 2.3 |
| Industry | | |
|   Tourism-related | 16 | 36.4 |
|     Travel agency | 3 | 6.8 |
|     Airline | 1 | 2.3 |
|     Attraction | 4 | 9.1 |
|     Catering | 1 | 2.3 |
|     Hotel | 7 | 15.9 |
|   Communication operation | 9 | 20.5 |
|   IT | 4 | 9.1 |
|   Service | 3 | 6.8 |
|   Education | 9 | 20.5 |
|   Management/Government | 3 | 6.8 |
| Interview format | | |
|   Electronic | 27 | 61.4 |
|   Face-to-face | 12 | 27.3 |
|   Text | 5 | 11.4 |

*3.3 Data Analysis*

A qualitative content analysis based on grounded theory (Strauss & Corbin, 1998) was conducted on transcripts using NVivo 11 software. An adjusted entrepreneurial ecosystem for smart tourism destination development (Eichelberger et al., 2020; Stam,

2015) was adopted as the framework of this study. The threshold number of researchers for coding qualitative data is at least one (Campbell, Quincy, Osserman, & Pedersen, 2013). Thus, in view of the huge amount of text materials and limited research time, one researcher coded key contents of transcripts, another researcher double checked the coding results. To be more specific, the raw text material was reviewed verbatim by one researcher, following by a two-step analysis. First, each complete sentence or phrase that reveals implication for smart tourism development was coded with a label. For example, *"the government should cultivate more local talents, or attract talents from the Greater Bay Area"* in Interview 22 was tagged with "cultivate or attract more talents." Second, first-level coded labels were assigned into the existing categorization of the framework (Eichelberger et al., 2020). For instance, *"cultivate or attract more talents"* was assigned into the element of *"Talent,"* as one systemic condition for smart tourism development. Then, the coding results were confirmed by another researcher, and discrepancies were discussed until consensus was reached. Lastly, the inter-rater reliability was measured to ensure the accuracy of the coding results (Campbell et al., 2013). Among the coded representative sentenced and tagged themes, the consent rate between two researchers is 0.88, exceeding the suggested cutoff point of 0.7 (Kurasaki, 2000).

Comprehensive implications for smart tourism development were generated from the transcripts, falling into a framework that was originally proposed by Stam (2015) and Eichelberger et al. (2020). The next section elaborates the implications.

**4. Findings**

Following the ecosystem of smart tourism destination (Eichelberger et al., 2020; Stam, 2015), the results of the analyzed qualitative data were categorized into a modified framework (Figure 1). Implications for smart tourism development have nine key elements, namely *Networks*, *Talent*, *Finance*, *Support service*, *Knowledge*, *Culture*, *Leadership*, *Demand*, and *Physical infrastructure*. Table 2 presents the sub-elements, as well as their detailed implications and coded frequency.

*4.1 Integrated Element: Networks*

*"Networks,"* which assist in the efficient allocation of finance, information, and human resource of a system, is the key element to keep the system healthy (Stam, 2015). According to Buhalis and Amaranggana (2014) and Gretzel, Sigala et al. (2015), the distinct aspect in smart tourism ecosystem is the public–private collaboration. Dynamic stakeholders including suppliers and consumers can provide value and play an advisory role on smart tourism development. Consistent with previous studies, interviewees shared that the communication between government and residents is significant. Communication helps the government collect suggestions and gain trust and support from the public, as stated in Interview 39 and Interview 29:

*"Tourists are the experts in tourism. Given that people who work in the tourism industry have a limited view, they do not know the needs of tourists."*

*"The government should also communicate with the public, because this project needs the cooperation of citizens."*

Moreover, the collaboration among stakeholders promotes synergies and information circulation (Eichelberger et al., 2020). Governments would be the main project leader of smart tourism development, whereas enterprises play a significant role in maintaining the operation of smart tourism and providing feedback to the government for better management (Zhu, Zhang, & Li, 2014).
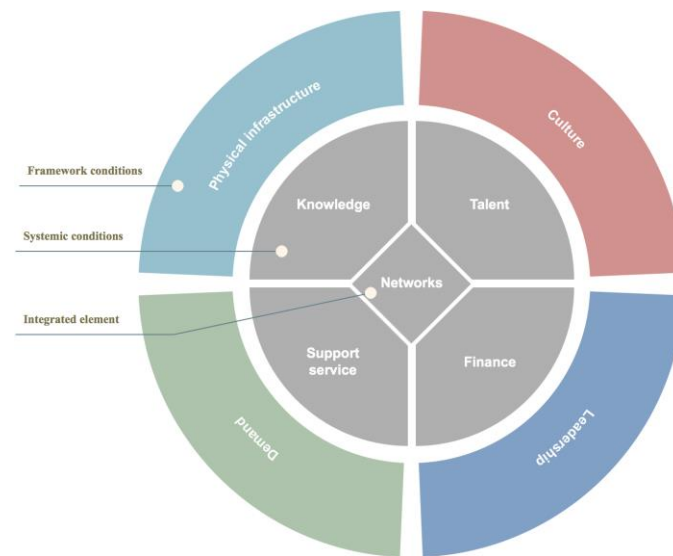
**Fig. 1.** Framework of implications for smart tourism development
(Adapted in line with Eichelberger et al. (2020) and Stam (2015))

**Table 2.** Implications for smart tourism development

| Framework | Elements | Sub-elements | Frequency |
|---|---|---|---|
| Integrated element | Networks | Communicate with the public | 4 |
| | | Strengthen collaboration among stakeholders | 18 |
| | | Collaborate with other cities | 8 |
| Systematic conditions | Talent | Cultivate/attract talents | 8 |
| | Finance | Financial support | 17 |
| | Support service | Diversify local tourism products | 12 |
| | | Diversify payment methods | 11 |
| | | Develop an app | 18 |
| | Knowledge | Tourism resource survey | 4 |
| | | Market survey | 5 |
| | | Develop science and technology | 7 |
| Framework condition | Culture | Improve the city image | 10 |
| | | Promote the local culture | 5 |
| | | Reposition the city | 9 |
| | Leadership | The government should take initiatives | 12 |
| | | Seize the opportunity | 2 |
| | | Establish a specific department | 4 |
| | | Formulate guidelines, policies, and standards | 8 |
| | | Conduct projects openly and transparently | 4 |
| | Demand | Promotion | 17 |
| | Physical infrastructure | Improve infrastructure | 17 |

Eighteen interviewees suggested the government to collaborate with tourism enterprises, communication operators, IT industry, as well as the education industry. As stated in Interview 22:

"*The government should be humbler and should collaborate with some small groups (restaurants, small businesses, travel agencies) … I would recommend that the tourism bureau work with mobile communication operators.*"

In the long term, the Hong Kong government should consider collaborating with nearby cities in the Guangdong–Hong Kong–Macau Greater Bay Area. This strategy allows cities to leverage their synergy effect to form a strong and attractive smart tourism destination. Moreover, short-haul tourism market from the Greater Bay Area, as well as long-haul tourism market from the Greater China and even the foreign market will be expanded accordingly. As shared in Interview 5:

"*Hong Kong is a small tourist destination; hence, it can collaborate with the Greater Bay Area to form a larger tourism industry cluster.*"

### 4.2 Systemic Conditions: Talent

In smart tourism ecosystem, one of the key elements is *"Talent,"* which is involved in technological and management issues of smart tourism development. However, as identified by several interviewees, interdisciplinary talent has a shortage in Hong Kong. More opportunities, therefore, should be provided to cultivate or attract developers who are talented in the fields of technology and tourism:

"*Do we have enough talent?… The government or companies should cultivate more local talents for big data analysis or attract talents from the Greater Bay Area.*" (Interview 22)

### 4.3 Systemic Conditions: Finance

*"Finance,"* the basic systemic condition, is necessary for smart tourism development. Sufficient funding gives an impetus to cultivate or attract talents, encourage start-up enterprises, and promote the development of technology. As suggested in

Interview 8:

*"Provide financial support to encourage technological talents or enterprises to innovate and develop in the smart tourism industry."*

## 4.4 Systemic Conditions: Support Service

*"Support service"* refers to smart tourism relevant products or service systems. Diversified tourism products such as attractions and travel routes, multiple payment methods, and a useful mobile application were crucial to support smart tourism development. Diversified tourism products not only contribute to an attractive tourist destination, but also lead to a rational distribution of tourist flow, which help in preventing the phenomenon of over-tourism:

*"Aside from Disney and Ocean Park, many country parks in Hong Kong are great. The government should pay more effort to promote diverse tourism products." (Interview 20)*

Consistent with previous research (Zhu et al., 2014), experts in Interview 10 and Interview 13 demonstrated that, for the convenience of currency exchange, multiple payment methods should be available in Hong Kong for overseas and Mainland Chinese tourists. Furthermore, 18 interviewees suggested that a sound smart tourism mobile application should be developed for the increasingly individualized needs of tourists in Hong Kong (Hong Kong Tourism Board, 2020). Specifically, such mobile application is expected to perform useful service functions and provide comprehensive and real-time tourism information for visitors (Interview 1). This application will greatly help tourists make a good travel plan, gain personalized experiences, and share comments to the public before, during, and after their trip. In Interview 29, the participant gave an example:

*"Ocean Park and Disney are suggested to provide real-time data to the Hong Kong government. After seeing the tourist flow in the application, I can decide whether I should go there."*

## 4.5 Systemic Conditions: Knowledge

In terms of final systemic conditions, *"Knowledge"* refers to the knowledge background of a developing destination. Before developing Hong Kong's smart tourism, a tourism resource survey should be conducted to evaluate the potential of tourism resources. Interview 2 stated:

*"Hong Kong should do a resource survey and SWOT analysis."*

Furthermore, a market survey that helps suppliers identify the market demand is paramount:

*"We need to do surveys or send questionnaires to understand the interests of the public." (Interview 28)*

More importantly, considering that the knowledge foundation of smart tourism is technology, the principal preparation is to develop science and technology. For instance, a science and technology incubator (Interview 1) could be leveraged to encourage technology innovation.

## 4.6 Framework Conditions: Culture

*"Culture"* is the macro social and cultural environment of a smart tourism destination. As an international tourist destination, Hong Kong has attracted multi-cultural tourists (Enright & Newton, 2004). The tourism image of Hong Kong, however, has been severely affected in recent years. First, the flourishing parallel trade between Hong Kong and Shenzhen has intensified conflicts between residents and tourists (Cheung & Li, 2019; Liu & McKercher, 2016; Wong & Buckley, 2015). Furthermore,

intermittent political events such as "Occupy Central" in 2014 (Luo & Zhai, 2017) and the ongoing (2019–2020) social unrest (South China Morning Post, 2020) have greatly influenced Mainland Chinese tourists' visit intention. Therefore, safeguarding social stability and providing a stable and friendly environment are priorities for the Hong Kong government. Interview 9 stated:

*"Even if it (smart tourism project) is done now, no tourists will go (to Hong Kong) because of the social situation. Hong Kong should be politically prepared and stable."*

Hong Kong's unique local culture is always a potential tourism resource to help maintain the competitiveness of this city. Although relying on the shopping tourism is no longer sustainable for Hong Kong's tourism industry, this city is expected to reposition itself and explore diversified characteristics to attract tourists. One possible strategy is to leverage local culture and integrate it into smart tourism products (Interview 15). Interview 27 suggested:

*"Hong Kong's local culture is underexplored, particularly some village houses in Hong Kong. During festivals, these village houses can provide meals or other traditions. I think that we can utilize the culture and folklore. This is another name card of Hong Kong tourism."*

## 4.7 Framework Conditions: Leadership

Apart from local culture, leadership is a crucial impetus driving the process of this project. Considering that the government is more long-sighted and have discourse power on public policy than any other stakeholders, it should take the initiative in such large-scale project:

*"It is very important that the government take the lead...If the government is unwilling to take the responsibility, then it (smart tourism) will remain an ideal concept." (Interview 22)*

During this challenging period, the government is recommended to turn challenges into opportunities. The government should seize the opportunity to leverage smart tourism, instead of being hindered by the COVID-19 outbreak and other political events. As demonstrated in Interview 9:

*"Don't hesitate to seize the timing! If Hong Kong can seize this opportunity, then the city image will be improved, especially in the current unstable situation."*

To take actions on smart tourism development, a specific department is paramount to handle relevant issues. For example, considering the legal management and utilization of tourism big data, this formal department is expected to engage in formulating related guidelines, standards, and policies (Interview 4). This opinion also echoes with Gretzel, Reino et al. (2015) and Zhu et al. (2014), who highlighted that data management and sharing should be standardized and institutionalized in the future. Additionally, the government is recommended to conduct smart tourism project transparently and openly. Inviting the public to play an advisory role may assist the government to gain trust and support from the public. Interview 23 recommended:

*"The government should first make the utilization of information collected as transparent as possible to ease people's distrust of technology and privacy issues."*

## 4.8 Framework Conditions: Demand

The development of tourism industry is largely driven by tourist demand. Marketing is an effective strategy to create market demand, which, in turn, promotes the development of smart tourism projects. As highlighted in Interview 1:

*"The most important thing is that the government should promote this project."*

Interview 32 below provides an example. To disseminate smart tourism project related information, multiple social network sites could serve as an effective platform.

*"The government should spend more money on tourism promotion. For example, find a foreign Internet channel to promote Hong Kong's tourism information to foreigners."*

### 4.9 Framework Conditions: Physical infrastructure

The most basic foundation for smart tourism development is physical infrastructure. Network-related infrastructure should be constructed well to support information dissemination among suppliers and tourists. Several public facilities are necessary to be updated to boost the city's development. For example:

*"Accelerate the infrastructure development of 5G and Smart City (primarily IoT sensors on roads, museums, and other POIs)."* (Interview 23)

*"Improve transportation facilities…The high-speed rail station should connect more mainland cities to facilitate tourists to Hong Kong…which is good for tourists and local residents."* (Interview 32)

## 5. Discussion and Implications

Based on the feedbacks of smart tourism stakeholders, systematical policy implications are provided for smart tourism development in Hong Kong. This study comes up with significant implications for academia, industry, and government. Meanwhile, there are several limitations that should to be addressed in the future.

### 5.1 Theoretical Implications

This study extends smart tourism research, which is a key concern among practitioners and academics. First, on the basis of several academic descriptions of smart tourism, this study refines the definition of smart tourism. More importantly, this study contributes to the research area of smart tourism development by providing sound implications based on the case study of Hong Kong. As smart tourism is mostly a top-down development project oriented by the government (Gretzel, Sigala et al., 2015), systematic implications from relevant stakeholders' perspective is essential for policy-makers and project leaders to make wise decisions and actions.

Second, a framework (Eichelberger et al., 2020; Stam, 2015) was adopted as the theoretical foundation of this study. Existing smart tourism hot topics range from the effects of smart tourism on tourists (Lee et al., 2018), technology adoption (Basili et al., 2014), analysis of user-generated data (Chua et al., 2016), and smart tourism development (Khan et al., 2017). Among these topics, smart tourism development has drawn increasing attention especially from regional governments and scholars. However, research on smart tourism development is scant and usually non-theory driven (Gretzel, Reino et al., 2015). In fact, scholars have attempted to extend this research area by introducing the case study of Korea (Koo et al., 2013) and Dubai (Khan et al., 2017). It was not until 2020 that Eichelberger et al. (2020) introduced a theoretical framework for systematic smart tourism development policy making. This study proposed an adjusted framework with nine elements for smart tourism development implications. In line with Eichelberger et al. (2020), results supported that integrated elements, systematic conditions, and framework conditions are essential for smart tourism development

### 5.2 Practical Implications

Findings provide significant practical implications for smart tourism policy-makers and relevant developers. The framework for smart tourism development implications provides a structured and valuable reference for regional policy making. According to the nine elements in the aforementioned framework: a) communication among governments, stakeholders, and residents should be strengthened, b) all-around talent should be cultivated or introduced from nearby cities because they are essential to technology innovation and management, c) sufficient budget is necessary to support the entire smart tourism project, d) a smart tourism mobile application that provides and collects real-time tourism data is expected to be launched, e) surveys on tourism resources and markets should be conducted to understand the destination well, f) a friendly and inclusive environment would be more attractive to tourists. Thus, g) a specific government department is responsible for formulating smart tourism guidelines, h) taking initiatives in infrastructure construction, and i) market promotions.

### 5.3 Limitations and Future Research

This study has several limitations. First, for the convenience of interviewees and accuracy of primary data, Cantonese, Mandarin, and English are the media of interview. However, to ensure the consistency of the coding results, the analyzed data were translated in English. Thus, two trilingual researchers have taken into consideration the context of the three languages as much as possible during the translating and interpreting the meaning. It might minimize semantic or cultural discrepancies in the expression of different languages. Second, although the proposed implications were structured into a general framework, it may not applicable to all regions due to different political systems and cultural environments. Specifically, in the case study of Hong Kong, cultural implications were in line with the current social situation. Other stable and safe smart tourism destinations may consider to emphasize other elements. Lastly, the proposed percentage of interviewees' region has been adjusted due to the pandemic and informants' privacy concerns, which might influence the results to some extent. By soliciting help from experts in GBA, the researchers have tried their best to minimize the possible skewness. Nevertheless, given the exploratory nature of this study and the significance of implications for smart tourism development, these limitations do not diminish the contributions of this study.

## 6. Concluding Remarks

Aiming to provide a framework of implications for smart tourism development in Hong Kong, this study employs a qualitative approach to collect insights from multiple stakeholders. Findings reveal practical implications from nine aspects, namely network, talent, finance, support service, knowledge, culture, leadership, demand, and physical infrastructure for smart tourism development. This study extends the research area of smart tourism development by adopting and confirming a framework derived from the business realm. Theoretical and practical implications are generated as well, which are likely to benefit academic researchers, industry practitioners, and policy makers.

**Declaration of competing interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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