

## Chapter 2

# Technology Application in Tourism in Asia



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**Abstract** The significance of the application of technology to tourism has been long confessed because it is one of the strategic forces of competitiveness in the global tourism. Recently, tourism destinations are in a tight race to launch new technologies that can efficiently and effectively advance services towards the satisfaction of touristic needs. The COVID-19 pandemic has made the adoption of technology essential rather than ancillary means of rendering many touristic services. Furthermore, the rapid growth of Asian tourism industry has accelerated the adoption of modern technologies including virtual reality, artificial reality, artificial intelligence, and so on in scenic spots, accommodation, transportation, catering and major sporting and non-sporting events. At present, several Asian destinations have built a strong technology base for providing ‘untact’ services. Research on technology adoption in tourism from western context has significantly increased in the past decade. However, there is a limited knowledge in tourism technology scholarship regarding the use of technologies in Asian tourism. This chapter provides a theoretical and conceptual analysis of technology adoption in Asian tourism. In particular, this chapter presents a critical review on how technology adoption is progressing the opportunities, and the prospects of its use in Asian tourism industry. This conceptualization is significant to better understand the status and progression of Asian tourism industry with respect to the application of various technologies.

**Keywords** Technology · Tourism · Development · Asia · Analysis

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## Introduction

Technology has occupied a good position in any industry as it can play a significant role in the success of business through augmenting the quantity and increasing quality of products and services. Technology transforms touristic the landscape. Tourism is a highly disintegrated sector as it needs to involve different stakeholders including tour operators, government, accommodation providers, hoteliers, technology providers and transportation providers etc. to complete a touristic service (Jamal & Stronza, 2009). In global tourism industry, the technology eases the coordination and collaboration of diverse resources possessed and controlled by diverse stakeholders. Tourism in Asia is not exceptional in terms of technology use. Now, Asia is an attractive tourism market for both inbound and outbound tourism (James Cook University, n.d.). Many destinations in Asia have greatly responded to technological change (Gek-Siang et al., 2021). Although a significant technological shift has been noticed in tourism of many Asian countries since the last decade, tourism in Asia in general is still in its infant stages comparing with western tourism in terms of technology application. At present, the application of advanced technology is critical in tourism sector in Asia for its sustainability. The studies on the application of technology in Asian tourism “bring international acumen from across the Asian region - Singapore, Indonesia, India, Iran, China, Vietnam, Bangladesh, Russia and the Philippines - to assess and interpret the trends and issues” related to technology adoption (James Cook University, n.d.). There is a need of research to provide a conceptual analysis of the application of technology in Asian tourism and present future research direction referring to previous studies. This study presents a comprehensive review of previous literary work and conceptual analysis on the application of technology in Asian tourism. This study also provides future research direction based on previous studies. This conceptual analysis is helpful to diverse tourism stakeholders and policy makers to obtain a better understanding on the current speed of technology diffusion in the region. This study assists them to decide the technology that needs more attention for the advancement of the region’s tourism sectors.

## Significance of Technology in Asian Tourism

In the twenty first century, technologies are necessary for reacting to expeditiously changing needs and preference of tourists (Lee & Lee, 2019). Technology can keep actual and potential tourists up to date about a destination (Zainol, 2005). Digital communication has become imperative to provide services to tourists, particularly during COVID-19. Digital communications can only be enabled by various technologies. The technologies including “the internet, the software applications and the devices allow people to connect both to the network and to each other whenever, wherever and however they want to” (Ryan & Jones, 2009, p. 6). It is the technology

that can provide the facilities of  $24 \times 7$  real time interaction to obtain information. Some countries such as Japan, China, South Korea, Indonesia, Taiwan, Malaysia and India etc. in the Asia are very keen and friendly to adopt new applications and technologies to develop sustainable tourism sectors (Sezgin & Aktas, 2016a). Tourists in this region also share their touristic experiences through technology-enabled platforms. Technology is an important strategic means for both performing touristic services and sharing tourists' views about the services in the greater virtual as well as real world (Asian Trade Centre, 2017). For example, internet technology used by hoteliers in Hong Kong assists travellers to make their purchase decisions easily (Wong & Law, 2005). Furthermore, the research of Wong and Law (2005) found that this technology also helps the Hong Kong hoteliers to generate more profits by saving labor and broker costs. Similarly, the South Korean hoteliers and the tourists in Korea found internet technology as advantageous, safe and fast for exchanging information (Kim & Kim, 2004). During global pandemic, particularly COVID-19, internet technology in many destinations in the Asian region have eased maintaining physical distancing in terms of tour confirmation, cancellations, reservations, and refunds etc. Many countries in this region have been able to keep running the wheel of their tourism sectors through 'untact' services (Bae & Chang, 2020). This 'untact' service is substantially flourishing and rapidly diffusing in Japanese (Kim et al., 2018), South Korean (Bae & Chang, 2020) and Malaysian (Zainol, 2005) tourism sectors. 'Smart digital devices and advanced technologies have enabled "untact" service, facilitating customer encounters without a face-to-face contact with employees' (Lee & Lee, 2019, p. 1). The digital devices enable both effective and efficient customized services to meet the needs of tourists. Kim et al. (2018) pointed out that technology-enabled services offer fast services at  $24 \times 7$ , convenience due to all services at one station, high privacy, and individual tourists-specialized service. In addition, many destinations in Asian region are using technology not only for promoting touristic attractions and providing information, but also for tourism planning, development, and evaluations.

## **Actual and Potential Use of Some Notable Technologies in Asian Tourism**

The modern technologies that have currently opened new opportunities for value creation and impacted greatly on service rendering are artificial intelligence, gamifications, virtual reality, robotic systems, augmented reality, machine learning, cloud computing, mobile technologies, and big data analytics, etc. These technologies are currently being used to ease the diverse touristic activities in many countries of the Asian region. This section provides the present status and future prospect of the application of several modern technologies in Asian tourism sectors.

## ***Artificial Intelligence (AI)***

Artificial intelligence (AI) means computer software or automation that can perform activities with almost human-level capacity and intelligence. Although the application of artificial intelligence is substantially increasing in various sectors, the global tourism sector is in growth stage in terms of its use (The United Nations Development Programme, 2018). Some Asian destinations have already realized the benefits of AI such as work efficiency, ensuring safety and security, and accurately analysing travellers' behaviour and preferences with respect to booking airlines, hotels, and cars. For example, many travel companies in Singapore, South Korea, Malaysia and China are using AI for trip itineraries, real-time language translations, digital marketing, chatbots and face recognitions (Chandran, 2020). A study conducted by Tuo et al. (2021) on the application of AI in Chinese tourism sector stated that the AI is beneficial to tourism destination governments, tourism experiences, and tourists in terms of performing high quality government functions, quick responses to emergency rescue and touristic service demands, customized tourism services and quick response to tourists' enquiry. Many countries, for instances, India, Pakistan, Indonesia, Philippines, and Bangladesh etc. engage hundreds of millions of people in tourism sectors. At present, they are less responsive to employ AI in their tourism sector because AI will pursue a large number of layoffs (The United Nations Development Programme, 2018). Alternatively, many Asian countries are organizing AI-related training for their people to successfully reallocate them and implement the application of AI in future. Research in respect to AI's application in Asian tourism is limited (Tuo et al., 2021). There is a need of research on how tourism destinations in Asian region can achieve strong network among diverse stakeholders in fragmented tourism sector through the application of AI (Tuo et al., 2021).

## ***Gamifications***

Gamification is a digital marketing tool that reward or gift travellers for their functions or activities (Sooksatit, 2016). This provides the opportunity to combine game with products and services of travel industry (Chung et al., 2015). Although the practices of gamification have frequently been used in increasing travellers' use of services of hotel and airlines and uplifting destination's brand image, the application is gamification in travel industry is still in incipient stage (Yilmaz & Coskun, 2016). Many Asian airlines and hotel businesses use gamifications to attract travellers. The Singapore airline is notable for gamifications (Sooksatit, 2016). Due to gamification strategy, the winning travellers are prioritized with respect to check-in, seat selection, boarding, food, accommodation, free or discounted ticketing, and passenger segmentation/status (Yilmaz & Coskun, 2016). The practice of gamification in tourism industry in Asian region is currently increasing. The governments

and tourism companies in many Asian regions are trying to design touristic products and services by leveraging with games. Gamification strategy is currently being used in China in a wider spectrum. However, this strategy also gets criticized because several groups of tourists feel annoyed with messages or invitations. Asian touristic businesses are more likely to apply gamifications strategy because many destinations in the region are emerging in world tourism market and they are trying to brand themselves. In line with that, we recommend future researchers to provide insights on how Asian tourism sectors can make the use of gamifications efficient and more tourists friendly.

### ***Virtual Reality***

Virtual reality (VR) is “the use of a computer-generated 3D environment – called a ‘virtual environment’ (VE) – that one can navigate and possibly interact with, resulting in real-time simulation of one or more of the user’s five senses” (Guttentag, 2010, p. 638). It is obtaining popularity in tourism sectors because it can qualify travellers to view and enjoy a destination without considering geographical demarcation or distance. Due to virtual reality, tourists are able to obtain real-time experience on facilities in airlines and hotels, and an entire understanding of a destination before moving to the destination (Samala et al., 2020). For example, Atlantis Dubai Hotel offers tourists the facilities of virtual reality before starting to travel with the hotel and its collaborators (travel agent, airlines and car companies etc.) (Samala et al., 2020). The VR is useful for marketing sensitive and risky natural attractions. Many Asian tourism destinations are becoming dominant in terms of using VR technologies. For example, China, Singapore, South Korea, Malaysia, Thailand, and Indonesia have achieved a remarkable growth in VR applications in the recent past. Several previous research (Dong et al., 2011; Jung et al., 2015; Tavakoli & Mura, 2015) recommended that the application of VR technologies is wide in Asian tourism destinations with respect to theme parks and natural attractions. Furthermore, many Asian Muslim female tourists find VR technologies as highly comfortable due to religious norms and safety reasons (Tavakoli & Mura, 2015). The more innovative touristic destinations in the Asian region are more technology-friendly and quickly adopting VR technologies in their tourism sectors (Jung et al., 2015). In future, the application of VR technologies will obtain more popularity. As the Asia has diverse tourism resources, products and different religious and age group people, the region is quite potential market for the use of VR technology. Further study is required to have better understanding on how Asian tourism destinations can render more customized services to different age (Jung et al., 2015), religious and gender groups (Tavakoli & Mura, 2015) through the applications of VR technologies.

## ***Augmented Reality (AR)***

Although several researches considered VR and AR as similar and related (Guttentag, 2010; Milgram et al., 1995), there is a difference between VR and AR (Buchholz, 2014; Farshid et al., 2018). The AR is the combination of real world with machine-generated content; and the VR is entire digital portrayal of the real world (Farshid et al., 2018). AR applications are useful to augment a tourist's experiences. The destination marketing organizations and other related tourism businesses including accommodations, cruise ships, food, resorts, theme parks, transports, museums, and eco-parks in Asia can use VR technology to promote touristic services and affect the taste and preferences of tourists. The VR applications are widely used and popular to many Asian heritage areas (Jung et al., 2019), notably Chinese, Korean, Macau and Malaysian cultural heritages, because the heritage areas have some access-related restrictions for conservation (Chung et al., 2018; Gek-Siang et al., 2021; Ilhan & Çeltek, 2016; Yin et al., 2021). The Asian tourism destinations are recommended to fully integrate four important segments of tourism industry including hoteliers, food providers, tourism attractions and transports with respect to VR technologies to exploit the region's tourism opportunities (Gek-Siang et al., 2021). Asian tourism is a huge potential market for VR technology because the region has huge population and is the world's largest market for smartphone (Technicolor, 2020). The compounded growth rate of the application of VR technologies in the world over the last five years was about 80% where Asia was the fastest growing market (Technicolor, 2020). Several Asian tourism destinations such as Japan, China, South Korea, Singapore are currently (during COVID-19) investing a huge amount of money in VR technology to boost up tourism businesses.

## ***Mobile Technology***

Mobile technology plays a significant role in the advancement of tourism. In the twenty-first century, mobile technology actually lessens the need of face-face interactions in terms of rendering many touristic services including flight booking, hotel booking, destination detailing and catering choosing etc. (Sezgin & Aktas, 2016b). Asian Trade Centre (2017) reported that with the application of mobile technology, the tourists can obtain 'hundreds of options; sort by cost, location, star rating, or customer reviews; compare prices; and book a reservation' (p. 1).

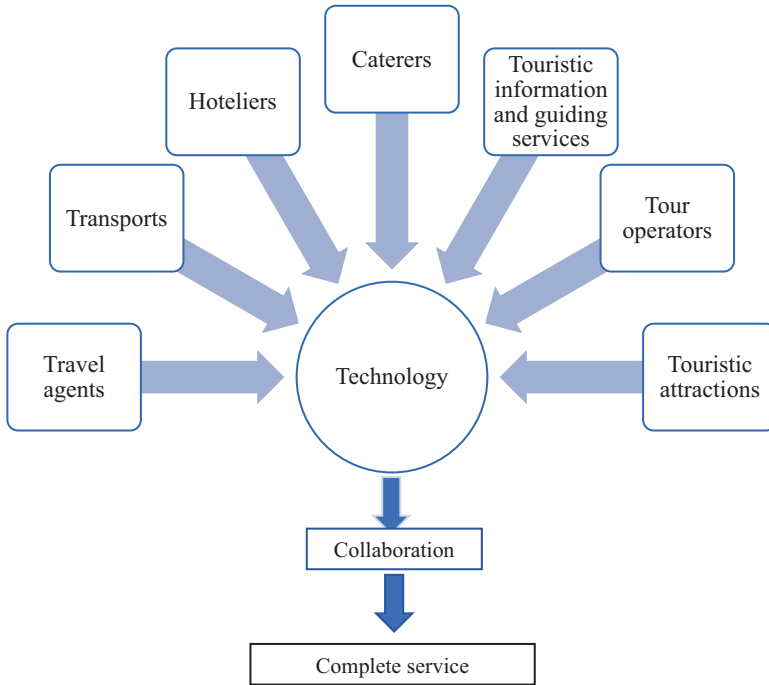
Mobile device usage is highly popular to many Asian tourists to complete several touristic activities. For instances, almost 78% Chinese travellers use mobile devices to book travels and catering (Jing Daily, 2015). Navigation apps in the smartphone are effective means to many groups of tourists driving car or walking to find out the directions towards touristic destinations. Different types of navigations or wayfinding apps enabled by mobile technology have been developed or used in different countries in the Asian region to assist domestic as well as foreign tourists. More

than any other tourists in the world, the Asians seek for travel information, manage accommodations, and make payment with apps in smartphone (Asian Trade Centre, 2017). However, several apps are in the country's own languages that cannot provide benefits to many international tourists in the region (Brennan et al., 2018). Destination marketing organizations in the region are highly active to promote various social networking apps enabled by mobile technology. Tourists from different corners of the world can be able to obtain various information for making travelling decisions in the Asian countries. Furthermore, the mobile technology is effective device for handling touristic security and emergency issues in this region. The tourist police in various Asian destinations have a special number for those services. Mobile payment apps also make touristic financial transactions easy and convenient in the region. In line with this, "smartphones have become dominant service-delivery points for tourists and are currently used as GPS, cameras, music players, dictionaries, notepads, and translators" (Abolfazli et al., 2015, p. 65). It is also true that many Asian tourists and small tourism-related businesses are still far behind in terms of using different mobile-enabled apps. Future research could explore what are the barriers in terms of using mobile-enabled apps in Asia to provide touristic services and how to overcome that.

In addition to the above-mentioned modern technologies (i.e. artificial intelligence, gamifications, virtual reality, augmented reality, and mobile technology), there are many other technologies that are being used by tourism organizations in Asia. There is a huge potential of diffusion of technologies from western countries to Asian countries to enrich and exploit touristic opportunities.

## **Actual and Potential Touristic Functions for Technology Use**

It is reiterated that tourism is a highly fragmented sector (Zapata & Hall, 2012) because it combines several diverse sectors including accommodations, catering, transports, travel agents, touristic attractions management and sports etc. (see Fig. 2.1). Destination marketing organizations and tourism businesses must perform a variety of functions (Zairi, 1997) to satisfy tourists. For example, collaboration, marketing, finance, human resource, and product development etc. are the critical functions in tourism business (Dollinger et al., 2010; Hojehghan & Esfangareh, 2011). Currently, several functions are enabled by technology. The status and prospect of the application of technology to perform several widely cited functions by Asian tourism business are briefly discussed below:



**Fig. 2.1** Technology-enabled collaboration to produce a complete service. (Source: developed by the authors, 2021)

## *Collaboration*

Collaboration means several stakeholders work together in a platform and share resources to achieve a common goal (Jamal & Stronza, 2009). In tourism, collaboration is a necessary due to the involvement of different stakeholders to produce a complete touristic service (see Fig. 2.1). Creating and maintaining collaboration in a traditional way is a difficult task because of diverse stakeholders, stakeholder's insufficient time and infrequent communication (Jiang & Ritchie, 2017). Collaboration and frequent communication among tour operators, hoteliers, caterers, transport providers and tourists etc. could easily be developed with the assistance of technology (see Fig. 2.1). Currently, many tour operators in Asia are collaborated with related tourism businesses (accommodation providers, caterers and transport etc.) (Asian Trade Centre, 2017). So, a tourist can easily purchase or book almost all necessary services from a single station with the help of technology to travel many countries of the Asia.

In Asia, technology is considered as an important tool to bring all the tourism related partners in a single platform. Due to fast technology diffusion in Asian region and technology-enabled collaboration and cooperation with tourism stakeholders, online travel agents in many countries of Asia are able to respond to



millions of tourists' inquiries within a minute (Asian Trade Centre, 2017). In this regard, China's Ctrip and Indonesia's Traveloka are notable. Although there are different levels of trends of technological applications in different Asian countries, the region's tourism is highly potential area for collaborative technological investments (Asian Trade Centre, 2017).

### ***Digital Marketing***

At present, digital marketing is one of the most important functions for tourism businesses. Considering the present tourism business environment and the tastes and preferences of tourists, digital marketing has obtained popularity to tourism products and services providers (Hassan & Ramos, 2021). Digital marketing means performing various functions and processes enabled by technologies for generating, disseminating, and delivering value to tourists and related tourism businesses (Riyadi et al., 2019). In Asia, the popular digital marketing tools are website, SMS and blogs, and social media platform (Sharma et al., 2020). "A Web site is a powerful medium offering unique marketing, advertising, product and service information, and communication opportunities between a business and its customers or potential customers" (Kasavana et al., 1998, p. 35). There are some Asian countries like Singapore, Thailand, South Korea, Malaysia, Japan and Hong Kong that have been better marketing their touristic places and offers thorough websites (So & Morrison, 2004). Different social media marketing practices also exist almost all Asian countries for promoting tourism. Despite some indigenous social media platforms, Facebook and Instagram are the popular means in Asian tourism stakeholders. However, this region needs to develop a policy for adopting and implementing digital marketing practices to tourists and tourism industry for the enhancement of its tourism market share. The diffusion of digital marketing in many developing countries in the region is slow. Further study could explore how the developing countries in Asian region can successfully adopt technology for marketing tourism. The study also needs to be conducted to examine the costs and benefits of digital marketing from the perspective of sustainable tourism development in the region's developing countries.

### ***Finance***

Currently, almost all tourism organizations and many tourists prefer to complete their tourist service-related financial transactions through technology. For example, the debit card, credit card, master card, and visa card facilities have eased tourism service-related payments for both tourists and tourism businesses. E-wallet users in Asia are increasing day by day. Particularly in South Asia, 49% of various urban customers use e-Wallet (Bosting Consulting Group, 2020). This percentage will

probably reach at 84% by 2025 (Bosting Consulting Group, 2020). Alipay and WeChat pay are highly popular to Chinese tourists, restaurants, travel agents and other small tourism businesses (TechinAsia, 2017). The small tourism businesses in South Korea, Japan, India, Singapore, Indonesia, Bangladesh, Malaysia, and many other Asia countries are currently providing apps payments or other e-payments facilities to tourists. In Asian region, some south and southeast Asian countries are emerging with respect to technology use in touristic financial transactions. For example, Singapore, China, Malaysia and Indonesia are considered as leaders; Thailand and Philippines are considered as followers; India is considered as highly prospect; and Bangladesh and Pakistan are considered as challengers (Deloittee & Inclusion, 2020). However, small tourism businesses such restaurants, hotels and car rent in Asia have poor understanding regarding the process of digital payments due to their low education (Bosting Consulting Group, 2020).

### ***Human Resource Management***

Tourism industry faces more complexity in staffing because the seasonality of tourism businesses like food, accommodation, transports, and attractions has an impact on recruitment. The traditional staffing process is more costly (Hojeghan & Esfangareh, 2011). In Asian region, most of tourism related businesses are privately owned. The recruitment and termination of staff in these types of businesses in many countries of the Asian region are unorganized and highly volatile. Consequently, the staffing process creates a problem for staff, and generates inefficiency and effectiveness in organizations' performance (Hojeghan & Esfangareh, 2011). The application of technology in recruitment and selection, developing and training, performance evaluation and reward can cut down the investment of money, time, and efforts (The United Nations Development Programme, 2018).

### **Challenges of Technology Use in Tourism in Asia**

The adoption of technology in almost all sectors incurs costs and some technological expertise or knowledge of both suppliers and users. Tourism industry is not exceptional. Supportive management is an important factor for responding to technological change. In Asia, most of the managements of tourism organizations are dominating and less supportive for the technology adoption (Heung, 2003). Management of tourism businesses in many Asian countries have negative attitude toward technology adoption due to huge financial costs, legal complexity, risks, small size of the business, and lack of management' and tourists' technological knowledge (Heung, 2003).

The Asia is the most populous continent in the world. Almost sixty percent of total world's population live in Asia. Tourism sector is highly labour-intensive industry. A significant number of Asian workforces are also engaged in Asian travel and tourism industry. One of big challenges for Asian travel and tourism industry to manage the employees' layoffs due to technology adoption (The United Nations Development Programme, 2018). Many Asian countries like India, Philippines, Bangladesh, and Pakistan etc. cannot promptly adopt several technologies in tourism sector due to the potential layoffs of a huge number of staff (The United Nations Development Programme, 2018). This region's government, tourism industry and related stakeholders must plan and organize technology-related education and training to fit current staff with technology-related job in tourism industry.

Many owners of the small tourism businesses such as food, accommodation, transports, and tea stalls etc. in many Asian countries are not educated to handle or operate technology in their businesses. The application of technology also requires reconfiguration of business modules that many owners are reluctant to do (Tuo et al., 2021). There is also a huge number of people in Asia who do not have internet access (Lee & Lee, 2019). The adoption of technology cannot help them. They prefer to do face-face interactions with touristic service providers. There are several groups of tourists like senior citizen, tourists with no English skill, and people with negative perceptions of online or technology services, who are not interested to use online services (Lee & Lee, 2019). This situation creates a barrier to the diffusion of technology in the region's tourism sector (Bosting Consulting Group, 2020).

Furthermore, although some countries such as Japan, Singapore, South Korea, China, Malaysia, Hong Kong, Indonesia, and Taiwan are quickly adopting technology in tourism sectors (Chung et al., 2018; Gek-Siang et al., 2021), many other Asian countries, such as Pakistan, Bangladesh and Nepal etc., are lagging behind due to lack of technological infrastructural base and investments (Meo et al., *in press*). Some tourism service suppliers feel that the investment of technology in Asian tourism sector is also risky because many Asian countries' tourists have doubt on online transactions and want to make face-face to interactions (Sharma et al., 2020). However, the current COVID-19 situation might force the Asian tourists to seek technology as blessing.

Many destinations in the region are also concerned with privacy and security when they will deal with cloud machine, AI and other technologies (Abolfazli et al., 2015). The application of technologies requires providing personal data of tourists and touristic service providers into the systems. Privacy and security of these personal data can be disclosed or jeopardized by cyber hacker (Lee & Lee, 2019). The adoption of technology in Asian tourism sector creates a further challenge of ensuring effective risk management systems. Moreover, technology-enabled tourism services can make tourists feel disappointed and confused as they face a vast array of information.

## Conclusion

The travel and tourism sector is the most technology-affected sector in the world (Hojeghan & Esfangareh, 2011). We live in an era of globalization. The Asian tourism industry needs to promote tourism attractions and services beyond Asian demarcation. The tourists from different corners of the world also inquire information before starting travel to the Asian region. Information technology can provide updated information to all relevant tourism stakeholders beyond any geographical boundary at minimum cost and time (Zainol, 2005). Asian tourism sector is one of the large and lucrative market segments for the application of technology. The overall Asian tourism sector except some countries' tourism is still backward in terms of responding to technological change; and its sustainability will be vulnerable without the adoption of appropriate technology in future. Some Asian countries like Singapore, South Korea and Hong Kong are remarkable and exemplary in the world in terms of technology application in tourism sector. The adoption of technology has several challenges, but the Asian tourism sector has potential to overcome the challenges. The region's tourism related businesses have already started to realize the long-term benefits of technology adoption. It is highly expected that the diffusion of technology in the region's tourism businesses will rapidly increase by the passage of time and fully exploit the advantages of using technology. The government, relevant stakeholders and policy makers have to come forward with technology-friendly policies and initiatives for the advancement of the region's tourism sector with sophisticated technologies and innovations.

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