

Azizul Hassan *Editor*

Technology Application in Tourism in Asia

Innovations, Theories and Practices

 Springer

Technology Application in Tourism in Asia

Azizul Hassan
Editor

Technology Application in Tourism in Asia

Innovations, Theories and Practices

 Springer

Editor
Azizul Hassan
Tourism Consultants Network
The Tourism Society
London, UK

ISBN 978-981-16-5460-2 ISBN 978-981-16-5461-9 (eBook)
<https://doi.org/10.1007/978-981-16-5461-9>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Introduction

Asia's rapid growth has resulted in an increase in affluence, allowing its residents to enjoy leisure travel, both long-haul and short-haul. The region's low-cost travel market, which includes low-cost airlines, is also predicted to explode. The rise of low-cost airlines and the region's expanding affluent middle class have drastically altered the tourism industry's landscape. The advancement of technology has had a tremendous impact on the travel business, with more travelers buying their vacations online. The largest and most established component of Asia's Internet-based economy is online travel. When arranging a vacation, many tourists look for a combination of benefits and discounts. Tourists' usage of technology and technological devices has increased more than any time before. The tourism industry has frequently capitalized on such desire (need) for staying in touch with its clients. Tourists are accustomed to be contacted for Internet surveys and automated phone calls in recent years. They have also dabbled in e-marketing, which can be believed as a far more sophisticated version of digital means of staying in touch. Many hotels and tourist facilities provide free access to the Internet with or without additional charges for Internet access, local calls, and per-page faxing. As a result of such offers and individualized services, tourists can assume that technology has become a double-way street. Technology is used for providing personalized service while increasing revenue in hotels, aeroplanes, transportation hubs, etc.

For the tourism business, technology has since become useful and rewarding. This offers numerous benefits while also being utilized to boost income and reduce customer service. Technology has turned air travel convenient and secure, but this has also necessitated long security lines and other inconveniences. Certainly, certain segments of this industry have started to make good use of technology. In the context of travel and tourism, the application of useful technology has always been a prime demand and more relevant. It is crucial to recall that tourism is all about peoples' interaction with one another. Using technology appropriately can be beneficial. The correct usage of computers to assist both check-ins and check-outs of businesses like hotels can free up the person on duty for dealing with other issues. Consistency and clarity might also help. In today's interconnected multilingual world, tourists can get a lot of information in their own language without any

pronunciation, linguistic, or grammatical mistakes. Ease of access can be advantageous. Utilizing technology and social media for allowing visitors for conducting research and acquiring elementary information from the comfort of their own homes can help. Travel agencies rely on online booking platforms to manage data, conduct transactions, and provide fast customer support.

Booking platforms, often known as online travel agents (OTAs), steer travelers not only to most of the good hotels, but also to airlines, vehicle rental companies or agencies, and relevant travel-related products and services. Consumers can get real-time availability and price comparison information through OTA, which is an all-in-one platform. Tourists are able to compare costs across OTAs to pick the best offers. Tourism and travel, an industry that has already been significantly “disrupted” by technology, will see even more business-related activities go online. Technology has already had a significant impact on how and where people travel, how they book, and how they use other people’s recommendations to make decisions. Local businesses have been hit hard by the disruption, and they now have to split their profits with the multinational corporations who operate the applications. Disruption is unavoidable in today’s digital society. Tourists may easily obtain comprehensive information on hotels, restaurants, and read guest reviews on an all-in-one platform site, allowing them to make better selections while picking their holiday destination. When compared to booking directly with hotels, OTAs such as Agoda and Expedia have given consumers the power to secure better offers.

Because of the COVID-19 pandemic, most Asian governments have banned international commercial flights, significantly impacting the region’s tourism business. The pandemic has resulted in the loss of millions of jobs in the tourism and aviation industries across Asia. As virus restrictions in some member nations are gradually eased, hotels and online travel agencies are eager to relaunch tourism, beginning with domestic visitors. Some hotels are already offering locals special bargain packages for a “staycation.” OTAs are the quickest and most convenient approach to find the greatest offer. The landscape of travel and tourism is changing dramatically as a result of technological advancements. Bookings can be made right away, with minimal preparation time and a wide range of options. Artificial intelligence (AI) in the form of chatbots provides on-demand “human” support and price comparisons across platforms ensure a cost-effective trip. The availability of information, the ease of booking, and the variety of entertainment and attractions from which to pick will shift the focus to more personalized experiences with customized travel. Simultaneously, they have the potential to reach a massive audience with information about their services. In difficult economic times like COVID-19, the tourism business, which includes hospitality and travel, is confronted with a fundamental challenge. Technology offers the significant advantage of allowing tourism sectors to replace costly human labor with electronic labor, lowering labor costs while also eliminating customer service concerns. However, technology has the potential to create a whole new set of unintended effects. Technology is undeniably vital in travel and tourism. Most of the tourists and travelers are now familiar with making online airline reservations, dealing with automated phone systems, and other economizing measures. Such technological advancements have enabled

businesses for saving money on labor and also for offering tourists and travelers the ability to make their own judgments.

Technology affects practically every element of the tourism sector and tourists tend to like it. However, most of the tourists are wise enough to take advantage of the benefits of technology, such as convenience, accuracy, and speed, while avoiding some of the downsides, such as user-friendliness, letter size, and loss of human touch, technology can save us time and money. The tourism sector mostly looks the prominence of the human aspect and recognizes that tourism is involved with experience generation. This allows the tourists to frequently opt for a combination of benefits and discounts at the time of booking hotels and other products and services online. Considering the interesting features and importance of technology application in the Asian tourism industry, this book is designed its twenty-seven chapters in four sections (i.e., theories, innovations, practices, and future research directions). Brief summaries of all chapters are presented as follows:

In Chap. 1, Hossain et al. write a Systematic Literature Review (SLR) of thirty years of research on technology application in the tourism and hospitality industry. The application or adoption of technology in the tourist and hospitality business became mainstream during the fourth industrial revolution, and research researchers paid close attention to it. However, using a Systematic Literature Review (SLR) to understand the dynamics of technology in the tourist and hospitality business has never been done before. As a result, this chapter fills a vacuum in the literature on the nexus between technology and the tourism business. Despite the fact that the tourism literature has widely examined the application or adoption of technology in the tourist and hospitality industries, the research structure in this sector has remained scattered and fragmented. The current chapter attempts to bridge the gap by achieving three objectives. To begin, SLR is conducted solely on the basis of research articles taken from Web of Science and Scopus on the chosen topic using some specific search terms to unfold the corpus of research on use and acceptance of technology in the tourism and hospitality industry. The study uses four bibliometric analysis processes to conduct the SLR: co-citation, network visualization using co-occurrence data, multidimensional scaling, and hierarchical cluster analysis. Second, the chapter discusses how technological advancements have shaped tourism in new ways. Third, the chapter describes how technology is implemented and embraced in the tourism business by defining the models and ideas that were discussed in prior research. Researchers and academicians can use the study's findings to better understand research trends and knowledge structures in this field.

Mollah and Sebata in Chap. 2 assert that in Asia, technology is being used in tourism. The importance of using technology in tourism has long been acknowledged because it is one of the main competitive factors in the global tourism industry. Tourism locations have recently been in a race to introduce new technology that may swiftly and effectively enhance services to meet tourist needs. Because of the COVID-19 epidemic, technology has become a necessary rather than a desirable means of providing many tourist services. In addition, the rapid growth of the Asian tourism industry has accelerated the adoption of modern technologies such as virtual reality, artificial reality, artificial intelligence, and other similar technologies in

scenic spots, lodging, transportation, catering, and major sporting and non-sporting events. Several Asian destinations have developed a strong technological foundation for providing “untact” services. In the last decade, there has been a substantial surge in research on technology adoption in tourism from a western perspective. However, there is a scarcity of understanding about the application of technology in Asian tourism in tourism technology studies. This chapter examines technology adoption in Asian tourism from a theoretical and conceptual perspective. This chapter, in particular, offers a critical assessment of how technology adoption is moving, as well as the chances and prospects for its application in the Asian tourism industry. This conceptualization is important in order to better comprehend the current state and advancement of the Asian tourist industry in terms of the use of various technologies.

Chapter 3 is contributed by Wah et al. and discusses the application of technology in Asian tourism with a Comprehensive Science Mapping Analysis. A new tourist strategy that incorporates technology (from now on referred to as the e-smart e-tourism strategy). We must understand the alternatives and gaps in this type of research to provide significant insights into technological applications in tourism and to assist academics. As a result, a literature evaluation is carried out in this study in order to create a unified classification of the research environment. We do a targeted search in one of the most important databases, Web of Science, for every article connected to (1) technology application in tourism. These databases house a variety of articles that deal with the use of technology in the tourism industry. There are 1335 articles in the final set of data created by the classification algorithm. The first section contains articles that evaluate and compare the use of technology in tourism. Articles about the use of technology in tourism make up the second section. The final section contains articles about technology’s application in tourism, including reviews and analyses. The main qualities of this new field are then defined in terms of the following aspects: the motivation to use technology in tourism, open difficulties that obstruct use, and recommendations for enhancing acceptance, use, and implementation of technology in tourism. The research’s new directions were then discussed.

Mohanty et al. in Chap. 4 outline technological innovations in Asian tourism. Technology is regarded as one of the primary factors of innovation in the tourism sector, and it is emerging as a perennial force in driving the success of the industry. As a result, there is a strong link between a tourism company’s technical investments and the level of innovation it generates. In light of this, Asia has earned the reputation of being a hotbed of innovation and a watchful eye on emerging travel trends. The purpose of this chapter is to investigate the technical applications that promote innovation in the Asian tourism industry. The chapter also seeks to figure out how technological-driven innovation works in Asian tourism. The majority of previously published works have primarily dealt with the aspects of technology and innovation individually, with only a few attempting to investigate the interconnections that this chapter tries to investigate. This is primarily a descriptive study using a qualitative approach.

Ramos and Hassan in Chap. 5 explain in Asia, the role of ICT in tourism and marketing. Technology has contributed to the revolutionization of the tourism industry, both in terms of how it operates and in terms of developing new concepts. ICT has been essential in generating new ideas, identifying trends, defining more innovative techniques, and, as a result, developing new practices. The progress in the use of voice to search on Google, the increasing use of chatbots to interact with tourists, the growth in the use of video marketing to promote and publicize tourism products and services, and the combination of artificial intelligence and machine learning to assist customers in planning and deciding what they want to do stand out as new technologies emerge. The combination of the technologies mentioned above and those associated with the concept of industry 4.0 will help to change the face of tourism and marketing, as it will increase connectivity between men and machines through interaction and communication expressed on social networks using a smartphone, while potentiating the need to purchase goods and services, and supporting decision-making. This chapter examines the major potential of emerging technologies, taking into account the Internet's means of communication and the connection-involvement between user-technology-experience for tourism and marketing as a tool to transform the face of tourism in Asia.

In Chap. 6, Vij and Rizwan coin about the emerging tourism innovations for a better experience in Dubai. The relationship between tourism and technology is like hand and glove in the new, contemporary world. Tourists are becoming more tech savvy and technology oriented on the demand side, while suppliers are left with no choice but to implement the latest innovations to reach and manipulate potential tourists for a favorable decision on the supply side. Destination Management Organizations (DMOs) are equally engaged in the use of the latest technology to promote the destination and provide their partners with beneficial technical platforms for successful collaboration. Dubai, the second-largest United Arab Emirates (UAE) emirate, has made tremendous progress in tourism and hospitality. Strategically situated on the Arabian Sea, Dubai has emerged as a tourist destination of international luxury. Dubai, with 15.93 million international overnight visitors in 2019, maintained its spot as the fourth most visited city in the world for the fifth year in a row, according to Mastercard's Global Destination Cities Index (GDCI). According to Euromonitor International, a UK-based market research consultancy, the city was ranked among the top 10 most popular city destinations in the world in 2019. Although the success of Dubai tourism has been attributed to several factors, the secret to it has been successful governance. Dubai Commerce and Tourism Management (DTCM), the main organization for tourism development and promotion, has successfully managed the show by implementing best practices, especially through the incorporation of the latest technologies. The goal of this chapter is to explore the role played by the latest technologies, such as service digitization, AI, and ML, in managing tourism at a Dubai-focused destination. The chapter explores how Dubai is using technology to give its visitors digital experiences while offering a range of examples. The results are useful in defining and evaluating the contribution of technology to tourism and hospitality management at a destination for academics, researchers, scholars, and practitioners.

Chapter 7 by Hossain et al. discusses the application of technology in the Middle East Asian tourism and hospitality industry. The Middle East's tourism and hospitality industries have profited from technological advancements. Tourists, on the other hand, are privileged in that they have easier access to planning their excursions and obtaining all of the information they require to plan the perfect trip, thanks to the Internet's ubiquitous assistance. They can also use the Internet to quickly obtain the information they require about any chosen destination. Theoretically, general technology-enhanced tourism and hospitality are pretty thoroughly researched by scholars, implying that looking at the impact of technology-based tourism in the Middle East during a difficult pandemic period could be beneficial. As a result, this chapter focuses on the achievements of the Middle East's technology-based tourism and hospitality business, with a concentration on the COVID-19 and post-COVID-19 pandemic periods. The current research literature on technology-based tourism in the Middle East is brought into the conversation in order to provide meaningful conclusions for Middle Eastern tourism policymakers and stakeholders. With theoretical analysis, the findings illustrate the prospects and constraints of technology-based tourism in the Middle East. Despite the chapter's focus on only a few Middle Eastern nations, it provides significant insight for visitors and tourism policymakers.

In Chap. 8, Albattat and Phuoc show the impact of mobile apps on Jordanian hospitality operations, enterprises, and customer perception. Technology, social media, and Internet platforms are critical to a country's welfare and progress. This chapter discusses mobile applications as a critical marketing tool for promoting, marketing, and selling hospitality operations, as well as ensuring the long-term viability of organizations. This study, based on Jordanian hospitality, examines how the popularity of mobile applications has improved customers' quality of life and perceptions of quality service by providing user-friendly platforms and step-by-step guides to identify and meet customers' needs, resulting in a shift in customers to online platforms to satisfy their needs and increase the potential income for businesses. The study also looks at the drawbacks of using mobile apps and the ethical issues that customers have raised. It shows how social media has a significant impact on purchasing decisions and customer perceptions of value. Different mobile applications are investigated from the perspectives of both businesses and customers.

Chapter 9 by Kaliappen and Hassan features digital hotel industry trends in Asia. The authors believe that by 2020, fresh waves of digital innovation will have impacted practically every industry, including hospitality. To stay ahead of both traditional rivals and market disruptors in a fast-changing competitive climate, hotels must undergo digital transformation to meet shifting customer demands in the digital era. This necessitates hotels adopting the finest practices in terms of technology, creativity, data-driven, and customer-centric service, as well as an acceptable work culture. Several digital trends in the hotel business are explored, along with real-life implementations in line with their respective operations as AI, mobile technologies, Chatbots, robots, digital kiosks, Internet of Things (IoT), Blockchain, Virtual Reality (VR), and Augmented Reality (AR). The practical ramifications and research ideas for the future are also discussed. This will aid in the development of

smart hotels to ensure long-term survivability and sustainability in the event of a pandemic. This will aid in the development of smart hotels to ensure long-term survivability and sustainability in the event of a pandemic. This chapter will also aid hotel executives in formulating judgments and policies on the use of digital tools in hotel operations. This chapter also covers real-life hotel examples from Asia.

Chapter 10 by Ramazanova et al. is about digital technologies as widely regarded as a critical instrument for socioeconomic development in many countries, as well as a requirement for many industries, including tourism. The proliferation of information and communication technology, as well as the desire for digitalization in other economic sectors, is putting pressure on numerous locations to adopt and expand digital technologies in the tourism sector. In this context, the purpose of this book chapter is to investigate the current level of digital technology application in the tourism business, as well as the constraints and issues related to its implementation in Kazakhstan, a developing and promising tourism destination. The authors investigate the effects of information and communication technology on Kazakhstan's tourism demand over the years 2000–2018. We use the gravity model to do so. Secondary data from international organizations, ministries, and national and regional authorities in Kazakhstan have been collated and deconstructed. The report updates traditional policy implications and makes significant recommendations for the use of digital technology in the country's tourist growth.

Mansouri in Chap. 11 critically explains the application of technology in the Iranian tourism industry and discusses the present and future situation and challenges of technology application in the tourism and hospitality industry in Iran. With the great eye-catching role of technology and technology applications in various industries, the current century is distinguished. Its position in the tourism industry has been highly efficient and productive, and its growth is especially important in developing countries and emerging markets. In the sustainable growth of tourism and hospitality, technology is now recognized as a central and integrative part of development and strategic planning. This is attributable to the unconditional reality faced by tourism in mobile computing and connectivity, the design of new products, the design of smart organizations and creative tourism products, and the styles and forms of promotion and marketing of tourism to enable both individuals and their governments to recognize a large share of the contribution that technology can make to this industry's sustainable growth. Iran, a nation with a wide range of environment, property, culture, languages, architecture, ethnic and historical characteristics, as well as human resources, has a high potential for tourist attractions and a significant international ranking in terms of heritage sites, diversity of climate, and competitiveness of prices. Without technology, the aforementioned high potential of tourism and hospitality could not flourish. This chapter provides a study and an overview of Iranian technological advances and their eventual effect on the sustainable growth of Iranian tourism and their contribution to the economic, social, and environmental development of Iran. In addition, it presents some of the issues and challenges ahead of such developments, plus technical advances that can bring more hope for Iran's future position in the growth of world tourism.

Chapter 12 by Zong et al. presents stakeholder perspectives on hospitality curriculum reform with big data technology integration for Bachelor programs in China mainland and Taiwan. Because it delivers advances to the daily operations in the hotel business, big data technology has accelerated the curriculum reform for hospitality undergraduates in 4-year bachelor's programs. This study conducts in-depth interviews with four different types of specialists from mainland China and Taiwan in order to gain a basic understanding of how big data technology is used to and incorporated into the reform of the hospitality curriculum. The dimensions of curricular reform include competence positioning, input resources, and the breadth of courses applied with big data. Stakeholder perspectives from four types of specialists are reflected in relevant categories and items. Theoretical and practical recommendations are thus made to serve as a guide for developing big data courses in the hospitality curriculum.

Chapter 13 by Musa et al. explains technology application in the Chinese tourism industry. Technology has altered our decision-making, communication, learning, entertainment, and other aspects of our existence. Tourism is a dynamic industry that requires instruments to make decisions and compete in terms of economic, social, and environmental sustainability. Big data, artificial intelligence, virtual reality, augmented reality, "3S" technology, and smart tourism are all widely used in today's era of high technology and development in all sectors of social life. It contributes significantly to the marketing and expansion of the tourism industry. This chapter will examine contemporary technical advancements, effects, and customer relationships with the industry. For the Chinese tourism business, we defined and offered philosophical, methodological, technical, and realistic applications of technology to enable advanced technical services that meet customers' needs. Systematic planning and layout of scenic locations, investigation and evaluation of tourist resources, destination planning, tourist information management and application, tourist environment monitoring, and so on are examples of future technologies that are appropriate for Chinese tourism. Since China promotes its tourism industry 3.0 and industry 4.0 globally, visitors to China are rapidly becoming more familiar with future technologies. To create significant advances to the travel sector, the Internet and the IoT include embedding sensors in vehicles, bags, buildings, and other items. The evolution of the Chinese tourist business is owing to technological advancements and institutional reforms.

Chapter 14 by Hashimoto explains the application of technology for promoting tourism destinations in Japan. Focusing on Okinawa as one of Japan's attractive resorts in this segment, this chapter explores how does the hotel industry use technology apps for destination promotions. Okinawa has recently been extraordinarily advanced in tourism. The chapter also investigates these hotels, and presents the impacts and challenges of the promotion of destinations. Two hotels, Hyatt Regency Seragaki Island and Halekulani Okinawa, are targeted as follows. The study methodology is primarily adopted through interview and analysis. Finally, from these observations, to demonstrate what influence there is and what difficulties there are. As a result, the value of the facility management system was the first thing that was remembered. It is the system that controls the facilities that sustain the system

directly related to the guest, and it is said that when this system works effectively, the system directly related to the guest, such as reservation, accommodation, and customer management, will operate effectively for the first time. Furthermore, it will not operate effectively in a system directly related to visitors, unless the core system and subsystems are closely connected.

Chapter 15 by Alauddin et al. analyzes mobile technology and applications in the Hong Kong tourism and hospitality industry. Hong Kong's tourism industry is immensely appealing, and information technology has given it a new dimension. Information technology plays an increasingly essential role in people's daily life; its use in trade and commerce is growing rapidly, and tourism clients want all services and transactions to be completed online. In this sense, Hong Kong's tourism industries are attempting to incorporate the most up-to-date technical gadgets in order to improve the sector. Furthermore, Hong Kong has gained a better reputation for its appealing tourism site, which attracts visitors from all over the world, not just from Asia. It's a lovely city that draws millions of visitors each year. It's well-known for its aesthetic appeal. It is also known throughout Asia as a clean city. Due to the fierce competition, they are turning to modern technology to cut costs, increase operational efficiency, and, most importantly, improve service quality in order to obtain a competitive edge. This chapter examines mobile technology and its applications in Hong Kong's tourist and hospitality business. This chapter also discusses how Hong Kong develops its tourist and hospitality industry through technological applications (apps).

Chapter 16 by Tushar et al. brings out the importance of M-tourism applications in Thailand's sustainable tourism sector. The tremendous expansion of technical innovations in the tourist industry is having a significant impact on the industry's development and long-term viability. The study examines the role of information and communication technology (ICT) in general, and mobile-based tourism-related applications (m-tourism) in particular, in the development of Thailand's sustainable tourism sector. The chapter describes and gives a detailed overview of the use of mobile-based applications in the tourism industry from both the customer (demand side) and service provider (supplier side) perspectives (supply side). Following that, the study looks at the acceptance, expenses, and affordability of M-tourism applications in Thailand. According to the survey, M-tourism applications enable consumers to search for information, book or purchase, and review, while service providers may operate and manage enterprises in Thailand and around the world in a more flexible, ubiquitous, adaptable, and appealing manner. In addition, at the end of the chapter, there are a few issues in M-tourism applications that have been addressed.

Chapter 17 by Osman deliberates virtual tourism experience in Malaysia. The hospitality and tourism industry is one of the industries in which technology has brought more remarkable changes. Technology is paramount and has contributed a great deal to the worldwide growth of this industry. However, while the adoption of technology in the tourism sector is outrageous, the infestation of the world coronavirus pandemic has made the industry even more reliable on technology. The restriction of movement, as well as the fear of being sick, affects the way people look at traveling. The basic principle of VR travel, which is currently seeing a rise in

popularity, is to experience the world from the comfort of home. These travel experiences in VR seek to create a sensation that is as much like being as possible in the real destination. These are made possible by the development of technology. While virtual travel can never replace traditional travel, virtual travel may become as common as real travel exploration, from print to social media, the creation and implementation of digital technology, just as travel platforms. This chapter clarifies the experience of virtual tourism and discusses how much the virtual experience helps to scale up tourism in Malaysia. It also addresses the fascinating possibilities gathered from the participation of MyVirtual Experience Program participants in the virtual travel experience.

Chapter 18 written by Pitanatri et al. analyzes that social media has been shown to have an effect on tourism and spending. However, research from a large-scale perspective related to travel intentions has remained very limited in Indonesia. This chapter presents an empirical case study using the text mining method on the travel intentions of Indonesian domestic tourists to fill in the missing gap. To categorize whether or not a tweet contains travel intentions, text classification was used by focusing on tourism-related tweet data from Twitter before and after the COVID-19 pandemic. To identify the entities in the Tweet, the entity recognition process was also used. The Indonesian intention to fly was 13.08% higher than before the COVID-19 pandemic, this study revealed. In addition, interest in adventure activities rose by 581.25% and honeymoon trips by 175%, it was also found. Surprisingly, in this report, 92% of short-stay intentions concluded. However, there is a 215.18% rise in Indonesian tourists who want to take a long trip. The results of this research also illustrate the preference of Indonesian tourists to travel to many destinations, such as Bali, the Riau Islands, and Bandung. As a result of this study, a more effective Indonesian tourism promotion strategy is expected to evolve. Referring to the results of the analysis, it appears that the new promotion model is relatively different from the previous one. Promotional activities focusing on (1) sustainable development; (2) enhanced competitiveness; (3) creativity in investment and digital transformation; (4) morality, culture, and social responsibility; and (5) technical cooperation have become increasingly necessary for the Ministry of Tourism of Indonesia to be included in the various programs.

Chapter 19 by Tushar et al. outlines the ubiquitous role of technology-based social media application in the Vietnamese tourism industry. The enormous popularity of social media has been demonstrated in recent years as a result of technical advancements that have fundamentally created a new paradigm in the worldwide tourist industry. The chapter examines the role of social media technologies in the Vietnamese tourism industry. It also primarily covers and describes the significance of social media in the Vietnamese tourist industry from two viewpoints: tourists or consumers (demand side) and marketers or service providers (supply side) (supply side). The chapter also goes on to discuss the Vietnamese tourism industry's trust and adoption of social media technology. According to the report, smart tourism boosted by social media technologies can make the Vietnamese tourism business more appealing to visitors. The chapter addresses a variety of concerns and difficulties surrounding the use of social media in the tourism business. In addition, the

chapter concludes with a discussion of the future of tourism in Vietnam as a result of technological integration and its implications.

Chapter 20 by Roy B.R. summaries the application of Information and Communication Technology in the Indian tourism industry. Tourism has established itself as one of the fastest-growing sectors in the world, with only the manufacturing industry surpassing it in terms of business volume. In 2019, the travel and tourism industry generated 330 million jobs and contributed around 10.3% of global GDP. Many countries, including India, have expanded their investment in the tourism sector since tourism has become a more reliable source of income and jobs. The sector's investment was focused not only on the construction of physical infrastructure, such as hotels and airports, but also on the development and deployment of information and communication technology (ICT) to improve service quality. As a result, international tourist arrivals in India have increased naturally during the millennium, from 2.54 million in 2001 to 10.93 million in 2019. Since the middle of the past century, the tourism industry has seen the usage of ICT in its services all over the world. The use of ICT in tourism has evolved from automated booking systems to providing visitors with a huge amount of information, better and faster service, improved relationships between distribution channels, and the ability to promote and distribute products directly to clients. The tourism industry took advantage of Internet, artificial intelligence, and other e-business applications as ICT grew and developed. Tourists have begun to rely on information technology platforms to evaluate products and make the best destination decisions. This chapter investigates the use of ICT in several sectors of the tourism business, with a focus on India.

Chapter 21 by Shaikh discusses designing digital ecosystems for competitive tourism-related micro and small enterprises in Pakistan using the IoT. The influx of the IoT has perplexed the corporate sector due to developing technology breakthroughs and the arrival of the fourth industrial revolution. New technologies have brought global markets closer together, allowing them to transcend geographical boundaries. In the service sector, the tourist industry has a huge opportunity to grow by incorporating modern technical tools like AI into tourism offerings, which could result in enhanced travel experiences, particularly in Asia's authentic heritage tourism. When travelers want more information about a site, recent advances in information technology and AI can help construct destination knowledge exchange and tourist data collection protocols. The major areas of integration between information technology and historic tourism are thus highlighted in this chapter. The content focuses on the importance of legacy tourism destinations and addresses some key concerns about the necessity for digitization in historical destinations and why this combination is seen as essential. As a result, this chapter emphasizes the merging of technology with Asia's historic tourist offers, as well as how these places will become future competitive tourism destinations.

Chapter 22 by Arachchi et al. explores the ways Sri Lanka is prepared to respond to digital tourists. The combined power of technology and transport reinvented the travel cycle in the twenty-first century. Immediate assistance, seamless experience, and customized content and services are needed by modern travelers than ever before. Cloud Computing, AI, the Internet, mobile technology, robots, AR, VR, IoT,

and Big Data co-create travel experiences, offer travelers an unbridled sense of freedom and convenience, provide instant access to any details, customize holidays, and provide digital spaces with instant booking and social sharing. This chapter focuses on how Sri Lanka, as a tourism destination, is adapting its supply chain to technological developments. The chapter narrowed down into the four main tourism industry providers, hoteliers, restaurateurs, airlines, and tour operators, to reduce the uncertainty. Based on semi-structured interviews and observations, the data was collected. The findings and debate highlight prevailing technological kick-ups in Sri Lanka among leading hoteliers, restaurants, airlines, and tour operators. Findings show that the invention of virtual tours, AR content, mobile check-in, self-check-in kiosks, digital concierge, cloud-based property management systems (PMS), smart rooms, and defined digital transformation and technology adaptation across the accommodation sector helps for its growth. Sri Lankan restaurants are investing in digital upgrades to build the restaurant of the future that appeals to all the senses of hyper-connected mindset through robot waiters, online food ordering and delivery apps, personalized digital menus, and smartphone self-service apps. As the only airline operator in the world, Sri Lankan Airlines is reshaping the flying experience by expanding mobile commerce through the Sri Lankan Airlines App, introducing e-wallets, security technology like robot inspection dogs, self-service check-in kiosks, flight VR entertainment, and in-flight Wi-Fi. In order to attract tech-savvy travelers, travel agencies are adapting innovations to streamline their processes, improve operational efficiency, customize online tour planning, and multiple aspects of digital marketing.

Chapter 23 by Rahman et al. briefs the application of technologies in the Bangladeshi tourism industry. Due to the availability of modern technologies, the tourism industry's contribution has been evolving in recent years. The tourist industry was one of the first to rely nearly totally on information and communication technology (ICT) for business purposes. Since then, ICT has benefited tourist development, and its success is primarily reliant on technology. ICT, it is argued, facilitates this integration by allowing tourism products to be tailored to match the demands of specific persons. The market is becoming more segmented as a result of changes in tourist consumer behavior, with each potential consumer belonging to many market categories at the same time. The degree to which tourist operators are aware of these developments and have made plans to adjust, or better yet, be proactive, is highly debatable. ICT has brought with it a flood of new business and tourist issues and opportunities, offering challenges to the industry and tourism operators in general. In the context of Bangladesh, this chapter looks at the ICT trends that have happened in the tourism sector, as well as the industry's ICT developments and the reaction of various actors to the issues that these advancements entail. To obtain better insights, the chapter relies on secondary data as well as expert opinion.

Chapter 24 by Mohanty et al. explains overcoming overtourism in Asian cities through technology. Overtourism is becoming a global problem for cities. It (overtourism) is a complicated issue caused by a number of different and interconnected causes that have an impact on different parts of the city. Overtourism, which is considered one of the risks to the sustainability aim, is being addressed through a

variety of effective approaches, including structural policy efforts and the use of technology. In recent years, the smart city idea has also been applied to the problem of overtourism in many European cities. However, such examples are uncommon in Asian cities, which are frequently hailed as hotbeds of technical advancement. This research seeks to analyze the various aspects of technological interventions that are and have the capacity to solve the overtourism problem in Asian cities. It is designed as a descriptive research.

In Chap. 25, Jawad and Naz write on the foundations, developments, and management of smart tourism in Asia. Smart tourism is a new buzzword coined to describe how tourism locations, businesses, and visitors are becoming increasingly reliant on changing types of ICT that allow massive amounts of data to be turned into value offerings. Its theoretical evolution, however, is hampered by its lack of definition as a notion. The chapter introduces smart tourism, discusses current advancements in the field, and then lays out its technological and industrial foundations. Following that, a brief discussion on the benefits and drawbacks of smart tourism is held. Furthermore, the chapter emphasizes the critical importance of research in guiding the creation and management of smart tourism.

Chapter 26 by Jawad and Naz deals with the position of mobile technology in Asian tourism: patents, articles, news, and feedback on mobile tour apps. The goal of this study is to determine the state and role of mobile technology in attaining sustainable and smart tourism in Asia, as well as to consider potential research and policy options for academics and practitioners. This analysis drew on a variety of sources, including patents, scholarly publications, and the press, as well as approaches tailored to the needs of each study. The study employed Netminer, a social network research software, to assess the links between patents' International Patent Classification (IPC) codes. It also employed the T-LAB software for content analysis to examine the texts of patents, journal articles, and press. The Leximancer software was employed in the study, which analyzes relative frequency to measure user feedback in mobile apps. In this chapter, we identified many forms of data-related and mobile technologies for smart city networks and maps. Mobile technology was also found to be linked to climate, sustainability, industrial, and consumer topics. We investigated user perceptions and demands for mobile travel applications using their input. Mobile technology advancements are projected to produce sustainable competitive advantages for tourism destinations and tourism-related vendors, as well as the creation of sustainable smart tourism skills.

Chapter 27 by İştin et al. views that in terms of ensuring the survival of companies in the tourism industry, gaining competitive advantage, increasing the standard of service, creating a positive picture, and meeting the needs and demands of tourists entirely, technological advances affecting the lifestyles of all people are significant. The growing prevalence of social media in the tourism industry; rapid developments in robotics, machine learning, and AI automation; emerging innovations such as the use of bitcoin and blockchain technology and the use of VR technology and other smart tourism technologies will give visitors the ability to deliver highly personalized goods and experiences. For this purpose, tourism businesses need to effectively and efficiently evaluate developments in tourism knowledge and

communication technologies and build technology-oriented tourism policies. Tourism companies should, however, concentrate on predicting what new technological opportunities will emerge in the future and be prepared for the future to meet the challenges of innovation in technology. In this context, the technical applications used in the tourism industry in this chapter have been discussed. Then, the expected developments in the use of technology in the future and what kind of applications could arise based on these developments were also examined. Moreover, it was discussed that the worldwide effects of the COVID-19 outbreak might bring what kind of new technological applications to the tourism industry. Finally, within the framework of the report, recommendations were given to companies in the tourism industry.

Azizul Hassan

Contents

Part I Technology Application in Tourism in Asia: Theories

- 1 Thirty Years of Research on Application of Technology in Tourism and Hospitality Industry: A Systematic Literature Review** 3
Mohammad Rokibul Hossain, Fahmida Akhter,
Anukrati Sharma, and Azizul Hassan
- 2 Technology Application in Tourism in Asia** 37
Md. Ruhul Amin Mollah and Emmanuel Sebata
- 3 Technology Application in Tourism in Asia: Comprehensive Science Mapping Analysis.** 53
Khaw Khai Wah, Al-Zuhairi Omar, Alhamzah Alnoor,
and Maher Talib Alshamkhani

Part II Technology Application in Tourism in Asia: Innovations

- 4 Technological Innovations in Asian Tourism** 69
Priyakrushna Mohanty, Himanshi Dhoundiyal, and Anila Thomas
- 5 The Role of ICT Applied to Tourism and Marketing in Asia** 81
Célia Ramos and Azizul Hassan

Part III Technology Application in Tourism in Asia: Practices

- 6 Emerging Technologies in Tourism for a Better Experience: The Case of Dubai.** 97
Mohit Vij and Syed Ahmad Rizwan

7	Technology Application in the Tourism and Hospitality Industry of the Middle East Asia	109
	Syed Far Abid Hossain, Faiza Tanaz Ahsan, Kazi Mohiuddin, Armana Hakim Nadi, Hafsa Neamah, Mussanna Ahmed, and Azizul Hassan	
8	The Role of Mobile Applications in Jordanian Hospitality Operations, Businesses and Service Perception	127
	Ahmad R. Albattat and Jeong Chun Phuoc	
9	Digital Trends in Asian Hotel Industry	147
	Narentheren Kaliappen and Azizul Hassan	
10	Analysis of the Use of Digital Technologies in the Tourism Sector: Evidence from Kazakhstan	165
	Makhabbat Ramazanova, Khusen Ibragimov, and Gulnur Saspugayeva	
11	Technology Application in the Iranian Tourism Industry	183
	Shirzad Mansouri	
12	Hospitality Curriculum Reform with the Integration of Big Data Technology for Bachelor Program in China Mainland and Taiwan: Exploration of the Stakeholders' Perspectives	201
	Yuanyuan Zong, You-Yu Dai, and Bingwang Xue	
13	Technology Application in the Chinese Tourism Industry	219
	Mohammad Musa, Preethu Rahman, Zhi-rong Kang, and Syed Far Abid Hossain	
14	Technology Application in the Japanese Tourism Industry: Destination Promotion	241
	Shunsaku Hashimoto	
15	Mobile Technology and Applications in the Tourism and Hospitality Industry of Hong Kong	255
	Md. Alauddin, Syed Far Abid Hossain, and Mohammad Masrurul Mowla	
16	The Ubiquitous Role of M-tourism Application in Driving Sustainable Tourism Sector in Thailand	267
	Hasanuzzaman Tushar, Md Abdus Salam, Rubaba Nawrin, and Saima Rahman	
17	Virtual Tourism Experience: A Tale from Malaysia	283
	Sharina Osman	
18	Sentiment Analysis and Its Applications in Assessing Visit Preferences Pre and Post COVID-19: An Indonesian Perspective	295
	Putu Diah Sastri Pitanatri, Muhammad Apriandito Arya Saputra, and I Gde Pitana	

19 Ubiquitous Role of Technology Based Social Media Application in the Vietnamese Tourism Industry 311
 Hasanuzzaman Tushar, Syed Far Abid Hossain, Bui Nhat Vuong, A. K. M. Mohsin, and Mohammad Abu Horaira

20 Information and Communication Technology Application in the Indian Tourism Industry 327
 Saroop Roy B. R.

21 Internet of Things: Designing Digital Eco-Systems for Competitive Tourism Related Micro and Small Enterprises in Pakistan 349
 Sadia Shaikh

22 Connecting the Connected: How Is Sri Lanka Prepared to Respond to Digital Tourists? 367
 R. S. S. W. Arachchi, J. A. R. C. Sandaruwani, and G. V. H. Dinusha

23 Tourism in Bangladesh: The Application of Technologies 383
 Muhammad Khalilur Rahman, Azizul Hassan, and Md. Abdul Jalil

24 Overcoming Overtourism Through Technology: The Case of Asian Cities. 395
 Priyakrushna Mohanty, Nirmalya Nair, and Atul Kumar Sharma

25 Smart Tourism: Foundations, Developments and Management in Asia 407
 Muhammad Jawad and Munazza Naz

26 Mobile Technology’s Role in Tourism of Asia: Patents, Articles, News, and Feedback of Mobile Tour Applications. 423
 Muhammad Jawad and Munazza Naz

Part IV Technology Application in Tourism in Asia: Future Research Directions

27 Technology Applications in the Asian Tourism Industry in Future. 441
 Aysen Ercan İştin, Gamze Eryılmaz, and Meral Üzülmöz

Index. 471

About the Authors

Md. Abdul Jalil is currently working as the Chairman, Department of Law and the Dean, Faculty of Arts and Humanities at the World University of Bangladesh (WUB). He has a total of 20 years of teaching and research experience in different universities in Malaysia, United Arab Emirates, and Bangladesh since October 2000. He has published 42 refereed journal papers in international reputed journals, 6 book chapters, and 4 books. He is teaching mercantile law, international trade law, intellectual property law, research methodology, business and professional ethics, principles of management, constitutional law, and legal system of Bangladesh.

Mussanna Ahmed is a research assistant at IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh. His research interest is in tourism and hospitality science and word-of-mouth marketing.

Faiza Tanaz Ahsan is a research assistant at North South University. Her research interests are women empowerment, edge-cutting technology in business, artificial intelligence, bank lending practices, credit management, cloud computing, budget taxation and public investment, trade and globalization, and so on.

Fahmida Akhter is Assistant Professor of School of Business Administration, East Delta University, Bangladesh. Her area of concentration is accounting and information systems. She started her career as an academic in 2015, and she teaches undergraduate and postgraduate students in financial accounting, managerial accounting, auditing, and cost accounting. Her key research interest lies in the area of corporate governance, voluntary disclosures, corporate social responsibility, sustainability practices, environmental disclosures, human resource disclosures, circular economy, and tourism. Her articles are published in various national and international peer-reviewed academic journals.

Md. Alauddin is a PhD candidate at College of Business, Department of Marketing, City University of Hong Kong, Kowloon Tong, Hong Kong. He has been working as Assistant Professor of Marketing (on study leave) in the Department of Business Administration at International Islamic University Chittagong, Bangladesh. He has completed his BBA, MBA, and MPhil degree in Marketing from the University of

Chittagong, Bangladesh. His research contribution and interest are in the field of service quality, green innovation, big data, etc.

Ahmad R. Albattat is a senior lecturer in Post Graduate Centre, Management and Science University, Shah Alam, Selangor, Malaysia. He is a visiting professor and external examiner in Medan Academy of Tourism (Akpar Medan). He holds a doctoral degree in Hospitality Management “Disaster and Emergency Planning and Preparedness” from University Sains Malaysia (USM). He worked as an assistant professor, Ammon Applied University College, Amman, Jordan; senior lecturer and research coordinator in School of Hospitality and Creative Arts, Management and Science University, Shah Alam, Selangor, Malaysia; and Researcher at Sustainable Tourism Research Cluster (STRC), Pulau Pinang, Malaysia. He was working for the Jordanian hospitality industry for 17 years. He has participated and presented research papers in a number of academic conferences held in Malaysia, Taiwan, Thailand, Indonesia, Sri Lanka, USA, Italy, Greece, and Jordan. He is an active member of Scientific and Editorial Review Board on hospitality management, hotel, tourism, events, emergency planning, disaster management, and human resource for various SCOPUS journals. His latest works have been published in the refereed international journals, conference proceedings, books, and book chapters.

Alhamzah Alnoor is Lecturer at the Southern Technical University, Management Technical College. He received his MBA from the University of Basrah. His research interests lie in organizational studies. He is a reviewer for many journals. He published many papers in different journals. Now he is a PhD student at the School of Management, Universiti Sains Malaysia, Penang, Malaysia.

Maher Talib Alshamkhani is a PhD student at the School of Chemical Engineering, Universiti Sains Malaysia, Pulau Pinang, Malaysia. He is also Lecturer at Southern Technical University, Basrah Engineering Technical College, Iraq.

R. S. S. W. Arachchi graduated from the Sabaragamuwa University of Sri Lanka before receiving his Master degree from Colombo University, Sri Lanka, and PhD degree from Management and Science University in Malaysia. He is working as a senior lecturer of the Department of Tourism Management, Faculty of Management Studies, Sabaragamuwa University of Sri Lanka, Belihuloya. He has involved in various administrative activities in the university and contributed his service for various government and private sector tourism projects as a consultant and resource person in various workshops. His major teaching and research areas are ecotourism, community-based tourism, sustainable tourism development, responsible tourism, environment and tourism resources, and homestay tourism in Asian Countries. He has published nearly 20 articles in well-recognized journals both in Sri Lanka and overseas. He is an editorial board member of *Journal of Tourism and Hospitality Management* and *International Journal of Education Humanities and Social Science*, and a member of Global Association for Humanities and Social Science Research. He is also a leading consultant in sustainable tourism, community-based ecotourism and regulatory advice, curriculum development, and quality parameters development projects in Sri Lanka.

You-Yu Dai is Associate Professor at the International Business School of Shandong Jiaotong University, China. He obtained PhD from the Graduate Institute of Recreation, Tourism, and Hospitality Management, National Chiayi University, Taiwan, in 2015. His research interests are tourism management, tourism marketing, tourist behavior, cruise tourism, and low-carbon tourism. He has published more than 20 journal papers.

Himanshi Dhoundiyal is currently working as University Research Fellow under the supervision of Dr Anoop Kumar at the Institute of Hotel and Tourism Management, MD University, Rohtak. She has completed her master's degree in Tourism and Hospitality Management from the same department. Her research interests are sustainable management, event management, destination development, and current scenarios in travel industry. Her doctoral research focuses on the study of employees working in travel industry.

G. V. H. Dinusha is Lecturer, Department of Tourism Management, Faculty of Management Studies, Sabaragamuwa University of Sri Lanka. He is graduated from the Sabaragamuwa University of Sri Lanka with a degree in BSc (Special) in Tourism Management with two gold medals. He worked for several reputed destination management company (DMC) in Sri Lanka handling in-bound Italian market for two years. He is specialized in lecturing intercultural communication for tourism, tourism economics, greening hospitality, hospitality accounting, and legal and administrative environment for tourism subjects. His research interests fall in the areas of tour guiding, sustainable tourism, and cultural tourism. He is the editor of *Tourism in Paradise* (TIP) magazine. Moreover, he is working as a resource person for capacity-building programs for tourism stakeholders which are organized by the provincial councils of Sri Lanka.

Gamze Eryilmaz completed her undergraduate education in 2012 at Mersin University, Department of Tourism and Hotel Management. In addition, she completed her master's degree in 2014 and PhD in 2018 at Mersin University, Department of Tourism Management. Gamze Eryilmaz, who started to work as an assistant professor in 2019 at the Department of Travel Management and Tourist Guiding, College of Tourism and Hotel Management, İskenderun Technical University. In the same year, she started to work in the department of Gastronomy and Culinary Arts at the Faculty of Tourism, Iskenderun Technical University. She carries on her career as Dean Vice in the same faculty. She instructs undergraduate and graduate levels in the fields of tourism marketing, marketing research, general tourism, and data analysis.

Shunsaku Hashimoto is Full Professor and Associate Dean in the Faculty of Global and Regional Studies at the University of Ryukyus, Japan. He is a member of the Executive Committee of THERAA (Tourism and Hospitality Educators and Researchers Association of Asia). His main research area is organizational behavior in service organizations. His background is in both practical and academic areas. After graduation, he worked in the hotel for six years. Then went to the postgraduate course at the University of Strathclyde to learn hotel management. After finishing

the course, he worked as a manager in the Hotel New Otani Osaka and worked as a consultant in Ake Beam Morin Japan. Then he moved to Okinawa and is working as a professor at the University of the Ryukyus. Hashimoto has a good track of publication.

Azizul Hassan is a member of the Tourism Consultants Network of the UK Tourism Society. Dr. Hassan has been working for the tourism industry as a consultant, academic, and researcher for over 20 years. His research interest areas are technology-supported marketing for tourism and hospitality, immersive technology applications in the tourism and hospitality industry, and technology-influenced marketing suggestions for sustainable tourism and hospitality industry in developing countries. He has authored over 150 articles and book chapters in leading tourism outlets. He is also part of the editorial team of 25 book projects from Routledge, Springer, CAB International, and Emerald Group Publishing Limited. He is a regular reviewer of a number of international journals.

Mohammad Abu Horaira is Associate Professor of College of Tourism and Hospitality Management (CTHM), International University of Business Agriculture and Technology (IUBAT), Bangladesh. His major research interest is in sustainable tourism development, ecotourism, culture and heritage tourism, community-based tourism development, and human resource management. He is a Certified Hospitality Educator by American Hospitality Academy, USA.

Mohammad Rokibul Hossain is currently working as Assistant Professor of Marketing in the Faculty of Business Studies at Premier University, Bangladesh. Since joining Premier University, he has been actively involved in teaching undergraduate and postgraduate students. He offers courses in business research methodology, marketing research, marketing management, consumer behavior, and pricing. Hossain's key research interests are in the area of tourism marketing, customer engagement, consumer behavior, and neuromarketing. He has published articles on tourism marketing, customer relationship management, and agricultural marketing in different national and international peer-reviewed journals.

Syed Far Abid Hossain is a PhD researcher at the School of Management of Xi'an Jiaotong University, China. He graduated from the University of Sunderland, London, UK, with an MBA degree. He is a senior lecturer of College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh. He has published numerous papers in indexed and reputed international journals. Also, he has achieved the Outstanding International Student Award, Dean's scholarship, and Fullbright scholarship from the Chinese government. His research interests include women entrepreneurship, innovation, mobile-phone usage, academic performance, social networking, and TPACK. He has participated in numerous reputed international conferences in the USA, China, and Bangladesh. He is appointed as a reviewer by famous publishers such as Elsevier, Emerald, Wiley, SAGE, Springer, Frontiers, Taylor and Francis, and IGI Global.

Khusen Ibragimov is a PhD candidate at the University of Alicante, Spain. He is involved in many tourism projects such as forecasting tourism demand, measuring sustainability for tourism, the impact of climate change on tourists' behavior, and the role of information technology for tourism development. He graduated with a master's degree in tourism and environmental economics from the University of Balearic Islands, Spain. He got a bachelor's degree in tourism economics, Samarkand University of Economics and Services, Uzbekistan.

Aysen Ercan İştin is an assistant professor. She completed her undergraduate education in 2010 in the Department of Tourism and Hotel Management at Mustafa Kemal University. In addition, she completed her master's degree in 2014 in the Department of Tourism and Hotel Management at Akdeniz University and her PhD degree in 2018 in the Department of Tourism Management at Mersin University. She, who started to work as a research assistant in 2017, was appointed as an assistant professor in 2018 in the Department of Tourism and Hotel Management at Şırnak University. She is the Head of Gastronomy and Culinary Arts Department in the same university. She instructs undergraduate and graduate levels in the fields of management and organization and issues related to tourism businesses. She has articles, books chapters, and papers in the same fields and carries on with her studies.

Muhammad Jawad is Assistant Professor at Fatima Jinnah Women University, Pakistan. Jawad performed duties as a post-doctoral researcher at the University of York, UK for two years. He did his PhD in leadership and Management Studies from National Defense University, Pakistan. Jawad worked as an associate dean at the University of Lahore. He has 32 national and international publications in globally world-renowned journals and he is an associate editor and editorial member of several ESCI and SSCI journals. He represents his university in national and international conferences and workshops.

Narentheren Kaliappen is a senior lecturer at the School of International Studies, Universiti Utara Malaysia (UUM). He holds a PhD, MBA, and BBA from UUM. He was conferred Distinguish Doctoral Dissertation Award by Academy for Global Business Advancement (based in the USA) for PhD thesis. He also published several Scopus indexed journals in the field of business management in addition to presenting several papers at local and international conferences. "Match Your Strategies for Brilliant Performance" and "Strategy Execution for Performance Excellence" are the latest books of the author. Notably, he received 2016 Emerald Literati Awards for Excellence for the paper entitled "Innovation Strategies and Performance Are They Truly Linked." He has been constantly invited to deliver speeches in Vietnam, Singapore, Bahrain, Tunisia, and China and conduct workshops in Malaysia, Thailand, India, and Australia.

Zhi-rong Kang is a master's student at the International Business School of Shaanxi Normal University, China. She won many scholarships from the university during her postgraduate study. Her research interests include environment economic, transport policy, smog control, carbon emission, and policy evaluation model. She has a

good thesis writing ability and a good command of multiple data analysis methods. She has participated in reputed international conferences. She also has participated in an international conference in China. Her articles are published as a collection of papers.

Shirzad Mansouri is the founder of Talent Forte Training Center in Bangkok and a University Lecturer. He obtained his bachelor's degree in English and master's degree in teaching English as Foreign Language (TEFL). He also received his MBA in Tourism and Hospitality, and Doctorate in Business Administration. He has more than 25 years of experience working alongside the executive team of different educational and academic institutions in Iran, Thailand, and Indonesia. He has cooperated with European International University and some more private and public institutions and universities in Iran, Thailand, and Indonesia. He has been specialized in leadership and tourism and hospitality management. He has been the head of tourism and hospitality curriculum for undergraduates since 2019. He has been also responsible for educating young talents in tourism and hospitality for solving career problems and academic issues in different organizations and institutions. His current research looks at the Human Capital Development during COVID-19 and the survival of tourism and hospitality businesses in Muslim communities in Thailand, Indonesia, and Iran. Pursuing tourism research agenda, he has recently been working on TEFL tourism in Bangkok. His area of interest is technology and tourism development, tourism entrepreneurship, and innovative education in human capital development in tourism.

Priyakrushna Mohanty is Assistant Professor in the Department of Tourism and Travel Management, Jyoti Nivas Autonomous College, Bengaluru. He is also a UGC Senior Research Fellow under the guidance of Dr Anu Chandran in the Department of Tourism Studies, Pondicherry University, India. He is an awardee of the prestigious Travel Corporation (India) Gold Medal for his outstanding performance in master's degree in Tourism Studies from Pondicherry University, India. He also holds a master's degree in Commerce along with three PG Diploma Degrees in Rural Development, Research Methodology, and Teaching Skills. Mohanty has served the Indian Railway Catering and Tourism Corporation Ltd. for two years following which he was recruited as a Guest Faculty in the Department of Tourism Studies, Pondicherry University. He has published more than fifteen articles and chapters in both international and national journals and edited books. He is passionate about academic areas of tourism sustainability, sustainable livelihood, technology, and tourism along with gender issues in tourism development.

Kazi Mohiuddin is a PhD researcher at Shanghai Maritime University, China. He has published numerous papers in well-indexed reputed international journals. His research interests are tourism management, maritime management, artificial intelligence in tourism, and so on.

A. K. M. Mohsin is a PhD candidate in the International Business School of Shaanxi Normal University. He also served as a faculty member at IUBAT, Bangladesh. He has published numerous papers in well-indexed reputed interna-

tional journals. His research interests include operations management, supply chain management, and decision Analysis.

Md. Ruhul Amin Mollah is Assistant Professor at Jagannath University, Bangladesh. He obtained master's degree in Tourism Management from Hebei University in China and MBA and BBA from the University of Chittagong in Bangladesh. He is currently a PhD candidate in the Department of Tourism, Sport, and Hotel Management at Griffith University, Australia. He is also a Teaching and Research Assistant at Griffith University. His research interest includes tourism technology, sport tourism, religious tourism, contemporary management issues, and sustainable tourism. He has presented papers in peer-reviewed conferences such as the Council for Australasian Tourism and Hospitality Education (CAUTHE) and the Greater Western Chapter of the Travel & Tourism Research Association (GWTTRA) and also published 10 peer-reviewed articles in reputed journals. His publications appeared in the *Journal of Sport & Tourism*, *Man in India*, *ABAC Journal*, and several others.

Mohammad Masrurul Mowla is Professor of Marketing at International Islamic University Chittagong, one of the leading private universities in Bangladesh. He has done PhD in Marketing (Community Wellbeing and Sustainable Tourism Development) from the University of Hull, UK. Apart from this, he completed MSc in Advertising and Marketing Communications from the University of Hull, UK, having overall distinction. He also did "university-level teaching certificate" from the University of Hull in the year 2015. During his three and half a year of my PhD study, he worked as a guest lecturer at Hull University for four different courses: international marketing, research methods, marketing research, and strategic marketing and planning. Furthermore, he has a long teaching and administrative experience, and his present position is a Pro-Vice Chancellor of International Islamic University Chittagong. Previously, he was the Dean, Faculty of Business Studies, and Chairman of the Department of Business Administration at International Islamic University, Chittagong, Bangladesh. His research interest includes tourism management, sustainability, branding, etc. He has published more than 31 journal articles in different research journals in the home and abroad.

Mohammad Musa is Senior Lecturer of College of Tourism and Hospitality Management (CTHM), International University of Business Agriculture and Technology (IUBAT), Dhaka, Bangladesh. He is currently doing PhD at the International Business School of Shaanxi Normal University, China. His major is Western Economics, and his research area is Environmental Economics. He has completed his MBA with a double major in Marketing and Human Resources Management and Bachelor in Tourism and Hospitality from IUBAT. In his study life, he received many scholarships. He was trained by the editor of one of the journals of Elsevier at the "International Workshop on Scientific Writing." He has managed to publish several articles in indexed journals. His research interests include sustainability in tourism, environmental economics, innovative economics, tourism economics, and related fields.

Armana Hakim Nadi is a research assistant at IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh. She enjoys writing and relishes to play with words. As she pursues her career in teaching, it helped her to engage with the topic involving education and have a superior perspective over it.

Nirmalya Nair is a student pursuing her graduation degree in History, Tourism, and Journalism at the Jyoti Nivas College, Bengaluru, India. Her areas of interest include smart tourism, sustainability, tourism media, and overtourism.

Rubaba Nawrin is a senior lecturer at St. Theresa International College in Thailand. She has been a faculty member of Business Administration in this institution for the past seven years. She has completed her PhD in Human Resource and Organization Development from the National Institute of Development Administration (NIDA), Thailand, in 2018. Her research interest specifically emphasizes employee engagement, diversity management, psychological empowerment, and the broad areas of organization development. She has presented many research papers at various international conferences and authored several publications in international journals.

Munazza Naz is working as Assistant Professor at Fatima Jinnah Women University, Pakistan. Previously, Naz performed his duties as a post-doctoral researcher at the University of York, UK, for two years. She did her PhD in Mathematical Sciences from Quid-i-Azam University, Pakistan. Naz has 32 national and international publications in world-renowned journals.

Hafsa Neamah is a research assistant at IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh. Her research interests are tourism and economic development.

Al-Zuhairi Omar is Senior Lecturer in the Department of Physics, Faculty of Science and Mathematics, Universiti Pendidikan Sultan, Perak Malaysia.

Sharina Osman is Senior Lecturer and the Head of the Tourism Section at Universiti Kuala Lumpur Business School. She earned her PhD degree in Management from the University of Exeter, United Kingdom; Master of Human Resource Management; and BBA (Marketing) Honors from Universiti Utara Malaysia (UUM), Malaysia. Her research interests are identity, image and reputation, organizational culture, gastronomic tourism, tourism destination identity and branding, participative tourism development, and e-tourism. She carries an array of experience ranging from human resource to marketing (image and branding), and tourism. She is also on the Editorial Advisory Board for several journals and was also invited as Keynote or Guest Speakers in seminars. Being in an academic and in the research environment, coupled with vast hands-on experience in the industry, she helps organizations improve competency and capacity building through trainings and consultations. She believes in interacting and experiential learning and has conducted many workshops in different sectors, including government and private at both local and international.

Jeong Chun Phuoc currently holds a PhD from Universiti Malaya (UM, Malaysia). He obtained his Master of Laws (LLM) from the National University of Singapore (NUS, Singapore) after graduating with LLB (Hons.) from IIUM University (IIUM, Malaysia). He is advisor, supervisor, and lecturer at Management and Science University (MSU). He was adjunct professor, visiting professor, and senior lecturer at MSU. He is a consultant trainer and lecturer in business law having impact on hospitality, company law with a special relationship in hospitality and occupational safety and health affecting hospitality, and HR laws regulating hospitality. He was also a permanent lecturer for environmental law, revenue law, and equity and trust having practical ramification on hospitality industry for SMEs. He has led a government-funded project with Green Energy Transfer grant. He also drafted and reviewed numerous policy documents on issues in universities, SMEs, hospitality industry etc. He has provided continuous review and contribution in matters relating to compliance, regulatory and policy affairs with a special focus on environmental law, industrial, and occupational safety and health dimensions with close relationship with hospitality stakeholders. He has written two grand Volumes on “Environmental Law” (1st and 2nd edition) and “occupational Safety and Health” (1st and 2nd edition) for the encyclopedia *Halsbury’s Laws of Malaysia* by Lexis Nexis; *Revenue Law in Singapore and Malaysia*; and a 3rd Edition Lexis Nexis (with senior Prof. Dr Leo Desmond Pointon) which set the gold standard for industrial reference pertaining to hospitality-related best practice and sustainability. He has been playing roles as speaker, consultant, advisor, reviewer, drafter on policy and strategy, academic supervisor, SMEs trainer, moderator of conference and webinar, research grant leader etc. His present area of engagement encompasses innovation and industrial consultancy having innovative dimensions in hospitality compliance and regulatory, international journals, academic projects, conferences, symposiums, and webinars at various universities, research hubs, private SMEs, public and government agencies, and green NGOs.

I. Gde Pitana is Professor of Tourism, Udayana University, Bali (since 2001). He previously served as Deputy Minister for International Marketing, Ministry of Tourism, Republic of Indonesia (2015–2018) and as Special Adviser to the Minister in Tourism Marketing and Cooperation (September 2018–October 2019). He was Director of Bali Province Tourism Authority (2001–2004), Director of RnD, Ministry of Culture and Tourism (2005–2008), Director of International Tourism Promotion, Ministry of Culture and Tourism (2008–2010), Acting Director General for History and Heritage (2010–2011), and Deputy Minister for Resource Development, Ministry of Tourism and Creative Economy (2010–2015). He earned his PhD from Australian National University, Canberra (Australia, 1998), while his master’s (MSc) was gained from Ateneo de Manila University, the Philippines (1989). His BA is from Agricultural Economics, Udayana University. He has published a number of articles and books, nationally and internationally. He also teaches and supervises dissertation in many universities, especially in tourism-related programs, such as in Universitas Indonesia (Jakarta), Universitas Padjadjaran

(Bandung), Universitas Airlangga (Surabaya), Institut Pertanian Bogor (Bogor), Universitas Gadjah Mada (Jogjakarta), and Universitas Udayana (Denpasar, Bali).

Putu Diah Sastri Pitanatri is Lecturer in the Hospitality Department, Bali Tourism Polytechnic, Indonesia. She is currently a PhD candidate in Tourism Studies at Gadjah Mada University. She is active in various national and international associations. She edited the book “Homestay: A Mosaics of Community-Based Tourism” with I Wayan Mertha in 2018, and “Culinary Tourism: A New Attributes of Ubud” with Nyoman Darma Putra in 2016. She also wrote a book chapter titled “Big Data Research for Tourism Marketing in Indonesia” in 2021. She has received first place in Win Way Award (2018) as the Best lecturer under the Ministry of Tourism Republic of Indonesia and Best Paper Presenter in OBOROT-Palembang First International Conference in 2018. She is also an active reviewer in national journals and speaker in many international conferences. Her research interests are in big data, tourist studies, and sustainable tourism management.

Muhammad Khalilur Rahman is working as a faculty member in the Faculty of Entrepreneurship and Business at Universiti Malaysia Kelantan (UMK), Malaysia. He has been actively involved in research activities and published over 55 articles and book chapters in leading service management outlets. He has a wide interest in tourism and service management research which includes medical tourism, ecotourism, halal tourism, service quality, brand equity, supply chain management, operation management, and green and sustainable development. He is a reviewer of *Kybernetes*, *International Journal of Contemporary Hospitality Management*, *Journal of Islamic Marketing*, and *BMC Public Health*.

Preethu Rahman is a PhD researcher, majoring in Western Economics at the International Business School of Shaanxi Normal University, China. She completed her Bachelor in Mechanical Engineering and MBA with full scholarships from the International University of Business Agriculture and Technology (IUBAT), Dhaka, Bangladesh. She has achieved Gold Medal in her MBA. She was an event planner and the CEO of her event management firm Merriment Events in Bangladesh. Her research interests include One Belt and One Road Initiative (OBOR), innovative economics, entrepreneurship, innovation and growth, artificial intelligence, innovation and tourism management, production and operations management, etc. She has participated in many education conferences and academic activities in China. She is appointed as an editor and reviewer by IGI Global.

Saima Rahman is currently working as Senior Lecturer at International University of Business Agriculture and Technology (IUBAT), Dhaka, Bangladesh. She completed her Masters of Professional Accounting (MPA) from Monash University in Australia. Her area of expertise is accounting, and her focus includes bringing positive changes to accounting practices over the years. She is an active participant in various educational trainings, conferences, and seminars by national and international organizations.

Makhabbat Ramazanova is Assistant Professor in the Department of Tourism, Heritage, and Culture and a researcher at the REMIT-Research on Economics, Management, and Information Technologies of the Portucalense University, Portugal. She got a PhD degree in Tourism from the University of the Balearic Islands, Spain; a master's degree in Sustainable Development from the Dublin Institute of Technology, Ireland; and a bachelor's degree in Finance from Ualikhonov University, Kazakhstan. She is a member of several EU TEMPUS and ERASMUS + projects. Her main research interests are sustainable tourism, tourism and water, lake tourism, and tourism planning and development.

Célia M.Q. Ramos graduated in computer engineering from the University of Coimbra in Portugal; obtained her master's degree in electrical and computers engineering from the Higher Technical Institute, Lisbon University; and obtained a PhD in econometrics from the University of the Algarve (UALG), Faculty of Economics, Portugal. She is Professor at the School for Management, Hospitality and Tourism, also in the UALG, where she lectures mainly in information systems. Current research interests include tourism information systems, electronic tourism, business intelligence tools, business analytics, digital marketing, and panel data models. She is a researcher at the Centre for Tourism, Sustainability, and Well-being (CinTurs).

Syed Ahmad Rizwan has had a career in Travel and Tourism Management related fields that many would envy. Rizwan holds a Doctorate in Tourism Management from the University of Lucknow, India, and MPhil from Madurai Kamaraj University, Madurai, India. His academic endeavor includes roles with Ministry of Higher Education, Oman; University of Nizwa, Oman; and Skyline University College, UAE, along with Guest faculty to DoT, University of Lucknow, IITM (Lucknow, Gwalior, and New Delhi Chapter), and BHU. Actively involved as a resource person with Academic Staff College, he had a long association with Centre for Tourism Research and Development, a four-decade-old "A" tier journal in tourism. He has published papers, academic book reviews, conference reports, and articles. Syed has coauthored books from India and USA to his credit Syed is currently serving as an assistant professor at City University College of Ajman, UAE.

Md Abdus Salam has been working in St. Theresa International College, Thailand, for the past six years. He is the head of the accountancy program and a faculty member of Business Administration. His contribution to research has been observed in various areas including organization psychology, organization development, and sustainability. He completed his PhD in HROD from the National Institute of Development Administration (NIDA), Thailand. He has published many research papers in international journals and presented several papers at various international conferences.

J. A. R. C. Sandaruwani graduated from the Sabaragamuwa University of Sri Lanka with a first-class degree in BSc (Special) in Tourism Management and completed her Master of Business Administration (Tourism) in the Faculty of Graduate Studies of Sabaragamuwa University of Sri Lanka. She joined the Sabaragamuwa University as an academic in 2014 and has been working as lecturer attached to the

Department of Tourism Management, Faculty of Management Studies of Sabaragamuwa University of Sri Lanka. She is specialized in teaching e-tourism, hospitality management, and hotel housekeeping subjects. Her research interests fall in the areas of sustainable tourism, cultural and heritage tourism, and e-tourism. She is also working as a resource person to the capacity-building programs for tourist facilitators organized by the provincial councils of Sri Lanka.

Muhammad Apriandito Arya Saputra is a researcher and data scientist at the Big Data and Business Analytics Laboratory, SBM-ITB. He has been an instructor in various big data analytics training activities, such as Digital Talent Scholarship and Digital Talent Incubator. He is active in conducting research related to the use of big data in improving the decision-making process.

Saroop Roy B. R., BTech, MTA, is currently Assistant Professor in Travel and Tourism as well Coordinator of Centre for Responsible Tourism at Kerala Institute of Tourism and Travel Studies (KITTS). Before that, he had worked with Thenmala Ecotourism Promotion Society and was also the Kerala Coordinator of EQUATIONS, a Bangalore-based research, campaign, and advocacy organization on tourism policies and issues for 8 years. His expertise areas include tourism policy formulation, ecotourism, responsible tourism, rural tourism, and community-linked tourism projects. He participated in the SBSTTA 13 Meeting of the Convention on Biological Diversity held at Rome in February 2008. He also led the Indian delegation of Ecotourism practitioners to attend the South African and Indian Practitioners' Workshop to exchange lessons and best practices on using nature tourism as a force for poverty alleviation at Johannesburg in May 2008. He has played a significant role in the formulation and implementation of Responsible Tourism Initiative in the state of Kerala. On the policy front, he was the drafting committee member of the Kerala Tourism Policy 2012, Revamping of Homestay Classification Scheme for Kerala 2015, and preparation of Charter for Green Carpet initiative for Kerala Tourism 2016. He has coauthored the book "An Introduction to Business of Tourism" published by SAGE India in May 2017 bringing out various dimensions of tourism with an academic perspective.

Gulnur Saspuayeva is Associate Professor in the Department of Environmental Protection Management and Engineering of the LN Gumilyov Eurasian National University, Kazakhstan. She is involved in several national projects related to the monitoring and protection of natural resources in Kazakhstan. Her main research interest is wastewater, ecology, water quality assessment, and tourism development impacts.

Emmanuel Sebata is currently a PhD candidate at the Sport Business School, Beijing Sport University, Beijing, China. He is a teaching and research graduate fellow in the Department of Sport Science, Faculty of Science, Kyambogo University, Kampala, Uganda. He was also selected as an IOC Young Leader 2021–2024. His areas of research interest are sport tourism, sport economy, Olympics, leisure, event heritage, festivals, and sport and tourism development in developing economies. He completed master's degree in Tourism Management

based on sport tourism at Hebei University, China, and a Bachelor of Science in Sport and Leisure Management at Kyambogo University, Uganda.

Sadia Shaikh holds her doctoral degree in Business Management with a research focus on SMEs and entrepreneurship. She is associated with Benazir School of Business, BBSUL, Karachi, as assistant professor. He has a vast experience of teaching in various universities and possesses a strong research background in diverse areas. Her research interests include entrepreneurship, IoT, Industry 4.0, MSMEs, tourism, sustainability, development economics, and green and lean marketing management practices. She also has an extensive experience in managing academic research journals and also regularly reviews research papers on her subject areas for well-reputed international/national research journals.

Anukrati Sharma is currently Associate Professor and Head of the Department of Commerce and Management, University of Kota, Rajasthan, India. She has edited and authored several books and has attended a number of national and international conferences, presenting over 45 papers. She has been invited to talks, lectures, and panel discussions by different universities. She handles training sessions at the Rajasthan Police Academy, Jaipur, India. Her special interest areas are tourism, tourism marketing, strategic management, and international business management.

Atul Kumar Sharma is Assistant Professor in the Department of Tourism and Travel Management, Jyoti Nivas College, Bengaluru, India. He is also a UGC Senior Research Fellow in the Department of Tourism Studies, Pondicherry University, India. He has completed his master's degree in Tourism Management from Banaras Hindu University, India. He has an avid interest in the areas of pilgrimage tourism, smart tourism, and tourism entrepreneurship.

Anila Thomas is Assistant Professor and Head of the Department of Tourism and Travel Management at Jyoti Nivas Autonomous College, Bengaluru. She holds her PhD in Tourism Management and master's in History and Tourism from Mother Teresa Women's University, Kodaikanal, Tamil Nadu. She is a member of National Executive Committee of Indian Tourism and Hospitality Congress (ITHC). She is also an honorary member of the editorial board of *International Journal of Biosciences and Technology* (IJBST).

Hasanuzzaman Tushar is Assistant Professor of College of Business Administration at International University of Business Agriculture and Technology (IUBAT), Bangladesh. He is a PhD candidate at the Graduate School of Human Resources and Organizational Development, National Institute of Development Administration (NIDA). He also served at Chandigarh University as a visiting professor. His research interest primarily lies in the area of career development, human resource development and management, tourism education, leadership, and social stratification. He authored various publications and presented several papers at national and international conferences.

Meral Üzülmöz is currently Assistant Professor in Gastronomy and Culinary Arts at the Kadırlı School of Applied Disciplines of the Osmaniye Korkut Ata University,

Turkey. She completed her undergraduate education in 2012 in the Department of Tourism and Hotel Management at Afyon Kocatepe University. In 2014, she completed her master's degree in the Department of Tourism and Hotel Management at Çanakkale 18 Mart University. She did her PhD in 2018 in the Department of Tourism Management, Mersin University. Her current research interests include gastronomy, local foods, Turkish cuisine, sustainable tourism, and tourism management.

Mohit Vij is serving Associate Professor in School of Business, Skyline University College, United Arab Emirates (UAE). He holds MBA from HEC Montreal (Canada) and PhD from Kurukshetra University (India). He has made a significant contribution to tourism academia through publishing in journals and books, national newspapers, and trade magazines. Mohit has also been actively involved in tourism training and consultancy projects for UAE Destination Management Organizations (DMOs). He was honored with Award for Excellence in Teaching 2017–2018 and 2011–2012 and Award for Excellence in Services 2014–2015. His research areas include tourism training, tourism marketing, and sustainable tourism development. Before joining Skyline University College, Mohit served as Head of Tourism Department in the Institute of Integrated and Honors Studies, Kurukshetra University, India, where he played a leading role in developing and launching various undergraduate tourism programs.

Bui Nhat Vuong is a lecturer of Faculty of Air Transport at Vietnam Aviation Academy, Vietnam. He has received his PhD in Business Administration from the National Institute of Development Administration, Thailand, in 2020. His current research interests are human resources management, marketing, and Public administration.

Khaw Khai Wah is Senior Lecturer in the School of Management, Universiti Sains Malaysia. He holds a PhD in statistical quality control from Universiti Sains Malaysia. He is a coordinator of the Business Analytics Program in the School of Management, USM. His areas of research are in advanced analytics and statistical quality/process control. He has featured in prominent international publications. His efforts and excellence have been acknowledged and awarded at several dignified platforms. He is actively involved in conducting training in statistics and visualization. Prior to his academic career, he worked in a renowned US multinational company as a Data Analytics Team Leader.

Bingwang Xue is Professor and Dean from Tourism Management School, Wuhan Business University, China. He has been visiting many hospitality schools in Switzerland, France, and other countries. His research interests are hotel management, tourism planning, and hospitality and tourism education. He is a principal investigator for 20 scientific projects of different ranks in tourism and hospitality area and has published more than 20 journal papers.

Yuanyuan Zong, CHE, CHI, and CHIA (AHLEI), is a PhD candidate from the Graduate Institute of Marketing and Tourism Management, National Chiayi

University, Taiwan. She is also a hospitality lecturer at Wuhan Business University, China, and a visiting scholar at Oklahoma State University, USA. Her research interests are cultural tourism, destination marketing, hotel operation management, and hospitality and tourism education. She has published more than 30 journal papers.

Part I
Technology Application in Tourism in Asia:
Theories

Chapter 1

Thirty Years of Research on Application of Technology in Tourism and Hospitality Industry: A Systematic Literature Review



Mohammad Rokibul Hossain, Fahmida Akhter, Anukrati Sharma, and Azizul Hassan

Abstract In the fourth industrial revolution, the application or adoption of technology in the tourism and hospitality industry became mainstream and received significant attention from research scholars. But application of Systematic Literature Review (SLR) to elucidate the dynamics of technology in the tourism and hospitality industry has hardly been experimented in any prior research. Therefore, the literature gap pertaining to the nexus of technology and tourism industry is addressed in this chapter. Although the literature in tourism has extensively discussed technology application or adoption in tourism and hospitality industry, the research structure in this field remained scattered and fragmented. The current chapter is intended to bridge the gap and is attempted to achieve three goals. First, to understand the corpus of research on “Application and Adoption of technology in tourism and hospitality”, SLR is conducted only based on research articles extracted from Web of Science and Scopus on the specified topic using some specific search strings to unfold the corpus of research on use and adoption of technology in tourism and hospitality industry. To conduct the SLR, the study adopts four bibliometric analysis process named-co-citation, network visualization through co-occurrence data, multi-dimensional scaling, and hierarchical cluster analysis that shed light on the intellectual structure on technology application in tourism industry. Second, the chapter illuminates on how the technology shape tourism in a new form. Third, the

M. R. Hossain (✉)

Faculty of Business Studies, Premier University, Chattogram, Bangladesh

e-mail: rokibul.fbs@puc.ac.bd

F. Akhter

School of Business Administration, East Delta University, Chattogram, Bangladesh

A. Sharma

Department of Commerce and Management, University of Kota, Kota, Rajasthan, India

A. Hassan

Tourism Consultants Network, The Tourism Society, London, UK

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,

https://doi.org/10.1007/978-981-16-5461-9_1

chapter delineates the models and theories that were addressed in the previous studies to describe how technology is applied and adopted in the tourism industry. The findings of the study help the researchers and academicians to understand the research trends in this area and how knowledge structure has been evolved over the years.

Keywords Technology · Tourism · Technology adoption · Smart tourism · Artificial Intelligence · Augmented Reality (AR) · Virtual Reality (VR) · Robochat

Introduction

The fourth industrial revolution focuses on the exponential growth of emerging technologies which triggers customer-centric revolution in modern tech-based tourism business. Technologies such as Robotics, Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR), Internet of Things (IoT), blockchain technology, fully automated vehicles, nano technology, quantum computing, fifth generation wireless technology and many other advanced technologies have affected the marketers' strategies and tourists' experience in tourism and hospitality industry (Car et al., 2019; Pencarelli, 2020). The rapid growth of information and communication technology, e-business platforms, digital marketing, social media marketing has effectively revolutionized the dynamics of tourism and hospitality industry (Herrero et al., 2018; Law et al., 2014; Moreno & Tejada, 2019). These technological advancement have brought unprecedented challenges and opportunities in operation, strategy setting, process innovation and process re-engineering throughout the industry (Law et al., 2014). The tourism and hospitality industry has been heavily revolutionized with the digital transformation and adoption of smart technologies (Law et al., 2014; Mariani, 2019). Companies operating under tourism industry are reaping benefits of technologies through improved customer experience by focusing on customers' preferences (Pappas et al., 2021). Technology can facilitate the tourism industries to improve the efficiency, productivity, maximum reach, visibility, traceability, value co-creation and co-innovation (Pappas et al., 2021; Pencarelli, 2020). Conversely, such technological solution can boost the customer experiences by combining tourism product and services (Stankov & Gretzel, 2020), allowing access for information and inter modular transportation or by shaping the physical environment around the customers (Chung et al., 2017; Pappas et al., 2021).

The revolutionary impact of technology has been foresighted significantly in most of the industries and business (Leung, 2020; Osei et al., 2020; Sigala & Gretzel, 2017). Unlike other industries, technology has transformed the tourism and hospitality landscape altering previous operational and managerial techniques with a new sophisticated business model (Ivanov et al., 2020). Extant literature on application/adoption of technology in tourism industry ushers that researchers have emphasized on different aspects of technology usage in tourism and hospitality industry. Scholars focused on use of robotics or automation in tourism industry

(Çakar & Aykol, 2020; Christou et al., 2020; de Kervenoael et al., 2020; Fusté-Forné, 2021; Hou et al., 2021; Ivkov et al., 2020; Kelly et al., 2019; Kim et al., 2021; Nam et al., 2020; Park, 2020; Zeng et al., 2020a, b; Zhong et al., 2020), Artificial Intelligence (Fusté-Forné, 2021; Kelly et al., 2019; Kim et al., 2021; Mingotto et al., 2020; Nam et al., 2020; Tuomi et al., 2020; Tussyadiah, 2020), smart tourism (Ivanov, 2019; Jeong & Shin, 2020; Lacka, 2020; Lerario & Varasano, 2020; Leung, 2019; Pai et al., 2020; Santos-Júnior et al., 2020; Shen et al., 2020a, b), Augmented Reality (AR) or Virtual Reality (Aluri, 2017; Bogicevic et al., 2019; Cranmer et al., 2020; Flavián et al., 2021; Han et al., 2019; Liang & Elliot, 2021; Jung et al., 2020; Kang, 2020; Kim et al., 2020; Kim & Hall, 2019; Lee et al., 2020; Lee & Kim, 2021; Lin et al., 2020; Lo & Cheng, 2020; Loureiro et al., 2020; Sun et al., 2021; Van et al., 2020; van Nuenen & Scarles, 2021; Walmsley & Kersten, 2020; Wei, 2019; Yuce et al., 2020; Yung et al., 2021; Yung & Khoo-Lattimore, 2019), use of digital platform or social media in tourism (Cheunkamon et al., 2020; Foroudi et al., 2020; Inversini & Masiero, 2014; Kovács et al., 2021; Kowalczyk-Anioł & Nowacki, 2020; Li et al., 2018; Li & Law, 2020; Lin et al., 2020; Mosweunyane et al., 2019; Munar & Jacobsen, 2014; Pateli et al., 2020; Sharmin et al., 2021; Shen et al., 2020a, b; Sigala, 2018; Singh & Srivastava, 2019; Sultan et al., 2021; Zhou et al., 2020), application of Blockchain in tourism (Bodkhe et al., 2020; Filimonau & Naumova, 2020; Kizildag et al., 2019; Nuryyev et al., 2020; Rashideh, 2020; Thees et al., 2020; Tyan et al., 2020), use of (ICT) Information and communication technology (Alabau-Montoya & Ruiz-Molina, 2020; Law et al., 2019; Xiang, 2018), mixed reality technology (Bae et al., 2020), mobile application (Briciu et al., 2020), application of Big Data in tourism and hospitality industry (Kubo et al., 2020; Li & Law, 2020; Rashideh, 2020; Stylos et al., 2021; Valls & Roca, 2021; Yallop & Seraphin, 2020; Zeng et al., 2020a, b; Zhang et al., 2020).

Previous studies on the application of technologies in tourism and hospitality usher that researches on this topic are diversified such as scholars addressed their research from tourists' perspective or service provider's perspective. It is evident that technology transformed the tourism and hospitality industry into a new paradigm. Although some of the studies have conducted review to the tourist's perception on adoption of technology or firms challenges to adopt new business model but very few studies have addressed the technological impact in tourism industry from particular aspects only such as innovation research in hospitality and tourism (Lelo de Larrea et al., 2021); mobile technology (Law et al., 2018); technology adoption in fourth industrial revolution (Osei et al., 2020); tourism forecasting with internet data (Li et al., 2021); automation in tourism (Tussyadiah, 2020); use of ICT in restaurant (Moreno & Tejada, 2019), use of Blockchain (Bodkhe et al., 2020); adoption of user generated content (Ukpabi & Karjaluoto, 2018) and use of AR or VR in tourism industry (Loureiro et al., 2020; Wei, 2019).

Numerous studies have been investigated focusing exclusively on tourism industry practices or embracement of any particular technology in Tourism Industry. But, till the date, the field of Tourism research lacks to delineate a complete picture, where all the fourth revolution technologies will be enlightened in a single frame for their impact in tourism and hospitality industry through SLR. Furthermore, there is

a dearth of knowledge that how technology alter the tourists' travel experience and tourism service providers' business strategy with new business model. Therefore, the present chapter is intended for systematic and quantitative evaluation of the past and present technology application research in tourism and hospitality industry for assessing the potential contributions of this flourishing research domain. This chapter answers two questions: first, what is the knowledge structure of technology adoption in tourism and hospitality industry?; second, how does technology impact tourism and hospitality industry?

By adopting SLR approach, the chapter contributes to the existing literature in some ways. First, the chapter provides a comprehensive research overview of the domain of technology adoption in tourism and hospitality industry over the last thirty years. To fulfill this research objectives, the study is carried out by extensive literature survey using different renowned database like Scopus, Science Direct, and web of Science. The systematic reviews "summarize in an explicit way what is known and not known about a specific practice related question" (Briner & Denyer, 2009, p. 19). The value of SLR can provide a clear understanding of the current state of the research regarding the topic being investigated in a single platform. Considering the knowledge expansion in this domain over the years, the target of this chapter is to present a comprehensive overview of the research conducted in the domain of technology adoption in tourism and hospitality industry and its reflection in literature. The chapter attempted to explore the historical basis of technology adoption in tourism and hospitality domain. In general, as past and present studies influenced future research, this chapter helps the academician and practitioner to understand the trends of technological impact on tourism and hospitality industry in details.

Section 1.2 of this chapter presents the methodology used for SLR including data collection mechanisms from the publication database, the screening process and the data selection process. Section 1.3 and section 4 delineates the descriptive and thematic analysis respectively. The rest of the part is dedicated to conclusion and managerial and theoretical implication of this study.

Methods of Systematic Literature Review (SLR)

The study adopts SLR as it ensures the most efficient and high quality approach for exploring and evaluating extensive literature (Tranfield et al., 2003). SLR is used to evaluate and interpret the all-available research in a specific research area or phenomenon of interest where literature review can strengthen the foundation of research in a field of interest. SLR is a more authentic and verifiable source which incorporates a more comprehensive and unbiased search. According to Liliani et al. (2020), SLR establishes a defined procedure, and follows a strict review protocol to reduce researcher bias, and maintains the research process's independence, while permitting exploration and discovery that aids in the development of knowledge. The basic difference between traditional narrative review and SLR exists is

comprehensive and unbiased search (Tranfield et al., 2003). Extensive literature survey ushers that articles based on SLR can be in different forms such as Structured review articles with discussion on methods, theories discussed constructs that were used by the previous researchers and contexts and conditions of the study (Paul & Singh, 2017; Canabal & White, 2008); Conceptual framework based papers with further research directions (Paul & Criado, 2020), theoretical review paper (Paul & Rosad-Serrano, 2019), meta-analysis (Knoll & Matthes, 2017), bibliometric review (Randhawa et al., 2016). The study deploys SLR process consisting of data collection, data analysis and theme exploration using co-word analysis following the guidelines of Tranfield et al. (2003) and some extensively cited review articles (Rosad-Serrano et al., 2018; Keupp & Gassmann, 2009; Canabal & White, 2008).

Data Collection for SLR

The data collection for this study was carried out following the protocol as management review protocol is widely used to explore, discover and develop any research area by providing flexibility to the researchers to modify through the course of study, whilst it also ensure that reviews are less open to researcher's bias (Tranfield et al., 2003). The data collection protocol used in this study includes a rigorous search strategy with some specific criterion for inclusion and exclusion of the articles to fulfill the objective of Systematic literature review. The search strategy incorporates some relevant steps such as identification and selection of relevant keywords and search terms, selection of database for searching the articles, further modification of keywords and applying search strategy (Liliani et al., 2020; Tranfield et al., 2003).

Data Searching Strategy

The study used Scopus and Web of Science for extracting dataset to get relevant research papers on "Adoption or Application of Technology in Tourism and Hospitality industry". We used both Scopus and Web of Science as these are the reliable and widely accepted database and includes a wide range of peer reviewed journals in Business, Economics and management (Anees-Ur-Rehman et al., 2016; Foroudi et al., 2021; Fouroudi et al., 2020; Paul & Feliciano-Cestero, 2020). The search strategy deploys Boolean operators which includes some simple words (AND, OR, NOT or AND NOT) widely used to narrow or expand the search combining the keywords and search terms (Galvan & Galvan, 2017). Using Boolean operators in search produces a more usable search result, yet to saves time and efforts (Galvan & Galvan, 2017). The study employed some additional criterion in searching strategy to limit the results to peer reviewed academic articles within the selected databases. The reviewers have narrowed the datasets following some

restrictions criterion. First, the search was limited to the publications which were peer reviewed articles. Second, the search was done only within the domain of application of technology in Tourism and Hospitality Management and with the selected search strings such as Technology) OR (Augmented Reality) OR Virtual Reality OR Artificial Intelligence OR Big data OR ICT OR Social Media” AND “Tourism OR Hospitality OR Tourist Experience”. Third, the reviewers attempted to extract only articles which were published in scholarly journals in the selected domains. Fourth, the search was limited to English articles in all databases. Five, we screened all the abstracts of papers to decide on the contents of the articles that ultimacy helped to exclude some irrelevant articles. Finally, the data set was extracted from the database considering the relevance and context of the study and their connection with the research objectives. Initially search in different debases presented different amount publications such as Scopus 4441, web of science 323. After applying all selection criterion, we could finally select 989 from Scopus and 123 from web of science (Table 1.1).

Selection of Articles

Study selection or article selection from selected database refers to identification and selection of primary studies those are directly connected with research questions and objectives (Kitchenham & Charters, 2007). To reduce the bias and human error (Tranfield et al., 2003), the study adopted a systematic protocol that includes deciding on selection criteria, extraction methods, sorting duplicate articles among the databases, and selection of study based on title, abstract and keywords (Liliani et al., 2020; Tranfield et al., 2003). In this stage, the reviewers have gone through a rigorous process to select the most relevant articles to meet the objective of the study. After collection data from different data bases, the reviewers have gone through the full articles before inclusion and exclusion decision. In these circumstances, the writers debated and agreed on the decision to include or exclude. After deciding on conflicting and confusing articles, the finally selected articles were moved to a spreadsheet to filter the duplication of articles among the databases. After final section of articles from different databases, all the articles were moved to the spreadsheet of Scopus which directly imported from Scopus for further analysis through the VOSviewer. Two reviewers sincerely checked the title, keywords, and abstracts of all selected papers to ensure relevance of the papers with the objectives

Table 1.1 Search strings for this research

Search strings
Technology related words: (Technology) OR (Augmented Reality) OR Virtual Reality OR Artificial Intelligence OR Big data OR ICT OR Social Media
Tourism and Hospitality related Words: Tourism OR Hospitality OR Tourist Experience

Source: developed by the authors, 2021

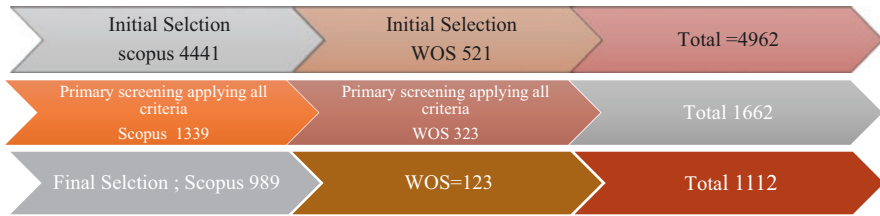


Fig. 1.1 The data collection and selection protocol. (Source: developed by the authors, 2021)

of the study. In selection through the title, the reviewers have focused on those papers that addressed the Technology and Tourism or Hospitality in the title of the papers. Next, keywords were reviewed ensure unification and consistency (i.e., singular/plural). In the full-text selection, all of the articles were read carefully focusing on Application of technology in Tourism Industry.

The application of data collection protocol, procedures of selection, and assessment criterion are depicted in Fig. 1.1.

Merging Scopus and Web of Science Data and Removing Duplicates

After extracting the data from Scopus and Web of science, the data were merged to perform bibliometric analysis. We adopted PRISMA method for inclusion and exclusion of articles for this study. Using search strings, articles related to application of technology in tourism and hospitality were extracted from Scopus and Web of Science in bib text format. Extracted data set were compiled using text maker software, and two separate datasets were constructed for the analysis using R studio. Initially we converted both files into bibliographic framework. Then, data set for web of science was merged into Scopus data set and duplicates were removed through R programming.

Data Analysis Tools

The data analysis using SLR is conducted through descriptive analysis and thematic analysis after retrieving the data through different appraisal mechanism (Liliani et al., 2020). In the first part of the data analysis, the descriptive analysis is presented. According to (Tranfield et al., 2003) the descriptive analysis is used in SLR to depict the profile of the selected articles using some categories and classification scheme. The classification scheme is done based on the published articles and it categorizes the total articles into different segments like circulation of published articles in different journals, contexts, time periods, and countries; reports

numerous policies and strategies for crisis period suggested by earlier studies; presents a set of theoretical standpoints within which those studies are explored. The second part of the analysis ushers some relevant theme. To explore the theme, the study uses Co-word analysis which is similar to the content analysis (Muñoz-Leiva et al., 2012) using the final data set. Co-word analysis has been applied as text mining to the articles' titles, abstracts, and keywords (van Eck & Waltman, 2010). Using the VOSviewer software, the data set is analyzed to find the relevant themes. Multiple keywords that appear together in the same article are identified by co-word connections. The number of articles in which the keywords appear together determines the link between them (van Eck & Waltman, 2010). The interpretative approach was utilised to extract data from the collection and discover consensus or emerging topics in the thematic analysis (Tranfield et al., 2003). Plainly, this uses two analysis software like R programming and VOSviewer to analyze the extracted data.

Analysis Phase

The data set to carry out the bibliometric analysis has been prepared by merging the extracted data from Scopus and Web of Science (WoS) databases through R. Scopus and Web of science are more reliable, prestigious and widely accepted data base for the bibliometric studies (Aria & Cuccurullo, 2017; Foroudi et al., 2021; Fouroudi et al., 2020; Rey-Martí et al., 2016). Table 1.2 indicates the data information that are used in the bibliometric analysis. Figure 1.1 reveals years wise distribution of journal from 1991 to 2021 within the 30 years. The inclusion or research paper in 1991 reveals that application of technology in tourism is a mature topic in the tourism literature as scholars have focused the necessity of technology in tourism in 1991. Figure 1.2 also indicates that interest of scholars in research of application of technology in tourism and hospitality is increasing dramatically from last 5 years. The exponential growth of researchers' interest on this topic has resulted highest number of articles such as 102,99,197 and 217 in the year of 2017, 2018, 2019, 2020, respectively.

Bibliographic Coupling

In bibliographical coupling, two publications that refer to the same document are matched because they have a lot of shared references. It implies that the main publications have a lot of intellectual capital in common (Woerner & Wixom, 2015; Khanra et al., 2021; Shin & Perdue, 2019). Table 1.2 shows the most contributing authors, journals, organizations and countries in the sample of current based on the bibliographic coupling on the selected database. Table 1.2 reveals most 20

Table 1.2 Information on merged database

Description	Results
<i>Main information about data</i>	
Timespan	1991:2021
Sources (journals) Scopus and web of science	116
Documents	1184
Average years from publication	5.53
Average citations per documents	27.09
Average citations per year per doc	3.565
References	57692
<i>Document types</i>	
Article	1120
<i>Document contents</i>	
Keywords plus (id)	2179
Author's keywords (de)	3590
<i>Authors</i>	
Authors	2483
Author appearances	3255
Authors of single-authored documents	213
Authors of multi-authored documents	2270
<i>Authors collaboration</i>	
Single-authored documents	228
Documents per author	0.477
Authors per document	2.1
Co-authors per documents	2.75
Collaboration index	2.37

Source: developed by the authors using R Studio, 2021

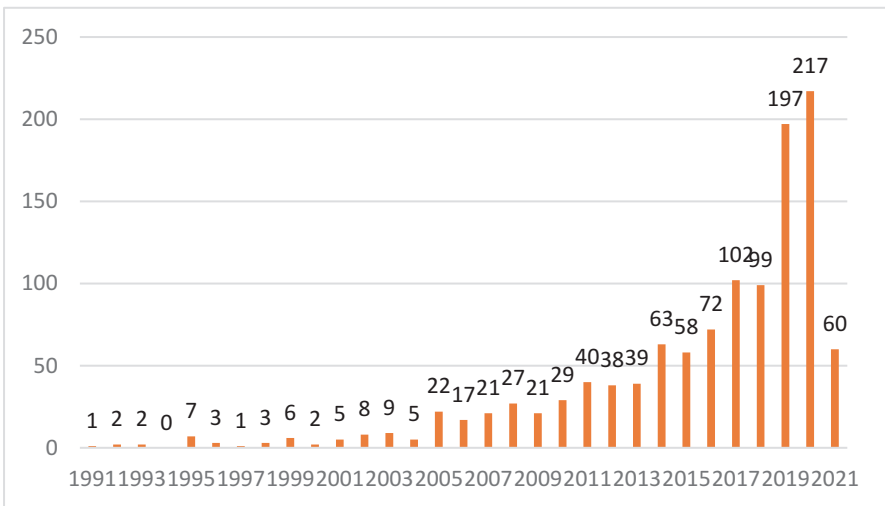


Fig. 1.2 Evolution of research in application of technology in tourism. (Source: developed by the authors using R Studio, 2021)

contributing authors, journals, countries and authors' affiliation in terms of producing articles over the years.

Citation Analysis

After merging the data using R programming, we have analyzed the dataset to identify widely cited paper in technology and tourism area. We focused on the citation analysis because an in-depth analysis of authors' citation provides a basic idea regarding the knowledge structure (Foroudi et al., 2021; Paul & Feliciano-Cestero, 2020) in technology and tourism research. We considered the total number of citations to select widely cited paper in this area. Table 1.3 and Fig. 1.3 indicated the highly cited paper. The analysis shows that the mostly cited paper focused on the progress of information technology in tourism sector (Table 1.4).

Prestige Analysis

The influence and popularity of contributors to a publication as reported by bibliographic coupling and citation analyses, respectively, may not reflect its prestige ((Khanra et al., 2020). An enhanced PageRank algorithm can be used to investigate the prestige of publications (Khanra et al., 2020). Using an enhanced version of the PageRank algorithm, this technique identifies articles that are important in shaping a research domain (Khanra et al., 2020). This algorithm gives high priority to publications that have been cited by well-known publications (Khanra et al., 2021). Table 1.5 shows the top prestigious articles from a sample of 1181 articles that were identified and ranked according to their PageRank Score.

Co-authorship Analysis

Co-authorship analysis provides valuable insight into the collaborative networks that form the intellectual capital of a research subject (Khanra et al., 2020). The propensity of a group of coauthors to cite specific publications may have an effect on the literature on a particular topic (Caviggioli & Ughetto, 2019; Khanra et al., 2021).

Table 1.3 Top 20 contributing authors, journals, countries and authors' affiliation in terms of producing articles over the years

Authors	Articles	Affiliations	Articles	Sources	Articles	Country	Articles	Country	Total citations
Law r	23	Kyung Hee university	44	Sustainability	118	China	127	United Kingdom	5722
Buhalis d	21	The Hong Kong Polytechnic university	32	Tourism management	109	USA	125	USA	5686
Gretzel u	17	Bournemouth university	26	Tourism economics	56	Spain	109	Spain	2604
Chung n	16	University of surrey	25	Current issues in tourism	49	United kingdom	96	China	1801
Fesenmater d	13	Hong Kong Polytech university	18	Journal of sustainable tourism	48	Australia	54	Australia	1748
Jung t	12	Temple university	15	Annals of tourism research	44	Korea	54	Denmark	1510
Wang y	10	Manchester metropolitan university	14	Journal of hospitality and tourism technology	44	Italy	36	Canada	1311
Xiang z	10	Hong Kong polytechnic university	11	Journal of travel research	40	Hong Kong	28	Korea	1242
Gosling s	8	University of central Florida	11	Asia pacific journal of tourism research	36	India	25	Italy	898
Kim j	8	University of Queensland	11	African journal of hospitality tourism and leisure	33	Austria	19	Hong Kong	834
Kumar r	8	University of Tasmania	11	Journal of environmental management and tourism	33	South Africa	17	Greece	666
Tussyaiah i	8	University of Johannesburg	10	International journal of contemporary H&M	27	Greece	15	Sweden	545
Chen y	7	Modul university Vienna	9	International journal of tourism research	25	Malaysia	15	Austria	488

(continued)

Table 1.3 (continued)

Authors	Articles	Affiliations	Articles	Sources	Articles	Country	Articles	Country	Total citations
Filimonau v	7	Texas a and m university	9	Journal of travel and tourism marketing	24	Canada	14	Portugal	448
Lee s	7	University of Granada	9	Worldwide hospitality and tourism themes	24	Denmark	11	New Zealand	338
Tom d m	7	University of the south pacific	9	Information technology and tourism	23	Portugal	11	France	271
Yeoman i	7	Not reported	8	E-review of tourism research	21	Norway	10	Finland	217
Bulchand-gudumal j	6	University of Innsbruck	8	Tourism recreation research	20	Thailand	10	Turkey	179
Hardy a	6	Florida state university	7	Journal of tourism futures	16	Turkey	10	Malaysia	162
Kim m	6	Griffith university	7	Journal of destination marketing and management	15	Finland	9	Norway	144

Source: developed by the authors using R Studio, 2021

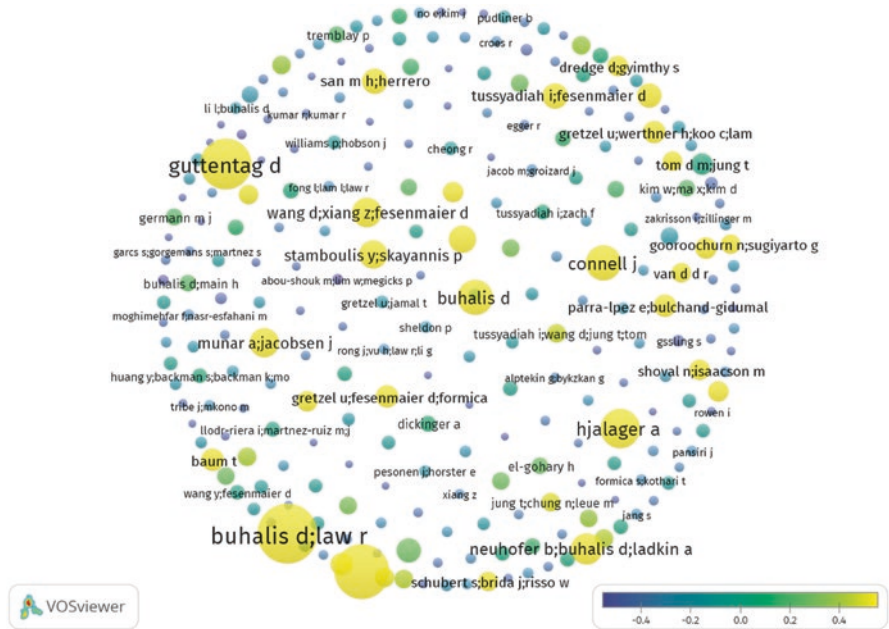


Fig. 1.3 Citation analysis of the author. (Source: developed by the authors using VOSviewer, 2021)

Table 1.4 Mostly cited paper focused on the progress of information technology in tourism sector

Author	Title	Journal information	Total citation	Py
Buhalis d; Law r	Progress in information technology and tourism management 20 years on and 10 years after the internet the state of tourism research	Tour. Manage.	1482	2008
Litvin s; Goldsmith r; Pan b	Electronic word of mouth in hospitality and tourism management	Tour. Manage.	1278	2008
Guttentag d	Airbnb disruptive innovation and the rise of an informal tourism accommodation sector	Curr. Issues tour.	671	2015
Hjalager a	A review of innovation research in tourism	Tour. Manage.	640	2010
Connell j	Medical tourism sea sun sand and surgery	Tour. Manage.	523	2006
Buhalis d	Strategic use of information technologies in the tourism industry	Tour. Manage.	489	1998
Guttentag d	Virtual reality applications and implications for tourism	Tour. Manage.	420	2010

(continued)

Table 1.4 (continued)

Author	Title	Journal information	Total citation	Py
Munar a; Jacobsen j	Motivations for sharing tourism experiences through social media	Tourism manage.	370	2014
Stamboulis y; Skayannis p	Innovation strategies and technology for experience-based tourism	Tour. Manage.	351	2003
Buhalis d; Licata m	The future E tourism intermediaries	Tour. Manage.	321	2002
Tussyadiah i; Fesenmaier d	Mediating tourist experiences access to places via shared videos	Ann. Tour. Res.	288	2009
San m h; Herrero	Influence of the users psychological factors on the online purchase intention in rural tourism integrating innovativeness to the UTAUT framework	Tour. Manage.	269	2012
Law r; Buhalis d; Cobanoglu c	Progress on information and communication technologies in hospitality and tourism	Int. J. Contemp. Hosp. Manag.	265	2014
Gretzel u; Fesenmaier d; Formica s; O'leary j	Searching for the future challenges faced by destination marketing organizations	J. Travel res.	226	2006
Gretzel u; Werthner h; Koo c; Lamsfus c	Conceptual foundations for understanding smart tourism ecosystems	Comput. Hum. Behav.	221	2015
Doolin b; Burgess l; Cooper j	Evaluating the use of the web for tourism marketing a case study from New Zealand	Tour. Manage.	219	2002
Baum t	Human resources in tourism still waiting for change	Tour. Manage.	214	2007
Parra-lpez e; Bulchand-gidumal j; Gutierrez-tao d; Daz-armas r	Intentions to use social media in organizing and taking vacation trips	Comput. Hum. Behav.	212	2011
Wang d; Xiang z; Fesenmaier d	Smartphone use in everyday life and travel	J. Travel res.	211	2016
Amaro s; Duarte p	An integrative model of consumers intentions to purchase travel online	Tour. Manage.	208	2015
Neuhofer b; Buhalis d; Ladkin a	A typology of technology enhanced tourism experiences	Int. J. Tour. Res.	208	2014
Neuhofer b; Buhalis d; Ladkin a	Conceptualizing technology enhanced destination experiences	J. Destin. Mark. Manage.	204	2012
Orfila-sintes f; Cresp-cladera r; Martnez-ros e	Innovation activity in the hotel industry evidence from Balearic islands	Tour. Manage.	201	2005

Source: developed by the authors using R Studio, 2021

Table 1.5 Top ten contributor based on prestige analysis

Node	Betweenness	Closeness	PageRank
(Herrero et al., 2018)-1	612.7688	0.004184	0.024044
Springer: cham	21.29733	0.003279	0.003759
Gretzel u. 2015-2	135.8345	0.003731	0.015747
Buhalis d. 2008-1	205.5454	0.003984	0.012243
Law r. 2014	152.7629	0.003846	0.011183
Boes k. 2016	72.13817	0.003623	0.010164
Buhalis d. 2015-1	121.6945	0.003704	0.010583
Buhalis d. 2014	12.20186	0.003509	0.008265
Neuhofer b. 2012	89.67146	0.003717	0.011339
Buhalis d. 2015-2	244.3287	0.003774	0.010022
Huang c.d. 2017	67.9046	0.003534	0.009305
Gretzel u. 2011	38.79852	0.003636	0.008219

Source: developed by the authors using R Studio, 2021

Co-citation Analysis

It is known that citing or refereeing a pair of publication by two articles is considered as co-cited (Xu et al., 2018). Research papers which are often cited by other articles mostly discuss on similar topic (Hjørland, 2013). According to Hjørland (2013: p. 1314), in bibliometric analysis we use citation and co-citation indexes based on the assumption that “there are (normally) subject relations and semantic relations between citing and cited documents”. Co citation is considered as a method of exploratory data analysis (EDA) through which we can explore the data structure (Xu et al., 2018). Using the bibliometric package in R programming co-citation analysis was performed. Figures 1.4, 1.5, 1.6, and 1.7 present the co-citation map which is randomly generated by the software. The map represents 4 different clusters. Articles belonging to each cluster are connected to each other based on the theme of the articles. After extracting the data from Scopus and web of science, we merged the both data set and converted Web of science data into Scopus data frame using R software. In this previous section, we performed citation analysis using citation frequency to identify the highly cited paper (Samiee et al., 2015). We performed the co citation analysis based on Multi-dimensional scaling (MDS) method because MDS provides opportunity to researchers to screen the intellectual structure of the domain on which they are conducting the research (Foroudi et al., 2021; Samiee et al., 2015). In accordance with suggestions of researchers (Foroudi et al., 2021; Samiee et al., 2015), we conducted co-citation analysis to configure intellectual structure of research in technology and tourism research .The resulting co-citation map fragmented the total data set into four

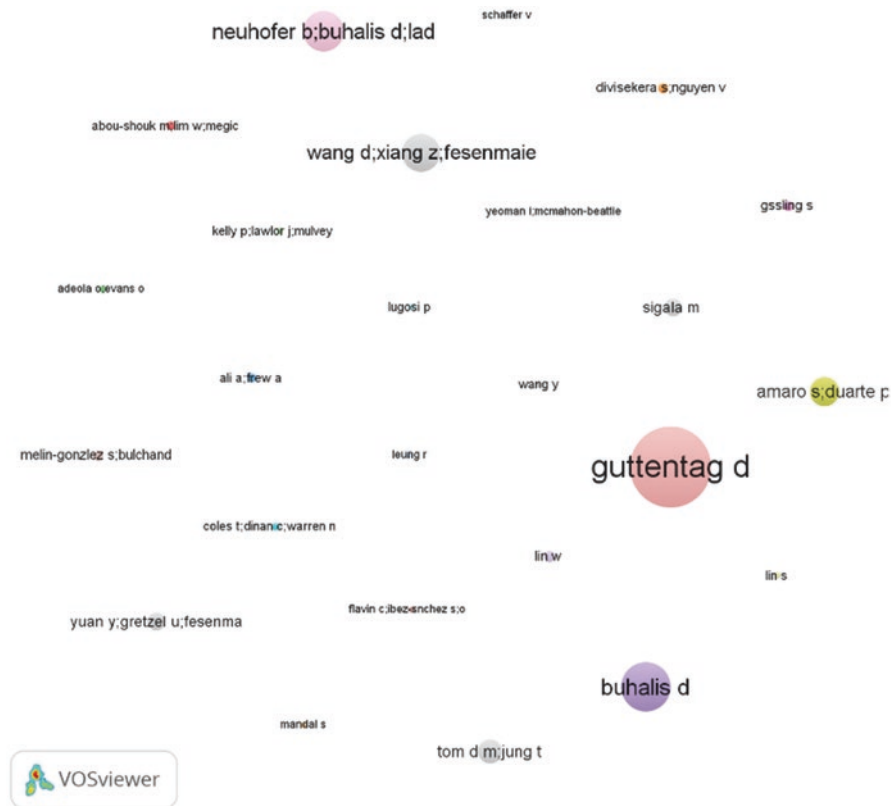


Fig. 1.4 Network of authors from co-authorship analysis*. * minimum publications = 3; minimum citations = 10. (Source: developed by the authors using VOSviewer, 2021)

clusters. The clusters produced by the R programming indicates that papers within one cluster related to same theme. Extensive survey on these clusters ushers that clusters are all related to technology and tourism and focused on some specific domain (Table 1.6).

Thematic Synthesis of Technology and Tourism Research through Co-word Analysis

Co-word Analysis

A co-word analysis is a kind of content analysis (Kassarjian, 1977; Muñoz-Leiva et al., 2012). Co-word analysis converts a large number of descriptors (or keywords) to a collection of network graphs that effectively depict the strongest relationships

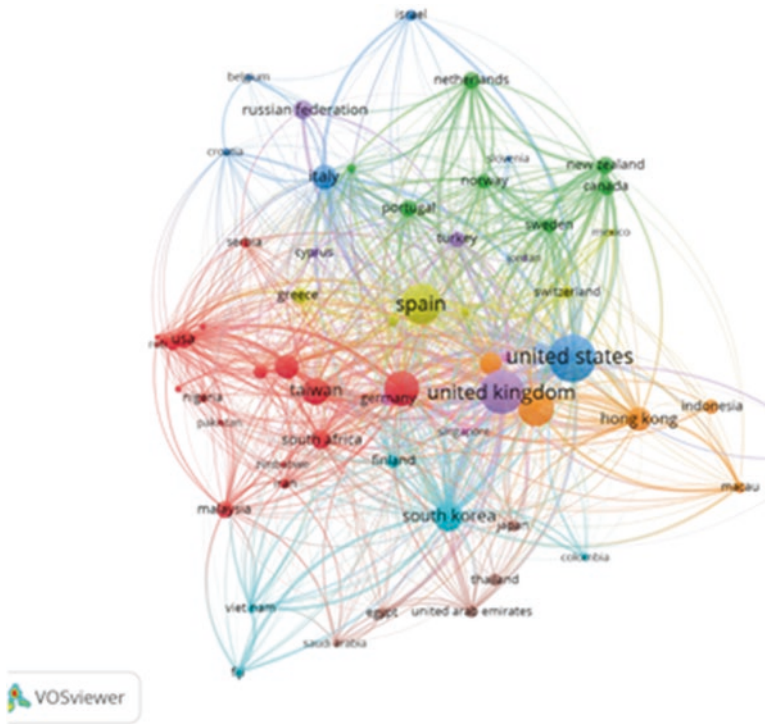


Fig. 1.5 Network of authors from coauthorship analysis*. * minimum publications = 3; minimum citations = 10. (Source: developed by the authors using VOSviewer, 2021)

between them. To detect the theme, the study adopts the guidelines of (He, 1999). The exploration of themes through the co-word analysis goes through some consecutive steps such as (1) raw data collection (2) selection of item types to analyze, (3) relevant information’s extraction from the raw data, (4) similarity calculation between items on the basis of extracted information, and (5) a clustering algorithm used for detecting the themes. The study analyses the authors’ keywords and indexed keywords. Although (Courtial et al., 1993) initially proposed the co-word analysis method from detecting and representing the relationship between concepts from the selected research articles but later, many other authors like (He, 1999) used the co-word analysis for theme detection from textual data. Co-word analysis is used to uncover themes within a specific field of study, as well as relationships between them, their relevance to a larger region, and the degree to which they are internally structured (Muñoz-Leiva et al., 2012). Conceptualization of research topic can be derived from the analysis of co-occurrences of keywords (Fahimnia et al., 2015). Co-word in the current study is performed using authors’ keywords and indexed keywords.

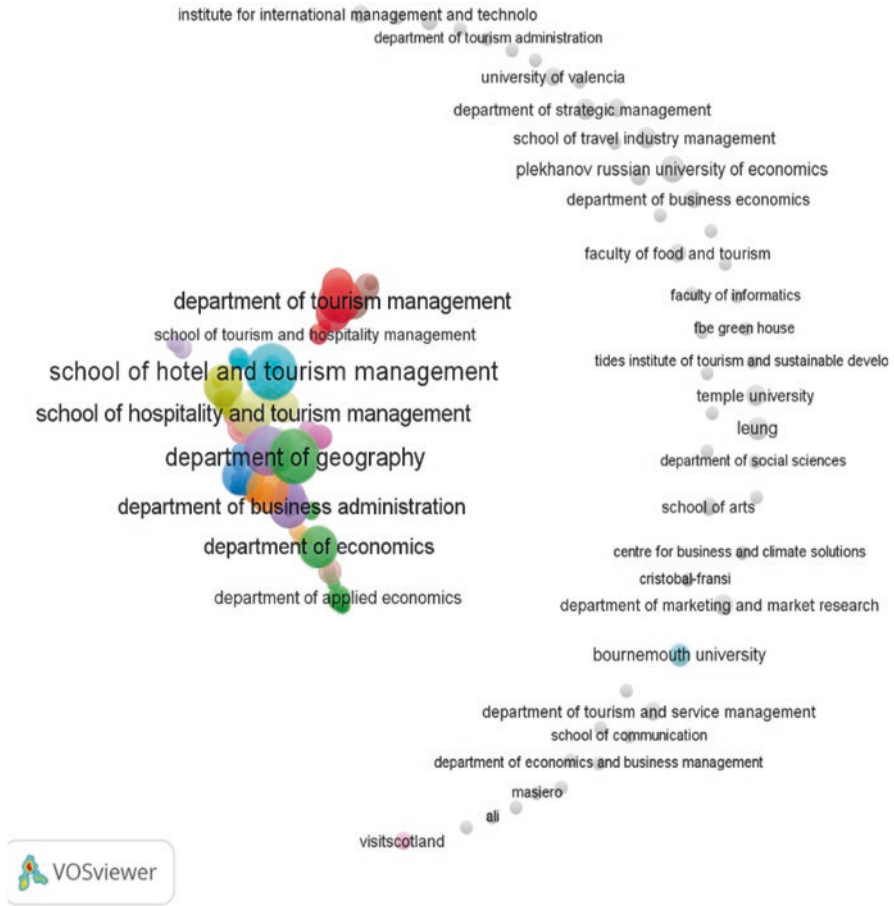


Fig. 1.6 Network of authors from coauthorship analysis*. * minimum publications = 3; minimum citations = 10. Network of authors from co-authorship analysis*. * minimum publications = 3; minimum citations = 10 (source: developed by the authors using VOSviewer, 2021)

This section explores the themes and research domain on technology application in tourism and hospitality industry. Along with quantitative approach to classify the literature review, we focus on the exploration of themes on that topic using authors' keyword and keywords plus and visualizing those themes with the help of VOSviewer software (see www.vosviewer.com) (van Eck & Waltman, 2016; Foroudi et al., 2021). According to van Eck and Waltman (2016), and Foroudi et al. (2021), network visualization is a powerful and cutting edge method for representing the graphical representation of bibliometric analyses, enabling researchers to better understand and visualize the study domain. Using the text mining capabilities of VOSviewer software, we built a term map based on co-occurrence data in the most widely cited publication on technology in tourism and hospitality

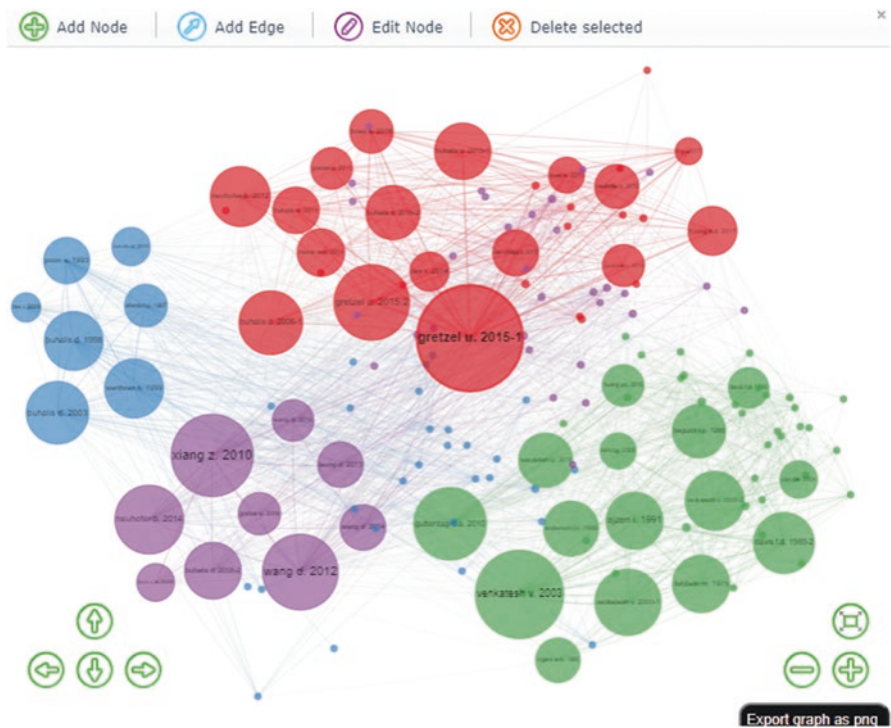


Fig. 1.7 Co-citation Network based on author and MDS. (Source: developed by the authors using VOSviewer, 2021)

(see Fig. 1.8). Researchers can use the co-occurrence map to interpret study topics within a research domain, with the size of the circles indicating how many citations each keyword has received. Since closely related keywords in the same color are more likely to be related, they display a stronger correlation. According to Fig. 1.8, the most highly used keywords in this sample of this study are technology (82) times, Smart Tourism (66), ICT (54), Internet (51), Innovation (42), Social Media (46), Virtual Reality (34), Augmented Reality (30), E-tourism (46). Figure 1.8 and Table 1.7 usher that the keywords are segregated into different clusters. Keywords are that close and related are having stronger association among those keywords which have been visualized in the same color in the graph. Cindering the density of the keywords the followings’ themes have been explored.

Smart Tourism

Smart tourism is a novel approach dealing with new realities in tourism brought about by the effect of innovative information and communication technologies (ICTs) on destinations, travelers, and businesses (Tyan et al., 2020). According to

Table 1.6 Cluster analysis based on co-citation network following MDS method

Node	Cluster	Pagerank	Node	Cluster	Pagerank
Herrero et al. (2018)	1	0.024044	Venkatesh and Bala (2012)	3	0.018492
Gretzel et al. (2015)	1	0.015747	Herrero et al. (2018)	3	0.015123
MichopoulouandBuhalis(2008)-	1	0.012243	Guttentag (2010)	3	0.012849
Law et al. (2014)	1	0.011183	Fishbein (1975)	3	0.010229
Boes et al. (2016)	1	0.010164	Rogers e.m. 1995	3	0.007232
Buhalis and Amaranggana (2015)	1	0.010583	Venkatesh v. 2000-1	3	0.010642
Mistilis et al. (2014)	1	0.008265	Anderson j.c. 1988	3	0.008268
Neuhofer et al. (2012)	1	0.011339	Bagozzi r.p. 1988	3	0.009579
Buhalis and Amaranggana (2015)	1	0.010022	Tussyadiah i.p. 2018	3	0.008416
Gretzel (2011)	1	0.008219	Chin w.w. 1998	3	0.005967
Munar and Jacobsen (2014)	1	0.008325	Venkatesh v. 2000-2	3	0.009244
Li et al. (2017)	1	0.008934	Wang d. 2012	4	0.024481
Buhalis (2003)	2	0.013694	Neuhofer b. 2014	4	0.014071
Buhalis and Main (1998)	2	0.013521	Wang d. 2014	4	0.010374
Poon (1993)	2	0.011727	Buhalis d. 2008-2	4	0.01076
Werthner and Klein (1999)	2	0.011627	Leung d. 2013	4	0.009938
Buhalis (2000)	2	0.006937	Wang d. 2016	4	0.009051
Sheldon (1997)	2	0.009018	Litvin s.w. 2008	4	0.006511
Law et al. (2010)	2	0.006142	Urry j. 1990	4	0.004367
Buhalis and Kaldis (2008)	2	0.003272	Wang n. 1999	4	0.005294
Hopken et al. (2009)	2	0.007401	Gretzel u. 2009	4	0.008536
Sheldon (1997)	2	0.00381	Mackay k. 2012	4	0.006028
Lin and Fu (2012)	2	0.005644	Hays s. 2013	4	0.005568
Doolin et al. (2002)	2	0.004671	Kaplan a.m. 2010	4	0.0035

Source: developed by the authors using R Studio, 2021

Pencarelli (2020), the term “Smart Tourism“ refers to the efficient and effective use of technological, human, and social resources for pursuing sustainability principles to improve people’s quality of life in smart tourist locations while also increasing customers’ tourist experiences. The Smart Tourism destinations are places that use available technology to co-create value, pleasure, and experiences for visitors while also providing benefits and income to tourism organizations and destinations. Furthermore, the literature on Smart Tourism Destinations defines them as places that collect and analyze data in order to better understand tourists' needs and behaviors and, as a result, can offer better services and experiences in a more context-aware and real-time manner (Xiang & Fesenmaier, 2017). In accordance with the study of (Huang et al., 2012; Tyan et al., 2020), it can be said that the true sense of Smart Tourism Destinations is to use ICTs to concentrate on and cater to tourists' needs in order to improve tourism service efficiency and management. Smart Tourism has turned the tourism and hospitality industry into a new paradigm. It has

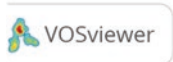
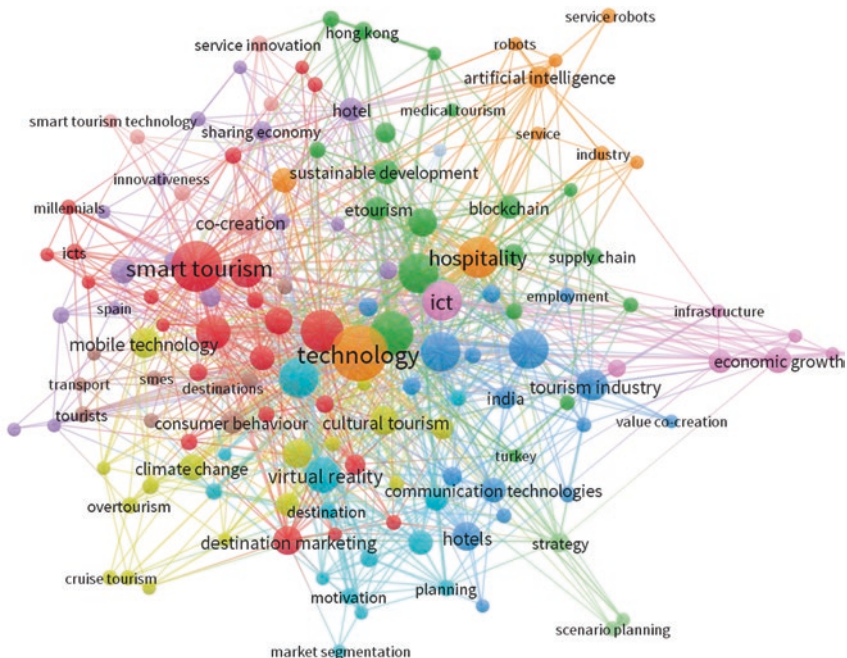


Fig. 1.8 Theme exploration using keywords. (Source: developed by the authors using VOSviewer, 2021)

Table 1.7 Frequently used keywords

Keyword	Occurrences	Total link strength	Keyword	Occurrences	Total link strength
Technology	82	120	Augmented reality	30	34
Smart tourism	66	91	E-tourism	20	34
Internet	51	89	Big data	22	33
Hospitality	45	85	Consumer behavior	14	33
ICT/Information and Communication Technology	54	110	Artificial intelligence	13	31
Innovation	42	71	Destination marketing	21	31
Social media	46	62	Co-creation	20	29

(continued)

Table 1.7 (continued)

Keyword	Occurrences	Total link strength	Keyword	Occurrences	Total link strength
Information technology	40	53	E-tourism	15	29
Sustainable tourism	40	49	Mobile technology	23	29
Virtual reality	34	48	Economic growth	18	28
Sustainability	42	44	Tourism industry	26	28
Technology acceptance model	31	42	Marketing	16	27

Source: developed by the authors using R Studio, 2021

brought changes in the tourist experience to service providers' strategies and ultimately leading to a competitive smart industry gradually. This paradigm shift of tourism towards smart tourism is modifying the concepts and languages what we are experiencing in the tourism and hospitality industry. According to (Pencarelli, 2020), everything is becoming "Smart" in tourism, and thus, we talk about smart travelers, smart cities, smart destinations, smart eyewear, smart cards, smart cars, and smart ecosystems, among other things. It is recommended that smart tourism should be adopted considering the concept of smart cities so that it can improve the quality of life, better tourist experience and finally ensure sustainability.

Virtual Reality

"Virtual reality (VR) tourism, using the three-dimensional (3D) world of an innovative technology, is formed via a combination of visual, kinetic, and audio elements so that users can actually experience a real object from a tourist perspective" (Kim et al., 2020: p. 69). With the advancement of technology, VR tourism ensures a holistic picture of hotels and tourism destinations by reducing consumers' risk as it familiarizes consumers with unfamiliar destinations (Kim et al., 2020). Planning and management, heritage protection, marketing, accessibility, education, and entertainment are the six key tourism-related fields where VR has been used extensively (Guttentag, 2010; Jude & Ukekwe, 2020; Yuce et al., 2020). VR approach has also been used to bridge information gap between tourist and service provider (Caron-Fasan et al., 2020). Thus, VR has reshaped the tourism industry by providing new customer experience.

Social Media in Tourism Industry

Social Media another significant blessings of technology in this era. According to (Kim & Law, 2015), promoting tourism activities through the social media refers to connecting, partnering and sharing of visual and content material with social media among the users of online communities. Social media provides different types of benefits to both tourists and tourism service providers by facilitating interaction among the customer or between customers and service providers. It offers entertainment and trendiness through different types of comments. Considering the necessity of adopting social media, tourism and hospitality also embraced this blessings into this industry. Social media has dramatically changed the way of creating and sharing information (Buhalis & Foerste, 2015). Both customers and service providers can share ideas directly with their target segment. According to Hays et al. (2013), social media refers to the practices, activities, and behaviours of online communities of individuals who use conversational media to share knowledge, information, and ideas. Conversational media are web-based apps that allow users to quickly produce and share material in the form of images, words, videos, and audios.

Application of Internet of Things (IoT) in Tourism

According to Sethi and Sarangi (2017), the IoT is a paradigm in which devices with sensors, actuators, and processors connect with one another in order to accomplish a meaningful goal. Tourism and hospitality industry has already adopted the IoT in different arena of tourism such as, Geo-location technologies, Medical (wellness) tourism, Ecotourism, Retail tourism services, Virtual concierge, airport management (Car et al., 2019), through the geolocation technologies tourist can have a good travel experience as it provides to track different location from route planning to accommodation arrangement and journey planning. IoT has a profound impact on medical tourism as using IoT technologies, patients' health can be monitored from a remote place (Car et al., 2019). Besides this, IoT has brought a dramatic change in the tourist travel experiences by introducing different types of apps.

Theoretical Background in Technology-Tourism Research

Systematic literature reviews on the topic of technology application in tourism and hospitality industry reveals that various theories have been utilized to study the topic of this study. Theories like Technology Adoption Model (TAM), Technology Organization and Environment Model (TOE), Stimuli Organism and Response Theory (SOR), Innovation diffusion model (DIT), Task technology fit (TTF) theory and applied the unified theory of acceptance and use of technology (UTAUT)

Table 1.8 Theories adopted in technology-tourism research

Theories adopted technology & tourism research	Study references	
Technology-organization-environment (TOE)	Yadegaridehkordi et al. (2018)	1 study
Innovation diffusion theory (DIT)	Adedoyin et al. (2020), Ajagunna et al. (2020), Alrawadieh et al. (2021), Casado-Díaz et al. (2021), Foris et al. (2020), Gunarathne et al. (2020), Jin et al. (2020), Kamboj and Gupta (2020), Kamel and El Sherif (2001), Mehraliyev et al. (2021), Pai et al. (2021), Sultan et al. (2021), Sun et al. (2021), Valls and Roca (2021), Wang et al. (2021)	15 studies
Technology acceptance model (TAM)	Bae and Han (2020), Bisson and Hambleton (2020), Cheunkamon et al. (2020), El-Gohary (2012), Huang et al. (2016, 2019), Im and Hancer (2014), Kim et al. (2021), Kowalczyk-Anioł and Nowacki, (2020), Lee et al. (2013), Lin et al. (2020), Malik and Rao (2019), Palos-Sanchez et al. (2017), Sharmin et al. (2021), Sila (2015), Singh and Srivastava (2019), Vyas (2019)	15 studies
Stimulus-Organism-Response (SOR)	Alqatan et al. (2012), Lama et al. (2020), Lerario and Varasano (2020), Sharma et al. (2020), Smerecnik and Andersen (2011), Soares et al. (2020)	6 studies
Theory of planned behavior (TPB)	Lim (2009), Sánchez-Torres et al. (2019)	2 studies

Source: synthesized by the authors, 2021

have been widely used theories in technology and tourism research. The table summarizes the widely used theories along with corresponding studies in brief (Table 1.8).

Conclusion

The study uses four bibliometric analysis processes to conduct the SLR: co-citation, network visualisation through co-occurrence data, multi-dimensional scaling, and hierarchical cluster analysis, which illuminates the intellectual structure of technology application in the tourism industry. Second, the chapter discusses how technology is influencing tourism in a new way. Third, the chapter describes how technology is implemented and embraced in the tourism business, based on the models and ideas discussed in prior research. The study's findings show that the Fourth industrial revolution technologies and ubiquitous usage have been rapidly infiltrating every aspect of the tourism industry. At present era, technologies are not merely considered instrumental in mitigating communication gap, rather technologies act as a transformative driver which influence industry operation and also tailor functions and expectations of stakeholders (Sigala, 2018). Rapid technological

advancements introduce new terms in the same domain such as VR, Smart Tourism, IoT in tourism and Social media in tourism causing fundamental disruptions through empowering tourism actors to form new market, management practices, competitive advantages and offerings. As a result, technology is transforming tourism management and marketing from a static and utilitarian perspective (in which managers and tourists use technology as tools) to a transformative perspective (in which tourism markets and actors (tourism providers, stakeholders, intermediaries, and tourists) shape and are shaped by technology). The wide array of technological innovations are also expected to alter future outlook of the tourism sector. Therefore, it has become unequivocal stating that success of future tourism business will require a proper blend of smarter customer experience and technology applications that are unobtrusive and which pose no ethical, moral or privacy concerns. Developed countries are technologically sufficient to facilitate the tourism industry, and developing countries follow the same footprints as their developed counterparts. Moreover, developing countries promote their tourism attractions to the developed countries. Consequently, developing countries are positioning themselves in top list in global market share in world tourism leaving behind America and Europe. Government can play pivotal role through initiatives such as adequate infrastructure, financial support, leadership that will open up strategic window for sustainable tourism in the long run. Furthermore, repositioning of the tourist destinations, exploiting emerging opportunities and making the best use of local products and service may be few strategies to attract travellers. Institutional support is also required to anticipate and manage the negative cultural, social, environmental and economic problems arising from tourism and promote smart tourism with best customer experience towards the globe.

References

- Adedoyin, F. F., Bekun, F. V., Driha, O. M., & Balsalobre-Lorente, D. (2020). The effects of air transportation, energy, ICT and FDI on economic growth in the industry 4.0 era: Evidence from the United States. *Technological Forecasting and Social Change*, 160, 120297.
- Ajagunna, I., Pinnock, F., Johnson, E. S., & Teare, R. (2020). Reflections on the theme issue out-comes the fourth industrial revolution: What are the realities for maritime and tourism dependent countries? *Worldwide Hospitality and Tourism Themes*, 12(1), 104–108.
- Alabau-Montoya, J., & Ruiz-Molina, M. E. (2020). Enhancing visitor experience with war heritage tourism through information and communication technologies: Evidence from Spanish Civil War museums and sites. *Journal of Heritage Tourism*, 15(5), 500–510.
- Alqatan, S., Singh, D., & Ahmad, K. (2012). Study on success factors to enhance customer trust for mobile commerce in small and medium-sized tourism enterprises (SMTEs) – A conceptual model. *Journal of Theoretical and Applied Information Technology*, 46(2), 550–564.
- Alrawadieh, Z., Alrawadieh, Z., & Cetin, G. (2021). Digital transformation and revenue management: Evidence from the hotel industry. *Tourism Economics*, 27(2), 328–345.
- Aluri, A. (2017). Mobile augmented reality (MAR) game as a travel guide: Insights from Pokémon GO. *Journal of Hospitality and Tourism Technology*, 8(1), 55–72.
- Anees-Ur-Rehman, M., Wong, H. Y., & Hossain, M. (2016). The progression of brand orientation literature in twenty years: A systematic literature review. *Journal of Brand Management*, 23(6), 612–630.

- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975.
- Bae, S. Y., & Han, J. H. (2020). Considering cultural consonance in trustworthiness of online hotel reviews among generation Y for sustainable tourism: An extended TAM model. *Sustainability*, 12(7), 2942.
- Bae, S., Jung, T. H., Moorhouse, N., Suh, M., & Kwon, O. (2020). The influence of mixed reality on satisfaction and brand loyalty in cultural heritage attractions: A brand equity perspective. *Sustainability*, 12(7), 2956.
- Bisson, L., & Hambleton, T. (2020). COVID-19 Impact on West African Value Chains. *Clingendael Institute*. Retrieved from: <https://www.clingendael.org/publication/covid-19-west-africa-impact-value-chains>. Accessed 10 June 2021.
- Bodkhe, U., Tanwar, S., Parekh, K., Khanpara, P., Tyagi, S., Kumar, N., & Alazab, M. (2020). Blockchain for Industry 4.0: A comprehensive review. *IEEE Access*, 8, 79764–79800.
- Boes, K., Buhalis, D., & Inversini, A. (2016). Smart tourism destinations: Ecosystems for tourism destination competitiveness. *International Journal of Tourism Cities*, 2(2), 108–124.
- Bogicevic, V., Seo, S., Kandampully, J. A., Liu, S. Q., & Rudd, N. A. (2019). Virtual reality presence as a preamble of tourism experience: The role of mental imagery. *Tourism Management*, 74, 55–64.
- Briciu, A., Briciu, V. A., & Kavoura, A. (2020). Evaluating how “smart” Brasov, Romania can be virtually via a mobile application for cultural tourism. *Sustainability*, 12(13), 5324.
- Briner, R. B., & Denyer, D. (2009). Systematic review and evidence synthesis as a practice and scholarship tool. In D. M. Rousseau (Ed.), *Handbook of evidence-based management: Companies, classrooms and research* (pp. 112–119). Oxford University Press.
- Buhalis, D. (2000). Tourism and information technologies: Past, present and future. *Tourism Recreation Research*, 25(1), 41–58.
- Buhalis, D. (2003). *eTourism: Information technology for strategic tourism management*. Financial Times/Prentice Hall.
- Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 377–389). Springer.
- Buhalis, D., & Foerste, M. (2015). SoCoMo marketing for travel and tourism: Empowering co-creation of value. *Journal of Destination Marketing & Management*, 4(3), 151–161.
- Buhalis, D., & Kaldis, K. (2008). eEnabled internet distribution for small and medium sized hotels: The case of Athens. *Tourism Recreation Research*, 33(1), 67–81.
- Buhalis, D., & Main, H. (1998). Information technology in peripheral small and medium hospital-ity enterprises: strategic analysis and critical factors. *International Journal of Contemporary Hospitality*, 10(5), 198–202.
- Çakar, K., & Aykol, Ş. (2020). Understanding travellers’ reactions to robotic services: A multiple case study approach of robotic hotels. *Journal of Hospitality and Tourism Technology*, 12(1), 155–174.
- Canabal, A., & White III, G. O. (2008). Entry mode research: Past and future. *International business review*, 17(3), 267–284.
- Car, T., Pilepić Stifanich, L., & Šimunić, M. (2019). *Internet of Things (Iot) in tourism and hospitality: Opportunities and challenges*. September, pp. 163–173.
- Caron-Fasan, M.-L., Lesca, N., Perea, C., & Beyrouthy, S. (2020). Adoption of enterprise social networking: Revisiting the IT innovation adoption model of Hameed et al. *Journal of Engineering and Technology Management*, 56, 101572.
- Casado-Díaz, A. B., Navarro-Ruiz, S., Nicolau, J. L., & Ivars-Baidal, J. (2021). Expanding our understanding of cruise visitors’ expenditure at destinations: The role of spatial patterns, onshore visit choice and cruise category. *Tourism Management*, 83, 104199.
- Cavaggioli, F., & Ughetto, E. (2019). A bibliometric analysis of the research dealing with the impact of additive manufacturing on industry, business and society. *International Journal of Production Economics*, 208, 254–268.
- Cheunkamon, E., Jomnonkwao, S., & Ratanavaraha, V. (2020). Determinant factors influencing Thai tourists’ intentions to use social media for travel planning. *Sustainability*, 12(18), 1–21.

- Christou, P., Simillidou, A., & Stylianou, M. C. (2020). Tourists' perceptions regarding the use of anthropomorphic robots in tourism and hospitality. *International Journal of Contemporary Hospitality Management*, 32(11), 3665–3683.
- Chung, N., Tyan, I., & Han, H. (2017). Enhancing the smart tourism experience through geotag. *Information Systems Frontiers*, 19(4), 731–742.
- Courtial, J., Callon, M., & Sigogneau, A. (1993). The use of patent titles for identifying the topics of invention and forecasting trends. *Scientometrics*, 26(2), 231–242.
- Cranmer, E. E., Dieck, M. C., & Fountoulaki, P. (2020). Exploring the value of augmented reality for tourism. *Tourism Management Perspectives*, 35, 100672.
- de Kervenoael, R., Hasan, R., Schwob, A., & Goh, E. (2020). Leveraging human-robot interaction in hospitality services: Incorporating the role of perceived value, empathy, and information sharing into visitors' intentions to use social robots. *Tourism Management*, 78, 104042.
- Doolin, B., Burgess, L., & Cooper, J. (2002). Evaluating the use of the Web for tourism marketing: A case study from New Zealand. *Tourism Management*, 23(5), 557–561.
- El-Gohary, H. (2012). Factors affecting E-Marketing adoption and implementation in tourism firms: An empirical investigation of Egyptian small tourism organisations. *Tourism Management*, 33(5), 1256–1269.
- Fahimnia, B., Sarkis, J., & Davarzani, H. (2015). Green supply chain management: A review and bibliometric analysis. *International Journal of Production Economics*, 162, 101–114.
- Filimonau, V., & Naumova, E. (2020). The blockchain technology and the scope of its application in hospitality operations. *International Journal of Hospitality Management*, 87, 102383.
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2021). Impacts of technological embodiment through virtual reality on potential guests' emotions and engagement. *Journal of Hospitality Marketing and Management*, 30(1), 1–20.
- Foris, D., Crihalmean, N., & Foris, T. (2020). Exploring the environmental practices in hospitality through booking websites and online tourist reviews. *Sustainability*, 12(24), 1–18.
- Foroudi, P., Marvi, R., & Kizgin, H. (2020). THE OTHERS: The role of individual personality, cultural acculturation, and perceived value on towards firm's social media and acculturation orientation. *International Journal of Information Management*, 52, 102075.
- Foroudi, P., Akarsu, T. N., Marvi, R., & Balakrishnan, J. (2021). Intellectual evolution of social innovation: A bibliometric analysis and avenues for future research trends. *Industrial Marketing Management*, 93, 446–465.
- Fouroudi, P., Kitchen, P. J., Marvi, R., Akarsu, T. N., & Uddin, H. (2020). A bibliometric investigation of service failure literature and a research agenda. *European Journal of Marketing*, 54(10), 2575–2619.
- Fusté-Forné, F. (2021). Robot chefs in gastronomy tourism: What's on the menu? *Tourism Management Perspectives*, 37, 100774.
- Galvan, J. L., & Galvan, M. C. (2017). *Writing literature reviews: A guide for students of the social and behavioral sciences*. Routledge.
- Gretzel, U. (2011). Intelligent systems in tourism: A social science perspective. *Annals of Tourism Research*, 38(3), 757–779.
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25, 179–188.
- Gunarathne, N., de Alwis, A., & Alahakoon, Y. (2020). Challenges facing sustainable urban mining in the e-waste recycling industry in Sri Lanka. *Journal of Cleaner Production*, 251, 119641.
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637–651.
- Han, D.-I. D., Tom Dieck, M. C., & Jung, T. (2019). Augmented Reality Smart Glasses (ARSG) visitor adoption in cultural tourism. *Leisure Studies*, 38(5), 618–633.
- Hays, S., Page, S. J., & Buhalis, D. (2013). Social media as a destination marketing tool: Its use by national tourism organisations. *Current Issues in Tourism*, 16(3), 211–239.
- He, Q. (1999). Knowledge discovery through co-word analysis. *Library Trends*, 48(1), 133–159.
- Herrero, A., San Martín, H., & Collado, J. (2018). Market orientation and SNS adoption for marketing purposes in hospitality microenterprises. *Journal of Hospitality and Tourism Management*, 34, 30–40.

- Hjørland, B. (2013). Citation analysis: A social and dynamic approach to knowledge organization. *Information Processing and Management*, 49(6), 1313–1325.
- Hopken, W., Gretzel, U., & Law, R. (Eds.). (2009). *Information and communication technologies in tourism 2009*. Springer.
- Hou, Y., Zhang, K., & Li, G. (2021). Service robots or human staff: How social crowding shapes tourist preferences. *Tourism Management*, 83, 104242.
- Huang, X., Yuan, J., & Shi, M. (2012). Condition and key issues analysis on the smarter tourism construction in China. In F. L. Wang, J. Lei, R. W. H. Lau, & J. Zhang (Eds.), *Multimedia and signal processing. CMSP 2012. Communications in computer and information science* (pp. 444–450). Springer.
- Huang, Y. C., Backman, K. F., Backman, S. J., & Chang, L. L. (2016). Exploring the implications of virtual reality technology in tourism marketing: An integrated research framework. *Intrnational Journal of Tourism Research*, 18(2), 116–128.
- Huang, Y. C., Chang, L. L., Yu, C. P., & Chen, J. (2019). Examining an extended technology acceptance model with experience construct on hotel consumers' adoption of mobile applications. *Journal of Hospitality Marketing and Management*, 28(8), 957–980.
- Im, J. Y., & Hancer, M. (2014). Shaping travelers' attitude toward travel mobile applications. *Journal of Hospitality and Tourism Technology*, 5(2), 177–193.
- Inversini, A., & Masiero, L. (2014). Selling rooms online: The use of social media and online travel agents. *International Journal of Contemporary Hospitality Management*, 26(2), 272–292.
- Ivanov, S. (2019). Ultimate transformation: How will automation technologies disrupt the travel, tourism and hospitality industries? *Zeitschrift Für Tourismuswissenschaft*, 11(1), 25–43.
- Ivanov, S. H., Webster, C., Stoilova, E., & Slobodskoy, D. (2020). Biosecurity, crisis management, automation technologies and economic performance of travel, tourism and hospitality companies – A conceptual framework. *Tourism Economics*. <https://doi.org/10.1177/1354816620946541>
- Ivkov, M., Blešić, I., Dudić, B., Bartáková, G. P., & Dudić, Z. (2020). Are future professionals willing to implement service robots? Attitudes of hospitality and tourism students towards service robotization. *Electronics*, 9(9), 1–16.
- Jeong, M., & Shin, H. H. (2020). Tourists' experiences with smart tourism technology at smart destinations and their behavior intentions. *Journal of Travel Research*, 59(8), 1464–1477.
- Jin, L., Xiao, H., & Shen, H. (2020). Experiential authenticity in heritage museums. *Journal of Destination Marketing and Management*, 18, 100493.
- Jude, O. C., & Ukekwe, C. (2020). Tourism and virtual reality (VR) in developing nations. *African Journal of Hospitality, Tourism and Leisure*, 9(2), 1–16.
- Jung, T., Tom Dieck, M. C., Lee, H., & Chung, N. (2020). Moderating role of long-term orientation on augmented reality adoption. *International Journal of Human-Computer Interaction*, 36(3), 239–250.
- Kamboj, S., & Gupta, S. (2020). Use of smart phone apps in co-creative hotel service innovation: An evidence from India. *Current Issues in Tourism*, 23(3), 323–344.
- Kamel, S., & El Sherif, A. (2001). *The role of small and medium-sized enterprises in developing Egypt's tourism industry using e-commerce*. In K. D. F. A. T. R. Kocaoglu, D. F. & T. R. Anderson (Eds.), PICMET '01. Portland international conference on management of engineering and technology. proceedings Vol.1: Book of summaries (IEEE Cat. No.01CH37199), pp. 60–68.
- Kang, H. (2020). Impact of VR on impulsive desire for a destination. *Journal of Hospitality and Tourism Management*, 42(January), 244–255.
- Kassarjian, H. H. (1977). Content analysis in consumer research. *Journal of Consumer Research*, 4(1), 8–18.
- Kelly, P., Lawlor, J., & Mulvey, M. (2019). Self-service technologies in the travel, tourism, and hospitality sectors: Principles and practice. *Robots, Artificial Intelligence and Service Automation in Travel, Tourism and Hospitality*, 1994, 57–78.
- Keupp, M. M., & Gassmann, O. (2009). The past and the future of international entrepreneurship: A review and suggestions for developing the field. *Journal of management*, 35(3), 600–633.

- Khanra, S., Dhir, A., & Mäntymäki, M. (2020). Big data analytics and enterprises: A bibliometric synthesis of the literature. *Enterprise Information Systems*, 14(6), 737–768.
- Khanra, S., Dhir, A., Kaur, P., & Mäntymäki, M. (2021). Bibliometric analysis and literature review of ecotourism: Toward sustainable development. *Tourism Management Perspectives*, 37, 100777.
- Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International Journal of Information Management*, 46, 236–249.
- Kim, H. H., & Law, R. (2015). Smartphones in tourism and hospitality marketing: A literature review. *Journal of Travel & Tourism Marketing*, 32(6), 692–711.
- Kim, M. J., Lee, C. K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended stimulus-organism-response model. *Journal of Travel Research*, 59(1), 69–89.
- Kim, S. S., Kim, J., Badu-Baiden, F., Giroux, M., & Choi, Y. (2021). Preference for robot service or human service in hotels? Impacts of the COVID-19 pandemic. *International Journal of Hospitality Management*, 93, 102795.
- Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in SE*. Retrieved from: https://www.elsevier.com/_data/promis_misc/525444systematicreviewsguide.pdf. Accessed 10 June 2021.
- Kizildag, M., Dogru, T., Zhang, T. C., Mody, M. A., Altin, M., Ozturk, A. B., & Ozdemir, O. (2019). Blockchain: A paradigm shift in business practices. *International Journal of Contemporary Hospitality Management*, 32(3), 953–975.
- Knoll, J., & Matthes, J. (2017). The effectiveness of celebrity endorsements: A meta-analysis. *Journal of the Academy of Marketing Science*, 45(1), 55–75.
- Kovács, Z., Vida, G., Elekes, Á., & Kovalcsik, T. (2021). Combining social media and mobile positioning data in the analysis of tourist flows: A case study from Szeged, Hungary. *Sustainability*, 13(5), 2926.
- Kowalczyk-Anioł, J., & Nowacki, M. (2020). Factors influencing Generation Y's tourism-related social media activity: The case of Polish students. *Journal of Hospitality and Tourism Technology*, 11(3), 543–558.
- Kubo, T., Uryu, S., Yamano, H., Tsuge, T., Yamakita, T., & Shirayama, Y. (2020). Mobile phone network data reveal nationwide economic value of coastal tourism under climate change. *Tourism Management*, 77, 104010.
- Lacka, E. (2020). Assessing the impact of full-fledged location-based augmented reality games on tourism destination visits. *Current Issues in Tourism*, 23(3), 345–357.
- Lama, S., Pradhan, S., & Shrestha, A. (2020). Exploration and implication of factors affecting e-tourism adoption in developing countries: A case of Nepal. *Information Technology and Tourism*, 22(1), 5–32.
- Law, R., Buhalis, D., & Cobanoglu, C. (2014). Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 26(5), 727–750.
- Law, R., Chan, I. C. C., & Wang, L. (2018). A comprehensive review of mobile technology use in hospitality and tourism. *Journal of Hospitality Marketing and Management*, 27(6), 626–648.
- Law, R., Leung, D., & Chan, I. C. C. (2019). Progression and development of information and communication technology research in hospitality and tourism: A state-of-the-art review. *International Journal of Contemporary Hospitality Management*, 32(2), 511–534.
- Lee, W.-J., & Kim, Y. H. (2021). Does VR tourism enhance users' experience? *Sustainability*, 13(2), 1–15.
- Lee, B. C., Cho, J., & Hwang, D. (2013). An integration of social capital and tourism technology adoption – A case of convention and visitors bureaus. *Tourism and Hospitality Research*, 13(3), 149–165.
- Lee, M., Lee, S. A., Jeong, M., & Oh, H. (2020). Quality of virtual reality and its impacts on behavioral intention. *International Journal of Hospitality Management*, 90, 102595.
- Lelo de Larrea, G., Altin, M., Koseoglu, M. A., & Okumus, F. (2021). An integrative systematic review of innovation research in hospitality and tourism. *Tourism Management Perspectives*, 37, 100789.

- Lerario, A., & Varasano, A. (2020). An IoT smart infrastructure for S. Domenico Church in Matera's "Sassi": A multiscale perspective to built heritage conservation. *Sustainability*, *12*(16), 6553.
- Leung, R. (2019). Smart hospitality: Taiwan hotel stakeholder perspectives. *Tourism Review*, *74*(1), 50–62.
- Leung, R. (2020). Hospitality technology progress towards intelligent buildings: A perspective article. *Tourism Review*, *76*(1), 69–73.
- Li, X., & Law, R. (2020). Network analysis of big data research in tourism. *Tourism Management Perspectives*, *33*, 100608.
- Li, Y., Hu, C., Huang, C., & Duan, L. (2017). The concept of smart tourism in the context of tourism information services. *Tourism Management*, *58*, 293–300.
- Li, J., Pearce, P. L., & Low, D. (2018). Media representation of digital-free tourism: A critical discourse analysis. *Tourism Management*, *69*, 317–329.
- Li, X., Law, R., Xie, G., & Wang, S. (2021). Review of tourism forecasting research with internet data. *Tourism Management*, *83*, 104245.
- Liang, L. J., & Elliot, S. (2021). A systematic review of augmented reality tourism research: What is now and what is next? *Tourism and Hospitality Research*, *21*(1), 15–30.
- Liliani, Tjahjono, B., & Cao, D. (2020). Advancing bioplastic packaging products through co-innovation: A conceptual framework for supplier-customer collaboration. *Journal of Cleaner Production*, *252*, 119861.
- Lim, W. M. (2009). Alternative models framing UK independent hoteliers' adoption of technology. *International Journal of Contemporary Hospitality Management*, *21*(5), 610–618.
- Lin, S.-W., & Fu, H.-P. (2012). Uncovering critical success factors for business-to-customer electronic commerce in travel agencies. *Journal of Travel and Tourism Marketing*, *29*(6), 566–584.
- Lin, L. P. L., Huang, S. C. L., & Ho, Y. C. (2020). Could virtual reality effectively market slow travel in a heritage destination? *Tourism Management*, *78*(October 2019), 104027.
- Lo, W. H., & Cheng, K. L. B. (2020). Does virtual reality attract visitors? The mediating effect of presence on consumer response in virtual reality tourism advertising. *Information Technology and Tourism*, *22*(4), 537–562.
- Loureiro, S. M. C., Guerreiro, J., & Ali, F. (2020). 20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach. *Tourism Management*, *77*, 104028.
- Malik, G., & Rao, A. S. (2019). Extended expectation-confirmation model to predict continued usage of ODR/ride hailing apps: Role of perceived value and self-efficacy. *Information Technology and Tourism*, *21*(4), 461–482.
- Mariani, M. (2019). Big data and analytics in tourism and hospitality: A perspective article. *Tourism Review*, *75*(1), 299–303.
- Mehraliyev, F., Choi, Y., & King, B. (2021). Expert online review platforms: Interactions between specialization, experience, and user power. *Journal of Travel Research*, *60*(2), 384–400.
- Michopoulou, E., & Buhalis, D. (2008). Performance measures of net-enabled hypercompetitive industries: The case of tourism. *International Journal of Information Management*, *28*(3), 158–180.
- Mingotto, E., Montaguti, F., & Tamma, M. (2020). Challenges in re-designing operations and jobs to embody AI and robotics in services. Findings from a case in the hospitality industry. *Electronic Markets*. <https://doi.org/10.1007/s12525-020-00439-y>
- Mistilis, N., Buhalis, D., & Gretzel, U. (2014). Future eDestination marketing: Perspective of an Australian tourism stakeholder network. *Journal of Travel Research*, *53*(6), 778–790.
- Moreno, P., & Tejada, P. (2019). Reviewing the progress of information and communication technology in the restaurant industry. *Journal of Hospitality and Tourism Technology*, *10*(4), 673–688.
- Mosweunyane, L., Rambe, P., & Dzansi, D. (2019). Use of social media in Free State tourism small, medium and micro enterprises to widen business networks for competitiveness. *South African Journal of Economic and Management Sciences*, *22*(1), 1–10.
- Munar, A. M., & Jacobsen, J. K. S. (2014). Motivations for sharing tourism experiences through social media. *Tourism Management*, *43*, 46–54.

- Muñoz-Leiva, F., Viedma-del-Jesús, M. I., Sánchez-Fernández, J., & López-Herrera, A. G. (2012). An application of co-word analysis and bibliometric maps for detecting the most highlighting themes in the consumer behaviour research from a longitudinal perspective. *Quality and Quantity*, 46(4), 1077–1095.
- Nam, K., Dutt, C. S., Chathoth, P., Daghfous, A., & Khan, M. S. (2020). The adoption of artificial intelligence and robotics in the hotel industry: Prospects and challenges. *Electronic Markets*. <https://doi.org/10.1007/s12525-020-00442-3>
- Neuhofner, B., Buhalis, D., & Ladkin, A. (2012). Conceptualising technology enhanced destination experiences. *Journal of Destination Marketing & Management*, 1(1-2), 36–46.
- Nuryyev, G., Wang, Y. P., Achyldurdyeva, J., Jaw, B. S., Yeh, Y. S., Lin, H. T., & Wu, L. F. (2020). Blockchain technology adoption behavior and sustainability of the business in tourism and hospitality SMEs: An empirical study. *Sustainability*, 12(3), 1256.
- Osei, B. A., Ragavan, N. A., & Mensah, H. K. (2020). Prospects of the fourth industrial revolution for the hospitality industry: A literature review. *Journal of Hospitality and Tourism Technology*, 11(3), 479–494.
- Pai, C. K., Liu, Y., Kang, S., & Dai, A. (2020). The role of perceived smart tourism technology experience for tourist satisfaction, happiness and revisit intention. *Sustainability*, 12(16), 6592.
- Pai, C., Kang, S., Liu, Y., & Zheng, Y. (2021). An examination of revisit intention based on perceived smart tourism technology experience. *Sustainability*, 13(2), 1–14.
- Palos-Sanchez, P. R., Hernandez-Mogollon, J. M., & Campon-Cerro, A. M. (2017). The behavioral response to Location Based Services: An examination of the influence of social and environmental benefits, and privacy. *Sustainability*, 9(11).
- Pappas, N., Caputo, A., Pellegrini, M. M., Marzi, G., & Michopoulou, E. (2021, January). The complexity of decision-making processes and IoT adoption in accommodation SMEs. *Journal of Business Research*. <https://doi.org/10.1016/j.jbusres.2021.01.010>
- Park, S. (2020). Multifaceted trust in tourism service robots. *Annals of Tourism Research*, 81(March), 102888.
- Pateli, A., Mylonas, N., & Spyrou, A. (2020). Organizational adoption of social media in the hospitality industry: An integrated approach based on DIT and TOE frameworks. *Sustainability*, 12(17), 7132.
- Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know?. *International Business Review*, 29(4), 101717.
- Paul, J., & Feliciano-Cestero, M. M. (2020). Five decades of research on foreign direct investment by MNEs: An overview and research agenda. *Journal of Business Research*, 124, 800–812.
- Paul, J., & Rosado-Serrano, A. (2019). Gradual internationalization vs born-global/international new venture models: A review and research agenda. *International Marketing Review*, 36(6), 830–858.
- Paul, J., & Singh, G. (2017). The 45 years of foreign direct investment research: Approaches, advances and analytical areas. *The World Economy*, 40(11), 2512–2527.
- Pencarelli, T. (2020). The digital revolution in the travel and tourism industry. *Information Technology and Tourism*, 22(3), 455–476.
- Poon, A. (1993). *Tourism, technology and competitive strategies*. CABI.
- Randhawa, K., Wilden, R., & Hohberger, J. (2016). A bibliometric review of open innovation: Setting a research agenda. *Journal of Product Innovation Management*, 33(6), 750–772.
- Rashideh, W. (2020). Blockchain technology framework: Current and future perspectives for the tourism industry. *Tourism Management*, 80, 104125.
- Rey-Martí, A., Ribeiro-Soriano, D., & Palacios-Marqués, D. (2016). A bibliometric analysis of social entrepreneurship. *Journal of Business Research*, 69(5), 1651–1655.
- Samiee, S., Chabowski, B. R., & Hult, G. T. M. (2015). International relationship marketing: Intellectual foundations and avenues for further research. *Journal of International Marketing*, 23(4), 1–21.
- Sánchez-Torres, J. A., Arroyo-Cañada, F. J., Rojas-Berrio, S. P., Robayo-Pinzón, O. J., & Fontalvo-Cerpa, W. (2019). The Colombian electronic consumer: Analysis of the leading factors of e-commerce use. *International Journal of Electronic Marketing and Retailing*, 10(3), 283–308.

- Santos-Júnior, A., Almeida-García, F., Morgado, P., & Mendes-Filho, L. (2020). Residents' quality of life in smart tourism destinations: A theoretical approach. *Sustainability*, *12*(20), 1–24.
- Sethi, P., & Sarangi, S. R. (2017). Internet of things: Architectures, protocols, and applications. *Journal of Electrical and Computer Engineering*. <https://doi.org/10.1155/2017/9324035>
- Sharma, S., Singh, G., Pratt, S., & Narayan, J. (2020). Exploring consumer behavior to purchase travel online in Fiji and Solomon Islands? An extension of the Utaut framework. *International Journal of Culture, Tourism, and Hospitality Research*, *15*(2), 227–247.
- Sharmin, F., Tipu Sultan, M., Badulescu, D., Badulescu, A., Borma, A., & Li, B. (2021). Sustainable destination marketing ecosystem through smartphone-based social media: The consumers' acceptance perspective. *Sustainability*, *13*(4), 1–24.
- Sheldon, P. J. (1997). Tourism information technology. In L. Dweyr & P. Forsyth (Eds.), *International handbook on the economics of tourism* (pp. 399–418). Edward Elgar.
- Shen, S., Sotiriadis, M., & Zhang, Y. (2020a). The influence of smart technologies on customer journey in tourist attractions within the smart tourism management framework. *Sustainability*, *12*(10), 4157.
- Shen, S., Sotiriadis, M., & Zhou, Q. (2020b). Could smart tourists be sustainable and responsible as well? The contribution of social networking sites to improving their sustainable and responsible behavior. *Sustainability*, *12*(4), 1–21.
- Shin, H., & Perdue, R. R. (2019). Self-service technology research: A bibliometric co-citation visualization analysis. *International Journal of Hospitality Management*, *80*, 101–112.
- Sigala, M. (2018). Implementing social customer relationship management: A process framework and implications in tourism and hospitality. *International Journal of Contemporary Hospitality Management*, *30*(7), 2698–2726.
- Sigala, M., & Gretzel, U. (Eds.). (2017). *Advances in social media for travel, tourism and hospitality: New perspectives, practice and cases*. Routledge.
- Sila, I. (2015). The state of empirical research on the adoption and diffusion of business-to-business e-commerce. *International Journal of Electronic Business*, *12*(3), 258–301.
- Singh, S., & Srivastava, P. (2019). Social media for outbound leisure travel: A framework based on technology acceptance model (TAM). *Journal of Tourism Futures*, *5*(1), 43–61.
- Smerecnik, K. R., & Andersen, P. A. (2011). The diffusion of environmental sustainability innovations in North American hotels and ski resorts. *Journal of Sustainable Tourism*, *19*(2), 171–196.
- Soares, A. L. V., Mendes-Filho, L., & Gretzel, U. (2020). Technology adoption in hotels: Applying institutional theory to tourism. *Tourism Review*. <https://doi.org/10.1108/TR-05-2019-0153>
- Stankov, U., & Gretzel, U. (2020). Tourism 4.0 technologies and tourist experiences: A human-centered design perspective. *Information Technology and Tourism*, *22*(3), 477–488.
- Stylos, N., Zwiegelaar, J., & Buhalis, D. (2021). Big data empowered agility for dynamic, volatile, and time-sensitive service industries: The case of tourism sector. *International Journal of Contemporary Hospitality Management*, *33*(3), 1015–1036.
- Sultan, M. T., Sharmin, F., Badulescu, A., Stiubea, E., & Xue, K. (2021). Travelers' responsible environmental behavior towards sustainable coastal tourism: An empirical investigation on social media user-generated content. *Sustainability*, *13*(1), 1–19.
- Sun, B., Liu, L. Y., Chan, W. W., Zhang, C. X., & Chen, X. (2021). Signals of hotel effort on enhancing IAQ and booking intention: Effect of customer's body mass index associated with sustainable marketing in tourism. *Sustainability*, *13*(3), 1–20.
- Thees, H., Erschbamer, G., & Pechlaner, H. (2020). The application of blockchain in tourism: Use cases in the tourism value system. *European Journal of Tourism Research*, *26*(2020), 1–21.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review* Introduction: The need for an evidence-informed approach. *British Journal of Management*, *14*, 207–222.
- Tuomi, A., Tussyadiah, I. P., & Stienmetz, J. (2020). Leveraging LEGO® Serious Play® to embrace AI and robots in tourism. *Annals of Tourism Research*, *81*, 102736.
- Tussyadiah, I. (2020). A review of research into automation in tourism: Launching the annals of tourism research curated collection on artificial intelligence and robotics in tourism. *Annals of Tourism Research*, *81*, 102883.

- Tyan, I., Yagüe, M. I., & Guevara-Plaza, A. (2020). Blockchain technology for smart tourism destinations. *Sustainability*, *12*(22), 1–11.
- Ukpabi, D. C., & Karjaluo, H. (2018). What drives travelers' adoption of user-generated content? A literature review. *Tourism Management Perspectives*, *28*, 251–273.
- Valls, F., & Roca, J. (2021). Visualizing digital traces for sustainable urban management: Mapping tourism activity on the virtual public space. *Sustainability*, *13*(6), 3159.
- van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538.
- van Eck, N. J., & Waltman, L. (2016). Text mining and visualization using VOSviewer. Retrieved from: <https://arxiv.org/ftp/arxiv/papers/1109/1109.2058.pdf>. Accessed 10 June 2021.
- van Nuenen, T., & Scarles, C. (2021). Advancements in technology and digital media in tourism. *Tourist Studies*, *21*(1), 119–132.
- Van, N. T. T., Vrana, V., Duy, N. T., Minh, D. X. H., Dzung, P. T., Mondal, S. R., & Das, S. (2020). The role of human-machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City, Vietnam. *Sustainability*, *12*(22), 1–30.
- Venkatesh, V., & Bala, H. (2012). Adoption and impacts of interorganizational business process standards: Role of partnering synergy. *Information Systems Research*, *23*(4), 1131–1157.
- Vyas, C. (2019). Evaluating state tourism websites using search engine optimization tools. *Tourism Management*, *73*, 64–70.
- Walmsley, A. P., & Kersten, T. P. (2020). The imperial cathedral in Königslutter (Germany) as an immersive experience in virtual reality with integrated 360° panoramic photography. *Applied Sciences*, *10*(4), 1517.
- Wang, R., Xia, B., Dong, S., Li, Y., Li, Z., Ba, D., & Zhang, W. (2021). Research on the spatial differentiation and driving forces of eco-efficiency of regional tourism in China. *Sustainability*, *13*(1), 1–23.
- Wei, W. (2019). Research progress on virtual reality (VR) and augmented reality (AR) in tourism and hospitality: A critical review of publications from 2000 to 2018. *Journal of Hospitality and Tourism Technology*, *10*(4), 539–570.
- Werthner, H., & Klein, S. (1999). *Information technology and tourism: A challenging relationship*. Springer.
- Woerner, S. L., & Wixom, B. H. (2015). Big data: Extending the business strategy toolbox. *Journal of Information Technology*, *30*(1), 60–62.
- Xiang, Z. (2018). From digitization to the age of acceleration: On information technology and tourism. *Tourism Management Perspectives*, *25*, 147–150.
- Xiang, Z., & Fesenmaier, D. R. (2017). Big data analytics, tourism design and smart tourism. In Z. Xiang & D. Fesenmaier (Eds.), *Analytics in smart tourism design* (pp. 299–307). Springer.
- Xu, X., Chen, X., Jia, F., Brown, S., Gong, Y., & Xu, Y. (2018). Supply chain finance: A systematic literature review and bibliometric analysis. *International Journal of Production Economics*, *204*, 160–173.
- Yadegaridehkordi, E., Nilashi, M., Nasir, M. H. N. B. M., & Ibrahim, O. (2018). Predicting determinants of hotel success and development using Structural Equation Modelling (SEM)-ANFIS method. *Tourism Management*, *66*, 364–386.
- Yallop, A., & Seraphin, H. (2020). Big data and analytics in tourism and hospitality: Opportunities and risks. *Journal of Tourism Futures*, *6*(3), 257–262.
- Yuce, A., Arasli, H., Ozturen, A., & Daskin, M. (2020). Feeling the service product closer: Triggering visit intention via virtual reality. *Sustainability*, *12*(16), 1–17.
- Yung, R., & Khoo-Lattimore, C. (2019). New realities: A systematic literature review on virtual reality and augmented reality in tourism research. *Current Issues in Tourism*, *22*(17), 2056–2081.
- Yung, R., Khoo-Lattimore, C., & Potter, L. E. (2021). VR the world: Experimenting with emotion and presence for tourism marketing. *Journal of Hospitality and Tourism Management*, *46*, 160–171.
- Zeng, Z., Chen, P.-J., & Lew, A. A. (2020a). From high-touch to high-tech: COVID-19 drives robotics adoption. *Tourism Geographies*, *22*(3), 724–734.

- Zeng, D., Tim, Y., Yu, J., & Liu, W. (2020b). Actualizing big data analytics for smart cities: A cascading affordance study. *International Journal of Information Management*. <https://doi.org/10.1016/j.ijinfomgt.2020.102156>
- Zhang, K., Chen, Y., & Lin, Z. (2020). Mapping destination images and behavioral patterns from user-generated photos: A computer vision approach. *Asia Pacific Journal of Tourism Research*, 25(11), 1199–1214.
- Zhong, L., Sun, S., Law, R., & Zhang, X. (2020). Impact of robot hotel service on consumers' purchase intention: A control experiment. *Asia Pacific Journal of Tourism Research*, 25(7), 780–798.
- Zhou, S., Yan, Q., Yan, M., & Shen, C. (2020). Tourists' emotional changes and eWOM behavior on social media and integrated tourism websites. *International Journal of Tourism Research*, 22(3), 336–350.

Chapter 2

Technology Application in Tourism in Asia



Md. Ruhul Amin Mollah and Emmanuel Sebata

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

Md. R. A. Mollah (✉)
Griffith University, Gold Coast Campus, Southport, QLD, Australia

Jagannath University, Dhaka, Bangladesh
e-mail: mdruhulamin.mollah@griffithuni.edu.au

E. Sebata
The Sport Business School, Beijing Sport University, Beijing, China
Kyambogo University, Kampala, Uganda

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_2

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 24×7 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 24×7 , 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; Hojeghan & 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:

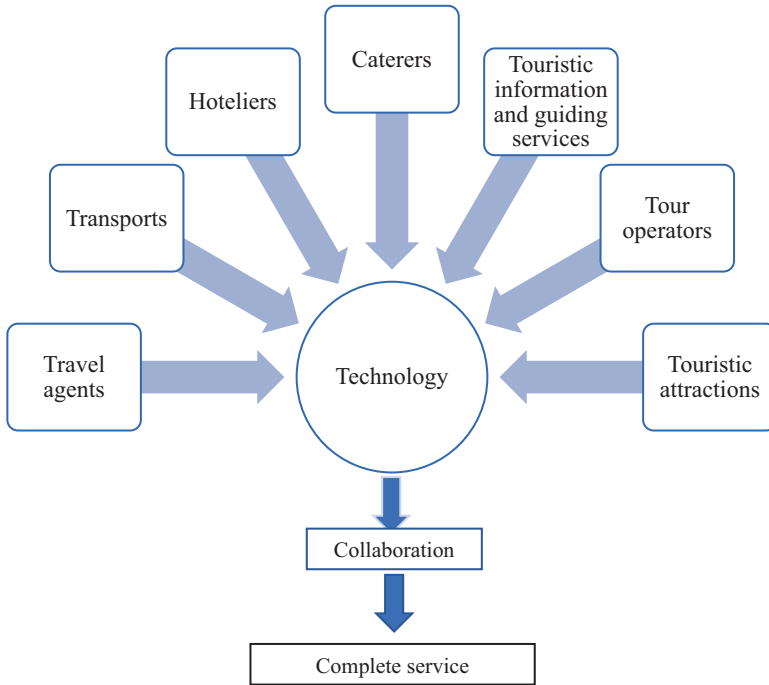


Fig. 2.1 Technology-enabled collaboration to produce a complete service. (Source: developed by the authors, 2021)

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.

References

- Abolfazli, S., Sanaei, Z., Tabassi, A., Rosen, S., Gani, A., & Khan, S. U. (2015). Cloud adoption in Malaysia: Trends, opportunities, and challenges. *IEEE Cloud Computing*, 2(1), 60–68.
- Asian Trade Centre. (2017). *Online travel agencies in Asia: A major opportunity in E-services*. Retrieved from: <https://static1.squarespace.com/static/5393d501e4b0643446abd228/t/59ed90808c56a88ac98cc755/1508741301259/OTA+Whitepaper+Oct+2017.pdf>. Accessed 11 May 2021.
- Bae, S. Y., & Chang, P.-J. (2020). The effect of coronavirus disease-19 (COVID-19) risk perception on behavioural intention towards 'untact' tourism in South Korea during the first wave of the pandemic (March 2020). *Current Issues in Tourism*, 24(7), 1017–1035.
- Bosting Consulting Group. (2020). *Southeast Asian consumers are driving a digital payment revolution*. Retrieved from: <https://www.bcg.com/en-au/publications/2020/southeast-asian-consumers-digital-payment-revolutions>. Accessed 10 May 2021.
- Brennan, B. S., Koo, C., & Bae, K. M. (2018). Smart tourism: A study of mobile application use by tourists visiting South Korea. *Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Sociology*, 8(10), 1–9.
- Buchholz, R. (2014). *Augmented reality: New opportunities for marketing and sales*. Retrieved from: <http://bit.ly/1nMCLYO>. Accessed 5 May 2021.

- Chandran, N. (2020). Singapore hopes artificial intelligence will help boost its tourism industry. *Consumer News and Business Channel*. Retrieved from: <https://www.cnn.com/2020/09/24/singapore-looks-to-artificial-intelligence-ai-to-boost-tourism.html>. Accessed 5 May 2021.
- Chung, N., Lee, H., Kim, J.-Y., & Koo, C. (2018). The role of augmented reality for experience-influenced environments: The case of cultural heritage tourism in Korea. *Journal of Travel Research*, 57(5), 627–643.
- Chung, N., Lee, H., Lee, S. J., & Koo, C. (2015). The influence of tourism website on tourists' behavior to determine destination selection: A case study of creative economy in Korea. *Technological Forecasting and Social Change*, 96, 130–143.
- Deloitte, & Inclusion (2020). *The next wave- emerging digital life in South and Southeast Asia*. Retrieved from: <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/technology-media-telecommunications/deloitte-cn-tmt-inclusion-en-200924.pdf>. Accessed 2 May 2021.
- Dollinger, M. J., Li, X., & Mooney, C. H. (2010). Extending the resource-based view to the megaevent: Entrepreneurial rents and innovation. *Management and Organisation Review*, 6(2), 195–218.
- Dong, D., Weng, W., Xu, W., Dong Li, Y., & Wang, L. (2011). "Soul Hunter": A novel augmented reality application in theme parks. Paper presented at *Mixed and Augmented Reality (ISMAR)*, 10th IEEE International Symposium. Basel: the 26th-30th October, 2011.
- Farshid, M., Paschen, J., Eriksson, T., & Kietzmann, J. (2018). Go boldly! *Business Horizons*, 61(5), 657–663.
- Gek-Siang, T., Aziz, K. A., & Ahmad, Z. (2021). Augmented Reality: The game changer of travel and tourism industry in 2025. In S. H. Park, M. A. Gonzalez-Perez, & D. E. Floriani (Eds.), *The palgrave handbook of corporate sustainability in the digital era* (pp. 169–180). Springer.
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637–651.
- Hassan, A., & Ramos, C. M. Q. (2021). Innovative technology application in tourism marketing. In A. Hassan (Ed.), *Tourism marketing in Bangladesh: An introduction* (pp. 143–154). Routledge.
- Heung, V. C. S. (2003). Barriers to implementing E-commerce in the travel industry: A practical perspective. *International Journal of Hospitality Management*, 22(1), 111–118.
- Hojeghan, S. B., & Esfahangareh, A. N. (2011). Digital economy and tourism impacts, influences and challenges. *Procedia – Social and Behavioral Sciences*, 19, 308–316.
- Ilhan, I., & Çeltek, G. (2016). Mobile marketing: Usage of augmented reality in tourism. *Gaziantep University Journal of Social Sciences*, 15(2), 581–599.
- Jamal, T., & Stronza, A. (2009). Collaboration theory and tourism practice in protected areas: stakeholders, structuring and sustainability. *Journal of Sustainable Tourism*, 17(2), 169–189.
- James Cook University. (n.d). *Asian tourism: Market trends and intelligent futures*. Retrieved from: <https://www.jcu.edu.au/citba/flagship/flagships/asian-tourism-market-trends-and-intelligent-futures>. Accessed 8 May 2021.
- Jiang, Y., & Ritchie, B. W. (2017). Disaster collaboration in tourism: Motives, impediments and success factors. *Journal of Hospitality and Tourism Management*, 31, 70–82.
- Jing Daily. (2015). *Destination Asia: Chinese tourists plan to stay close to home in 2015*. Retrieved from: <https://jingdaily.com/destination-asia-chinese-tourists-plan-to-stay-close-to-home-in-2015/>. Accessed 3 May 2021.
- Jung, T., Chung, N., & Leue, M. C. (2015). The determinants of recommendations to use augmented reality technologies: The case of a Korean theme park. *Tourism Management*, 49, 75–86.
- Jung, T., Tom Dieck, M. C., Lee, H., & Chung, N. (2019). Moderating role of long-term orientation on augmented reality adoption. *International Journal of Human-Computer Interaction*, 36(3), 239–250.
- Kasavana, M. L., Knutson, B. J., & Polonowski, S. J. (1998). Netlurking. *Journal of Hospitality & Leisure Marketing*, 5(1), 31–44.
- Kim, R., Jeon, M., Lee, H., Choi, J., Lee, J., Kim, S., Lee, S., Seo, Y., & Kwon, J. (2018). *Trend Korea 2018*. Mirae- Book Publishing.

- Kim, W. G., & Kim, D. J. (2004). Factors affecting online hotel reservation intention between online and non-online customers. *International Journal of Hospitality Management*, 23(4), 381–395.
- Lee, S. M., & Lee, D. (2019). “Untact”: A new customer service strategy in the digital age. *Service Business*, 14(1), 1–22.
- Meo, M. S., Kanwal, S., Ali, S., Karim, M. Z. A., & Kamboh, A. Z. (in press). The future and challenges of applying innovative technologies in the tourism and hospitality industry in Asia. In A. Hassan (Ed.), *Handbook of technology application in tourism in Asia*. Springer.
- Milgram, P., Takemura, H., Utsumi, A., & Kishino, F. (1995). Augmented reality: A class of displays on the reality-virtuality continuum. Augmented reality: A class of displays on the reality-virtuality continuum. *Proc. SPIE 2351, Telemanipulator and Telepresence Technologies*, <https://doi.org/10.1117/12.197321>
- Riyadi, S., Susilo, D., Armawati Sufa, S., & Dwi Putranto, T. (2019). Digital marketing strategies to boost tourism economy: A case study of Atlantis Land Surabaya. *Humanities & Social Sciences Reviews*, 7(5), 468–473.
- Ryan, D., & Jones, C. (2009). *Understanding digital marketing marketing strategies for engaging the digital generation*. Kogan Page.
- Samala, N., Katkam, B. S., Bellamkonda, R. S., & Rodriguez, R. V. (2020). Impact of AI and robotics in the tourism sector: A critical insight. *Journal of Tourism Futures*. <https://doi.org/10.1108/jtf-07-2019-0065>
- Sezgin, E., & Aktas, S. G. (2016a). Marketing for new tourism perceived by East Asian E-Consumers. In E. Sezgin (Ed.), *e-Consumers in the era of new tourism* (pp. 123–136). Springer.
- Sezgin, E., & Aktas, S. G. (2016b). Mobile communication and application in tourism. In E. Sezgin (Ed.), *Marketing for new tourism perceived by East Asian E-Consumers* (pp. 13–34). Springer.
- Sharma, A., Sharma, S., & Chaudhary, M. (2020). Are small travel agencies ready for digital marketing? Views of travel agency managers. *Tourism Management*, 79, 104078.
- So, S.-I. A., & Morrison, A. M. (2004). Internet marketing in tourism in Asia: An evaluation of the performance of East Asian National Tourism Organization websites. *Journal of Hospitality & Leisure Marketing*, 11(4), 93–118.
- Sooksatit, K. (2016). Customer decisions on hotel booking via mobile phone and tablet applications: A case study of luxury hotels in Bangkok. In E. Sezgin (Ed.), *e-Consumers in the era of new tourism* (pp. 87–102). Springer.
- Tavakoli, R., & Mura, P. (2015). ‘Journeys in Second Life’ – Iranian Muslim women’s behaviour in virtual tourist destinations. *Tourism Management*, 46, 398–407.
- TechinAsia. (2017). *Chinese tourists are bringing their wallets – And China’s tech giants – Overseas*. Retrieved from: <https://www.techinasia.com/chinese-tourists-wechat-alipay-global-expansion>. Accessed 11 May 2021.
- Technicolor. (2020). *Virtual and augmented reality opportunities are rising and very real in Asia*. Retrieved from: <https://www.technicolor.com/news/virtual-and-augmented-reality-opportunities-are-rising-and-very-real-asia>. Accessed 7 May 2021.
- The United Nations Development Programme. (2018). *Development 4.0: Opportunities and challenges for accelerating progress towards the sustainable development goals in Asia and the Pacific*. Retrieved from: https://n.sinaimg.cn/tech/7d78cbe7/20181010/un_report_development_4.0.pdf. Accessed 6 May 2021.
- Tuo, Y., Ning, L., & Zhu, A. (2021). How artificial intelligence will change the future of tourism industry: The practice in China. In W. Wörndl, C. Koo, & J. L. Stienmetz (Eds.), *Information and communication technologies in tourism 2021* (pp. 83–94). Springer.
- Wong, J., & Law, R. (2005). Analysing the intention to purchase on hotel websites: A study of travellers to Hong Kong. *International Journal of Hospitality Management*, 24(3), 311–329.
- Yilmaz, H., & Coskun, I. O. (2016). Marketing for new tourism perceived by East Asian E-Consumers. In E. Sezgin (Ed.), *e-Consumers in the era of new tourism* (pp. 53–72). Springer.

- Yin, C. Z. Y., Jung, T., tom Dieck, M. C., & Lee, M. Y. (2021). Mobile augmented reality heritage Applications: Meeting the needs of heritage tourists. *Sustainability*, <https://doi.org/10.3390/su13052523>
- Zainol, R. (2005). Information technology (IT) as an innovative tool in tourism development. *Jati-Journal of Southeast Asian Studies*, *10*, 109–126.
- Zairi, M. (1997). Business process management: A boundaryless approach to modern competitiveness. *Business Process Management*, *3*(1), 64–80.
- Zapata, M. J., & Hall, C. M. (2012). Public–private collaboration in the tourism sector: Balancing legitimacy and effectiveness in local tourism partnerships. The Spanish case. *Journal of Policy Research in Tourism, Leisure and Events*, *4*(1), 61–83.

Chapter 3

Technology Application in Tourism in Asia: Comprehensive Science Mapping Analysis



**Khaw Khai Wah, Al-Zuhairi Omar, Alhamzah Alnoor,
and Maher Talib Alshamkhani**

Abstract Technology application in tourism new strategy (from now on referred to as the e-smart e-tourism strategy). To provide valuable insights into technology applications tourism and support researchers, we must understand the options and gaps in this type of research. Thus, in this study, a literature review is conducted to map the research landscape into a coherent classification. We operate a focused search for every article related to (1) Technology application in tourism in one significant database, namely, Web of Science. These databases contain a range of publications focusing on technology application in tourism. The final set of data generated from the classification scheme includes 1335 articles. The first section consists of evaluation and comparative articles on the technology application in tourism. The second section is composed of technology application in tourism articles. The final section includes review and analysis articles on technology application in tourism. We then define the essential characteristics of this emerging field in the following aspects: the drive to use the technology application in tourism, open challenges that hinder use, and recommendations for improving the acceptance, use, and implementation of the technology application in tourism. Then, the new directions of this research were described.

K. K. Wah

School of Management, Universiti Sains Malaysia (USM), Penang, Malaysia

A.-Z. Omar

Department of Physics, Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris (UPSI), Perak, Malaysia

A. Alnoor (✉)

School of Management, Universiti Sains Malaysia (USM), Penang, Malaysia

School of Management, Universiti Sains Malaysia (USM), Management Technical College, Southern Technical University, Penang and Basrah, Malaysia and Iraq

e-mail: Alhamzah.alnoor@student.usm.my

M. T. Alshamkhani

School of Chemical Engineering, Universiti Sains Malaysia (USM), Penang, Malaysia

Southern Technical University, Basrah Engineering Technical College, Basrah, Iraq

Keywords Technology · Application in tourism · Asia · Mapping Analysis

Introduction

In recent years, tourism revenues have continued to increase worldwide because of the emergence of an ideology of entertainment and the increase in countries' national income. Tourism has become part of people's lives, both local and international (Chang & Katrichis, 2016). There is also a set of factors that work as a dam for tourism development, such as economic growth, improving places for access, and political liberalization, given the role of technology in action (Tolkach et al., 2016). It is essential to achieve a relationship with consumers based on mutual benefit and concern for relational aspects to achieve commercial transactions, especially in companies with industries challenging to separate production and consumption (Wang et al., 2014).

Statistics indicated the rapid growth of tourism, as in 2015, the number of arrivals reached 1.19 billion, after it was 528 million in 2005, and the number of tourists is expected to reach 1.8 billion in the next few years (Hamid et al., 2021). Given the importance of tourism as one of the industries that provide millions of job opportunities than other industries, this results from the rapid and equal growth between tourism and technology and making it reach advanced levels of interaction (Buhalis & Law, 2008). The tourism industry has an economic impact as one of the industries that are considered the highest priority at the global and local levels and one of the industries most affected by technological changes rapidly (Steinbauer & Werthner, 2007). The emergence of technology provides more accessible ways for consumers to search for tourist destinations worldwide, so the continuous improvement of the opportunities offered by technology has become significant for destination users (Buhalis & Wagner, 2013). Technology is considered a catalyst for innovation, development, and Expanding competitiveness due to the revolution it has brought about in the tourism industry, which has called many organizations to change their strategic management (Buhalis, 2020).

Technology primarily works with the organization's three strategies, quality, and direction, human resource management, plus information technology. It solves its ability to communicate problems with customers, so organizations must take advantage of these innovative approaches to technology (Chang & Katrichis, 2016). Technology is bringing about a gradual revolution in the tourism industry. It works on interactive innovations between the consumer and the tourism institutions, so many institutions have entirely restructured the process. There are many and fragmented studies on this field due to what information technology has brought about a change in access consumer and tourism services and provide very innovative channels for accessing and using these channels (Ukpabi & Karjaluoto, 2017). As a result, technological development will also create more conscious and sophisticated consumers, and thus it must focus on it because it will be difficult to satisfy him.

Because consumers also became more developed and aware, it became difficult to meet them and determine the products and elements of tourism suitable for them.

Therefore, more intelligent organizations should serve consumers and exploit all available resources to achieve added value (Buhalis & Law, 2008). It has become necessary for deep and appropriate planning for the future considering technological progress and applying technical ideas in the tourism and hospitality industry and consumers' coexistence with this progress at a rapid and increasing pace (Law et al., 2019). Technology has changed a lot in society and significantly impacted restructuring and operational engineering management in recent years in the hospitality and tourism industry.

For example, statistics in 2018 indicated that the sales obtained by digital sales amounted to US\$ 470 billion in the year 2014 to continue to increase to reach US\$ 629 billion in 2017 (Law et al., 2019); technology has provided new tools that have revolutionized the tourism and hospitality industry, whereby technology is widely used in the commercial and operational process. We can also consider tourism to have developed as a revolution in the light of technology (Dorcic et al., 2019). The technology works in solving problems and difficulties by providing tourism information and thus bringing about a qualitative change in the means and channels of tourism services and maximizing the value of available tourism resources (Li et al., 2017), became possible to identify the past, current and future contributions, analyze them in a better way and discuss the introduction of technology in the tourism industry and its technical change (Stipanuk, 1993).

Literature Review

Tourism

Tourism is the movement of people from their place of residence to a remote location for a temporary period so that you may consider tourism a social, cultural, and economic phenomenon (Chang & Katrichis, 2016). In other words, tourism can be defined as a commercial activity that depends mainly on extensive information and many human resources (Steinbauer & Werthner, 2007). Likewise, tourism has a significant role in the development of the national economy because it is increasingly considered an investment field in addition to its ability to provide foreign currency (Sanjeev & Birdie, 2019). Thus, this comprehensive and extensive scope of tourism has led to the provision of many job opportunities worldwide to contribute to tourism in society (Hamid et al., 2021).

Because tourism has become an essential part of many people's lives, unlike other industries, tourism revenues continue to grow worldwide (Chang & Katrichis, 2016). Tourism is considered one of the service activities concerned with aspects of the relationship with consumers and the endeavor to maintain these relationships to achieve mutual benefits and achieve continuity to reach the organization's common

goals (Wang et al., 2014). The interests and characteristics of travelers are increasingly different. Thus, some factors that improve the quality of tourism have been considered, such as political growth, economic growth, infrastructure, and its development and tourism, which has led to an increase in the number of long-distance visitors or local tourists (Tolkach et al., 2016). Today's business environment witnesses fierce competition in the tourism and hospitality sectors, especially so companies must work hard to develop their competitiveness and pursue business success.

Tourism and Technology

Since the early nineties, technology has played an essential role in the tourism and hospitality industry, facilitating reaching customers through its channels of websites, applications, and social media (Law et al., 2018). Tourism is an ecosystem powered by technology that works to attract audiences through trends of real value and provide platforms for the tourism experience and boost shared value (Buhalis et al., 2019). Technology has an essential and influential role in tourism and hospitality organizations because of its ability to improve quality, reduce costs, improve customer experience, create a competitive advantage, and its importance in marketing and managing distribution on a large scale. Many organizations have changed their strategic management in line with the technological shifts and reformulated some operational and marketing practices to take advantage of these shifts (Buhalis & Sinarta, 2019).

Likewise, information technology can change a tourist's behavior by tracking his performance, providing observations about his behavior, and making appropriate suggestions through innovative personal technologies. Therefore, tourism organizations need to use technology in designing a tourism experience. Technology has provided various channels for consumers to access information to operate its tourism services, and thus it has brought about a change in the ways to access those services (Ukpabi & Karjaluoto, 2017). Technology seeks to maximize the value of all available and available tourism resources and make changes in methods and means of presentation (Li et al., 2017). As a result of the modern technological development in the process, management, and marketing of destinations and tourism products, new challenges appear to the stakeholders, and their role gradually weakens. It has also become possible to proactively develop tourism products due to the apparent effect of technology in increasing the competitiveness of providing an information structure for tourism organizations and the entire industry (Buhalis & Law, 2008). To enhance the tourism experience, tourism companies must provide the components of the tourism ecosystem in a manner appropriate to the consumer, which consists of travel agency experiences, accommodation, transportation, and accommodation.

Therefore, we must consider technological progress as an essential pillar for co-creation in the ecosystem of tourism and hospitality services (Buhalis et al., 2019). The use of technology in the operational and commercial process on a large scale is

appropriate because tourism is one of the industries that have developed increasingly in the shadow of modern technology and thus provided many new industrial tools (Dorcic et al., 2019). In the future, only the organizations that offer technology in their performance and appreciate the opportunities they see and their efficiency in managing their resources will enter the competitive market. In other words, the integration of technology and the digitization of the tourism system, such as augmented reality, artificial intelligence, cryptocurrencies, and robots, creates great opportunities and challenges in the operational strategy in the tourism industry (Law et al., 2019).

Tourism and Hospitality

Tourism is the process of moving individuals to different geographical areas outside the scope of their environment, and this movement may be for various purposes such as tourism or work. Tourism is also a service activity that significantly impacts economic, social, and cultural development in many countries (Hamid et al., 2021). Hospitality (transportation, hotels, catering, and travel agent) is an essential component of the tourism supply chain (Chang & Katrichis, 2016). Due to the significant contribution of tourism and hospitality to the GDP. It is important to take essential steps to boost this industry, such as foreign investment, facilitating access to visas, and improving the infrastructure (Sanjeev & Birdie, 2019).

As a result of the availability of technological aspects, technology has reduced the barriers facing consumers of tourism services and changed a lot in all sectors of tourism and hospitality and their industries (Ukpabi & Karjaluoto, 2017). In addition, to obtain a beneficial competitive advantage, relationship marketing was directed as a strategic tool. For example, airline companies use frequent flyer programs and frequent hotel guests and other tourism and hospitality sectors (Wang et al., 2014). The tourism and hospitality industry must go into the midst of market competition. One of the most critical challenges that must be considered is tourists' desires and needs, which have undergone demographic, psychological, economic, and social changes over time (Tolkach et al., 2016). The tourism and hospitality industry, a tangible service company and demanding to separate between consumption and production, is necessary to build a strong relationship with its consumers and strive to continue this relationship (Wang et al., 2014).

Theories and Applications

Information and communication technology has brought about continuous developments and repercussions in tourism, as it strengthened the marketing process and provided new tools for tourism management (Buhalis & O'Connor, 2005). Technology may play a mediating role between employers and customers by

designing tourism technologies that convincingly affect the behavior of tourists and provide a meaningful experience (Tussyadiah, 2017). The tourism applications can be summarized as follows:

- Technology contributes to tourism growth, as technology has contributed to economic growth tremendously and significantly.
- It is important to consider technology as a maker of the tourism experience. It is the creative side of the tourism industry to create a suitable climate, material conditions, and suitable attractions.
- Technology is sometimes a lawyer for the tourist experience, as it helps to protect against potential risks, whether medical or human-made and protect the destination itself.
- Technology is an enhancer to the tourism experience, meaning that it can achieve a more comfortable and enjoyable tourism experience.
- Technology is sometimes a focal point, which uses industrial sites such as farms, ports, and laboratories as tourist destinations.
- Technology is considered a tool that creates the tourism experience. Its contribution as a builder of the industry and not as a service is the administrative and marketing aspects (Stipanuk, 1993).

Given that technology and its platforms are among the essential sources of information that consumers need, it is crucial to develop search engines suitable for consumer behavior. A lot of consumers have turned to search for their next destination. This weakened the role of travel agencies, so it became necessary for the tourism organizations to be present on the databases as part of the operational process (Buhalis & Wagner, 2013). Relying on technological innovations in tourism services creates a shared value for the tourism experience in all stages of travel and increasingly (Buhalis & Sinarta, 2019). To promote innovations further and take advantage of all these opportunities, it is necessary to adopt an agile strategy to transform opportunities for the organization's benefit and strategic management levels. It may also include technological applications, integration, and the continuous digitization of the tourism industry into many papers mentioned countless (such as communication sites, smartphones, enhanced broadband, artificial intelligence, robots, and cryptocurrencies) (Law et al., 2019).

Comprehensive Science Mapping Analysis

The researcher used the bibliometric analysis by the Rstudio program by analyzing the Scopus database to analyze strategic performance. We collected data from the Web of Science website to analyze it, and the tables and figures below show that. Table 3.1. Indicates the primary data gathered regarding technology application in tourism.

Comprehensive science mapping analysis was adopted to explore the problems of technology application in tourism in most cases discussed since it only indicated

Table 3.1 Main Information about the collection

Description	Results
<i>Main information about data</i>	
Timespan	1970:2021
Sources (Journals, Books, etc.)	63
Documents	75
Average years from publication	8.29
Average citations per documents	0
Average citations per year per doc	0
References	1
<i>Document contents</i>	
Keywords Plus (ID)	0
Author's Keywords (DE)	209
AUTHORS	
Authors	179
Author Appearances	194
Authors of single-authored documents	13
Authors of multi-authored documents	166
<i>Authors collaboration</i>	
Single-authored documents	13
Documents per Author	0.419
Authors per Document	2.39
Co-Authors per Documents	2.59
Collaboration Index	2.68

Source: Developed by the authors with R-studio software, 2021

the advantages of technology application in tourism. Many barriers were neglected, so mapping analysis based on bibliometrics was used. It is possible to clarify the literature that was investigated in Table 3.1 that shows there is tremendous growth in cases that incorporate technology application in tourism, especially the last four years, which were adopted as criteria for selection, as the number of papers was 1335 for different cases, while at the level of authors, most of them were joint papers. It included multiple authors except for one article belonging to one author. Figure 3.1 explained the most frequent words. Wordcloud refers to the most important topics dealt with technology application in tourism, as Fig. 3.1 shows the essential critical words adopted by previous studies on this topic's relationship.

It is clear from Fig. 3.1 that the most frequent keyword is technology adoption and customer usage decisions, whether about travel or the internet, indicating that the most frequent categories are technological and marketing cases that have adopted the technology application in tourism.

Figure 3.2 shows that the analyzed literature has applied technology application in tourism in different sectors. Moreover, the tourism sector has the most extensive papers and reached ten articles, followed by the technology sector. Nevertheless,



Fig. 3.1 WordCloud. (Source: Developed by the authors with R-studio software, 2021)

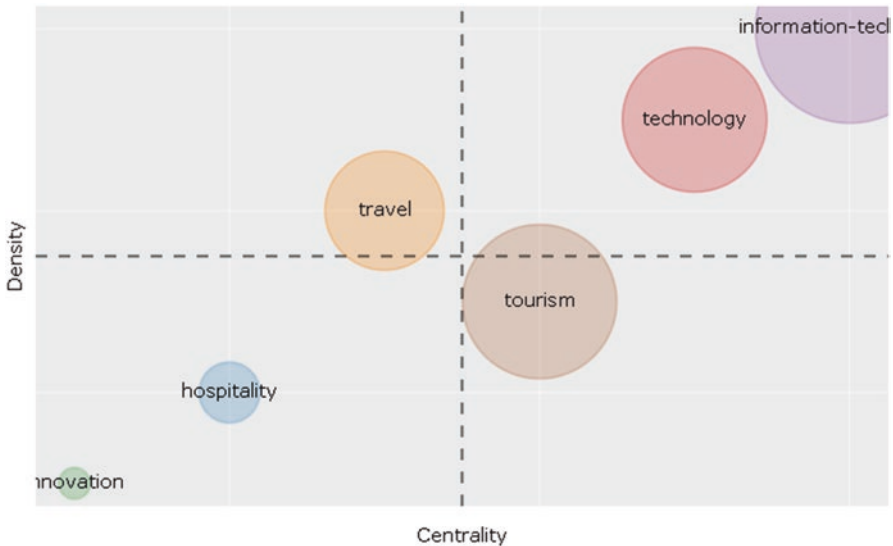


Fig. 3.2 Thematic map. (Source: Developed by the authors with R-studio software, 2021)

there is a severe lack of implementation of this method in some industries, for example, airports industrial sectors, there is gap in this review because many studies ignore vital sectors, and this gap can open a lot from future research to experiment

Country Collaboration Map

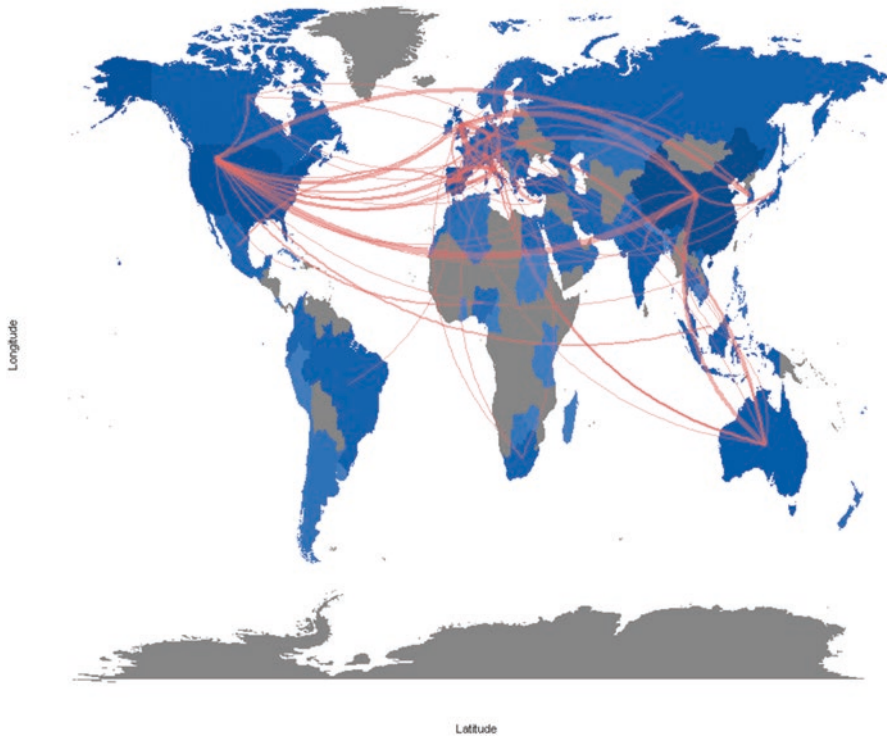


Fig. 3.3 Collaboration WorldMap. (Source: Developed by the authors with R-studio software, 2021)

with implementing technology application in tourism in other sectors. Figure 3.3 shows the most word dynamics for ten keywords concerned with this topic. The technology has repeatedly published papers to show that these journals have recently been interested in technology application in tourism. We note that the tourism applications were the number of articles interested in many papers. Therefore, this is normal as it is specialized in this field.

The word dynamics for these categories during the year and we note the reactions of employees and leaders, gender as well, began to be taken care of in 2006 and increased attention to it in recent years, especially in 2020. A thematic map is a type of map that depicts the style of a specific subject. This usually involves using map symbols to visualize the characteristics of invisible features in Fig. 3.4. Presented the thematic map, and it showed technology application in tourism produces a cause technology, travel, tourism, hospitality, and information.

A research cooperation network is a network where the authors are the nodes, and the co-authors are the contacts. Research cooperation is one of the most recorded ways of teamwork in science. Hence, the strength of the technology application in

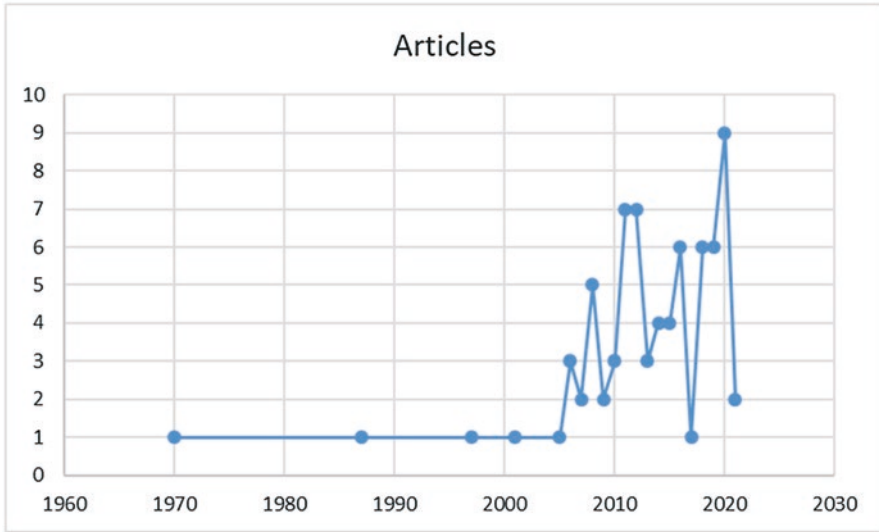


Fig. 3.4 Annual scientific production. (Source: Developed by the authors with R-studio software, 2021)

the tourism research network may also represent a network of cooperation between authors. However, the interaction may also be limited, as depicted by the many issues that still require further investigation (Fig. 3.5).

A research cooperation network is a network where the authors are the nodes, and the co-authors are the contacts. Research cooperation is one of the most recorded ways of teamwork in science. Hence, the strength of the technology application in the tourism research network may also represent a network of cooperation between authors. However, the interaction may also be limited, as depicted by the many issues that still require further investigation. The following Fig. 3.6 shows annual scientific production relative to the year of publication, as it shows that the year 2020 interest in this topic has increased dramatically.

The following figure shows the most relevant sources for more than 20 journals concerned with this topic. We note that the journal of applied behavioral science was the number of articles. It was interested in is six papers. Therefore, this is normal as it is specialized in this field (Fig. 3.5).

Figure 3.6 shows that the articles on technology application in tourism included in this review came from 25 countries and nationalities. These articles generally include case studies conducted in 25 countries.

The value $n = 1335$ In particular, the geographical distribution of the selected articles on technology application in tourism in terms of numbers and percentages shows that the most productive authors are from the USA with 20, China with 7, UK with 6, Australia with 4, Canada, Germany, Israel, South Africa with 3, France, Ireland, Netherland, Norway, Saudi Arabia with two studies, Austria, Brazil, Denmark, Estonia, Greece, India, Lithuania, Pakistan, Singapore, Spain, Sweden and Switzerland with 1 case.

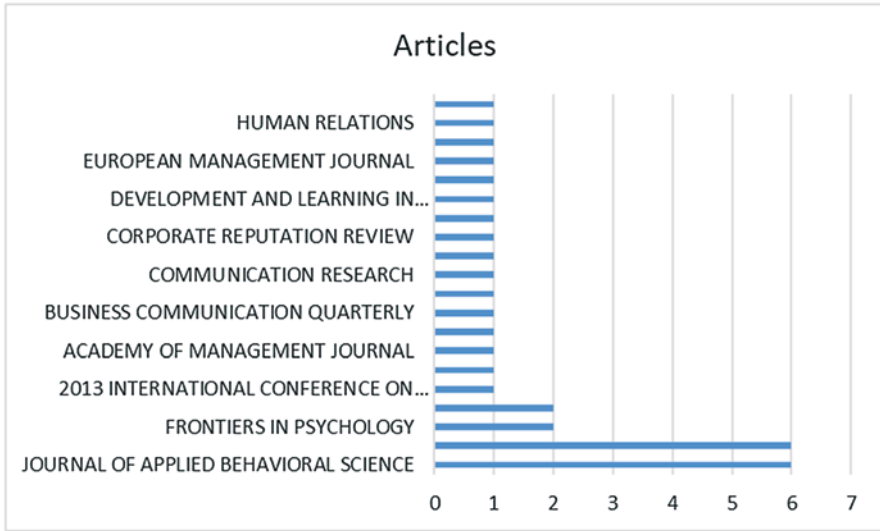


Fig. 3.5 Most relevant sources. (Source: Developed by the authors with R-studio software, 2021)

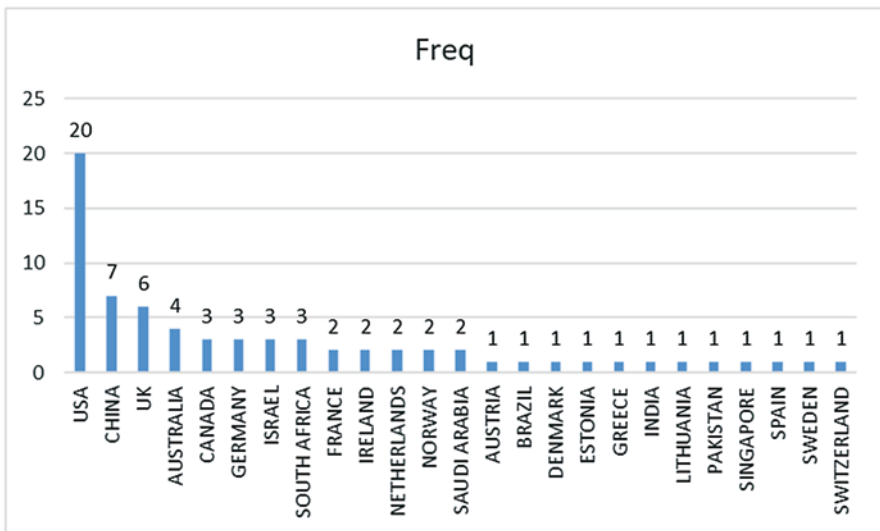


Fig. 3.6 Country scientific production. (Source: Developed by the authors with R-studio software, 2021)

Conclusion

A recent trend has emerged regarding technology application in tourism, which is the technology application in tourism. Research on this topic is still ongoing. Much of the literature has indicated that this strategy is more weighted than technology application in tourism. Moreover, despite the many challenges that this strategy has faced, it has proven it is worth it and needs further investigation. Specific patterns can be drawn from different businesses around technology application in tourism as these businesses have been classified into three categories. The first-class included the evaluation and comparative study for the technology application in tourism that tackled studies on the assessment and comparison, which attempted to find the best methods of technology application in tourism according to a set of criteria (1335 papers). An in-depth analysis of the data helps the benefits, challenges, and recommendations of the technology application in tourism.

The results indicate that the technology application in tourism is a new starting point that organizations must adopt to obtain a sustainable competitive advantage. Nevertheless, there are many gaps associated with the topic, whether at the application level or the conceptual model and the sector. The literature also made some recommendations to increase strategic performance as well as achieve marketing differentiation in addition to high customer satisfaction and help reduce risks and respond to uncertainties and achieve high flexibility to react to changing environmental conditions, especially in emergencies, in addition to increasing social responsibility, high earnings quality, and entrepreneurship. More developed. These recommendations can solve the challenges facing the technology application in tourism when applied and open more opportunities for future research in this area. These problems are related to poor performance because of adopting traditional strategies that competitors can easily imitate. Insights were defined in the current review, and a summary of previously published studies on the technology application in tourism is provided. A review of these works may serve as a reference for researchers on this topic.

Moreover, the competitive advantage in technology application in tourism may be a viable philosophy mainly when managed with a combination of internal and external factors and achieve proportionality between these factors because they act as information filters to create a more robust strategy. Finally, the research has yet to explore more about the hybrid strategy that controls competitive advantage. Another consideration for the study is the adoption of multidisciplinary approaches with other strategic and scientific fields.

Limitations and Future Directions

The most relevant limitation to this review is the number and quality of databases. Although the data selected are reliable and represent broad groups, they are subject to error. The other thing is, or is there significant progress in this area, so the time factor is considered one of the most critical determinants of the survey. Finally, the results of this review reflect the main objective of this paper, which is to explore the role of hybrid strategies in the business world. It is necessary to explore more about this topic in future research.

References

- Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019). Technological disruptions in services: Lessons from tourism and hospitality. *Journal of Service Management, 30*(4), 484–502.
- Buhalis, D. (2020). Technology in tourism—from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article. *Tourism Review, 75*(1), 267–272.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research. *Tourism Management, 29*(4), 609–623.
- Buhalis, D., & O'Connor, P. (2005). Information communication technology revolutionizing tourism. *Tourism Recreation Research, 30*(3), 7–16.
- Buhalis, D., & Sinarta, Y. (2019). Real-time co-creation and nowness service: Lessons from tourism and hospitality. *Journal of Travel & Tourism Marketing, 36*(5), 563–582.
- Buhalis, D., & Wagner, R. (2013). E-destinations: Global best practice in tourism technologies and applications. In L. Cantoni & Z. Xiang (Eds.), *Information and communication technologies in tourism 2013* (pp. 119–130). Springer.
- Chang, W. J., & Katrichis, J. M. (2016). A literature review of tourism management (1990–2013): A content analysis perspective. *Current Issues in Tourism, 19*(8), 791–823.
- Dorcic, J., Komsic, J., & Markovic, S. (2019). Mobile technologies and applications towards smart tourism – State of the art. *Tourism Review, 74*(1), 82–103.
- Hamid, R. A., Albahri, A. S., Alwan, J. K., Al-qaysi, Z. T., Albahri, O. S., Zaidan, A. A., Alnoor, A., Alamoodi, A. H., & Zaidan, B. B. (2021). How smart is e-tourism? A systematic review of smart tourism recommendation system applying data management. *Computer Science Review, 39*(1), 1–18.
- Law, R., Chan, I. C. C., & Wang, L. (2018). A comprehensive review of mobile technology use in hospitality and tourism. *Journal of Hospitality Marketing & Management, 27*(6), 626–648.
- Law, R., Li, G., Fong, D. K. C., & Han, X. (2019). Tourism demand forecasting: A deep learning approach. *Annals of Tourism Research, 75*(3), 410–423.
- Li, Y., Hu, C., Huang, C., & Duan, L. (2017). The concept of smart tourism in the context of tourism information services. *Tourism Management, 58*(1), 293–300.
- Sanjeev, G. M., & Birdie, A. K. (2019). The tourism and hospitality industry in India: Emerging issues for the next decade. *Worldwide Hospitality and Tourism Themes, 11*(4), 355–361.
- Steinbauer, A., & Werthner, H. (2007). Consumer behaviour in e-tourism. In M. Sigala, L. Mich, & J. Murphy (Eds.), *Information and communication technologies in tourism 2007* (pp. 65–76). Springer.

- Stipanuk, D. M. (1993). Tourism and technology: Interactions and implications. *Tourism Management, 14*(4), 267–278.
- Tolkach, D., Chon, K. K., & Xiao, H. (2016). Asia Pacific tourism trends: Is the future ours to see? *Asia Pacific Journal of Tourism Research, 21*(10), 1071–1084.
- Tussyadiah, I. P. (2017). Technology and behavioral design in tourism. In D. Fesenmaier & Z. Xiang (Eds.), *Design science in tourism* (pp. 173–191). Springer.
- Ukpabi, D., & Karjaluoto, H. (2017). Consumers' acceptance of information and communications technology in tourism: A review. *Telematics and Informatics, 34*(5), 618–644.
- Wang, L., Law, R., Hung, K., & Guillet, B. D. (2014). Consumer trust in tourism and hospitality: A review of the literature. *Journal of Hospitality and Tourism Management, 21*(12), 1–9.

Part II
Technology Application in Tourism in Asia:
Innovations

Chapter 4

Technological Innovations in Asian Tourism



Priyakrushna Mohanty, Himanshi Dhoundiyal, and Anila Thomas

Abstract Innovation is emerging as a perennial factor in driving the success of the tourism industry while technology is regarded as one of the fundamental determinants of innovation in the tourism sector. Hence, there exists a high correlation between the technological interventions of a tourism firm and the magnitude of innovation it induces. In this backdrop, the Asia continent has earned the repute of being the playground for innovation and an observatory for new travel trends. This chapter aims to find out the technological applications that drive innovation in the Asian tourism sector. The chapter also tries to understand the mechanism of technological-driven innovation in Asian tourism. Majority of the earlier works published have mostly dealt with the aspect of technology and innovations separately and very few of them have tried to explore the interlinkages which this chapter seeks to explore. This work is mainly descriptive and adopts a qualitative approach.

Keywords Technology · Asia · Tourism · Innovations

Introduction

Technology-based innovations have become great means to satisfy human needs and are highly applauded for their ability to drive social transformations and economic growth (Li & Piachaud, 2019). Similarly, in the tourism industry, innovation is emerging as a perennial factor in driving the success of various ventures (Hjälager, 2002) while technology is regarded as one of the fundamental determinants of innovation

P. Mohanty (✉)

Department of Tourism & Travel Management, Jyoti Nivas College Autonomous,
Bengaluru, Karnataka, India

H. Dhoundiyal

Institute of Hotel & Tourism Management, M.D. University, Rohtak, Haryana, India

A. Thomas

Department of Tourism & Travel Management, Jyoti Nivas College Autonomous,
Bengaluru, Karnataka, India

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_4

(Divisekera & Nguyen, 2018). Hence, there exists a high correlation between the technological interventions of a tourism firm and the magnitude of innovation it induces. Starting from booking the ticket to providing feedback for the tours, technology has drastically changed the structure and operations of the tourism industry through land marking innovations. In their study about future trends of the Asia Pacific region, Tolkach et al. (2016) predicted “technology and innovation” as the second most trending theme in the Asia-Pacific region.

Meanwhile, the Asian continent has earned the repute of being the playground for innovation and an observatory for new travel trends. Both tourism and technology are thriving in Asia and are showing spectacular signs of a bright future. While Asian tourism is maintaining its ace position in terms of growth in global tourist arrivals and spending in the year 2018 (UNWTO, 2019), the continent has also become the land for the technological boom. So, both technology and innovation are undergoing a synced-growth process in the context of the Asian tourism industry and therefore, are influencing each other like never before. However, this parallel growth process has hardly been discussed in the academic literature and needs a thorough investigation. The majority of the earlier works published have mostly dealt with the aspect of technology and innovations separately and very few of them have tried to explore the interlinkages. Against this backdrop, this chapter aims to find out the technological applications that are driving innovation in the Asian tourism sector.

The study is mainly descriptive and stems from the various literature in reputed newspapers, journals, Govt. documents, newsletters, and magazines etc. documenting the technology-based innovations in the Asian continent. One of the stark aspects of this chapter is that in the absence of adequate scientific literature, this work derives most of its records from the ‘grey’ literature that comprises of “unpublished studies and studies published outside widely available journals” (Conn et al.,

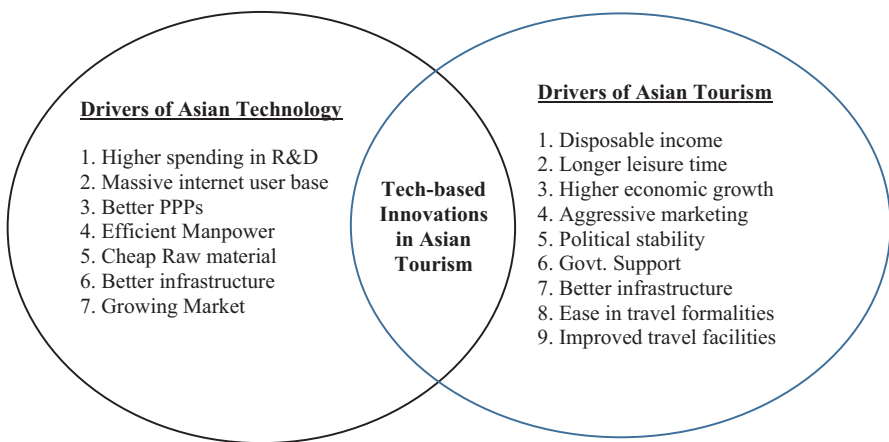


Fig. 4.1 Framework for drivers of tech-based innovations in Asian tourism. (Source: authors’ own work)

2003: p. 256) and is considered as rich sources for data which are not adequately available in the scientific periodicals. Divided into three different parts, the paper begins by discussing the technological rise in the Asian region. While doing so, the authors also shed light on the reasons for such an upsurge. Secondly, various facets of the implication of technology-based innovations on the Asian tourism industry have been pondered upon. Last section deals with prospects and challenges that wait in future while adopting these innovations in the Asian tourism industry.

Growth of Technology in Asia

In the last decade, the Asian region has emerged as one of the tech giants with stories of technological upsurge across its different nations making the headlines of many global periodicals. Asia is not anymore perceived as a third-world region with inadequate technological infrastructure and has been the blooming ground for many tech companies and startups. According to a McKinsey & company (2020) report, the Asian region acquired a global share of 52% of growth rate in tech-company revenues and accounted for 51% of spending on R&D (Research and Development), 43% of funding for startups, and 87% of patents filed for the year 2019. While China and Japan have occupied the second and third spots in the largest economies of the world, India at the fifth spot is exhibiting great signs of progress (Silver, 2020). Consequently, the technological growth in Asia has been most advanced by these three nations. China, for example, was home to 26% of the global unicorns (startup ventures with value more than equal to \$1 billion), whereas India produced three fourth of the global STEM (science, technology, engineering, and mathematics) graduates during the period from 2016 to 2018 (Woetzel & Seong, 2020). With Asia's emergence as the adobe of the unicorns, six of the top fifteen global technology unicorns considering market capitalization are now from Asia including the biggest unicorn Bytedance, a Chinese technology venture worth US\$147b; just ten years before, there was no representation from Asia in this category (CB Insights, 2020). Besides countries like South Korea and Japan are driving the innovation game to the next level backed by the companies like Samsung and Sony respectively. One of the bright indicators of Asia's commitment to innovation and knowledge is the number of patents filled. Over the last decade, the region seized 87% of worldwide growth in filings of patent with China alone accounting for 45% of the global patents.

Apart from the technological advancements, the Asian continent is also progressing a great deal in the telecom infrastructure and manufacturing of hardware and software. 90% of the total smartphones in the world are manufactured in Asia whereas the deployment of 5G internet services is in full flow across the Asian region. Across the world, five companies hold the patent for 5G services and four of these five belong to the Asian continent. World's biggest online retail market, Alibaba and online travel ventures like [Trip.com](https://www.trip.com/) and Ctrip have their origins in China. Also, tech unicorn like Traveloka which is an Indonesian venture is changing

the shape of the travel industry with huge investments (approx. US\$150 billion) in the travel experience market (Muskita, 2019). With Asian economies shifting to a diversified innovation- and knowledge-focused, its share in the world in terms of technology venture revenue has increased to a staggering 45% in 2016–18 from 41% in 2006–08, which is estimated to be 52% of growth worldwide.

Technology-Tourism Synergy in Asia

Travel industries need to keep up with the latest technology associated with travel and tourism for the alleviation of cost, providing the best experiences to customers, and improve the business performance. Technology adoption helps the travel industries to sustain in the globally competitive market as well as contribute to sustainability (Cheng & Cho, 2011). Technology adoption is contributing to sustainability in the tourism industry by replacing resources with technology (Choi et al., 2020). The technological evolution wave was noticed in the 1990s and influenced many airlines, travel agencies, and hospitality firms to develop websites along with online booking functions. Later, the online reservations of flights, hotels, and car rentals were offered by Expedia in 1996. In the continuation of the evolution of the online booking trend, many online platforms came into existence such as ‘Priceline’ online payment and website of trip advisor in 2000. In 2003, hotels started expanding around the world with the inclusion of Wi-Fi facilities. Many mobile-friendly websites and mobile application were launched after the introduction of smartphones. The touch screen information board replaced human contact, as a result, the first hotel in Japan Henn-na Hotel having robots staff was established in 2016 (Ira, 2020).

The technology application came into effect in the 1990s with the implementation of AI-based methods for tourism forecasting research and widely adapted since 2009 like the use of neural networks, genetic algorithms, and support vector regression. As of now, many new methods are used for tourism forecasting such as the use of big data analysis, machine learning, and search engine data research methods (Liu et al., 2019). Technological innovation in Asia has accelerated and brought digital transformation in the travel industry with the introduction of a various online platform like Travel and Expense management company ‘Baoku’, Online booking platforms like 12Go Asia, BorderPass, ConfirmTKT, Huangbaoche, Mafengwo, and online travel agency Flymya are specialized in facilitating the hassle-free travel-related services and smooth operation (Akeroyd, 2018).

The practice of searching information on online platforms is common among travellers for the collection of information about destinations and activities to participate but there is a lack of various other travel-related information such as choosing the best way to travel, time management, transportations. Artificial Intelligence (AI) is used to facilitate integrated information by adapting of Ant-Colony System for travelling and spreading travel awareness in Thailand. Ant Colony System is slow to perform but a popular tool for routing problems as well as suggests the shortage route to reach the destination and provide various travel-related

information such as opening and closing hours of attractions, type of vehicles to opt, suitable accommodations, recommend restaurants and activities to participate. Also, the Ant colony system is used for the Thailand Green Travelling problem by providing an information dataset taken from the Designated Areas for Sustainable Tourism Administration (DASTA) organization which supports reducing carbon emissions (Chawarattharungsri & Tongngam, 2020). Technology adoption is not limited to reservation only; the use of Robotics is also boomed in hotels of Asian regions (Dhoundiyal & Mohanty, *in press*) as in the case of MSocial Hotel of Singapore where chef robot prepares eggs for guests. Similarly, the facilitation of technology in Insadong and Cheonggyecheon Seoul forest acts as an attraction for travellers with the installation of media boards, free Wi-Fi, U- Health Park and self-driven information center 'U-help point' and permits visitors to connect the smartphone with official application to check the real-time state of tourist attraction. Since 2015, many projects are ongoing to facilitate smart ecosystem based on the Internet of Things (IoT) as the Bukchon city of Seoul is converted to living lab and these selected areas provide safety, transportation, and residential environment to tourists and residents by the installation of smart tour guide information center, free Wi-Fi and CCTV. 'U-city project' of Busan in Korea has also tremendously improved the city operation, ports, transportation. Busan announced the plans of global smart city development with the introduction of 26 the IoT-based services like smart parking, smart streetlights, and smart buildings in 2016. Thus, the smart city was established by Busan Tourism Corporation in 2017 and revealed the strategies like team formulation for smart tourism, public Wi-Fi, maps development, customized *Virtual reality* (VR), and *Augmented reality* (AR) for tourist sites (Um & Chung, 2021).

The use of technology is becoming crucial to get a hold on new ways to deal with the internal and external environment of a firm (Abelsen et al., 2014). Among Japanese society, robots have attained huge attention and are perceived positively as a result considered as companions despite machines. The previous studies found that Japan has the strongest emotional and social attachment to humanoid robots (Choi et al., 2020). Hence, Information and Communication Technology (ICT) plays an important role in describing, promoting, distributing, integrating, organizing, and delivering tourism products. Moreover, technology also brings innovation either sustaining innovation or disruptive innovation (Hjalager, 2014).

Tech-Based Innovations in Asian Tourism

Innovation is defined as the adoption of the perceived new idea, practice, objects by the individual or other units (Hung et al., 2011). Innovation is considered as a remedy to tackle the economic woes for the various industries of developed and developing nations. Hence, innovation adoption becomes necessary for growth and sustainability in the global competitive market. Also, the tourism industry is facing high competition due to the astonishing growth in the last few decades (Divisekera & Nguyen, 2018). In the competitive market, organizations are required to innovate

in the form of novelty, quality products, or cutting costs to fulfil the demands of customers. For successful innovation, an organization needs necessary tangible, financial, and intangible resources as well as requires people and technology to cope-up the rising global competition (Hjalager, 2014). According to Condor, 82% of global travel bookings were made via mobile app and website in 2018 and expected to rise to US\$817 Billion in 2020 (Condor Ferries, 2021).

Travellers perceived the usefulness of mobile guide services provided by mobile app for tour planning, tour purpose, and peripheral information. The further purchase intension of travellers can be influenced by a mobile application that meets travellers expectation and fulfils the demands along with the feel of uniqueness and unforgettable experience (Chuang, 2020).

The innovation in the travel industry is parallel running with the evolution in technology and bringing novelty in the approaches of ICT and service delivery such as Computer Reservation System (CRS) and Global Distribution System (GDS). ICT services were used in the 1980s, e-service like Internet and Online travel agency (OTA) came into existence in the 1990s, the m-service prompted by the hike in the use of smartphones and social media in late or mid-2000s and 2020 introduced a-services which includes the use of IoT, AI and service robots, VR and AR and Biometric identifications. Similarly, service delivery approaches have evolved from Company-centric-standard-driven to Consumer-centric-data-driven (Leung, 2019).

The online innovations implemented for making the booking process flexible and convenient such as organizations like Expedia Group and [Booking.com](https://www.booking.com) made it easy for clients to cancel the booking in case of circumstantial change or change of mind. Similarly, in the case of the COVID-19 outburst, Expedia Group launched 'Expedia Group Academy' to impart skills and provide training to workers as well as Philippines' Department of Tourism came in the front foot to support tourism stakeholders by providing online training to cope with the pandemic crises (Paine, 2020). Similarly, Mohanty et al. (2020) postulate how AR and VR technologies will make the tourists closer to the destination that they can't visit because of COVID-19 restrictions.

The hotel industry can be transformed with the innovative use of technology as it reduces the workload and provides the solution to avail quality products to the guests. Tech implementation enables the service to operate in an effective way such as Japan-based Tradfit's technology helping the hotel staff and guests both. Tradfit is a speaker that allows guests to make calls and sending housekeeping room requests as well as it has a chatbot that acts as a smart concierge for the hotel that translates up to 17 languages. The use of Tradfit in hotels is useful for handling the guest check-in and check-out process as it reduces the requirement of manpower. Tradfit uses AI, IoT, and voice recognition to handle guest query and facilitate the hotel operation efficiently (Yeo, 2019).

The new era is using Stimulus-Organisation-Response theory (SOR) for brand building of hotel as well as increasing Customer brand loyalty by the innovation of services and technological competence. Innovative services can be increased by the adoption of competence technology in a hotel and the guest psychological process can be changed after stay experience by innovative service and technology

competence. The feel of trust and brand equity can be raised among customers by using High-level service innovation and technological competence. Hence, brand loyalty will increase by creating a high level of perceived value among customers (Ruan et al., 2020).

The development of blockchain is also bringing a revolution in the travel industry as the innovators in Asia have been foster to adopt Blockchain technology in travel technology. The world's first digital wallet-based Blockchain is introduced by KrisFlyer airline of Singapore and allows the members to participate in point-of-sale transactions at retail merchants by using digital Kris Flyer miles. Blockchain is also applied by *Go Globe Chain* of China for building up a decentralized B&B booking system to eradicate false trading and credit risks (Akeroyd, 2018).

Drivers of Tech-Based Tourism Innovation in Asia

Several reasons are attributed to the rise of tech-based companies in Asian tourism. Undoubtedly, the biggest reason for it is the rise in middle-income groups with higher dispensable income and leisure time. As the most populous region of the world housing 47% of the global population, the Asian region is the home to 42% of the global middle-class, a number that is expected to grow to 54% by the year 2035. Also, with almost half of the global city-dwellers (2 billion Asian against 4.1 billion global) living in the Asian cities, the region accounts for 43% of the world's GDP considering purchasing power parity (Oxford Economics, 2020). These numbers narrate the behind the curtain stories of the rise in Asian tourism as well as higher investment in technology. Among the other reasons higher spending in R&D on technology (only by some countries like China and Singapore), massive internet user base, and better PPPs (Public-Private Partnerships) are considered to be the biggest contributors to Asia's rise as a tech-giant (McKinsey & Company, 2020).

On the other hand, Singh (1997) lists disposable income, longer leisure time, higher economic growth, aggressive tourism campaigns, and political stability as the factors for the growth of tourism in the Asia Pacific region. UNWTO (2019) commends additional factors like the support of Govt. for tourism, better tourism infrastructure, ease in travel formalities, and improved travel facilities for the growth of tourism in Asia. No matter whatsoever tourism industry in Asia is on a rising path and that is evident by more than one indicators. For example, China is the biggest outbound tourism market for the whole world while countries like India are the ones to show the biggest growth trends in tourist arrivals all over the world. As stated before, the parallel growth in both technology and tourism drives the innovation in tech-based tourism in Asia. A framework for the same is depicted below:

Prospects and Challenges of Tech-Based Innovation in Asian Tourism

The ongoing technological innovation is shaping the future of tourism service delivery system with the introduction of cutting edge technology or will be used to improve the experiences among tourists which includes the use of AI, IoT, service robots, VR and AR, and biometric identification features and predicted the evolution of service automation stage (i.e. a-service) (Leung, 2019). The delivery process in rural tourism projects can be innovated with the use of ICT for services which will help in the smooth flow of operations (Hjalager, 2014). Ant colony system needs to increase its searching speed and develop with the addition of more options to facilitate complete planning such as changing vehicles at a tourist site, the inclusion of more halts at the petrol station, and restaurants. The integration between the Public transport system and ant colony system will increase capacity to find out the best route, decrease the cost and reduce the CO² emission in the atmosphere. The other methods can also be introduced such as the Particle Swarm Optimization algorithm and shuffle Frog Leaping algorithm or may use hybrid methods (Chawaratthananarungsri & Tongngam, 2020). There is a need for empirical knowledge and study about innovations in tourism sectors for the formulation of strategies and policies to promote innovation (Divisekera & Nguyen, 2018). The government of Nepal is required to integrate with ICT to improve the tourism delivery method to resolve the issue of networking connectivity in remote and high altitude areas. The use of technology increased in the Nepal travel industry and needs an integrated system design to meet the demands, take care of existing technology and implement plans and policies for availing the advantages of ICT (Shrestha et al., 2021). Economic growth can be foster with the promotion of technology advancement, ICT distribution, and tourism development (Castro et al., 2021). The earlier study highlighted the key areas to utilize AR in a way to avail functional, social and perceived values of National Park visitors (i.e. tour and service information to be provided on the application during the visit) (Jiang et al., 2019). Hotels can introduce the use of Bicentennial Man with the inclusion of smart sound, light, and vision to bring the innovations in hotels which in return creates a technical rapport of the hotel. The inclusions of virtual dynamics will facilitate a unique experience for guests as well as customer evaluation can be improved with the installation of multidimensional sensory technology. The evolution is possible with the efficiency of hotel staff and motivation among staff therefore it's important to have freedom for employees to have flexible thinking and use ideas at work. Hence, customer's trust can be improved with the change in services and provides opportunity for innovation in hotel and escalate long-term relationship between employees and guests. The addition of ancillary services helps in enhancement of core product attractiveness (Ruan et al., 2020).

Challenges to Technological Innovations in Asian Tourism

Albeit the technological advancements that have occurred in Asia, the region has to overcome several issues before it could make it to the top of the global table. Woetzel and Seong (2020) in their article in the Japan Times note “Asia’s rapid development as a global technological leader over the last decade is a testament to the power of collaboration. And yet, in much of the world, the tide is turning toward isolationism and protectionism. Indeed, after years of relative openness, rising trade barriers threaten to disrupt global flows of technology and intellectual property”.

For quite some time, the continent of Asia has been wrongly perceived as a ‘monolith’ i.e. a region slows to change and comprising of little diversity. But the reality is far from it. This brings us to the challenge of technological gaps. While Asia has made tremendous growth in tech-based innovations, the majority of this stimulus has come from China alone. Other Asian countries are yet to harness their potential, if not their best. For example, a country like India with more than three fourth of STEM graduates don’t have an adequate number of tech-giants which is creating a huge wave of unemployment and subsequently, its people are falling into the colloquial unrest of ‘what happens when machines take up your job?’. Similar situation is reflected in the tech-based tourism innovations segment. While countries like China, Taiwan, and Singapore are facing the online travel market, the majority of other Asian countries are yet to make a mark on the digital platforms.

Most of this pocket development of technology in Asia can be attributed to the lack of collaboration among the Asian economies due to end number of geopolitical reasons. With constant unrest between China and India, for example, more than 115 Chinese apps (like TikTok and PUBG mobile) and websites were banned in India (ET Spotlight Team, 2021). Also, as tourism is a highly vulnerable industry, disruptions like these interrupt the harmony among different countries, which is one of the most basic elements for tourism growth.

Thirdly, not all Governments and private organizations across the Asian region find the technology-based travel sector lucrative to invest in and so, at the local level new tech ventures are not allocated sufficient funds to grow. South Asian countries specifically showcase a very minor portion of their budget allocated for tourism and technological developments. This consequently results in a lack of tech infrastructure growth in the tourism industry of these countries in the absence of favourable policies.

Another perennial challenge lying ahead of technology development in Asian tourism is the size, lack of experience and recent origins of its companies in the market. With the global tourism-technology market dominated by the big American and European companies, Asian tourism companies find it difficult to survive in the global online space. In recent years, companies like CTrip and Makemytrip are making their presence felt in the digital space, yet examples like these remain rare in the global market. Also, small tourism ventures even find it hard to access and make their presence on online platforms (let alone creating innovative products) due to lack of budget and scarcity of other resources (Styvén & Wallström, 2019).

Conclusion

Asia's story in terms of growth in tourism and technology is one to be remembered. This parallel growth in both sectors has provided a conducive breeding ground for innovations to happen. These innovations are not just important for providing strategic advances to the Asian organizations rather taking Asian tourism to a competitive position. On a long term basis, these new technological innovations can contribute to the cause of tourism sustainability based on environment, culture, and business as well (Mohanty, 2020). The chapter highlights some of the critical aspects of tech-based innovations in tourism while providing numerous examples from the Asian region. There is no doubt that innovations will drive a significant portion of Asian tourism growth. However, numerous challenges need to be addressed while implementing these innovations. The chapter also briefly highlights how these innovations will eventually take the center stage in tourism following the development of new paradigms post-COVID-19. In the absence of scientific literature on tech-based innovations in tourism, this article opens up many new avenues to be discussed and researched in the future.

References

- Abelsen, B., Eide, D., Kvidal, T., & Leenheer, A. (2014). Organizational innovation: Re-organizing destination marketing organizations. In G. A. Alsos, D. Eide, & E. L. Madsen (Eds.), *Handbook of research on innovation in tourism industries* (pp. 277–302). Edward Elgar Publishing.
- Akeroyd, S. (2018). Why Asia is shaping the future of travel. *TTG Asia*. Retrieved from: <https://www.ttgasia.com/2018/05/09/why-asia-is-shaping-the-future-of-travel/>. Accessed the 20th Apr 2021.
- Castro, C., Ferreira, F. A., & Nunes, P. (2021). Digital technologies and tourism as drivers of economic growth in Europe and Central Asia. In A. Abreu, D. Liberato, E. A. González, & J. C. Garcia Ojeda (Eds.), *Advances in tourism, technology and systems. ICOTTS 2020. Smart innovation, systems and technologies* (Vol. 209, pp. 341–350). Springer.
- CB Insights. (2020). *The complete list of unicorn companies*. Retrieved from: <https://www.cbinsights.com/research-unicorn-companies>. Accessed 20 Apr 2021.
- Chawaratthanarungsri, P., & Tongngam, S. (2020). Solving the travelling problem of Thai tourism by using improved ant colony optimisation. *International Journal of Innovation, Creativity and Change*, 12(12), 551–556.
- Cheng, S., & Cho, V. (2011). An integrated model of employees' behavioral intention toward innovative information and communication technologies in travel agencies. *Journal of Hospitality & Tourism Research*, 35(4), 488–510.
- Choi, Y., Oh, M., Choi, M., & Kim, S. (2020). Exploring the influence of culture on tourist experiences with robots in service delivery environment. *Current Issues in Tourism*. <https://doi.org/10.1080/13683500.2020.1735318>
- Chuang, C.-M. (2020). A current travel model: Smart tour on mobile guide application services. *Current Issues in Tourism*, 23(18), 2333–2352.
- Condor Ferries. (2021). *Online travel booking statistics 2020-2021*. Retrieved from: <https://www.condorferries.co.uk/online-travel-booking-statistics>. Accessed 20 Apr 2021.
- Conn, V. S., Valentine, J. C., Cooper, H. M., & Rantz, M. J. (2003). Grey literature in meta-analyses. *Nursing Research*, 52(4), 256–261.

- Dhoundiyal, H., & Mohanty, P. (in press). Artificial intelligence and robotics driving Tourism 4.0: An exploration. In A. Hasan (Ed.), *The Springer handbook on technology application of tourism in Asia*. : Springer.
- Divisekera, S., & Nguyen, V. K. (2018). Determinants of innovation in tourism evidence from Australia. *Tourism management*, 67, 157–167.
- ET Spotlight Team. (2021). India to permanently ban 59 Chinese apps, including TikTok. *The Economic Times*. Retrieved from: <https://economictimes.indiatimes.com/tech/technology/india-to-permanently-ban-59-chinese-apps-including-tiktok/articleshow/80451148.cms>. Accessed 20 Apr 2021.
- Hjalager, A.-M. (2002). Repairing innovation defectiveness in tourism. *Tourism Management*, 23(5), 465–474.
- Hjalager, A.-M. (2014). Disruptive and sustaining innovations: The case of rural tourism. In G. A. Alsos, D. Eide, & E. L. Madsen (Eds.), *Handbook of research on innovation in tourism industries* (pp. 56–83). Edward Elgar Publishing.
- Hung, Y.-C., Yang, Y.-L., Yang, H.-E., & Chuang, Y.-H. (2011). Factors affecting the adoption of E-commerce for the tourism industry in Taiwan. *Asia Pacific Journal of Tourism Research*, 16(1), 105–119.
- Ira. (2020). The history and future of travel technology briefly. *PackitUp*. Retrieved from: <https://packitup.io/blog/the-history-and-future-of-travel-technology-briefly/>. Accessed 20 April 2021.
- Jiang, S., Scott, N., & Tao, L. (2019). Antecedents of augmented reality experiences: Potential tourists to Shangri-La Potatso National Park, China. *Asia Pacific Journal of Tourism Research*, 24(10), 1034–1045.
- Leung, X. Y. (2019). Technology-enabled service evolution in tourism: A perspective article. *Tourism Review*, 75(1), 279–282.
- Li, B., & Piachaud, D. (2019). Technological innovations and social development in Asia. *Journal of Asian Public Policy*, 12(1), 1–14.
- Liu, H., Liu, Y., Wang, Y., & Pan, C. (2019). Hot topics and emerging trends in tourism forecasting research: A scientometric review. *Tourism Economics*, 25(3), 448–468.
- McKinsey & Company. (2020). *How Asia can boost growth through technological leapfrogging*. Retrieved from: <https://www.mckinsey.com/featured-insights/asia-pacific/how-asia-can-boost-growth-through-technological-leapfrogging>. Accessed 20 Apr 2021.
- Mohanty, P. (2020). ICT and sustainable development: Implications for the tourism industry. In A. Hassan & A. Sharma (Eds.), *The Emerald handbook of ICT in tourism and hospitality* (pp. 259–272). Emerald Publishing.
- Mohanty, P., Hassan, A., & Ekiz, E. (2020). Augmented reality for relaunching tourism post-COVID-19: Socially distant, virtually connected. *Worldwide Hospitality and Tourism Themes*, 12(6), 753–760.
- Muskita, P. (2019). How Traveloka plans to conquer the \$150b travel experiences market. *Tech in Asia*. Retrieved from: <https://www.techinasia.com/traveloka-plans-conquer-150b-travel-experiences-market>. Accessed 20 Apr 2021.
- Oxford Economics. (2020). *Data on middle-income, urban, and total populations*. Retrieved from: <https://www.oxfordeconomics.com/data-sets>. Accessed 20 Apr 2021.
- Paine, J. (2020). Technology is key to rebooting tourism. *Jakarta Globe*. Retrieved from: <https://jakartaglobe.id/opinion/technology-is-key-to-rebooting-tourism/>. Accessed 20 Apr 2021.
- Ruan, W.-Q., Zhang, S.-N., Liu, C.-H., & Li, Y.-Q. (2020). A new path for building hotel brand equity: The impacts of technological competence and service innovation implementation through perceived value and trust. *Journal of Hospitality Marketing & Management*, 29(8), 911–933.
- Shrestha D., Wenan T., Gaudel B., Maharjan S., & Jeong S. R. (2021) An exploratory study on the role of ICT tools and technologies in tourism industry of Nepal. In J. S. Raj (Ed.), *International conference on mobile computing and sustainable informatics. ICMCSI 2020. EAI/Springer innovations in communication and computing* (pp. 93–110). Cham: Springer.

- Silver, C. (2020). The top 25 economies in the world. *Investopedia*. Retrieved from: <https://www.investopedia.com/insights/worlds-top-economies/>. Accessed 20 Apr 2021.
- Singh, A. (1997). Asia Pacific tourism industry: current trends and future outlook. *Asia Pacific Journal of Tourism Research*, 2(1), 89–99.
- Styvén, M. E., & Wallström, Å. (2019). Benefits and barriers for the use of digital channels among small tourism companies. *Scandinavian Journal of Hospitality Tourism Management*, 19(1), 27–46.
- Tolkach, D., Chon, K. K., & Xiao, H. (2016). Asia Pacific tourism trends: Is the future ours to see? *Asia Pacific Journal of Tourism Research*, 21(10), 1071–1084.
- Um, T., & Chung, N. (2021). Does smart tourism technology matter? Lessons from three smart tourism cities in South Korea. *Asia Pacific Journal of Tourism Research*, 26(4), 396–414.
- Woetzel, J., & Seong, J. (2020). What is driving Asia's technological rise? *The Japan Times*. Retrieved from: <https://www.japantimes.co.jp/opinion/2020/12/24/commentary/world-commentary/asia-technological-rise/>. Accessed 15 Mar 2021.
- World Tourism Organization (UNWTO). (2019). *Asia tourism trends*. UNWTO.
- Yeo, S. (2019). How tech can help Southeast Asia keep up with surging tourist arrivals. *Tech in Asia*. Retrieved from: <https://www.techinasia.com/tech-southeast-asia-surgng-tourist-arrivals>. Accessed 20 Apr 2021.

Chapter 5

The Role of ICT Applied to Tourism and Marketing in Asia



Célia Ramos and Azizul Hassan

Abstract The tourism activity is dependent on technology, which has contributed to revolutionize the area both in terms of how to operate and in terms of generating new concepts. Information and Communication Technology have played a leading role in creating new ideas, discovering trends, defining more disruptive strategies and, consequently, developing new practices. With the emergence of new technologies, the following stand out: the progress in the use of voice to search on Google, the increasing use of chatbot to interact with tourists, the growth in the use of video marketing to promote and publicize tourism products and services, and the combination of artificial intelligence with machine learning to help the customer when planning and deciding what they want to buy and / or experience in a travel. The combination of the technologies mentioned above with those associated with the concept of industry 4.0 will help to change the face of tourism and marketing, since it will increase connectivity between men and machines, through interaction and communication expressed on social networks using a smartphone, while potentiate the need to purchase goods and services, while support decision making about how, when and where to purchase, taking into account the importance of immediate achievements, which is one of the characteristics of future consumers who are digital natives. This chapter identifies the main potential of emerging technologies, taking into account the means of communication provided by the internet, and the connection-involvement between user-technology-experience for tourism and marketing combined as a tool to change the face of tourism in Asia.

Keywords Tourism · Digital economy · Tourism marketing · Technologies innovations · e-tourism · e-commerce

C. Ramos (✉)

School for Management, Hospitality and Tourism, ESGHT and CinTurs (Research Centre for Tourism, Sustainability, and Well-Being), Universidade do Algarve (UALG), Faro, Portugal
e-mail: cmramos@ualg.pt

A. Hassan

Tourism Consultants Network, The Tourism Society, London, UK

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_5

Introduction

Currently it is no longer enough to have a technological basis to meet the needs of customers, the competitiveness of the tourism sector is guaranteed through the capacity of innovation that companies can achieve (Cunha, 2011), either through innovation associated with services or through services, through decisions associated with the governance of tourist destinations.

The relationship between tourism innovation and business competitiveness in the tourism sector must consider the emerging and innovative technologies that arise daily in society. In this context, the information systems applied to tourism, taking into account the various sectors of activity: accommodation, travel agencies, restaurants and gastronomy, tourist entertainment, transport, among others; that in addition to the management of tourist information, it has to integrate innovation mechanism, which should be based on the definition of an appropriate business model (Amit & Zott, 2012).

The business model that guarantees innovation must integrate design, production, service and marketing through a new customer relationship (Amit & Zott, 2012; Linder & Williander, 2017), consequently information systems in tourism must be able to meet the requirements inherent in the new business model (Sigala, 2018).

This chapter intends to investigate the role played by technologies in Marketing in general and specifically applied to tourism marketing. After the introduction, the chapter is structured in four sections, ending with some conclusions. The first section presents the role of technologies and digital transformations related to economic development. The second section presents the relationship between the new technologies and the innovations that have emerged within tourism. The third one presents the potential of Marketing for the tourism sector, through the presentation of concepts associated with Tourism Marketing. The fourth section presents the role of technologies in Tourism Marketing, as well as their potential.

ICT, Digital Transformations, and Economic Development

The ICT and digital transformations have influenced the emergence of new business models and fundamentally changed economic development, on the one hand they have forced to abandon certain traditional concepts and behaviours, on the other hand they have forced to adopt technological innovations, in order to guarantee the survival, innovation, sustainability and competitiveness of economic activity (Gössling, 2021).

The ICT economy is characterized by its rapid expansion, global reach, co-shared competition, structures that allow financial flows for small companies (Forbes, 2021; Gössling, 2021), where tourism is one of the main economic sectors for growth of the ICT economy.

Most of the technological innovations emerged in the last three decades, with the emergence of the World Wide Web and the use of personal computers standing out in the nineties, in the following, web 2.0 emerged, which allowed users to stop being passive and become content generators. In the last decade, and due to the emergence of the smartphone, technological innovations have appeared in the market, such as the emergence of mobile apps, such as: smart speakers, smart watches, smart glasses, which allowed the development of new applications, from wireless payments, electronic governance until the measurement of users’ emotions through emotion sensors (Gosling, 2021, as shown in Fig. 5.1 below:

All technological innovations contributed to the development of economic activities, as they were emerging, so was their adoption, where the most significant innovation was the Smartphone introduced in 2007 by Apple (Gosling, 2021), which contributes to the popularity of technological services, such as Social media, which include social networking sites, blogs, review sites and Wikis (Gandomi & Haider, 2015). In this technological environment, opportunities for using mobile devices in an economic context grew, which led to the emergence of new business models, due to changes in consumer behavior, the use of electronic commerce platforms, which had the advantage of verify the identity of the user, as well as save their personal data, which contribute to the definition of segmentation strategies by the companies, consequently the technological companies started to see its importance rising from day to day, which until now only the petroleum and automobile industries stood out, contributed to the definition of a new economy – digital economy (Tapscott, 1996) or technological economy (Gosling, 2021).

This new economy had a disruptive effect on society and on the way in which companies operate, which affected all companies, whatever their size, whether public or private, with effects on people and society, as well as the culture of consumers, as shown in Fig. 5.2, where we can analyze the drivers, changes and results, both from the point of view of consumers and from the point of view of business.

Technological innovations have boosted the emergence of drivers for consumers that included access to information about products and services, the potential for communication through social networks, to publicize products and services, which

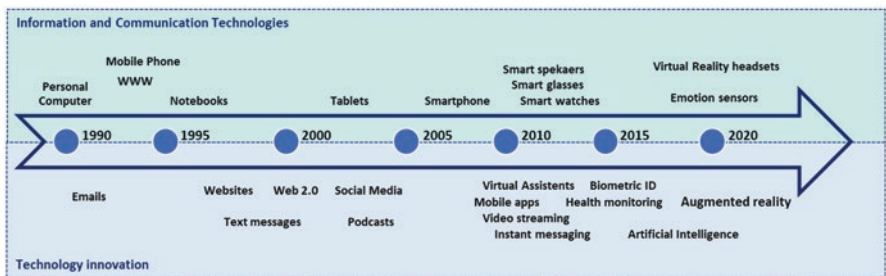


Fig. 5.1 Technology innovations and ICT developments, considering when technologies became widely available to consumers, not when these were invented. (Source: adapted from Gössling, 2021: 736)

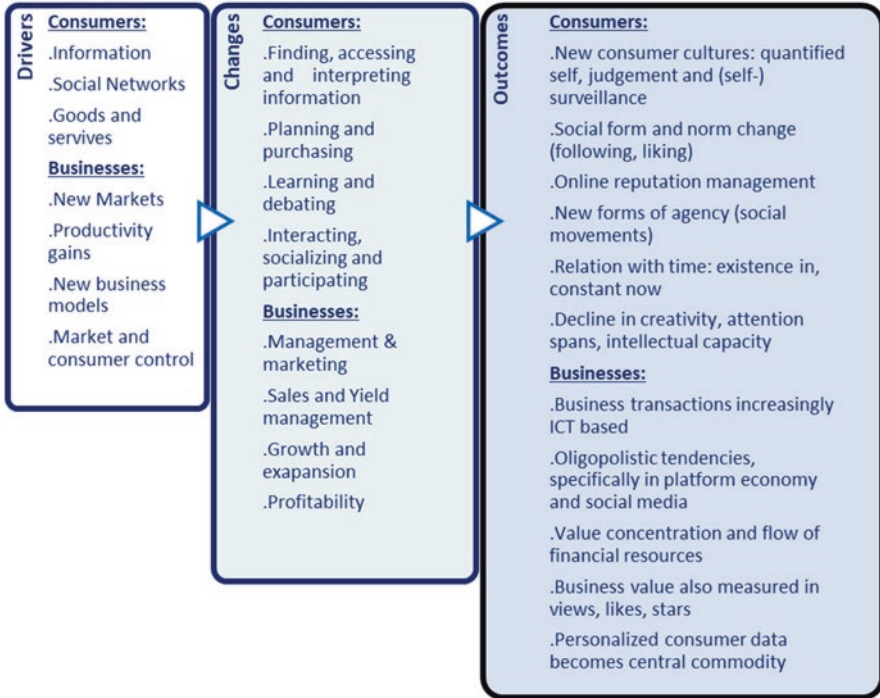


Fig. 5.2 Drivers, changes and outcomes of the technology and ICT innovations. (Source: adapted from Gössling, 2021: 737)

for businesses have boosted the emergence of new markets, increase of productivity to develop products according to the preferences of the customers, causing the emergence of new business models while it became possible to monitor and control the market and its consumers, in terms of preferences and characteristics. This technological environment, which provided these drivers also contributed to increase the importance of controlling commercial transactions, while decreasing the importance of production, since it started to be carried out according to the needs or satisfaction of consumers' preferences, contributing to analyzes differently, maintaining the assumptions of the analysis of opportunities and needs, but in a different perspective where technology is an essential player, and where business involvement is no longer a central aspect.

In terms of changes in consumers, it affected their behavior in the decision-making process to purchase a product or service, as they search for, and analyse information available online, use it to plan and buy, acquire knowledge about it, and their knowledge participates, becoming agents of products and services. For businesses, it caused changes in the way of managing sales, definition of new marketing strategies, with a view to increasing sales and profits, boosting the growth and expansion of its activities, as well as the profitability of companies.

With regard to results, both for society and for individuals, taking into account the consumer's point of view, new consumer cultures have emerged, new ways of interacting, the emergence of online reputation, with very valuable contributions caused by the contents generated by users, diminishing the importance of creativity. From the business point of view, results have emerged, transactions are now supported by technology, new dependencies have emerged mainly for small companies, changes in financial flows, changes in the way reputation is defined, changes in the focus for personalization of products and consumer data to facilitate management and increase productivity.

Information technologies have revolutionized the development of products and services (Buhalis et al., 2019) where the interconnection between products accelerated by ubiquitous network connectivity and processing power, restructure markets, reengineer business processes, disrupt value chains, and develop digital economies (Porter & Heppelmann, 2014), causing the emergence of innovation in different perspectives of the tourist activity. However, this process of technological adoption continues to evolve markedly with the emergence of COVID-19, there has been an acceleration of the evolution associated with the digital transformation of society, which will shape the future of companies in general and in particular those of tourism (Forbes, 2019), namely, in terms of teleworking, search and purchase of products and services online, virtual events and the use of the cloud, which made it easier for companies to manage the crisis.

Technological Innovations and Innovation in Tourism

The competitiveness of the tourism sector is guaranteed through the innovation capacity that companies are able to achieve (Cunha, 2011), based on the definition of a new business model (Amit & Zott, 2012; Sigala, 2018), which considers the establishment of a relationship with the customer where the components of design, production, service and marketing are integrated (Compete, 2017).

For the relationship between innovation in tourism and the competitiveness of the sector to be a successful partnership, it is relevant to consider the technological drivers of change associated with the concept of industry 4.0 (Lasi et al., 2014), constituting technological bases to leverage tourism companies to a technological environment called “Turismo 4.0” (Bu, 2018; Moustaka et al., 2019).

This technological environment implies the integration of information systems in a virtual (cyber-physical) world, the communication between equipment – Internet of Things (Lee et al., 2015; Xu et al., 2018), mechanisms that assure information security in virtual space, reality, cloud computing, big data, 3D printing, autonomous robots, and mobile Internet (Saturno et al., 2017), as shown in Fig. 5.3.

The technological environment associated with “tourism 4.0”, will allow the development of tourist companies and their digital transformation to be boosted to lead to the business models and conditions associated with a company strategy with



Fig. 5.3 Technologies of industry 4.0. (Source: adapted from Saturno et al., 2017)

the objective of creating personalized products and services with a view to improving the tourist experience (Tourism 4.0, 2018).

“Tourism 4.0” can be measured as the engine for facilitating innovation in the tourism sector and for stimulating entrepreneurial ecosystems (Bu, 2018), in three different perspectives: consumer (tourist and resident), producer (suppliers of services and products), and government (managing all tourism development infrastructures and environments).

Innovation and entrepreneurial ecosystems can improve the development of: (i) services and products: combined with emotional intelligence, accessible to everyone, accompanied with augmented reality, and virtual reality with immersive experiences (Nabben et al., 2016); (ii) applications that enhance tourist involvement (Oliveira & Panyik, 2015; Dickinson et al., 2014), and contribute to the customization and segmentation of services and products; (iii) applications of business intelligence and data analytics tools in real time, for the management of information storage structures, and big data with a view to managing the tourist destination and all the companies implanted there, in a secure way through cybersecurity and

payments using virtual currencies such as blockchain (Peceny et al., 2019), as well as IoT applications, with a view for information and communication exchange between diverse partners (Newman, 2018; Stalidis et al., 2015).

Tourism 4.0 will mainly lead for disrupting the service management and transforming value co-creation process. However, it must be borne in mind that it is necessary to go beyond business and leisure, consider that the service must be of quality for guests and non-guests (for example, for residents, local entrepreneurs, regional events, among others), pay attention to the needs and characteristics of different generations (different age groups), that is, it will have to be combined with tourism marketing strategies, with tourist campaigns carried out through digital marketing, which maximize reaching the largest number of potential customers; definition of price strategies, through packages and promotions, loyalty schemes, including gamification, with the addition of offers and attractive room rates; restructuring of operations and processes, creating specific and thematic offers with a view to reducing seasonality and increasing profit during the low season.

The Role of Tourism Marketing

The tourism marketing should have knowledge about consumer market and competition (tourism marketing), bearing in mind the components of the marketing-mix: product, place, promotion and price (Perreault et al., 2018), programming, people and partnership (Mill & Morrison, 2002).

Technology should be considered in tourism marketing strategies, such as to create tourism promotions, to develop marketing plans, to create and advertising campaigns, to define segments in according to their products, to define new services and fares offering to different segments and ages, define a brand for a destination, also using blogs, Wikis, social media, and mobile marketing (Goeldner, & Ritchie, 2007). For the author Goeldner and Ritchie (2007: 532) “Marketing is an inevitable aspect of tourism management. Marketing can be done effectively and well, with sophistication”, and more effectively through the inclusion of technologies in the definition and implementation of strategies, with the objective that they guarantee successful results.

In according with Goeldner and Ritchie (2007: 547), “successful tourism marketing depends in large on research”, where the research can be divided in three main market orientations: geographic, demographic and psychographic, with the aim to obtain knowledge about: (i) who are the tourists and where they live, (ii) identify what they likes and dislikes, (iii) who are the potential customers, (iv) what are their travel preferences and interests, (v) their travel destination preferences, (vi) their preferences about shopping and entertainment, (vii) to obtain knowledge about our competitiveness, (viii) identify the trends in the competition (competitive set), (ix) to learn about future trends in our market share, (x) how it is possible to increase the demand for our destination, (xi) what type of marketing programs will be necessary / efficient and (xii) how this plans can be executed.

Also, for Goeldner and Ritchie (2007: 548) the market research should obtain information about our visitors, in according with the maker orientation. For the demographic market orientation, it is important to know age, gender, levels of education, income, family status, and household. For the geographic market orientation, it is important to know where the tourist, the current visitors and potential in the future. For the psychographic market orientation, it is important to know tourists' motivations, hobbies, interest, responsiveness to advertisement and travel propensity.

With the knowledge above, it will be possible to offer a quality service, taking into account increasing customer satisfaction, so that it leads you to want to repeat the visit at our destination. Customer satisfaction and loyalty are the characteristics of a tourist destination that lead to the generation of profit from a business, and consequently to its success, as well as to its survival, leading to the emergence of the concept of quality of experience (QOE) "where tourism experience consists of a complex chain of service transactions and visitor participation in a broad range of activities and events" where the aim of the tourism business is "to provide the visitor with a holistic combination of services, activities, and events from which he/she derives a high level of satisfaction" (Goeldner & Ritchie, 2007: 550).

However, with technology these tasks became easier, since the emergence of the Internet came to support the tourist activity in different tasks, where it stands out: to provide information, distribution and sales, and research are all tasks being performed via this medium, 24 hours a day, 7 days a week, 365 days a year, and with the conjugation with consumer generated contents, where the tourists share reviews, photos and videos, and made available for the other Internet users in social media, which can be considered and interactive technology .

Another relevant aspect of tourism marketing, where technology plays a fundamental role is in market segmentation, since "an effective market strategy will determine exactly what the target markets will be and attempt to reach only those markets" (Goeldner & Ritchie, 2007: 553), that is, with appropriate technology it is possible to identify the characteristics of the consumers suitable for each segment and only reach the specific segment, without wasting costs and hours of human resources, presenting a quality product and service on the market, to increase demand and maximize profit.

The Role of Technology in Marketing

Technological innovations play a central role in the tourist activity and in the marketing strategies, which have effects both from the viewpoint of the industry/business, and from the opinion of the tourist/consumer. The technologies allowed the emergence of new scenarios to develop activities: digital marketing, SEO, SEM, PPC, social media, among others.

Technologies have revolutionized the functions of marketing, and the performance of marketing has been altered by the emergence of new concepts, ideas,

trends, strategies and improved practices; contributing to the emergence of more innovative and useful, efficient strategies, which, when applied to tourism marketing, has led to the development of new strategies to improve the relationship between business and potential customers. Technological innovations applied to tourism marketing contribute to improve the consumer/tourist experience, save time, obtain customer data, develop products and services according to the preferences and trends of tourists, increase automation in marketing and improve efficiency of use of means used, decrease costs.

Current technological trends that will contribute to continue to cause disruptive changes in society and business are: use of voice, Chatbot, advertising on mobile devices, personalization, blockchain, mobile payments, gamification, artificial intelligence and machine learning, robots, social media, Internet of Things (IoT), augmented reality and virtual reality (Hoyer et al., 2020).

Emerging technologies cannot be ignored for Marketing and will contribute to the development of more efficient tourism marketing plans to enhance the development of tourist destinations.

Should bet on the use of voice, or voice assistants, the number of voice searches on Google has been rising daily, which combined with machine learning and artificial intelligence techniques will provide usefulness to this resource and will bring potential tourists closer. Chatbot technology allows you to respond to customers in real time, whose content can be analyzed with text mining techniques to improve communication between companies and their consumers / tourists.

Advertising carried out through mobile devices, for example through social media platforms for sending personalized campaigns, as well as helping tourists to become agents of tourist destinations, through the sharing of reviews, photos and videos.

Blockchain technology will allow secure communication, whether of commercial transactions or personal data, increasing the credibility in sales and interactions made through this medium, as well as the security associated with reliable electronic systems, which is excellent for the tourism area, since it promotes the development of a feeling of security and trust associated with any payment, as well as the protection of personal data.

Artificial intelligence, as well as machine learning techniques, are increasingly present in society, and are gaining significant importance in the marketing area, since it supports the planning and decision-making process, both for tourists and for managers of tourist destinations, in terms of strategies, consumers and about their own human resources, where the Pokémon game is an example of an application that allows to know points considered to be of interest and define routes through cities (Hoyer et al., 2020).

The augmented reality and Virtual Reality can contribute to communicate additional information about tourist spots, points of reduced accessibility, more information for tourists' special accessibility needs, protection of artifacts that cannot be under public scrutiny, resolution of queues to access a specific location.

The Internet and Social Media platforms have caused disruptive effects in the way companies communicate with their tourists, as well as changed the way

tourism marketing is applied, since tourists use being on platforms to make purchase decisions, through consultation of information made available democratically under the name of testimonies, which contribute to inspire and validate the interest of tourist destinations. On the other hand, they contribute to improving the service provided to the tourist as well as increasing their satisfaction, and interaction with the dissatisfied tourist. They transformed travel agencies, contributing to the provision of tourist information, the offer of associated products and services, self-service booking, obtain knowledge about the tourist, helping them to create memories associated to the travel, while allowing to include loyalty programs that have become a fundamental part of the travel business model.

Mobile payments will make life easier for tourists, as it will allow payment in different currencies, without the need to exchange money, without the need to carry money and with greater security, even in unsafe or unknown security destinations.

Internet of Things (IoT) allows the search for relevant information, virtual accessibility, access to smart cards and smart services, enabling interaction between tourists and objects, as well as between tourists and points of interest, among other examples.

Gamification allows you to enjoy discounts and access to rewards after reaching certain business objectives, as well as a shared competition, which brings high benefits to tourist destinations. For example, a lunch at Restaurant A and a cocktail at Bar B will rewards a ticket to attend a local event, such as a traditional festival.

The technologies referred to, often referred to as the “digital revolution” (Hoyer et al., 2020; Pencarelli, 2019), and when adopted by both tourism marketing and businesspeople, boost tourist involvement while contributing to add value to their tourism experience, as well as it allows to know the customer journey of the tourists, which brings benefits to the entrepreneurs if it is analyzed with appropriate techniques.

The Role of ICT in Tourism and Marketing in Asia

Asia is both culturally and ethnically unique and diverse, where the growth potential of its tourism sector is huge. This potential combined with technologies innovations, mainly associated electronic commerce associated to the tourism activity, which provides an innovate technology-based marketing to contribute to create communication bridges between companies and customers (Jonathan & Tarigan, 2016).

The ICT contributes to increase the satisfaction of the customer, control activity development and detect deviations of the business and to monitor tourism industry performance, where the transaction of the tourism products are made through the ICT as an intermediary, where the Internet “has become a main distribution channel in e-tourism” (Jonathan & Tarigan, 2016: 59), contributed to reduce the cost associated to the commissions and the business intermediaries, while provides a medium to share and promote all the information Asian tourism products and services,

including presenting knowledge about the tourism destinations, the values of the residents, the culture associated to the heritage sites, traditions about native people and places.

The Internet provides tourist to have access to crucial and valuable information about the Asian countries as a tourism destination, where they search for detailed information about each region they intend to visit, in term of geographical information, climate, accommodation, restaurants, gastronomy, accessibilities, shopping facilities, social customs, culture and special characteristics of the places (Jadhav & Mundhe, 2011). Furthermore, the Internet can be used to access to booking systems, have access to destination promotion and events, define and add value to the customer relationship between the travelers and the suppliers.

With the Web 2.0 emerged the social media platform, which allowed changing the focus from cybernauts to generated content (Prayogo & Kusumawardhani, 2017), as well as allowing communication between tourists to allow the generation of content by other tourists, in the form of textual testimonies, sharing photos with landscapes, habits and customs, and videos where traditional festivals can be highlighted, thus enhancing the spread of electronic Word-of-Mouth, which arouses the curiosity and interest of potential tourists, while allowing travelers the creation of memories and virtual stories, shareable with family, friends and other tourists, playing the role of influencers and replacing the role of traditional travel agencies, through suggestions and advice on how to travel, what to visit, which care should be taken, which customs should be sharpened so as not to hurt the sensibilities of local people, teach about the values, culture and identity of c. one of the tourist destinations visited.

Destination management organizations should consider the impact of the ICT in the Asian tourism activity, where the digital marketing can contribute to engage customers in the destination (Hassan & Ramos, 2020), by the other side “the lack of integration of technology results in DMOs predominantly limiting their use of technology for marketing only” (Li et al., 2017: 99), however, presents disadvantages to the destinations where the want to attract their main source markets from developed countries, which in general travelers with high sophistication use of technology, and this kind of tourists generate contents in the social media platform, having associated other data, such as: socio-demographic data collected by the applications, combined with business intelligence tools, allow the development of marketing strategies taking into account the intelligent insights obtained, also contributing to the leverage the emergence of smart tourism destination in Asia (Gretzel et al., 2015; Femenia-Serra et al., 2019).

All technological innovations associated with industry 4.0 may further enhance the development of tourism in Asian countries, through the capture of new markets, with more economic power, contributing to reduce poverty, reduce hunger, improve the quality of life and health of local populations, improving the quality of education, creating decent work and boosting economic growth, reducing gender inequality, developing industry, creating more sustainable cities, which are just some of the Sustainable development goals (Gössling, & Hall, 2019; TOURISM4SDGS, 2021).

Conclusion

Technological innovations in tourism have emerged for enhancing the development of a more sustainable destination, as: using mobile devices through markets and social media, it is possible to connect the consumer with the product (Gretzel, 2016); with the deployment of revenue management tools, hotel chains can manage their entire business using big data (Pan & Yang, 2017); responsive websites creation that are suitable for different mobile devices' usage (Tao et al., 2018); smart hotels can improve their product and service offerings by using big data, sensors, and the Internet of Things to consider the context in which the visitor is visiting (Gretzel, 2016); with robots for helping the customer with services and for facilitating communications (Leung, 2019; Tussyadiah & Park, 2018); among others.

ICT is changing the face of tourist marketing. Once technologies have boosted the involvement of tourists, they have helped the managing entities of tourist destinations to publicize their products and services, resorting more and more to mobile devices, betting on the analysis of content generated by users for to verify the notoriety of its brands, to increase the number of sales, starting to consider the users of social media as influencers of its brands.

Technological innovations that have emerged in Asia, as in other parts of the world, have disrupted the development of tourist activity, enhancing the development of a more sustainable destination, such as: it is possible to connect the consumer through mobile devices, which enhances the development of a more sustainable destination. With the product, big data provides hotel chains with the ability to manage their entire business, smart hotels, which use sensors, big data, and the Internet of Things to enhance their product and service offerings while taking into account the context in which the tourist is located, and robots to assist with services and facilitate communication with customers. However, this technological scenario is still felt in very few regions of this continent full of potential.

Acknowledgement This paper is financed by National Funds provided by FCT- Foundation for Science and Technology through project UIDB/04020/2020.

References

- Amit, R., & Zott, C. (2012). Creating value through business model innovation. *MIT Sloan Management Review*, 53(3), 41–49.
- Bu, N. (2018). The 22nd session of the UNWTO general assembly–special session on smart tourism: Chengdu, China, 14–15 September 2017. *Anatolia*, 29(1), 143–145.
- Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019). Technological disruptions in services: Lessons from tourism and hospitality. *Journal of Service Management*, 30(4), 484–506.
- Compete. (2017). *Turismo 4.0*. Retrieved from: https://www.compete2020.gov.pt/admin/images/Turismo_4.0-vrs02_22maio2017.pdf. Accessed 30 April 2021.

- Cunha, L. (2011). Autenticidade e Inovação: factores de renovação dos destinos turísticos maduros. *Journal of Tourism Studies – Cogitur*, 4, 9–28.
- Dickinson, J. E., Ghali, K., Cherrett, T., Speed, C., Davies, N., & Norgate, S. (2014). Tourism and the smartphone app: Capabilities, emerging practice and scope in the travel domain. *Current Issues in Tourism*, 17(1), 84–101.
- Femenia-Serra, F., Neuhofer, B., & Ivars-Baidal, J. A. (2019). Towards a conceptualisation of smart tourists and their role within the smart destination scenario. *The Service Industries Journal*, 39(2), 109–133.
- Forbes (2019). COVID-19 is a before-and-after moment in the digital transformation. Retrieved from: <https://www.forbes.com/sites/andrewfilev/2020/03/30/covid-19-is-a-before-and-after-moment-in-the-digital-transformation/#6159bba9d422>. Accessed 30 April 2021.
- Forbes. (2021). *The richest people in the world*. Retrieved from: <https://www.forbes.com/billionaires/#1cd64db251c7> Accessed 30 April 2021.
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137–144.
- Goeldner, C. R., & Ritchie, J. B. (2007). *Tourism principles, practices, philosophies* (pp. 532, 547, 548, 550, 553). Chichester: Wiley.
- Gössling, S. (2021). Tourism, technology and ICT: A critical review of affordances and concessions. *Journal of Sustainable Tourism*, 29(5), 733–750.
- Gössling, S., & Hall, C. M. (2019). Sharing versus collaborative economy: How to align ICT developments and the SDGs in tourism? *Journal of Sustainable Tourism*, 27(1), 74–96.
- Gretzel, U. (2016). The new technologies Tsunami in the hotel industry. In M. Ivanova, S. Ivanov, & V. Magnini (Eds.), *Routledge handbook of hotel chain management* (pp. 490–497). Routledge.
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179–188.
- Hassan, A., & Ramos, C. M. (2020). Innovative technology application in tourism marketing. In A. Hassan (Ed.), *Tourism Marketing in Bangladesh* (pp. 143–154). Routledge.
- Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the customer experience through new technologies. *Journal of Interactive Marketing*, 51, 57–71.
- Jadhav, V. S., & Mundhe, S. D. (2011). Information technology in Tourism. *International Journal of Computer Science and Information Technologies*, 2(6), 2822–2825.
- Jonathan, C. J., & Tarigan, R. (2016). The effects of e-tourism to the development of tourism sector in Indonesia. *CommIT (Communication and Information Technology) Journal*, 10(2), 59–62.
- Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business & Information Systems Engineering*, 6(4), 239–242.
- Lee, J., Bagheri, B., & Kao, H. A. (2015). A cyber-physical systems architecture for industry 4.0-based manufacturing systems. *Manufacturing Letters*, 3, 18–23.
- Leung, R. (2019). Smart hospitality: Taiwan hotel stakeholder perspectives. *Tourism Review*, 74(1), 50–62.
- Li, S. C., Robinson, P., & Oriade, A. (2017). Destination marketing: The use of technology since the millennium. *Journal of Destination Marketing & Management*, 6(2), 95–102.
- Linder, M., & Williander, M. (2017). Circular business model innovation: inherent uncertainties. *Business Strategy and the Environment*, 26(2), 182–196.
- Mill, R., & Morrison, M. (2002). *The tourism system* (4th ed.). Kendall/Hunt.
- Moustaka, V., Vakali, A., Zikos, N., Tsirakidis, T., & Anthopoulos, L. G. (2019). *TOMI: A framework for smart tourism on the move innovation*. In WWW (Companion Volume). WWW '19: Companion proceedings of the 2019 world wide web conference, pp.123–129. <https://doi.org/10.1145/3308560.3317051>
- Nabben, A., Wetzal, E., Oldani, E., Huyeng, J., Boel, M., & Fan, Z. (2016). *Smart technologies in tourism: Case study on the influence of iBeacons on customer experience during the 2015 SAIL Amsterdam event*. In Research paper prepared for the International Tourism Student Conference. Madrid: NHTV Breda University of Applied Sciences, the 19th–22th April, 2016.

- Newman, D. (2018). Top 6 digital transformation trends in hospitality and tourism. *Forbes*. Retrieved from: <https://www.forbes.com/sites/danielnewman/2018/01/02/top-6-digitaltransformation-trends-in-hospitality-and-tourism/>. Accessed 12 May 2021.
- Oliveira, E., & Panyik, E. (2015). Content, context and co-creation: Digital challenges in destination branding with references to Portugal as a tourist destination. *Journal of Vacation Marketing*, 21(1), 53–74.
- Pan, B., & Yang, Y. (2017). Forecasting destination weekly hotel occupancy with big data. *Journal of Travel Research*, 56(7), 957–970.
- Peceny, U. S., Urbančič, J., Mokorel, S., Kuralt, V., & Ilijaš, T. (2019). *Tourism 4.0: Challenges in marketing a paradigm shift*. In *Consumer Behavior and Marketing*. Retrieved from: <https://www.intechopen.com/books/consumer-behavior-and-marketing/tourism-4-0-challenges-in-marketing-a-paradigm-shift>. Accessed 11 May 2021.
- Pencarelli, T. (2019). The digital revolution in the travel and tourism industry. *Information Technology & Tourism*, 22, 455–476.
- Perreault, W., Cannon, J., & McCarthy, E. (2018). *Essentials of marketing* (16th ed.). McGraw-Hill Education.
- Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, 92, 64–88.
- Prayogo, R. R., & Kusumawardhani, A. (2017). Examining relationships of destination image, service quality, e-WOM, and revisit intention to Sabang Island, Indonesia. *APMBA (Asia Pacific Management and Business Application)*, 5(2), 89–102.
- Saturno, M., Pertel, V. M., Deschamps, F., & Loures, E. D. F. (2017). *Proposal of an automation solutions architecture for industry 4.0*. In Proceedings of the 24th international conference on production research. Poznan: ICPR.
- Sigala, M. (2018). New technologies in tourism: From multi-disciplinary to anti-disciplinary advances and trajectories. *Tourism Management Perspectives*, 25, 151–155.
- Stalidis, G., Karapistolis, D., & Vafeiadis, A. (2015). Marketing decision support using Artificial Intelligence and Knowledge Modeling: application to tourist destination management. *Procedia-Social and Behavioral Sciences*, 175, 106–113.
- Tao, M., Nawaz, M. Z., Nawaz, S., Butt, A. H., & Ahmad, H. (2018). Users' acceptance of innovative mobile hotel booking trends: UK vs PRC. *Information Technology & Tourism*, 20(1-4), 9–36.
- Tapscott, D. (1996). *The digital economy: Promise and peril in the age of networked intelligence* (Vol. 1). McGraw-Hill.
- Tourism 4.0. (2018). *What is Tourism 4.0?*. Retrieved from: <https://www.tourism4-0.org/>. Accessed 12 May 2021.
- TOURISM4SDGS. (2021). *Tourism for SDGs – Welcome to the tourism for SDGs platform!* Retrieved from: <http://tourism4sdgs.org/>. Accessed 9 Jun 2021.
- Tussyadiah, I. P., & Park, S. (2018). Consumer evaluation of hotel service robots. In B. Stangl & J. Pesonen (Eds.), *Information and communication technologies in tourism 2018* (pp. 308–320). Springer.
- Xu, L. D., Xu, E. L., & Li, L. (2018). Industry 4.0: State of the art and future trends. *International Journal of Production Research*, 56(8), 2941–2962.

Part III
Technology Application in Tourism in Asia:
Practices

Chapter 6

Emerging Technologies in Tourism for a Better Experience: The Case of Dubai



Mohit Vij and Syed Ahmad Rizwan

Abstract Technology has played a crucial role in the growth of tourism over the last two decades. On the demand side the tourists are becoming more tech savvy and technology dependent while on the supply side, the suppliers are left with no choice but to adopt the latest technologies to be able to reach to the potential tourists and influence them for a making favorable decision. The Destination Management Organizations (DMOs) are equally involved in exploiting latest technologies to promote the destination and providing conducive technological platforms to their partners for effective collaborations. Dubai, the second largest emirate of United Arab Emirates (UAE) has progressed remarkably in the field of tourism and hospitality. Strategically located on the Arabian sea, Dubai has emerged as an international luxury tourist destination. According to Mastercard's Global Destination Cities Index (GDCI), Dubai, with 15.93 million international overnight visitors in 2019, retained its position as fourth most visited city in the world for the fifth year in a row. The city ranked among world's top 10 most popular city destinations in 2019, according to Euromonitor International, a UK based market research consultancy. Although there have been many factors attributing to the success of Dubai tourism, effective governance has been the key to it. The principle organization for tourism development and promotion, Dubai Commerce and Tourism Management (DTCM) has been successfully managing the show through adopting the best practices especially through integrating latest technologies. This chapter has an objective to explore the role played by the recent technologies such as digitization of services, artificial intelligence and machine learning with regard to managing tourism at a destination with a special focus on Dubai. While providing a variety of examples, the chapter examines how Dubai is leveraging on technology to offer digital experiences to its visitors. The findings are valuable to the academicians, researchers, scholars and practitioners to identify and analyze the contribution of technology in tourism and hospitality management at a destination.

M. Vij (✉)

Liwa College of Technology, Abu Dhabi, The United Arab Emirates

S. A. Rizwan

Hospitality and Tourism Management, City University College of Ajman,
Ajman, The United Arab Emirates

Keywords Dubai · United Arab Emirates (UAE) · Tourism · Technology · Digital

Introduction

Policymakers all over the world continue to prioritize ways in which they can make their cities smarter and digitally reliable. The need for technology adoption becomes even more critical for the urban cities which are densely populated and also receive a large number of visitors. Interestingly, the cities occupying only 2% of the planet's surface, accommodate 50% of the world population (United Nations Environment Programme, 2011). The extended population and urbanization in these cities require new innovative ways to manage the complexities involved in day to day life. While there has been an incremental increase of technology adoption and digitization at various levels in private and public sector, introduction of smart city concept addressed such issues in an effective and holistic way. In general, a smart city is defined as “a community in which citizens, business firms, knowledge institutions, and municipal agencies collaborate with one another to achieve systems integration and efficiency, citizen engagement, and a continually improving quality of life” (Snow et al., 2016, p. 92). It involves an implementation of information and communication technologies (ICT) in the management of urban assets for the effective use of resources and improving the quality of services and the standards of living provided to citizens (Caragliu et al., 2009; Cairney, 2000; Ismagilova et al., 2019). The United Arab Emirates (UAE) has contributed enormously to the development of smart cities and the digitization of services. The country is known for transforming its oil and petroleum based economy into a diversified folio of multiple business sectors, including tourism and hospitality (Vij et al., 2019). A large number of tourist attractions such as theme parks, sky scrapers, man-made islands, museums and malls have been constructed in country in the last two decades. Such developments have led the country receiving more than 21 million international tourists in 2018. Amongst the seven emirates, the emirate of Dubai with 16.8 million international tourists leads in terms of international tourist arrivals (Visitdubai, 2019). UAE tourism sector in 2020 contributed 11.9% and 11.1% to the country's GDP and employment respectively (World Travel and Tourism Council, 2020). Apart from Abu Dhabi and Dubai, other emirates of the country such as Sharjah and Fujairah have also been performing quite well in tourism development and promotion (Vij & Upadhya, 2020; Vij & Verma, 2016). An effective adoption and implementation of technology in tourism has been the key to this achievement. The contemporary international tourists prefer to stay connected with their origins and businesses while they are travelling. The tourist destinations need to provide desired ICT (information and communications technology) infrastructure for a comfortable stay of tourists. The emirate of Dubai embarked on a large scale transformation program to become one of the smartest cities in the world. The “Smart Dubai” initiative was founded in 2014 following the vision of His Highness Sheikh Mohammad bin Rashid Al Maktoum, Ruler of Dubai, to make Dubai the happiest city on earth. In

the recent past, the Smart Dubai Office has launched over 130 initiatives which include, the Dubai Data Initiative, the Dubai Blockchain Strategy, the Happiness Agenda, the Dubai AI Roadmap and the Dubai Paperless Strategy. In addition to this, focus has also been placed on infrastructure development such as extension of metros and trams for convenient travel, electric cars charging stations, e-bikes availability for health-conscious people, digital platforms for places of interest and entertainment, reasonably- priced mobile data enabling visitors to access internet, free Wi-Fi in the shopping malls and many more. These services have contributed enormously in tourism growth and development in Dubai, the second largest emirate after the capital city Abu Dhabi in UAE.

This chapter delves into the selected technologies adopted by tourism and hospitality stakeholders with reference to the initiatives taken up by the Emirate of Dubai. The chapter presents Dubai as a progressive city developing, promoting and managing tourism through an effective use of technology. In the first part of this chapter, a discussion is made on the promising and widely used forms of technologies in tourism while the second part deals with the programs initiated by the Dubai government and related authorities in this context.

Digitization, Artificial Intelligence (AI), and Machine Learning as Key Drivers

Digitization has transformed the long-established way of physical service delivery with the digital one! The conventional economies, with the help of digitization and technology, are now becoming digitally smart economies. Given the declining costs of technology and rising number of tech savvy users, acceptance of digitization in the businesses is inevitable. Digitization of a variety of customer services including promotions and loyalty schemes in products and services, has been found as a critical factor in enhancing customer experience and satisfaction (Kumar et al., 2017). Although the meaning and relevance of digitization may be contextual, commonly it refers to adopting intelligent business processes and efficient technology concepts, such as Big Data, Cloud and Mobile Computing, Internet of Things (IoT) for information collection, processing and disseminating through digital circuits, equipment, and networks. IoT enabled radiofrequency (RFID), self-scanning system, self-payment for buying items and mobile apps are leading to the development of a smart city lifestyle for tourists and residents (Saura et al., 2014). Potential of digitization in tourism is related to sales increase, booking convenience, sharing economy, personalized offers, social media, customer reviews and virtual reality (Härting et al., 2017). Hotels, in particular are offering IoT (Internet of Things) for a better control of room amenities and remodeling mobile apps integrating features such as facial recognition, electronic payments, itinerary preparation, food order and such (Nadkarni et al., 2020).

Technological developments have also proven to be of great advantage in data collection, access to online reviews, and use of mobile applications (Dorcic et al., 2019). AI and machine learning are the latest most trending technologies being used in various sectors, including tourism and hospitality. Machine learning is programmed to learn and adapt to the needs of the internet without the need for reprogramming for further fixation in times of issues. Although machine learning is leading in all aspects, it has a great impact on tourism and travel. When a potential traveler looks up information online, he/she expects to get access to that specific piece of information on the spot. People spend long hours in front of the screen looking up information about travel destinations and budgeting their travel costs. This is where machine learning and AI play a major role. There are seven elaborated areas under AI and machine learning and how it is helpful for tourism and hospitality sector are below:

Prediction System

When a person is booking travel tickets, machine learning comes into play, in that it adjusts the cost of the tickets after the customers refine their budget, and if there is no availability of cheaper rates, it sends regular updates to the customer whenever there is a drop in the price of the tickets.

Chatbots

Chatbots are helpful for the tourists as they are programmed to answer their queries at any time, and it also guides and suggests the tourist in Dubai or the UAE as a whole to where the tourist can find adventurous and entertaining places, as well as which places to visit, with excellent location accuracy all in one.

User Experience Management

User experience management helps in managing the experience of the user and adjusts the number of users accessing a site. The users tend to quit the site if they find it complicated to use or unattractive overall. In this way, machine learning comes into actions by managing the flow of the users to the website.

Recommender System

As the name it is self-explanatory, and it also plays a role in attracting viewers to the website. Furthermore, it measures and understands the needs of the viewer and what the viewer is looking for, and immediately tailors the service according to the search need and budget, places to book or hotels to book everything with the help of the machine learning. At the same time, it also makes the website or app more trustworthy, and hence people are more likely to use it.

Sales Optimization

Sales optimization refers to the behavior and patterns of the user and includes things that are tailored according to the user's previous searches. If a user is looking for something related to the mode of travel, for example, and prefers self-driving vehicles during their visit, the website, with the help of machine learning, will offer suggestions of car rental services nearby with the help of location accuracy.

Cost Optimization with the Help of AI

The website will optimize and tailor the costs the user is looking for, and also provide cheap and affordable flights that available at the preferred times. This is used by different websites and apps, such as Emirates Airlines which is for flights taking off and landing Dubai, and Air Arabia which takes off and lands in Sharjah.

Fraud Detecting Services

These services through AI and machine learning are capable of detecting if there is any fraudulent activity happening during the transaction and if the website is not legitimate. It protects tourists and users from falling victim to fraud. Dubai have given great importance to this, which is why while making any transaction online it first analyzes if the website is fraudulent or not, and if deemed safe, the user can proceed to the payment.

These technologies are remarkably contributing to the revolution of cities and making them smarter. The Emirate of Dubai has made strategic investments in AI and has been dedicatedly committed to bringing into effect the technologies that are a product of this. Taking the effect of Ai on economy and community into

consideration, by 2030 it is essential that the Dubai works on this aspect, a goal that is actively being worked towards. The very first AI lab in Dubai was inaugurated in 2017; the main aim was to develop a smart city and also motivate the public and many private sectors to also implement AI. In the field of transportation, it was implemented to cut down the costs of mobility, decrease the emission of carbon and make more autonomous transportation by the end of 2030, which will be tourist-friendly and safe for all passengers. Dubai has noted how the dependency on oil alone will not help the economy of Dubai flourish so they have considered alternatives for that as tourism; they are constantly working on making tourism attractive by implementing smart cities and that is possible with digitization, AI, and machine learning. It is estimated that the UAE alone will benefit from the contribution of AI approximately \$96 billion, leading from other Gulf Countries, namely Egypt, Bahrain, Kuwait, Qatar, Oman (PWC, 2018). UAE is the first country to implement widespread use of AI in several sectors such as transportation sector, government sector, knowledge sector, health sector, finance sector, water, and electricity sectors – and it also appointed the first minister for the AI sector. The smart city Dubai is achievable now thanks to the contribution of the public and private sectors in AI so as to achieve seamless, influential, safe, and the impactful smart city Dubai. It is said that by the year 2031 everything in the city will be operated through AI and will be digital. The implementation of such AI is also to safeguard residents and tourists, making it a safe place to live and making it even more tourist-friendly. One of the products of such AI is the smart drones, which have sensors like anti-collision, thermal imaging, and also the capability of video smart sensors. Interestingly, Dubai police is using AI and technology to catch criminals or prevent crime even before it has been committed (Nammour, 2019).

Dubai Leveraging on Technology to Provide Digital Experience to Visitors

Dubai is a fast-growing land of diversity. A number of plans/strategies are laid out by the Government of Dubai to advance its economy and wellbeing of the residents (Upadhya & Vij, 2016). The city gained worldwide recognition by incorporating digitization, opting for globalization, and for doing this they invested a lot of capital (Hvidt, 2007). The interest of the government in entrepreneurship made the UAE adopt the culture of openness and transparency in the field of smart governance (Salem, 2016). It also promoted the happiness campaign that runs across the city. The tourists and the nationals can give their feedback about the government entities and other non-government sectors. In the last two decades, Dubai has turned itself into a global city, as well as a tourism and business hub, attracting tourists and business representatives from all over the world. In 1999, when Dubai started its journey of adopting technology and digitization for attracting people and talents from all over the world, it announced its first ICT strategy, which was followed by the launch

of Dubai Internet City, Dubai e-government, Dubai Smart Government, and, in 2014, the Smart Dubai initiative. These initiatives were all taken in the best interest of people, and keeping in mind the ways of making the city safe. In particular smart destinations like Dubai use “advanced technologies and open, multipolar, integrated and shared processes” (Micera et al., 2013). Dubai is pioneered to provide exceptional standards of living for its people. His Highness Sheikh Mohammad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and the Ruler of Dubai, described technology as playing the role of an enabler, rather than a principal goal. The vision of the smart city initiative is that it ensures that Dubai is the happiest city in the world and the happiness goal has a significant impact on the lives of people in the city. The reason for formulating the happiness agenda was solely that the individuals get the best and happiest experience they have ever experienced in any city around the world. Dubai then raised the question of how to give a happy experience to its users in a smart way, while cutting down the extra expenditures, and hence they opted for technology. Thanks to digitization and technology that Dubai achieved smart happiness, and at the same time preserved its resources and still brought billions in profit to the country. The overall strategy of this unique program was to provide a unique opportunity not only to the visitors but also to the residents of the city. The six strategic objectives of Smart Dubai 2021 are listed in Table 6.1.

The government of Dubai also seek to ensure that the residents and tourists have trust and confidence in cyberspace to be capable of accessing city services and conducting transactions online. Therefore, the government takes various measures to safeguard sensitive and private information. Dubai Cyber Security Strategy was launched in 2017, aiming at providing integrated protection against the dangers of cyberspace. Dubai also stands committed in conceptualizing and launching an exclusive The Dubai Internet of Things (IoT) strategy is built on six domains “governance, management, acceleration, deployment, monetisation and security”.

The strategy aims at unifying the data sources for a dedicated Dubai Pulse platform, encouraging the government departments for digital transformation of their

Table 6.1 Strategic objectives and technology aspirations for Smart Dubai initiative

Strategic objectives of smart Dubai		Technology inputs
1	A smart, livable and resilient digital city	ICT enabled infrastructure
2	Connected, lean government	ICT to digitally transform economic sectors
3	A globally competitive economy powered by disruptive technologies	Digitizing services for visitors and residents
4	An interconnected and engaged community with easily reachable social services	Innovative mobility solutions
5	Easy and reliable transport provided by autonomous and shared mobile options	Leverage ICT to ensure sustainability
6	A clean environment via cutting-edge ICT Innovations	Zero visits to Government offices through digital channels

Source: [Smart Dubai Official Website \(2021\)](#)

respective data. The Dubai Blockchain Strategy is another initiative to project the city as the first city fully powered by Blockchain. Focusing on “3 strategic pillars – Government Efficiency, Industry Creation, and International Leadership”, the strategy aims at shaping up the future of internet with simple, safe and secure transactions. These strategies ensure seamless and convenient functioning and safe transactions for the tourism and hospitality suppliers and vendors as well as the visitors while accessing permissions, visa and other necessary requirements.

The smart city strategy also includes autonomous transport; as a tourist or a resident of the city it is very important to have access to transport systems, as traveling is required to explore the city and visit places. The driverless cars that have been designed for the easy and seamless mobility of the people and ensure the tourists that are not familiar with the places in the city reach their destination easily, fast, and safely keep these three aspects as the top priority. Services such as Kareem and Uber, along with Dubai Taxi, are already popular in Dubai. The smart city also implemented strategies to bring smart mobility into effect which is the smart parking areas, smart toll, smart and effective traffic lights that will make the mobility seamless, easy, fast and productive, and trouble-free. Road traffic and accidents sectors ensure that they work efficiently for the safety of the individuals. Thanks to the smart city initiative and plan, the UAE have estimated that there will be a decrease in the mobility by 80% and it will help save the infrastructure and resources. The e-government which will make the residents and tourists have an easy and seamless experience with the government, by cutting out trips to government sectors for what can now be done online, at the same time also contributing to make the environment cleaner and safer to breathe by cutting down unnecessary carbon emissions.

In addition to the above strategic initiatives, Dubai has also launched various applications enhancing visitors’ experience during their stay at the destination. One such application is TIME OUT DUBAI, which help people access information about the best night outs venues in the city: it could be the best restaurants, karaoke, film cinemas and world-class hotels to live in. Another application – DUBAI CALENDER is an innovative initiative towards generating awareness about the upcoming events in Dubai such as shopping festivals, concerts, exhibitions and so on. The IDUBAI application is the official application that shows locations and different places of interest like nearby hospitals, mosques and pharmacies, and it is very handy for a tourist visiting Dubai for the first time. The Department of Tourism uses technology not only to connect with the visitors but also with the related businesses. The Attractions B2B platform is developed exclusively for the tour operators, travel agents, and destination management companies for increasing their online visibility and eventually sales. The platform connects the attractions in Dubai with the distribution channels with the real time capacity, pricing and payment channels for a seamless experience.

Considering the significance of tourism sector for the economy, other department and authorities of Dubai have also invested significantly in adopting new technologies ensuring seamless experience for the visitors. SMART AIRPORT contributes majorly in attracting tourists. The smart gates system at the Dubai airports now

makes the travel and immigration process for people easy and seamless, and also with the smart wallet they can now use their smartphones to show details of their travel and personal details and access the e-gates. DUBZ – a technology start-up – recently announced a partnership with DNATA to inaugurate two new creative luggage assistants at Dubai Airport. The company currently provides services for departure and arrival passengers, with additional bonuses on offer for distant doorstep check-in and luggage drop-off (departures), as well as belt baggage pickup and delivery (arrivals). In the intercity travel, the RTA Dubai through its mobile application provides information regarding the metro, taxi, private taxis, and bus transportation, and where to easily access these services. The smart navigations have been the most impressive part; now the shops in the Dubai mall have their own personal applications that will navigate them to the destination they desire. For example, if a tourist is looking for a shop in the Dubai mall or marina mall, they can simply download the application and it will navigate them to that shop in the mall. Programs like digital reputation reports which are solely designed for the reviews of the visitors in the city staying in hotels. They will share the true experience they had in the hotels of Dubai city and help give an idea to the world about the services that are provided in the hotels. Dubai Expert is the online teaching program, and its initiative was to motivate and educate agents in 12 languages and selected agents from 40 countries about Dubai city, to help them learn about the different places and leisure spots that Dubai offers. It also provides travel agents that know Dubai city and guides the tourists to their desired places without any trouble. This initiative was carried out to make tourists feel they are at home, even when they are away from their homeland.

Conclusion

Technology in its different forms has contributed significantly to the world of tourism by remarkably reducing costs and physical labor thus improving operational services for a significantly better service experience. The Emirate of Dubai is progressing rapidly towards adopting and implementing futuristic technologies for enhancing visitors' satisfaction. The Smart Dubai initiative is launched with an agenda of making Dubai the Happiest city through smart technology and innovation. The initiative includes exclusive AI and Block chain strategies for various Government services to avoid redundancy in operations and data collection. Tourists visiting Dubai experience these technologies at their arrivals at the Dubai airports equipped with smart aquarium tunnel. While the tourists enjoy walking in the tunnel, watching fish in the aquarium, the AI powered cameras would scan their identities! During their stay the tourists can access a variety of information through using mobile applications to explore the city, book attractions, customize services for their specific requirements, access health or safety aids and such. This chapter presented Dubai as a role model in technology adoption for tourism. It is evident that the effective implementation of technology is best practiced when it comes from the

top. Although the Dubai Government encourages tourism and hospitality stakeholders including tourists to use technology for a better experience, a resistance to break the status quo is natural. It is thus suggested to conduct empirical studies in future to analyze the outcome of these strategies. Nevertheless, technology adoption in future especially post COVID-19 era will be a major requirement for travel and Dubai has already excelled in it.

References

- Cairney, T. (2000). *Developing a 'Smart city': Understanding information technology capacity and establishing an agenda for change*. University of Western Sydney.
- Caragliu, A., Del Bo, C., & Nijkamp, P. (2009). Smart cities in Europe. In *Proceedings of the CERS-3rd Central European conference in regional science*. Technical University of Košice.
- Dorcic, J., Komsic, J., & Markovic, S. (2019). Mobile technologies and applications towards smart tourism – State of the art. *Tourism Review*, 74, 82–103.
- Härting, R. C., Reichstein, C., Härtle, N., & Stiefl, J. (2017). Potentials of digitization in the tourism industry – Empirical results from German experts. In W. Abramowicz (Ed.), *Business information systems* (pp. 165–178). Springer.
- Hvidt, M. (2007). Public–private ties and their contribution to development: The case of Dubai. *Middle Eastern Studies*, 43(4), 557–577.
- Ismailova, E., Hughes, L., Dwivedi, Y. K., & Raman, K. R. (2019). Smart cities: Advances in research – An information systems perspective. *International Journal of Information Management*, 47, 88–100.
- Kumar, V., Ananda, A., & Song, H. (2017). Future of retailer profitability: An organizing framework. *Journal of Retailing*, 93(1), 96–119.
- Micera, R., Pindaro, V., Splendiani, S., & Chiappa, G. D. (2013). SMART destinations: New strategies to manage tourism industry. In *The 8th international forum on knowledge and asset dynamics (IFKAD) 2013*. IFKAD.
- Nadkarni, S., Kriechbaumer, F., Rothenberger, M., & Christodoulidou, N. (2020). The path to the hotel of things: Internet of things and big data converging in hospitality. *Journal of Hospitality and Tourism Technology*, 11(1), 93–107.
- Nammour, M. (2019). Dubai plans on using technology to prevent crimes even before they are committed. *Khaleej Times*. Retrieved from: <https://ssrn.com/abstract=2733632>. Accessed 1 May 2021.
- PWC. (2018). *AI to contribute \$320 billion USD to Middle East GDP by 2030*. Retrieved from <https://www.pwc.com/m1/en/media-centre/2018/ai-to-contribute-320-billion-middle-east-gdp.html>. Accessed 12 Apr 2021.
- Salem, F. (2016). A smart city for public value: Digital transformation through agile governance – The case of “smart Dubai”. *World government summit publications*. Retrieved from <https://ssrn.com/abstract=2733632>. Accessed 1 May 2021.
- Saura, I. G., Molina, M. E. R., & Contrí, G. B. (2014). Retail innovativeness: Importance of ICT and impact on consumer behaviour. In F. Musso & E. Druica (Eds.), *Handbook of research on retailer-consumer relationship development* (pp. 384–403). IGI Global.
- Smart Dubai Official Website. (2021). *Smart Dubai 2021 strategy*. Retrieved from <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/local-governments-strategies-and-plans/smart-dubai-2021-strategy>. Accessed 24 Apr 2021.
- Snow, C., Håkansson, D., & Obel, B. (2016). A smart city is a collaborative community: Lessons from smart Aarhus. *California Management Review*, 59, 92–108.

- United Nations Environment Programme (UNEP). (2011). *Visions for change. Recommendations for effective policies on sustainable lifestyles*. Retrieved from: <https://wedocs.unep.org/handle/20.500.11822/8009>. Accessed 1 May 2021.
- Upadhyia, A., & Vij, M. (2016). Creative tourist experience: Role of destination management organizations. In A. Upadhyia & M. Vij (Eds.), *Driving tourism through creative destinations and activities* (pp. 278–298). IGI Global.
- Vij, M., & Upadhyia, A. (2020). Systems approach to design and development of a tourist guide training program: A case study of Sharjah tourism. *Tourism Recreation Research*. <https://doi.org/10.1080/02508281.2020.1804735>
- Vij, M., Upadhyia, A., Vij, A., & Kumar, M. (2019). Exploring residents' perceptions of mega event-Dubai expo 2020: A pre-event perspective. *Sustainability*, *11*(1322), 1–17.
- Vij, M., & Verma, A. (2016). The rise of Fujairah: An emerging destination of the United Arab Emirates (UAE). *International Journal of Excellence in Tourism, Hospitality & Catering*, *7*(1&2).
- Visitdubai. (2019). *Dubai tourism 2019: Performance report*. Retrieved from: <https://www.visitdubai.com/en/tourism-performance-report>. Accessed 1 May 2021.
- World Travel and Tourism Council (WTTC). (2020). *Economic impact reports*. Retrieved from: <https://wtcc.org/Research/Economic-Impact>. Accessed 1 May 2021.

Chapter 7

Technology Application in the Tourism and Hospitality Industry of the Middle East Asia



Syed Far Abid Hossain, Faiza Tanaz Ahsan, Kazi Mohiuddin, Armana Hakim Nadi, Hafsa Neamah, Mussanna Ahmed, and Azizul Hassan

Abstract The use of technology has arguably benefited the tourism and hospitality industry of the Middle East. Tourists, on the other side, are also privileged for having easier access to scheduling their trips and finding all of the details they need to schedule the perfect trip with the ubiquitous help from the internet. They can also instantly find the necessary information about any chosen destination by browsing the internet. Theoretically, general technology-enhanced tourism and hospitality are relatively well investigated by researchers, meaning that; investigating the effects of technology-based tourism in the Middle East in the challenging pandemic time can be useful. Thus, this chapter is focused on discussing the advancements of the technology-based tourism and hospitality industry in the Middle East, highlighting the COVID-19 and the post-COVID-19 pandemic period. Current scholarly literature on technology-based tourism in the Middle East is brought into the discussion to generate insightful findings for the tourism policy-makers and relevant stakeholders in the Middle East. Results outline the opportunities and challenges of technology-based tourism in the Middle East with theoretical analysis. Although the

S. F. A. Hossain (✉)

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

School of Management, Xi'an Jiaotong University, Shaanxi, China

F. T. Ahsan

North South University, Dhaka, Bangladesh

K. Mohiuddin

Shanghai Maritime University, Shanghai, China

A. H. Nadi · H. Neamah · M. Ahmed

IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

A. Hassan

Tourism Consultants Network, The Tourism Society, London, UK

chapter has limited discussion on a few Middle Eastern countries, it discovers valuable comprehension for the travelers and tourism policy-makers.

Keywords Technology · Tourism · Hospitality · The Middle East · COVID-19

Introduction

Application of technology in the Middle East of Asian tourism and hospitality industry reached momentum when most tourists in this region started to familiarize with the latest advancements. In Middle Eastern countries, mobile devices are used in almost every aspect of planning a trip. Starting from booking trips online, buying tickets, looking up hotels, etc. This offers huge opportunities for the tourism and hospitality firms, airlines, and tour planners who utilize the devices to connect with their customers and plan their business ideas according to customers' feedback. As tourists are more tech-savvy, a noticeable shift in traveling patterns using the key technologies rises to attain a competitive advantage (Chebib, 2014).

However, amidst the global pandemic in the most recent times, all of the Middle Eastern nations and their commercial sectors faced difficulties. The tourism and hospitality was no different in sustaining regular activities. Before COVID-19, tourism had been an important sector for the world economy, contributing up to 10% of Global Gross domestic product (GDP) and over 300 million jobs approximately (Behsudi, 2020). Tourist countries of the Middle East, for instance, Jordan, Dubai, UAE, Oman, and Qatar, to name a few, have experienced a negative impact of the crisis than other countries. Fear of job loss, industry shock, and shrunk GDP are among the few adversities of these countries. Not only the public tours but also the significant events of the Muslims like the Hajj are affected. The Hajj takes place in Saudi Arabia, mainly in Medina and Mecca. The government reported that it could lead to a loss of US\$70 M of tourism revenue with the foreseeable travel restrictions set globally (Starr, 2020). Border restrictions have further caused tourism companies to shut down or minimize their operations. As a result, in the United Arab Emirates (UAE), the Meetings, Incentives, Conference/Conventions, and Exhibitions/Events (MICE) industry faced a sharp decline in demand, leading to noticeable losses. It is alarming to see that the industry could not function properly even though it is one of the most impactful sectors of the country (Aburuman, 2020). This study thus, explains the application of technology (i.e., Artificial Intelligence, Big Data, Machine Learning, Social Networking Sites, Smart technology, etc.) in the Middle East Asia with a particular focus on the effects of COVID-19.

The Middle East and North Africa (MENA) Region: A Glimpse of Tourist Cities

The Middle East and North African (MENA) region welcomed 87 million international tourist arrivals in 2018, equivalent to 6% of the world's total arrivals. International tourist arrivals increased to 10% in 2018 in these destinations in 2017, above the global average. The region earned US\$77 billion as international tourism receipts in 2017 that was 6% of the world's passes (World Tourism Organization, 2019). There are many popular attractions in the MENA region as below (Fig. 7.1).

Dubai (UAE)

Dubai is one of the most attractive and popular tourist destinations in the world, known mainly as a megacity. It is the home to the tallest tower in the world, the Burj Khalifa. This city is renowned for its expensive architecture and magnificent sky-lines. Dubai has plenty of tourist scopes for adventure activities like Desert Safaris through golden Arabian Dunes, skydiving over the beautiful Palm Islands, and wreck diving.

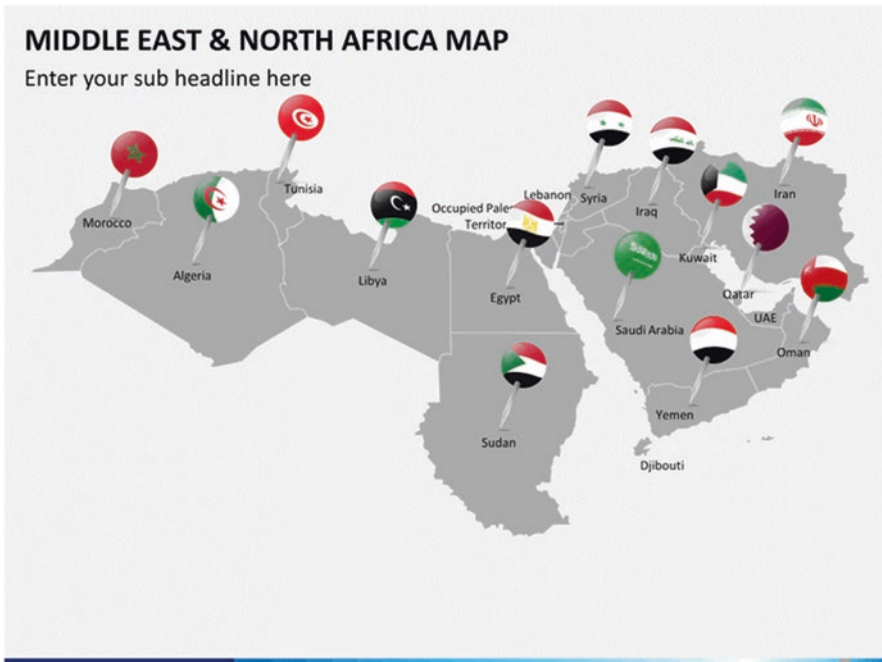


Fig. 7.1 The Middle East and North Africa (MENA) map. (Source: SketchBubble, 2021)

Abu Dhabi (UAE)

Abu Dhabi is one of the richest and popular travel destinations in the Middle East. It has a combination of rich culture and heritage. This city is full of luxury hotels, fine restaurants, and beautiful attractions such as Sheikh Zayed Mosque, Khalifa Park, the souks, etc.

Muscat (Oman)

Muscat, the capital of Oman, is a breath of full fresh sea air compared to its neighbors like Dubai and Abu Dhabi. This city is well known for its market area and its seafood. This place is very remarkable for having a great taste of the freshest seafood and experiencing endless deserts (Isalska, [2021](#)).

Doha (Qatar)

Doha, the capital of Qatar, is one of the fastest developing cities in terms of tourism and hospitality. In Qatar, tourism is divided into several categories such as cultural, historical, religious, and maritime. The Museum of Islamic Arts is undoubtedly the best place to visit in Doha. It has a fantastic collection of ceramics, glassware, jewelry, and textiles. It is a must for the visitors to see the fabulous beach and swim in the Persian Gulf.

Mada'in Saleh (Saudi Arabia)

It is in the north of Saudi Arabia. The extraordinary rock-tombs of Mada'in Saleh are the Middle East's most remarkable and least known sights (Thomas, [2019](#)).

Amadiya (Iraq)

It is located in the north of Kurdistan. From the Turkish border, it is only 10 km away. Amadiya is very photogenic, and it is one of the most beautiful villages in the Middle East. This village has the footprint of many civilizations and religions (Torres, [2019](#)).

Dahab (Egypt)

Dahab is known as the “Diver’s Paradise.” This place offers tourists beaches, the sea, and beautiful architectural structures. There are some popular attractions here, such as Blue Hole, Blue Lagoon, King Safari Dahab St. Catherine, etc. (Bisht, 2020).

Beirut (Lebanon)

In the Middle Eastern region, Beirut is known as one of the best travel destinations. It used to name as the “Paris of the Middle East.” Due to its lively nightlife, it is very remarkably familiar to the tourists. Beirut attracts people by offering its vast number of clubs and bars (Kelly, 2017).

Beit Al Quran (Bahrain)

With having a rich collection of the “Quran,” the holy book for the Muslims, Beit Al Quran is one of the most valuable places to visit for tourists. This place has the “Quran” from almost every century. For tourists, this place offers books and works of the most famous Islamic writers worldwide. This place is also renowned for Islamic calligraphy, manuscripts, and wood carving (Agarwal, 2021).

The Role of the Internet in the Tourism and Hospitality Industry in the Middle East

Modern days tourism is almost dysfunctional without the use of the Internet. Whether it is about looking at the top tourist nations, checking out reviews of hotels, or the best tourist spots, the Internet is the human’s initial guide to discover tourism and hospitality. Almost all tourism and hospitality industry areas have a website classified into four broad groups: corporation identity websites, chains, discount and attachment websites, and websites of individual sites and portals (Koelzer & Cox, 2005). The Internet can be recognized for its capacities to help growing competitiveness in the global tourism market demands. Travel agencies need Internet supports to offer exceptional efforts and investments in promotion, resources, knowledge, and quality to achieve satisfactory growth (Batinić, 2013). Thus, travel agencies and hospitality enterprises can incorporate the latest technologies to make the best use to stay ahead of the global competition. It is believed that the tourism markets should be researched.

The Middle East is quite technologically advanced due to its world-class security, military, defense, cyber-security measures, etc. Moreover, the Middle East also has a high demand for broadband and electronic gadgets. For instance, in the Middle Eastern nations, strata devices and public experiences helped countries like Oman and Jeddah attain the traditional, cultural, and resource-filled aspects of tourism. It was reported that “The UAE’s hospitality market is set to rise to \$7.6 billion by 2016, driven by a rise in visitors to both Dubai and Abu Dhabi. It is one of the most active markets in UAE in general and Dubai, particularly which welcomes more than 11 million visitors per year and is expected to grow to 20 million visitors for EXPO2021” (Almohammad, 2017). The UAE is the only country globally to have a ministry of artificial intelligence (StarupScene, 2021). Yuval Noah Harari once said that Israel is the leader in the field of surveillance. In 2019, the Badir Program for Technology Incubators and Accelerators represented King Abdul Aziz City for Science and Technology in a graduation ceremony they organized to celebrate 20 technological innovations. Not to mention, the GCC was among the first region on the entire planet to introduce the latest 5G networks. Thus, as you can see, this region has the technological capacity to provide solutions facilitating tourism. As mobile technology is prevalent globally, it would be wise to spread recommendations in trusted services like TripAdvisor to promote relevant vacation destinations in the Middle East to welcome higher tourists in the region than before the pandemic. It is discovered that 45% of its user uses smartphones to organize everything regarding their vacation (TripAdvisor, 2016). Services like Rehlat and Almosafer have made it easier for tourists overseas to book flights and hotels to MENA destinations.

Using public transport abroad can be a hassle, especially since people do not speak English at all in most the places in the MENA region. Fortunately, many of these regions have implemented easy solutions for foreigners to book private transport, like Dubai’s alternative to Uber, Careem. A similar solution like renting a private car for greater freedom is also possible through apps like RTA Dubai Drive. The Middle East has cuisine full of comfort foods and goodies that people may crave after their first experience, and it varies from region to region. But locating the hidden gems and must-visit restaurants can be pretty challenging, having mentioned the language barrier. Multiple apps like Talabat, Zomato, and Uber Eats help solve the problem quickly and provide the convenience of having food delivered in your footsteps.

Even though existing technologies have propelled the MENA region to astonishing heights, it still has a long road to go. They need to bounce back from the losses resulting from the pandemic and make up for revenues that could have been earned through those years by gaining a much higher number of tourists. More increased convenience has been achieved by introducing a contactless payments system. A study has shown that 70% of respondents in the MENA region are already using contactless payments. This comforts tourists in case they’re unable to use their credits or debit cards. Through Big Data, the government can gain insights into tourist

behavior, their spending, country of origin, their whereabouts, etc. Based on this data government can gain new insights regarding the popularity of certain parts of the cities and improvements o services that can be initiated by feedback from tourists.

Using Artificial Intelligence (AI) in the Tourism and Hospitality Industry of the Middle East

The implementation of AI in the tourism and hospitality industry has made travel arrangements much more straightforward and hassle-free. AI in the tourism industry ranges from in-person customer service to chatbox with other digital trends that have created various opportunities in the Middle Eastern countries. AI has provided the tourism industry with multiple options that lead to success and make it more attractive for their customers. AI has reconceived the tourism and hospitality industry (Ruel & Njoku, 2020) by enlarging production level, eventually brushing up the company's efficiency. The usage of AI aids in intensified decision-making with proof and creates an opportunity for talent management within the tourism company (Ruel & Njoku, 2020).

AI has made tourism more attainable to everyone as it expedites the guest's interaction with the amalgamation of their environment, which enlarges the standard of the escapade at the destination (Lopez de Avila, 2015). AI upgrades the traditional experience of tourism and hospitality in the Middle East. Using AI in tourism, the Middle East has made data collection less complicated by discouraging the display of an extensive amount of data. To intelligently store, process, integrate, and scrutinize data and aids to tourism and hospitality for their innovation towards operations and services they provide to the tourists by using artificial intelligence and big data technique (Tsaih & Hsu, 2018). Artificial intelligence has generated opportunities in the tourism and hospitality industry by enabling different intelligent systems and chatbots. It is best to be used in travel agencies or air transport companies (Zsarnoczky, 2017). They help establish better communication with the visitors and aids to reach out to their queries. Like other countries, the Middle East has also been facilitated, and opportunities have been open through AI. In Dubai, the handling of baggage, management of air traffic, and the replacement of immigration officers have been done through trials of artificial intelligence. Etihad, which belongs to Abu Dhabi, has partnered up with Microsoft to launch an in-house AI Academy, which would help track business ideas for the airline's workforce and a fast rate. Saudi Arabia is powered by artificial intelligence by using robotic cars, which aids cargo loading to become more methodological and well-planned. The robotic vehicles also steadily escort passengers around the airport (Arabian Business, 2020).

Use of Big Data and Machine Learning in the Middle East for Tourism and Hospitality

In recent years, the word “big data” has gained traction in the media, and it is now used in a rising range of sectors. Both kinds of data are overgrowing, which has become a need for all walks of life to expand and decline fast, ensuring that the rise of big data has opened doors for particular industries, such as tourism (Zhang & Wang, 2021).

Unlike tourism, many sectors have been alteration from data shortage to data abundance. Technological advancements have made it possible to handle vast volumes of data. Big data represents efforts to comprehensively quantify exchange, leading to computers’ universal availability with increased computing power (Weaver, 2021). Tourism is highly valued in many countries for several reasons, including jobs, income, and economic benefits. Tourism is essential in Japan, where the government implements a national development plan (Tsuda, 2021).

Another example for forecasting the Chinese cruise tourism is critical to make investment decisions and planning. The researchers improved forecasting performance by combining the gravitational search algorithm (LSSVR-GSA) with the support vector regression model. To forecast the cruise tourism market, they used big data such as search query data (SQD) of Baidu and economic indices (Xie et al., 2021).

Hotels now have advanced tools to analyze and enhance their success thanks to machine learning. The need for knowledge regarding a particular travel destination has led to today’s tourism, dependent on technical availability. For tourism research, big data has a significant contribution to its transformative potentiality. Tourism researchers are fascinated by the possibility of turning further facets of human behavior and commerce into data points (Gunter & Önder, 2016).

In the tourism industry, big data and ML relates to information collected by travelers. It aids tourism businesses in seeing more clearly by assessing customer appetite for various services and products. Big data can help people in the travel industry learn in numerous areas, allowing them to make more evidence-based choices. It will enable you to better forecast future demand, perfect your promotional plan, target advertising more accurately, and improve customer experience.

Applications (Apps)

Some popular applications have been created that influences the life of Middle Eastern people. The flexibility of using those applications made the lives of audience easy. Despite having a younger population, Middle Eastern countries are lagging in terms of technological advancements. However, many startups in the Middle East are overcoming the cultural barriers to tap into technological advancements (Singh, 2018). Some of those applications are Careem, Fordeal, and Anghami.

Careem

Careem is a vehicle hiring company and a subsidiary of the American company Uber. It is based in Dubai and has operations in over 100 cities in 15 countries (Arabian Business, 2018). It is one of the famous ride-sharing services in the world. Careem and its user-friendly features helped them to gain more users around the world. It is not only popular in the Middle East, but also it is providing its services to Africa, Asia. In just about 4 years, Careem has become an essential tool for those in need of transportation in 44 cities across 10 countries (D’Cunha, 2016). In 2019, Uber confirmed rumors that its building out its presence in the Middle East Asia and Africa by acquiring Dubai-based ride-hailing service Careem (Sawers, 2019).

Fordeal

Fordeal is a Chinese online shopping platform with large userbases in Saudi Arabia, UAE, Jordan, and Kuwait (WAYA Staff, 2020). This platform is one of the most popular platforms in the Middle East. In addition to people’s expectations, this platform brings simplicity to online shopping.

Anghami

Anghami (Arabic: أنغامي) is the first legal music streaming platform in the MENA region, giving more than 70 million users access to over 57 million Arabic and International songs to stream and download and over around 100,000 Arabic and International podcasts. Anghami is a freemium service that allows users to play millions of international and Arabic songs for free. As for paid users who subscribe to Anghami Plus, they are granted access to various features that allow them to download songs, play music offline, view lyrics, rewind, scrub, and repeat all the music they want. Anghami Plus perks also include playing music in high audio quality, using the platform on Playstation, Sonos, Carplay, Android Auto, Apple TV, Smart TV, and Android TV (Anghami, 2021).

Thus, it can be forecasted that although the travel industry’s performance was disrupted due to the global pandemic, by acquiring the policies mentioned and use of technology to analyze the market conditions, traveling patterns could be brought back to normal very soon.

The Role of Social Networking Sites (SNSs) in the Tourism and Hospitality Industry in the Middle East

In the Middle East, tourism and hospitality includes diverse events and tourist attractions across a region covering more than 13 million square kilometers. The tourism industry has been affected by the COVID-19 pandemic in this location. To

revive the global tourism industry post-COVID-19, a study of 35 research papers analyzed the pandemic's effect (Sharma et al., 2021).

SNSs have dramatically influenced the tourism industry. Consumers use social media networks to plan journeys, make informed travel choices, and share their personal experiences with a particular airline, hotel, and restaurant. SNSs are becoming an inseparable part of our daily activities, both for commercial and personal reasons. SNSs are now described in a variety of ways (Kacetl & Klimova, 2020).

SNSs are web-based systems that enable a user to make a profile on an online platform that helps connect with the other users shared by the mutual connections and make a list of relationships (Boyd & Ellison, 2007). They also highlight their social component, as this SNSs enable users to express and make their social networks accessible (Poulova & Klimova, 2015). In the Middle East the advent of the internet in developing various channels of social media in recent decades. It has changed the travel business and industry worldwide, and the way people travel (Iglesias-Sánchez et al., 2020).

In recent decades, the tourism industry, especially the travel and hospitality market, has focused on information and communications technology (ICT). The development of various ways and modes of social channels has been accelerated by increased Internet penetration and reliance. SNSs also revolutionize the travel industry, allowing agencies and businesses to collaborate and sell their offerings to specific demographics.

The Contemporary Scenario and Prospects of Smart Tourism in the Middle East

Smart tourism increases the reliance on tourism destinations with smart ICT facilities (Gretzel et al., 2015). As time passes and global citizens get more exposed to virtual reality and IT advancements, technology is recognized more as an infrastructure than singular pieces of systems. People, companies, and nations can make meaningful and impactful decisions.

The role of smart cities is to connect the dots within a community to create a more habitable, worthwhile, feasible, and sustainable place to live in (Wayne, 2016). However, the role of smart cities has extended to the development in the industry of tourism and hospitality by generating smart tourism, which in return gives numerous benefits to the travel companies. The use of artificial intelligence in tourism creates feasible portability, social incorporation, and territorial marketing. It implicates that smart cities are developing the tourism and hospitality industry so that its tourism and its product and services will be accessible to even people who are either temporarily or permanently paralyzed (Dias et al., 2021). It brings hope amongst people who cannot access privileges including traveling and smart cities make these dreams come true. Smart cities may bring change in which people encounter their environment. Their capacity to provide precise services is crucial (Dias et al., 2021)

that transforms tourism into a more accessible, understandable, and entertaining one. The trend of smart tourism is gradually becoming highly remarkable to urban modernization because of the combination of ICT in tourism. Under these situations, the incorporation of tourism and the smart city has transformed into an evaluative, participatory, and interactive journey of the strategies set by the smart cities (Gautam et al., 2016). The execution of certain smart services for visitors at the airport has helped them finalize and accomplish their airport formalities flawlessly (Abdelmoaty & Soliman, 2020). It demonstrates the feasibility and how tourism and hospitality have become more delightful, hassle-free, and less time-consuming for travelers, travel agencies, and airports. It has been found that the evolution of smart cities has been successfully contributing to the tourism and hospitality industry by engaging more people from the neighboring countryside along with a total number of tourists (Eichelberger et al., 2020).

Smart tourism uses technology to generate ideas and make efficient uses of tourism resources that enhance traveler's experiences and protect the valuation of land that cashes the economy favorably. Among the countries in the Middle East, Oman is one of the naturally diverse ones rich in resources to make the land exposed and promote travel scopes. The virtual reality projects were implemented, and several mobile applications were introduced such that it helps tourists discover Oman quickly, such as Muscat Geotourism Guide (Muthuraman & Al Haziazi, 2019). It has also been reported that Oman telecom and the Ministry of Tourism signed a strategic partnership during July 2018 to enable tourists a big-data-based application facility (Muthuraman & Al Haziazi, 2019).

Although there lie some challenges such as changes in customers' preferences on touring spots, extreme weather conditions can't always be predicted accurately via weather forecasting systems. With the lack of research on incorporating advanced tools and limited research on the environmental scopes while reserving the resources, the country still keeps on trying to take feedback and implement necessary changes. On the other hand, Dubai has been named as a Smart City based on the rich traveling experiences it has to offer to the world. Starting from a large-scale transformation program to facilitating digitized transportation throughout the city, Dubai has created a fashionable society based on communication, integration, and cooperation.

Introducing revolutionary applications on the tourism scenes such as Dubai GuidePal offers tourists various city highlights and trending events. Eateries users can also use the app to connect with locals, make friends, and personalize tour guides based on individual taste and preference and book tours (GuidePal, 2019). Besides this, apps such as Google places API bring out a full-on, virtually enhanced experience. The functions are described, such as a custom algorithm that can determine an itinerary for the user (Fig. 7.2).

The country's most prominent airline companies and the hospitality sectors have received enormous support from the government via fund, support schemes, and capital packages. Oman, for instance, came up with a campaign named 'Within Oman' where the citizens are encouraged to patronize the local airlines, hotels, and resorts. The campaign aims to focus on the natural assets of Oman and draw in more

YEAR	VISITORS	INCREASE/DECREASE	INCREASE/DECREASE (%)
2015	14,200,000	1,000,000	7.58
2016	14,900,000	700,000	4.93
2017	15,790,000	890,000	5.97
2018	15,920,000	130,000	0.82
2019	16,730,000	810,000	5.09
2020	5,510,000	-11,220,000	-67.07

Fig. 7.2 Unusual decrease of Dubai visitors in 2020. (Source: Dubai Online, 2021)

Daily average rates dropped from 415 AED (£81.77, €94.59, \$112.98) in 2019 to 343 AED (£67.59, €78.18, \$93.38) in 2020.

PROPERTY TYPE	NUMBER OF ESTABLISHMENTS 2020	ROOM SUPPLY 2020	OCCUPANCY RATE (%) 2020	NUMBER OF ESTABLISHMENTS 2019
5 Star Hotels	134	44,067	45	128
4 Star Hotels	161	34,905	53	158
1 - 3 Star Hotels	225	21,732	59	258

Fig. 7.3 Daily average room rate dropped. (Source: Dubai Online, 2021)

travelers by offering them lucrative traveling facilities. Hafidh Al-Hadhrami, the asset manager of the tourism group of Oman, stated that the tourism momentum might climax the only natural, heritage, and cultural practices in Oman (Arab News, 2020) (Fig. 7.3).

Post-COVID-19 Pandemic Tourism and Hospitality Industry in the Middle East: Scenario and Synopsis

The Middle East more or less has been a place for foreign attention, flocking an enormous number of tourists each year. This might prove to be a shock to most people unacknowledged of the region. This is well understood from the stereotypes about the region: drought-stricken, bone-dry desert flocked with camels. The Middle East is known to its populaces for lavish and luxurious living conditions. Equipped with cutting-edge technology and world-class security, it is no surprise that it generates billions of dollars in revenue from the sector. While places like UAE and Egypt have established themselves as top-ranking hotspots, many others like Saudi Arabia and Oman have shown great promise in recent years, leveling up gradually. But given the COVID-19 pandemic situation businesses, consumer markets, airports have all experienced crashing downfalls. As most countries started putting flight bans and travel restrictions, so did the Middle East. This caused the countries a significant loss in revenue, which contributed a massive percentage to its national budget. Here we discuss potential strategies directed towards the recovery of the region's tourism in a post-pandemic situation.

COVID-19 pandemic has demolished nearly every industry globally, as sharp decline became visible within 4–5 months of the global spread of the novel Coronavirus. No industry has seen the absolute nightmare than the aviation industry, with most countries declaring flight bans and travel restrictions soon after initiating lockdowns. As well as stranding many in their home countries preventing business travels, it also prevented people from spending vacations overseas. This decreased revenue earned from tourism. For some, the loss might be minimal, but for others, like the Middle East, it was a whole new story. Shocking it would be to most people in the world, holding presumed stereotypes of drought-stricken, bone-dry desert flocked with camels. The region is well-known to its foreign inhabitants for luxurious living conditions. Coupled with world-class security and cutting-edge technological developments, it is a favorite destination for hundreds of thousands of visitors each year. For some countries like UAE and Qatar, tourism is a significant growth sector to their economies, providing a massive percentage of revenue to their GDPs. In contrast, many others like Saudi Arabia and Oman were seen as potential prospects for tourist hotspots. Not to say, religious pilgrimages such as the Hajj and the Umrah to the cities of Makkah and Madinah and visitors from Jewish pilgrims to the Western Wall in Israel.

Retrospectively speaking, the Middle East has recently (for the past 10 years) been attracting foreign attention. This is not surprising, given many favorable conditions facilitating international travelers. Most prominently, affordability and low rates of crime. Counterintuitive, it might seem, as the Middle East is often believed to be transfixed with terrorism, in reality, most places have a negligible crime rate. Thus, travelers can roam free without concerns about putting their lives in danger. As already said, the Middle East is incredibly cheap, enabling you to extend your stays at hotels without running out of your budget. The fantastic cuisine of the

region is considerably underrated, including the sheer convenience provided by the introduction of online food delivery apps. Despite the language barrier of the area, tour guides are at hand's reach.

Returning to the present, we are now concerned by the catastrophes mentioned above, thinking of recovery. We would discuss portent strategies we could implement to tackle the tourism sector in a post-pandemic reality in need of recovery.

How to Implement Technology-Enhanced Tourism in the Post Pandemic Period

The COVID-19 pandemic has brought a lot of changes in our lives. Every activity is modified, and traditional methods are shifted to online or internet-based ones. People can also not follow the conventional way of conducting all the processing of visits in the tourism and hospitality industry. The tourism businesses have also transformed themselves to provide the facilities to cope with the pandemic. Thus, in the post-pandemic period, the tourism industry has implemented technology-enhanced tourism like Airbnb, which is considered one of the most remarkable and outstanding innovations in the tourism industry (Guttentag, 2019).

This is a mobile application that aids to access and book without going physically, which maintains the pandemic rules and regulations like maintaining social distance and keeping the passenger safe. This mobile application facilitates travelers by examining and inspecting a big data set containing all the online reviews and comments on the internet. It is discovered that the users try to assess their experience through the past hotel that was obtained from the references given online (Cheng & Jin, 2019). This also helps visitors evaluate and predetermine their choices through technology-enhanced tourism sites and applications. The tourism industry also facilitates its customers with mobile applications, and they also have adopted certain websites. One of them is [bookings.com](https://www.bookings.com), a magnificent source of information by an academic researcher in the hospitality industry. It can accumulate millions of reviews of hotels in a swift, economical and suitable method (Mellinas et al., 2015). Due to the speedy evolution and enlargement in the sector of technology, the utilization of E-commerce has spread out significantly in the current years, leading to the concentration of online travel ticket booking websites (Kaushik & Srinivasa, 2017) as well as mobile applications.

Besides these, the Middle Eastern countries are collaborating with the European countries to ensure a rise in tourism. For instance, UAE and Bahrain signed an agreement with the UK under the corridor travel list, which encourages travelers to move across the borders to visit the Middle Eastern countries while maintaining a safety quarantine period and inbound travel until a mutual visa waiver. This will increase the volume of incoming tourists, and the government will see a boost in the economic recovery. The Middle Eastern countries have also decided to lift travel bans from South Africa and neighboring nations (Ley, 2020).

Conclusion

This study explores how technology is used in the Middle East, emphasizing the impact of COVID-19. Findings show that technology is an essential part of the Middle East tourism and hospitality industry. It aids companies in their day-to-day activities while also improving customer satisfaction. This MENA region has witnessed the broader popularity of AI, Big Data and Machine Learning, SSN, Smart technology, etc. As a result, hotels, airlines, restaurants, and other businesses need to keep up with the new technological developments in the travel industry. However, the disruptions caused by COVID-19 in this region require adequate attention. Some suggestions to cope up in the post-COVID-19 pandemic period are: First, the potential visitors should be informed about their safety measures. Safety is the most important issue considered by the tourists. If safety measures can be ensured, tourists might be motivated to travel in the Middle East. Secondly, the Middle Eastern countries should work together to provide adequate health insurance for travelers, significantly different health schemes for COVID-19. If the tourists are infected, they should get proper treatment and care in the post-pandemic period. Finally, the Middle Eastern countries should ensure technology-enhanced tourism with the advanced usage of robots and artificial intelligence to reduce infections.

References

- Abdelmoaty, G., & Soliman, S. (2020). Smart technology applications in tourism and hospitality industry of the new administrative capital, Egypt. *Journal of Association of Arab Universities for Tourism and Hospitality*, 19(2), 102–129.
- Aburumman, A. A. (2020). COVID-19 impact and survival strategy in business tourism market: The example of the UAE MICE industry. *Humanities and Social Sciences Communications*, 7, 141.
- Agarwal, K. (2021). Famous 12 places to visit in Bahrain: The best cities & attractions. *My Holidays*. Retrieved from <https://www.myholidays.com/blog/places-to-visit-in-bahrain/>. Accessed: 7 Apr 2021.
- Almohammad, R. (2017). *How digital technology and analytics are changing the tourism industry in Dubai*. Retrieved from: <https://medium.com/@rawan.almohammad/how-digital-technology-and-analytics-are-changing-the-tourism-industry-in-dubai-a941c07e9121>. Accessed: 7 Apr 2021.
- Anghami (2021). *About Anghami—Get to know us*. Retrieved from: <https://www.anghami.com/about> Accessed: 7 Apr 2021.
- Arab News. (2020). *Oman pushes local tourism to in new campaign amid COVID-19 pandemic*. Retrieved from: <https://www.arabnews.com/node/1731216/middle-east>. Accessed: 7 Apr 2021.
- Arabian Business. (2018). *Careem eyes potential expansion to 250 cities in MENA*. Retrieved from: <https://www.arabianbusiness.com/transport/397038-careem-eyes-potential-expansion-to-250-cities-in-mena>. Accessed: 7 Apr 2021.
- Arabian Business. (2020). *Applying AI in the Middle East's travel industry*. www.arabianbusiness.com. Retrieved from: <https://www.arabianbusiness.com/business/436441-applying-ai-in-the-middle-east-travel-industry>. Accessed: 7 Apr 2021.
- Batinić, I. (2013). The role and importance of the internet in contemporary tourism in travel agencies business. *International Journal of Cognitive Research in Science Engineering and Education*, 1(2), 119–122.

- Behsudi, A. (2020). Tourism-dependent economies are among those harmed the most by the pandemic. *Arab News*. Retrieved from: <https://www.arabnews.com/node/1839786/middle-east>. Accessed: 7 Apr 2021.
- Bisht, A. (2020). Top 16 places to visit in the Middle East for a joyous holiday. *My Holidays*. Retrieved from: <https://www.myholidays.com/blog/places-to-visit-in-the-middle-east/>. Accessed: 7 Apr 2021.
- Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210–230.
- Chebib, K. (2014). The impact of technology on travel and tourism in the Middle East. *Euromonitor International*. Retrieved from: <https://blog.euromonitor.com/the-impact-of-technology-on-travel-and-tourism-in-the-middle-east/>. Accessed: 11 Apr 2021.
- Cheng, M., & Jin, X. (2019). What do Airbnb users care about? An analysis of online review comments. *International Journal of Hospitality Management*, 76, 58–70.
- D’Cunha, S. D. (2016). Meet Careem, the Middle Eastern ride hailing app giving back to its drivers. *Forbes*. Retrieved from: <https://www.forbes.com/sites/suparnadutt/2016/11/24/meet-careem-the-middle-eastern-ride-hailing-app-giving-back-to-its-drivers/?sh=472f2ee712b7>. Accessed: 7 Apr 2021.
- Dias, A., Santinha, G., & Rodrigues, M. (Eds.). (2021). *Smart cities and accessible tourism: A systematic review*. IGI Global.
- Dubai Online. (2021). *Dubai tourism statistics*. Retrieved from: <https://www.dubai-online.com/essential/tourism-statistics/>. Accessed: 7 Apr 2021.
- Eichelberger, S., Peters, M., Pikkemaat, B., & Chan, C. (2020). Entrepreneurial ecosystems in smart cities for tourism development: From stakeholder perceptions to regional tourism policy implications. *Journal of Hospitality and Tourism Management*, 45, 319–329.
- Gautam, G., Jain, R., Poudel, L., & Shrestha, M. (2016). Fish faunal diversity and species richness of Tectonic Lake Rupa in the mid-hill of Central Nepal. *International Journal of Fisheries and Aquatic Studies*, 4(3), 1–6.
- Gretzel, U., Sigala, S., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25, 179–188.
- GuidePal. (2019). *Home*. Retrieved from: <http://guidepal.com>. Accessed: 13 Apr 2021.
- Gunter, U., & Önder, I. (2016). Forecasting city arrivals with Google analytics. *Annals of Tourism Research*, 61, 199–212.
- Guttentag, D. (2019). Progress on Airbnb: A literature review. *Journal of Hospitality and Tourism Technology*, 10(4), 814–844.
- Iglesias-Sánchez, P. P., Correia, M. B., Jambrino-Maldonado, C., & De las Heras-Pedrosa, C. (2020). Instagram as a co-creation space for tourist destination image-building: Algarve and Costa del Sol case studies. *Sustainability*, 12(7), 2793.
- Isalska, A. (2021). 10 reasons to visit Muscat, Oman. *Rough Guides*. Retrieved from: <https://www.roughguides.com/article/10-reasons-we-love-muscat-oman/>. Accessed: 7 Apr 2021.
- Kacetl, J., & Klimova, B. (2020). Social network sites in travel and tourism: Benefits and limitations. *Journal of Engineering and Applied Sciences*, 14(9), 10544–10548.
- Kaushik, A., & Srinivasa, P. (2017). Effect of website quality on customer satisfaction and purchase intention in online travel ticket booking websites. *Management*, 7(5), 168–173.
- Kelly, T. (2017). The best places to visit in the Middle East in 2018. *Culture Trip*. Retrieved from: <https://theculturetrip.com/middle-east/articles/the-best-places-to-visit-in-the-middle-east-in-2018/>. Accessed: 9 Mar 2021.
- Koelzer, W., & Cox, B. (2005). *Internet marketing- za hotele, restorane i turizam*. M Plus.
- Ley, S. (2020). COVID-19: Insights on travel impact, Middle East and Africa – December. *SOJERN*. Retrieved from: <https://www.sojern.com/blog/covid-19-insights-on-travel-impact-middle-east-and-africa-december/>. Accessed: 15 Apr 2021.
- Lopez de Avila, A. (2015). *Smart destinations: XXI century tourism*. Presented at the ENTER2015 conference on information and communication technologies in tourism. Lugano, 4–6 February 2015.

- Mellinas, J. P., Martínez María-Dolores, S., & Bernal García, J. J. (2015). Booking.com: The unexpected scoring system. *Tourism Management*, 49, 72–74.
- Muthuraman, S., & Al Haziati, M. (2019). Smart tourism destination – New exploration towards sustainable development in sultanate of Oman. 2019 5th international conference on information management (ICIM), Cambridge: 24–27 March.
- Poulova, P., & Klimova, B. (2015). Social networks and their potential for education. In M. Núñez, N. Nguyen, D. Camacho, & B. Trawiński (Eds.), *Computational collective intelligence* (pp. 365–374). Springer.
- Ruel, H., & Njoku, E. (2020). AI redefining the hospitality industry. *Journal of Tourism Futures*. <https://doi.org/10.1108/JTF-03-2020-0032>
- Sawers, P. (2019). Uber confirms it's acquiring Middle East rival Careem for \$3.1 billion. *Venture Beat*. Retrieved from: <https://venturebeat.com/2019/03/25/uber-confirms-its-acquiring-middle-eastern-rival-careem-for-3-1-billion/>. Accessed: 5 Apr 2021.
- Sharma, G. D., Thomas, A., & Paul, J. (2021). Reviving tourism industry post-COVID-19: A resilience-based framework. *Tourism Management Perspectives*, 37, 100786.
- Singh, R. (2018). *Middle East is fast realizing that Mobile apps is the new oil*. Retrieved from: <https://appsexpert.medium.com/middle-east-is-fast-realizing-that-mobile-apps-is-the-new-oil-b94f3364451b>. Accessed: 9 Mar 2021.
- SketchBubble. (2021). *Middle East & North Africa (MENA) map*. Retrieved from: <https://www.sketchbubble.com/en/presentation-mena-map.html>. Accessed: 30 Mar 2021.
- Starr, S. (2020). Pandemic will ruin Middle East's 2020 tourism economy. *Arab Weekly*. Retrieved from: <https://thearabweekly.com/pandemic-will-ruin-middle-east-2020-tourism-economy-0>. Accessed: 15 Apr 2021.
- StarupScene. (2021). *The world's first minister for artificial intelligence was just appointed in the UAE*. Retrieved from: <https://thestartupscene.me/FUTURE/The-World-s-first-Minister-for-Artificial-Intelligence-Was-Just-Appointed-In-the-UAE>. Accessed: 19 Apr 2021.
- Thomas, G. (2019). 12 of the most beautiful places in the Middle East. *The Rough Guide*. Retrieved from: <https://www.roughguides.com/article/most-beautiful-places-in-the-middle-east/>. Accessed: 7 Apr 2021.
- Torres, J. (2019). 25 best places to visit in the Middle East in 2021. *Against the Compass*. Retrieved from: <https://againstthecompass.com/en/best-places-visit-middle-east/>. Accessed: 15 Mar 2021.
- TripAdvisor. (2016). *Travelers trends and motivations*. Retrieved from: <https://www.tripadvisor.com/TripAdvisorInsights/wp-content/uploads/2018/01/TripBarometer-2016-Traveler-Trends-Motivations-Global-Findings.pdf>
- Tsaih, R. H., & Hsu, C. C. (2018). Artificial intelligence in smart tourism: A conceptual framework. In *Proceedings of the 18th international conference on electronic business*. Guilin: ICEB, 2–6 December, pp. 124–133.
- Tsuda, H. (2021). Establishment of data-driven statistical tourism science and demonstration of its effectiveness. *Impact*, 2021(3), 49–51.
- WAYA Staff. (2020). *The #1 apps in the Middle East and North Africa*. Retrieved from: <https://waya.media/the-1-apps-in-the-middle-east-and-north-africa/>. Accessed: 13 Apr 2021.
- Wayne, S. (2016). How smart cities are leading the way to smart tourism. *Questex, LLC*. Retrieved from: <https://www.hotelmanagement.net/tech/how-smart-cities-are-leading-way-to-smart-tourism>. Accessed: 11 Aug 2020.
- Weaver, A. (2021). Tourism, big data, and a crisis of analysis. *Annals of Tourism Research*, 88, 50.
- World Tourism Organization (UNWTO). (2019). *Tourism in the MENA region*. Retrieved from: <https://www.e-unwto.org/doi/pdf/10.18111/9789284420896>. Accessed: 9 Apr 2021.
- Xie, G., Qian, Y., & Wang, S. (2021). Forecasting Chinese cruise tourism demand with big data: An optimized machine learning approach. *Tourism Management*, 82, 104208.
- Zhang, Y., & Wang, X. (2021). Tourism economic development model based on big data. *Journal of Physics: Conference Series*, 1744, 042137.
- Zsarnoczky, M. (2017). How does artificial intelligence affect the tourism industry? *VADYBA*, 2, 85–90.

Chapter 8

The Role of Mobile Applications in Jordanian Hospitality Operations, Businesses and Service Perception



Ahmad R. Albattat and Jeong Chun Phuoc

Abstract Technology, social media, and online platforms are cornerstone to the welfare and the development of countries. This paper presents mobile applications as an indispensable marketing tool for the promotion, marketing and sales of hospitality operations and sustainability of businesses. On the base of Jordanian hospitality, this study addresses how the popularity of mobile applications has enhanced the customer's quality of life their perception of quality service by offering user friendly platforms and step by step guide to identify and meet the needs of customers thereby shifting more and customers to online platforms to satisfy their needs and increase the potential income for a business. The study also addresses the downsides to the use of mobile applications and ethical barriers of the use of mobile applications identified by customers. It presents the strong influence of social media on purchasing decisions making also, on customer's value perception. Different mobile applications are explored from both business and customers' point of views.

Keywords Mobile applications · E-marketing · Social media · Value perception · Service quality · Ethical views · Data protection · Privacy · Agenda 2030 · UN SDG 17

Introduction

In the twenty-first century economy, mobile applications (Mobile application) have become the most dominant driver in almost all industries from corporate to SMEs and entrepreneurship sectors at both developed and developing countries. According to one

A. R. Albattat (✉)
Postgraduate Centre, Management and Science University, Selangor, Malaysia
e-mail: dr.battat@msu.edu.my

J. C. Phuoc
Postgraduate Centre, Management and Science University, Selangor, Malaysia

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_8

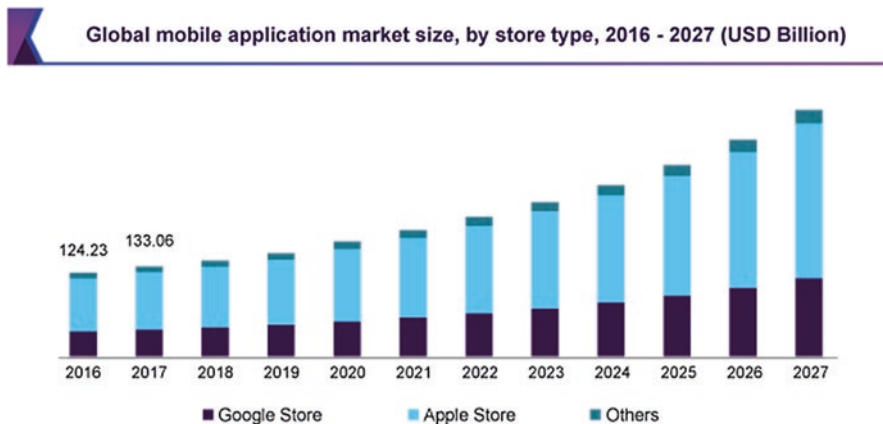


Fig. 8.1 Global mobile application market size. (Source: Grandview research Report, 2020)

Grandview Research Report (2020), in 2019 alone, the worldwide mobile application market was valued at USD154.05 billion in 2018, and it is expected to expand at a compound annual growth rate (CAGR) of 11.5% from 2020 to 2027. Mobile gaming applications, mobile music and amusement applications, mobile wellbeing and wellness applications, mobile long range informal communication applications, mobile retail and online business applications, and other mobile applications are generally instancing of mobile applications. Significant stores, for example, those portrayed in Fig. 8.1 underneath, advance mobile applications in hospitality.

Use of Mobile Technology in the Hospitality Industry

Mobile technology impacts the hospitality domain in many ways unlike 20 years ago since 2000. According to Quaytech's (2020), about 85% of global tourists (travelers) use a mobile device during their travel and for hospitality-related activities. About 74% of travelers have used a hotel application (i.e., mobile applications for bookings of stays and accommodation), and 70% the majority of last-minute bookings are made via a mobile device and mobile applications. In many respects, hotel mobile applications make bookings easier for around 70% of worldwide tourists, and 88% of guests staying in hotels prefer to use mobile applications that can provide some kind of a personalized experience (Ahmadi, 2019). Mobile applications now prevail in many sectors across all industry in view of Covid-19 and the reality for digital transformation in SMEs. In the main sectors of hospitality industry: mobile applications have playing a practical role in hospitality segments comprising food and beverages (F&B), travel, tourism, lodging, recreation, etc. Mobile applications have served as ubiquitous e-marketing tools in the online promotion and digital sales in supporting segments of hospitality such as food and beverages, travel, tourism, lodging, recreation, etc (Choi et al., 2016). Mobile applications even expand to the

management and operations of hospitality-related businesses and its sustainability guided by the UN SDG 17 goals currently observed all over the hospitality world. Global mobile phone user penetration is predicted to reach 63.4% in 2021. In January 2021, there were over 3.986 billion unique active mobile internet users who spent more than 5 h per day on their smartphones for various online activities.

Specific Use in Mobile Application

In the wake of COVID-19 pandemic, mobile applications are now utterly essential underpinning all levels of hospitality. According to a global research organization, in 2016, about 1.9 billion mobile phone users were recorded, and in 2017 it reached 2.12 billion, an increase of 12.6%. According to another study, nearly 50% of corporate travelers consider free Wi-Fi an important factor when choosing a hotel. It is clear from the statistics how powerful the technology of the hospitality industry is (Hopinfirst, 2018).

Mobile Application

Worldwide mobile telephone client entrance is anticipated to arrive at 63.4% in 2021. In January 2021, there were over 3.986 billion one of a kind dynamic mobile web clients who went through over 5 hours out of each day on their cell phones for different online exercises.

What Does Mobile-Centric Service Mean?

With increase in global mobile users, how can the hospitality sector work to ensure exceptional mobile service delivery for guests and travelers alike? Hospitality industry is maximizing mobile application in e-marketing to enhance overall customer experience. But how does the industry go about doing this? What are the issues that remain as stumbling blocks?

Enhance Mobile Application Websites

To improve intuitive mobile application linked to hospitality websites. It makes business sense for hotels to improve mobile application users. Potential guests are more likely to search for hotels online when they are traveling. By improving mobile

application on websites which are optimized for mobile application, hospitality experience can be enhanced to make it more convenient for mobile application users (Hapsari et al., 2020).

QR Codes Design

Technologies like QR codes can be used in the hospitality premises to guide and improve customers' hospitality experience. QR codes is a useful way to promote e-marketing as well allowing user access to mobile contents to obtain relevant hospitality information and data. For example, QR codes used in restaurants allows guests access to menu items, place orders, specified ingredients and the preparation of certain food such as kosher food or halal food.

Improved Safe Smartphone Payment

Within the hospitality industry, Smartphone Payment (e-payment) is becoming a norm. For instance, making payments using NFC and QR codes. This is safe and useful in hospitality because travelers need not carry cash.

Mobile Application and Lasting Hospitality Experience

Because smartphones are prevalent, it is easy now for hospitality stakeholders to use replacing room keys in hotels. Permitting guests to use their smartphones to access and lock doors is a good way to enhance hospitality experience and security. Mobile application has improved the many aspects of hospitality (i.e., room services and stay). For example, shutting of curtains in room, turning on and off lights, adjusting air-con of thermostat, selecting TV channel, access to hospitality data, placing room service orders, etc. In doing this mobile application could be utilized for e-marketing purposes as well (Trip Advisor, 2015).

Mobile Application in E-Marketing

Mobile applications as drivers in e-advertisement and e-promotion in almost all aspects of hospitality dimension. Mobile applications and its related technology have been vastly utilized in the hospitality industry and it involves the use of communications devices, computing devices and networking technology that connects them with uses in the hospitality sector. These Mobile applications drive mobile

devices to communicate and share voice, data, and applications seamlessly. As of 2021, mobile applications used in the hospitality industry and supporting segments are identified as follows: TikTok, Facebook, Instagram, WhatsApp, Telegram, Moj, Zoom, Snapchat, etc. These Mobile technology-related application have transformed the face of Hospitality Industry and businesses by providing several critical areas of use for global hospitality covering aspects such as Mobile friendly applications & websites, Quick service, predicting trends, Live information sharing. The influencing power of Mobile Apps to the Hospitality Industry is immense. For example, in the US alone, reports have estimated that more than 260 million smartphone users in the US by 2020. More than 45% of passengers use mobile applications to book hotel rooms, and two out of every three last-minute bookings are done using mobile applications on smart devices. According to a 2021 research, customers spent £105 billion on mobile applications in 2020, a 20% rise over the previous year. Top markets such as China, the United States, Japan, South Korea, and the United Kingdom are driving growth. Mobile application in e-marketing applies to 'point-of-sale' systems that operate as mobile application in smart devices such as mobile POS apps in these three environment such as [TouchBistro](#), [Revel Systems](#), [AccuPOS](#) (Buffer, 2018).

Mobile Application and Servqual Model

According to an earlier research by Parasuraman, Zeithaml, and Berry, the SERVQUAL model ('SERVQUAL') is a method for evaluating service quality from the perspective of the customer (1988). According to the findings of a research done by Parasuraman et al. (1985), the SERVQUAL model, which provides a set of metrics that look at consumers' expectations and perceptions in reaction to service quality, may still be useful in the hotel sector (Brochado et al., 2019). SERVQUAL contains a 34-item questionnaire and a set of 10 dimensions in its early stages of development (Ramanathan et al., 2018). The questionnaire was updated by Parasuraman et al. (1988) into five dimensions: dependability, assurance, tangibles, empathy, and responsiveness. It was created based on a list of 22 questions. Due to quality of service and customer satisfaction issues, SERVQUAL's five modified key dimensions (reliability, warranty, type, empathy, responsiveness) were used to assess customer perceptions and expectations (Mostafa, 2006; Rady, 2018).

Ji (2018)'s method to service quality evaluation validates the SERVQUAL model. He considered tangible factors such as the future of hospitality-related infrastructure and workers. Reliability refers to a company's capacity to provide high-quality hospitality-related services. In terms of ability, the response is to provide customers with timely and accurate entertainment-related services. Guarantees are associated with employee knowledge and the ability to persuade customers (Alotaibi, 2015). This is important in mobile apps. Empathy is viewed through the lens of customer philosophy, which includes individualized offers and diverse hospitality services (Shah et al., 2020; Tsafarakis et al., 2018). SERVQUAL has been

regarded an unsuitable model for global applicability, particularly its five dimensions across various cultures and races (Samson, 2016). Another study is the SERVQUAL scale, which was found by Parasuraman et al. (1985) to be utilized in characterizing administration quality in agreement to customer assumptions. This is because of the intricacies of administration quality. SERVQUAL, as per Carman (1990), is anything but a comprehensive, general measure for a wide range of administrations. Is this comprehensive of hospitality? It's conceivable. Because of this study, scientists refreshed the scales and offered numerous choices for use in additional measurements to research the particular person of the assistance business as it identifies with hospitality (Farooq et al., 2018).

Mobile Applications and Service Quality

In a globalized hospitality world, hospitality services are key point in hospitality business at all platforms in the hospitality segments. Hospitality services are critical to economic prosperity in both developed and developing countries (Alzaydi et al., 2018). Users of mobile application, travelers and customers in the hospitality industry have become more discriminating in several aspect of e-marketing hospitality. Hospitality-related service entities have taken notice of this demands to uphold and enhance hospitality service quality (Zakaria et al., 2018a, b). Turner (2020) in immaterial utilization, administrations were considered to be discernable from material merchandise as indicated by five fundamental qualities comprising of inseparable inventory, perishability, and absence of proprietorship. This depends on elusiveness, heterogeneity, solid customer interest, contemporaneous creation, utilization, and perishability, among different qualities (Xuehua, 2018).

It is made apparent here that service delivery in the manufacturing sector is not the same as service delivery in the hospitality-related service industry. The production of the service sector is intangible, whereas the output of the manufacturing sector is tangible. Services are not able to be kept as manufactured products since they manage a large amount of transactions and are often consumed while being created. Services need more labor, but production requires more capital. When it comes to the delivery of services, providers and customers interact. As a result, customer perceptions of service quality may grow or decline as a result of interactions between customers and service providers (Alzaydi et al., 2018). According to Parasuraman et al. (1985), service quality is defined as an inconsistency between consumers' expectations for service and their views of such service presentation. Service quality is recognized as a critical problem in many worldwide businesses for increasing revenues, customer happiness, and retention.

Zhang et al. (2018) exhibit how administration quality may further develop customer loyalty and bliss in the work environment. As indicated by Carranza et al. (2018), saw administration quality alludes to a customer's evaluation of the general greatness or prevalence of an assistance gave. They arrived at the resolution that help quality alludes to the distinction between shoppers' assumptions and the

assistance they got and experienced. The simple entry to administrations will advantageously affect administration quality and customer satisfaction. This backs a few earlier investigations on apparent help quality as an indicator of customer joy (Parasuraman et al., 1988).

Mobile Applications and Customer Satisfaction

Consumer loyalty is as an appraisal a client assesses on a trait of an item or a help and on the off chance that it gives any certain outcome from its utilization (Thielemann et al., 2018). A client is a definitive client of an item or an assistance, and hence, there are three general components that address consumer loyalty develop: first, consumer loyalty is a synopsis of compelling reaction with different kinds of forces. In an item determination measure, it includes reaction identified with a center, buy, and utilization. Reaction happens at a given time span, changed by a situation, notwithstanding restricted it is in term (Chan and Wong, 2015). This is clear in the cordiality area as the fundamental elements identified with buyers' friendliness decision concerning say carrier administrators is the apparent worth component this has an immediate relationship with purchaser fulfillment.

Hospitality in the airline service is another notable model. Airline hospitality quality profoundly affects consumer loyalties and its orderly buy (Alsalmi et al., 2020). Airline service quality and traveler fulfillment are so exceptionally interrelated as contemplated that hospitality service quality is a fundamental key in hospitality rivalry corresponding to traveler fulfillment. The demonstration of offering phenomenal assistance quality and maintaining traveler fulfillment are central questions in the airlines service industry (Kazmi & Shah, 2020). Ryu et al. (2012) concentrate on the inward connections between four elements of value (food, service, actual climate), value, fulfillment, and conduct goal in fast relaxed eateries, shown that nature of food and service quality were indispensable elements in the appraisal of consumer loyalty.

Further, the target of achieving customer satisfaction (CS) is a critical factor in assistance advancement achievement. Development improves the expected shots at offering superb support to acquire customers' satisfaction. Administration quality will improve customer satisfaction, in this way authorizing customer dedication prompting expanded corporate benefits and manageability. It has been tracked down that the nature of pre-flight, in-flight, and post-flight administrations were surveyed by numerous investigations to profoundly affect customer satisfaction-considered to be an intervening variable-emphatically affects long haul customer unwaveringness (Jiang & Zhang, 2016).

Mobile Application and Customer Loyalty

In the hotel industry, customer loyalty has many different connotations. Customer loyalty is defined as a strong bond between a person and a firm, as well as a consumer's profound devotion to a service or product that leads to future purchases (Zhang et al., 2018). Customer loyalty empowers explorers, clients, and customers to perceive an association's image, item, or administration and may decide to be rehash buyers out of attitudinal loyalty or propensity. Loyalty and repurchase conduct are affected by shopper joy, which later has an impact in deciding if to stay faithful to the current brand or merchandise, including hospitality. Therefore, it is basic to genuinely fathom customers' feelings, necessities, and wants (Zakaria et al., 2018a, b). Traveler or customer satisfaction is a significant resource for the avionics business and its administrators. Airline travelers in the twenty-first century are exacting, with exclusive requirements and requests. The same may be seen in passenger satisfaction service, which improves if a firm can provide advantages that surpass passengers' expectations, which is known as value-added (Kumara & Jain, 2017).

Customer satisfaction will be increased by providing excellent service quality and consistency in mobile applications. It has the following advantages: (1) The connection between the organization and the customer is additionally mixed. What's more, (2) give a decent establishment to repurchase exercises. (3) Encourage customer loyalty. (4) Make a suggestion for verbal (informal) that benefits the organization. (5) We support the arrangement of a decent corporate standing in the hearts of our customers. Furthermore, (6) increment the benefit of the organization. Customer satisfaction isn't restricted to fundamental food sources. They incline toward the top-notch food served in high end food. Creative airline administrators have considered the present circumstance and have attempted to work on the nature of their servings to hold and draw in existing and new purchasers (Li et al., 2016). In the hospitality industry, mobile application geared for that will surely benefit the travelers, users, customers. The Advantage offer by Mobile application in the hospitality industry is tremendous. Mobile app used by hotel staff provides them the flexibility in predicting customer behavior. Valuable insights could be gained into knowing guest activity and their hospitality preferences. Management team could use this data to provide and advise on innovative and personalized services and goods in line with current megatrends (Wang & Zhang, 2018).

Megatrends in Mobile Application

Other Prevalent Uses of Mobile Application

Mobile apps in line with AI assisted smart technology have shape the framework of hospitality industry since the set up of Las Vegas, Atlandis, Sentosa Island, Genting, as famous tourism landmarks in the world. Several areas have been identified for further expansion in hospitality industry as: Smart Energy Management, Smart Guest Experiences, Remote Check-In/Check-Out, Mobile Room Keys, Smart Room Service, Check-in/Mobile Key, Housekeeping, and so on.

SWOT Analysis: Downsides on Use of Mobile Applications

There are three main Downsides on use of mobile applications in current hospitality industry. What is a Mobile application and how it impacts customer experience within hospitality sector? Due to COVID-19 pandemic, the hospitality i.e., hotel industry has seen massive digital transformation using Mobile application, automation and digital solutions to resolve and promote numerous aspects of hospitality perspectives for both local and international travelers, tourists, customers and clients. These parties are expecting a more personalized experiences than traditional hospitality approaches. However, the specter of abuse and misuse of privacy and data provided in Mobile application for hospitality purposes remain a big headache for the stakeholder in the hospitality industry not only for foreign tourists i.e., European user and travelers but also user in Jordan.

Ethical Issues

Major Issues

Complexity in providing privacy data and access in mobile application is another area of concern for hospitality industry around the globe, and not only in Jordan. Mobile application may offer increasingly innovative ways to communicate with users, but most Mobile application are rather complicated in terms of personal data provision. For instance, QR codes work so well for menus in hospitality. The use, storage and sharing of personal data is becoming a major problem for the hospitality segments from top to bottom. Simplicity in providing personal data is perhaps instrumental in reducing the barriers to adoption are for hospitality sectors for users and guests alike, thus, leading to higher guest engagement (Jeong & Leo, 2012).

Compliance with Data and Privacy in ASEAN Hospitality

In Malaysia, the law regulating data used in hospitality is the Personal Data Protection Act 2010 (PDPA). Hospitality sectors are required to comply with the provisions of PDPA and that applied to Mobile application used for such purposes. In Malaysia, the Personal Data Protection Commissioner has published an amendment to the “Personal Data Protection Standard 2015” (which went into effect on December 23) that is very timely in correcting various data standards implementation for both sectors within business (San, 2020).

The EU and the UK

Compliance with such data protection used in the hospitality is critical because there is a growing legal trend on the need for such law to protect the rights and interests of all stakeholders in the hospitality industry. In the UK, the UK requires all hospitality players to comply with the UK Data Protection Act 1998, and in Singapore, compliance by the hospitality sectors with the national Personal Data Protection Act 2012 is enforced strictly to avoid and prevent misuse and abuse of data collected by Mobile application from users. To make matters compounded, it appears that there are two sets of compliance requirements for the commercial sector on the one hand and the public sector on the other. The compliance is a serious matter and in the EU hospitality, a new law has been enforced on almost all industries doing business in the EU region (Winter & Davidson, 2019).

Data and Privacy in Jordan

A data protection law is under consideration in Jordan but the timetable for its adoption is unclear. This may impact Mobile application in the hospitality industry in Jordan due to privacy concern on hospitality data. A draft data protection law has been submitted for consideration by the Jordanian parliament. But there is still no news in its outcome. In terms of hospitality relation with Europe, it is not clear if the draft data law was crafted to include the new EU data Law (i.e., GDPR provisions). Further, there is no timeframe given for it to become law in Jordan. This limitation is further compounded by the fact that in Jordan, there is no modern data protection law, and there is no Data Protection Authority or commission. The current Jordanian law is not catering to data used by Mobile application for hospitality purposes and activities.

Jordan: The Protection of Personal Data

The Constitution of the Hashemite Kingdom of Jordan contains privacy-specific provisions relating to services and data concerns. Article 18 of the Constitution says: “All postal and telegraph communications, telephony and other means of communication shall be deemed confidential and not subject to censorship, viewing, suspension or confiscation. The provisions of the law” Jordan has signed a number of international treaties and declarations concerning data protection, privacy, and the right to privacy as fundamental human rights (Salameh & Darawsheh, 2018: 80).

Jordan’s Compliance with Data in Hospitality

Jordan has ratified the International Covenant on Civil and Political Rights (ICCPR) as well as the Convention on the Rights of the Child, both of which protect the right to privacy. Jordan has ratified the Cairo Declaration on Islamic Human Rights, which safeguards the right to privacy. It is unknown, however, if the proposal conforms with the new EU General Data Protection Regulation [Regulation (EU 2016/679) ‘GDPR’] in terms of the new criteria and principles of transparency, accuracy, storage limitation, and data minimization. “The most recent version of the Draft Bill was published on the Legislation and Opinion Bureau’s website on January 23, 2020. However, no final version of the Draft Bill has been authorized as of yet, despite the fact that a final version is scheduled to be produced in 2020.” (OHCHR, 2021).

Privacy, and Data Protection Dilemma in Mobile Applications

Mobile Application in the U.S.A.

In the U.S.A., unprecedented use, and development of hotel-branded mobile applications in hospitality has increase guest–hotel interactions in the U.S. hospitality industry. There is a need for higher personalization of services whereby in order to cater to true personalization, travelers, tourists, customers, and users are required to provide personal information via Mobile application in the study by Morosan and Defranco (2016, 2019a, b). According to Morosan and Defranco (2016, 2019a, b), most of these are sensitive information and it is a severe and big problem from privacy and data protection perspectives. However, there has been little research on how users form intents to use mobile applications in light of the current personalization and privacy problems, as emphasized by them. Their study, which was situated in the United States, discovered that there is a perceived personalization and privacy concerns as different constructs at both general and Mobile application-specific

privacy issues, based on personalization-privacy theory. The findings, which were based on theoretical concepts in consumer psychology and information systems, caught many distinct types of consumers–app interactions in highly experienced contexts like hotels (e.g., innovativeness and involvement). The model was checked utilizing corroborative factor investigation and primary conditions demonstrating on a cross country test of lodging guests in the United States. The factors clarified 79% of the variety in goals to use lodging applications to tailor inn administrations, as indicated by the analysts. Inclusion was the most impressive indicator of expectations, trailed by application related protection concerns and saw customization. They feature the various parts of customization and protection with regards to inn applications, which have not been researched with regards to m-trade in the hospitality business. When personalization choices and privacy issues exist, the role of engagement is another significant aspect affecting visitors' intents to utilize Mobile applications. Thus, the practical implications are as follows: hotel owners recognize the importance of mobile applications in decision-making processes involving a mapping of the factors listed above, bringing about a more straightforward utilization of inn applications for buying customized lodging administrations, and solid key and monetary importance for the hospitality business (i.e., direct appropriation, brand union, and broad contact with visitors).

Data and Privacy: The New Privacy Requirement in Hospitality

The limitation, barriers, and downside of all the data collected from Mobile application within the hotel industry is the vulnerability of such Mobile application to hacking, fraud and other forms of cybercrime. Data privacy is now a major red flag and red button worldwide not only in Jordan. European Union's 2016 General Data Protection Regulation (GDPR) legislation now requires all hospitality players and stakeholder to comply fully or face charges for breaches and violation. This will have impact in Jordan and Jordanian hospitality players. Hospitality players, hotels and companies do collect a lot of data particularly health information, and this is a real risk on hospitality generally and especially in health hospitality (Bulley, 2016).

IOT and Mobile Application in Hospitality

The Internet of Things (IoT) has impact Mobile application used in hospitality in many ways as discussed above in various domain of innovations and uses such as smart hotel rooms, personalized services etc. to enhance customer engagement and satisfaction vide interactive environment and data collection methods and user interfaces. With massive amount of data collection from users' travelers, tourists, clients, etc., there is a real and present threat of crisis if such data are misuse or disclose to unauthorized parties. This raised serious new concerns on the hospitality

industry pertaining to privacy and ethical considerations. Smart hospitality requires smart and friendly Portable application and innovations as a stage for hospitality exercises and moment data trade (Buonincontri & Micera, 2016; Del Chiappa & Baggio, 2015). This is key for versatile application utilized in hospitality.

Privacy Concern in Hospitality

Every sector, including hospitality, is concerned about privacy. Users in the hotel industry are worried about the usage, disclosure, and accessibility of their personal information (Ooi et al., 2018). The fear is real on the basis that there is no trust in the hospitality players on the use, and storage of personal data (Buhalis et al., 2019). Security issues have been found to negatively affect full of feeling trust (Ngelambong et al., 2018). Security issues every now and again adversely affect individuals' trust in sharing their own information (Bansal et al., 2016). Seen security hazard is additionally genuine. When presented to finishing their exercises with new innovation (e.g., a versatile application in hospitality), clients have been displayed to have a significant degree of hazard discernments (Ozturk et al., 2017). Additionally, saw hazard is significant in foreseeing vacationer conduct, and security hazard would contrarily affect trust and protection concerns (Sadiq et al., 2021).

Control over Personal Information

When a user, travelers, tourists, clients, consumers believe that they are given some kind of control over how their personal information is to be used, stored, shared, transfer, etc., it will promote trust within the hospitality segments and key players (Mosteller & Poddar, 2017). This includes secondary control of personal data on hospitality, which is positively connected to confidence in social media platforms but adversely related to consumer privacy concerns (Mosteller & Poddar, 2017). Furthermore, perceived data control is proven to have a favorable relationship with data sharing online (Hajli & Lin, 2016).

Cyber-Attacks and Mobile Application in Hospitality

Mobile applications are utilized by consumers all over the world, and the hotel sector is no exception. These applications are vulnerable to security attacks, putting user data at risk. Illegal, irresponsible exploits and attempted assaults on Mobile applications used in hospitality are becoming so common that the FBI has urged customers to be cautious when downloading Mobile applications for commercial reasons across all platforms. According to safe security and privacy benchmark

Mobile App Security & Privacy Issues Plague Top Brands in 2020



Fig. 8.2 Mobile app security and privacy issues plague top brands in 2020. (Source: Schurr, 2020)

evaluations, 85% of public app store apps have cybersecurity problems, and 70% leak private data (Schurr, 2020). The following are five notable mobile app security and privacy concerns in 2020 as a consequence of a vulnerability, hack, or data leak (Fig. 8.2).

Mobil Application in the Context of Hospitality in Jordan

Mobile application penetration in Jordan is increasingly on the upward curve in the region hitting 64% in 2006. It was found that 86% of the Jordanian families are using mobile phones with some kind of Mobile application for hospitality-related activities, even though 16% of Jordanian families have Internet at homes which is admittedly quite low in terms of Internet penetration but does not in any way impede

the use of Mobile application for hospitality-related activities as demonstrated in the following literature discussion (Yousef, 2016).

According to Khwaldeh et al. (2020a, b), mobile application in Jordan invariably follows the same hospitality pattern that relies on the pertaining e-Marketing in Jordan. Khwaldeh et al. (2020a, b) also found that Mobile Hotel Reservation System ('MHRS') is very useful in the hospitality industry pertaining to Five Star rated hotels in the city of Aqaba, Jordan. These specialists found that there is a positive relationship impact of relative benefit, data force, sexual orientation, age, and individual pay on apparent value, and the last on consistent expectation to utilize MHRS in their exact investigation including 390 usable reactions containing 36 things. The discoveries have shown that the part of Mobile application is progressively imperative in the significant parts of hospitality industry in Jordan. Large inns have come to perceive the apparent value of embracing MHRS, and thus on consistent goal to utilize MHRS in hospitality-related help organizations.

Al-Naimat et al. (2020), investigated many major use factors of mobile commerce in Jordan's tourist and hospitality business in another Jordanian hospitality-related study project. On the basis of data obtained from 168 Jordanian hospitality-related SMEs, the primary drivers of m-commerce usage connected to hospitality activities were discovered to be perceived simplicity of use, perceived utility, system quality, and service quality. This result gives a deeper knowledge of m-commerce use in Jordan's hospitality-related business, indicating that there is a rising dependence on mobile applications in m-commerce, which has an influence on the broader hospitality industry in Jordan.

Another important Jordanian hospitality-related research using both exploratory study (qualitative) and confirmatory study (quantitative) Al-Adwan and Sammour (2021) have revealed that there are seven choice variables that have a direct influence on Jordanian consumers' propensity to acquire mobile apps. These criteria include the App's pricing, performance, enjoyment, trial-ability, electronic word-of-mouth (eWOM) regarding the App, technical dependability, and usefulness. These findings by Al-Adwan and Sammour (2021) are very practical in that these indicate how the decision trends of traveler, customers and consumers who would use mobile application in relation to hospitality-related activities in Jordan.

Challenges in the Use of Mobile Application

The challenges in the use of mobile application as e-marketing tools in hospitality are numerous. Hospitality operations and management continues to face many challenges despite the ease of mobile application as e-marketing tools. Communicating with travelers, customers, consumers, remains crucial in the mobile application equation in regard to hospitality-related products and services. This is compounded by existing legal issues relating to privacy, scams, junk e-marketing materials, etc. which is a pull factor for the hospitality industry (Zyad et al., 2018).

Concluding Remarks

The twenty-first century and disrupted by COVID-19 will see newer innovation in mobile application in top hospitality sites around the world. Smart hotels, sustainable hotels, robot staff, and hospitality unique brand experiences are all megatrends of the future in the hospitality digital social media world. In Jordan, literature supports from both exploratory i.e., qualitative, and confirmatory (i.e., quantitative dimensions have shown that mobile application will be increasingly dominant tool and an overriding factor in the decision-making process impacting the twenty-first century hospitality-related activities by traveler, tourists, customers, and clients in Jordan).

References

- Ahmadi, A. (2019). Thai airways: Key influencing factors on customers' word of mouth. *International Journal of Quality & Reliability Management*, 36(1), 40–57.
- Al-Adwan, A. S., & Sammour, G. (2021). What makes consumers purchase Mobile apps: Evidence from Jordan. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(3), 562–583.
- Al-Naimat, A. M., Alnuaimi, M. A., Abdulaal, A. M., & Almueit, M. Z. (2020). Determinants of m-commerce usage in Jordanian hospitality industry. *Journal of Theoretical and Applied Information Technology*, 98(23), 3834–3842.
- Alotaibi, M. M. (2015). *Evaluation of "AIRQUAL" scale for measuring airlines service quality and its effect on customer satisfaction and loyalty*. Doctoral Thesis. Cranfield University.
- Alsahli, A., Fazli Idris, D., & Alam, S. S. (2020). The mediating role of customer satisfaction on the effect of emotional labour strategies of the flight attendants of Malaysia AirAsia on customer loyalty. *Journal of Critical Reviews*, 7(11), 3152–3167.
- Alzaydi, Z. M., Al-Hajla, A., Nguyen, B., & Jayawardhena, C. (2018). A review of service quality and service delivery. *Business Process Management Journal*, 24(1), 295–328.
- Bansal, G., Zahedi, F. M., & Gefen, D. (2016). Do context and personality matter? Trust and privacy concerns in disclosing private information online. *Information & Management*, 53(1), 1–21.
- Brochado, A., Rita, P., Oliveira, C., & Oliveira, F. (2019). Airline passengers' perceptions of service quality: Themes in online reviews. *International Journal of Contemporary Hospitality Management*.
- Buffer. (2018). 21 top social media sites to consider for your brand. Online article written by Alfred Lua. Retrieved from: <https://buffer.com/resources/social-media-sites/>. Accessed 14 June 2021.
- Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019). Technological disruptions in services: Lessons from tourism and hospitality. *Journal of Service Management*, 30(4), 484–506.
- Bulley, D. (2016). *Migration, ethics and power: Spaces of hospitality in international politics*. Sage.
- Buonincontri, P., & Micera, R. (2016). The experience co-creation in smart tourism destinations: A multiple case analysis of European destinations. *Information Technology & Tourism*, 16(3), 285–315.
- Carman, J. M. (1990). Consumers' perceptions of service quality: An assessment of the SERVQUAL dimensions. *Journal of Retailing*, 66(1), 33–35.

- Carranza, R., Díaz, E., & Martín-Consuegra, D. (2018). The influence of quality on satisfaction and customer loyalty with an importance-performance map analysis. *Journal of Hospitality and Tourism Technology*, 9(3), 380–396.
- Chan, N. H., & Wong, H. Y. (2015). *Simulation techniques in financial risk management*. Wiley.
- Choi, M., Law, R., & Heo, C. Y. (2016). Shopping destinations and trust–tourist attitudes: Scale development and validation. *Tourism Management*, 54, 490–501.
- Del Chiappa, G., & Baggio, R. (2015). Knowledge transfer in smart tourism destinations: Analyzing the effects of a network structure. *Journal of Destination Marketing & Management*, 4(3), 145–150.
- Farooq, M. S., Salam, M., Fayolle, A., Jaafar, N., & Ayupp, K. (2018). Impact of service quality on customer satisfaction in Malaysia airlines: A PLS-SEM approach. *Journal of Air Transport Management*, 67, 169–180.
- Grandview Research Report. (2020). *Mobile application market size, share & trends analysis report by store type (Google Store, Apple Store), by application (Gaming, Music & Entertainment, Health & Fitness), By Region, and Segment Forecasts, 2020–2027*. Retrieved from: <https://www.grandviewresearch.com/industry-analysis/mobile-application-market>. Accessed 14 June 2021.
- Hajli, N., & Lin, X. (2016). Exploring the security of information sharing on social networking sites: The role of perceived control of information. *Journal of Business Ethics*, 133(1), 111–123.
- Hapsari, R., Hussein, A. S., & Handrito, R. P. (2020). Being fair to customers: A strategy in enhancing customer engagement and loyalty in the Indonesia mobile telecommunication industry. *Services Marketing Quarterly*, 41(1), 49–67.
- Hopinfirst. (2018). *How Mobile Technology effects more in Hospitality Industry*. Retrieved from: <https://hopinfirst.com/how-mobile-technology-effects-more-in-hospitality-industry/>. Accessed 14 June 2021.
- Jeong, C. P., & Leo, D. P. (2012). *Personal data protection: Cases and commentary*. CLJ Publication.
- Ji, X. (2018). SERVQUAL-model-based fuzzy evaluation of express service quality. *International Journal of Transportation Engineering and Technology*, 4(1), 20–23.
- Jiang, H., & Zhang, Y. (2016). An investigation of service quality, customer satisfaction and loyalty in China’s airline market. *Journal of Air Transport Management*, 57, 80–88.
- Kazmi, M., & Shah, S. A. H. (2020). Six sigma, a road to infallible service quality in hotel industry of Pakistan. *Artech Journal of Tourism Research and Hospitality (AJTRH)*, 1(1), 6–12.
- Khwaldeh, S., Alkhaldeh, R. S., Masa’deh, R. E., AlHadid, I., & Alrowwad, A. A. (2020a). The impact of mobile hotel reservation system on continuous intention to use in Jordan. *Tourism and Hospitality Research*, 20(3), 358–371.
- Khwaldeh, S., Alkhaldeh, R. S., Masa’deh, R., AlHadid, I., & Alrowwad, A. (2020b). The impact of mobile hotel reservation system on continuous intention to use in Jordan. March 2020. *Tourism and Hospitality Research*, 20(3), 358–371.
- Kumara, S., & Jain, A. (2017). An empirical study of passengers perception of service quality of selected Indian airlines. *International Journal of Trade & Commerce-IIARTC*, 6(1), 42–56.
- Li, W., Long, R., & Chen, H. (2016). Consumers’ evaluation of national new energy vehicle policy in China: An analysis based on a four paradigm model. *Energy Policy*, 99, 33–41.
- Morosan, C., & DeFranco, A. (2016). Modeling guests’ intentions to use mobile apps in hotels. *International Journal of Contemporary Hospitality Management*, 28(9), 1968–1991.
- Morosan, C., & DeFranco, A. (2019a). Classification and characterization of US consumers based on their perceptions of risk of tablet use in international hotels. *Journal of Hospitality and Tourism Technology*, 10(3), 233–254.
- Morosan, C., & DeFranco, A. (2019b). Using interactive technologies to influence guests’ unplanned dollar spending in hotels. *International Journal of Hospitality Management*, 82, 242–251.

- Mostafa, M. M. (2006). A comparison of SERVQUAL and IP analysis: Measuring and improving service quality in Egyptian private universities. *Journal of Marketing for Higher Education*, 16(2), 83–104.
- Mosteller, J., & Poddar, A. (2017). To share and protect: Using regulatory focus theory to examine the privacy paradox of consumers' social media engagement and online privacy protection behaviors. *Journal of Interactive Marketing*, 39, 27–38.
- Ngelambong, A., Ariffin, H. F., Zulkifli, A. H., Kibat, S., Ahmad, J. A., & Akhir, I. M. (2018). Retracted: Linking relationship benefit and word of mouth engagement in hospitality online brand community: The mediating role of relationship quality. *Journal of Fundamental and Applied Sciences*, 10(6S), 1300–1312.
- OHCHR. (2021). *International Covenant on Civil and Political Rights. Adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16 December 1966 Entry into force 23 March 1976, in accordance with article 49*. Retrieved from: Accessed 17 June 2021 from: <https://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx>. Accessed: 14 June 2021.
- Ooi, K. B., Hew, J. J., & Lin, B. (2018). Unfolding the privacy paradox among mobile social commerce users: A multi-mediation approach. *Behaviour & Information Technology*, 37(6), 575–595.
- Ozturk, A. B., Nusair, K., Okumus, F., & Singh, D. (2017). Understanding mobile hotel booking loyalty: An integration of privacy calculus theory and trust-risk framework. *Information Systems Frontiers*, 19(4), 753–767.
- Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12–40.
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, 49(4), 41–50.
- Quytech. (2020). *How Mobile Technology Is Changing the Hospitality Industry?* Retrieved from: <https://www.quytech.com/blog/mobile-technology-changing-hospitality-industry/>. Accessed 14 June 2021.
- Rady, H. A. W. A. (2018). Measuring airline service quality using AIRQUAL model: A study applied to Egyptair. *International Journal of Heritage, Tourism and Hospitality*, 12(1/2), 271–290.
- Ramanathan, U., Win, S., & Wien, A. (2018). A SERVQUAL approach to identifying the influences of service quality on leasing market segment in the German financial sector. *Benchmarking: An International Journal*, 25(6), 1–24.
- Ryu, K., Lee, H. R., & Kim, W. G. (2012). The influence of the quality of the physical environment, food, and service on restaurant image, customer perceived value, customer satisfaction, and behavioral intentions. *International Journal of Contemporary Hospitality Management*, 24(2), 200–223.
- Sadiq, M., Dogra, N., Adil, M., & Bharti, K. (2021). Predicting online travel purchase behavior: The role of trust and perceived risk. *Journal of Quality Assurance in Hospitality & Tourism*. <https://doi.org/10.1080/1528008X.2021.1913693>
- Salameh, M. T. B., & Darawsheh, S. A. (2018). Human rights in the Jordanian constitution: Between theoretical texts and practical application. *International Journal of Human Rights and Constitutional Studies*, 6(1), 70–88.
- Samson, J. (2016). *Moderating effects of service failure and customer communication on the relationship between service quality and customer satisfaction among mobile phone firms in Kenya*. Doctoral dissertation. Maseno University.
- San, T. P. (2020). Predictions from data analytics: Does Malaysian data protection law apply? *Information & Communications Technology Law*, 29(3), 291–307.
- Schurr, A. (2020) The top 5 Mobile AppSec & Privacy Breaches of 2020. Now Secure. Retrieved from: <https://www.nowsecure.com/blog/2020/12/21/the-top-5-mobile-appsec-privacy-breaches-of-2020/>. Accessed 17 June 2021.

- Shah, F. T., Syed, Z., Imam, A., & Raza, A. (2020). The impact of airline service quality on passengers' behavioral intentions using passenger satisfaction as a mediator. *Journal of Air Transport Management*, 85, 101815.
- Thielemann, V. M., Ottenbacher, M. C., & Harrington, R. J. (2018). Antecedents and consequences of perceived customer value in the restaurant industry: A preliminary test of a holistic model. *International Hospitality Review*, 32(1), 26–45.
- Trip Advisor. (2015). *Investor relations, tripadvisor study reveals 42% of travelers worldwide use smartphones to plan or book their trips*. Retrieved from: <https://ir.tripadvisor.com/news-releases/news-release-details/tripadvisor-study-reveals-42-travelers-worldwide-use-smartphones>. Accessed 14 June 2021.
- Tsafarakis, S., Kokotas, T., & Pantouvakis, A. (2018). A multiple criteria approach for airline passenger satisfaction measurement and service quality improvement. *Journal of Air Transport Management*, 68, 61–75.
- Turner, T. (2020). Strategies to enhance department store improvement of Brand Marketing.
- Wang, X., & Zhang, Q. (2018). Does online service failure matter to offline customer loyalty in the integrated multi-channel context? The moderating effect of brand strength. *Journal of Service Theory and Practice*, 28(6), 774–806.
- Winter, J. S., & Davidson, E. (2019). Big data governance of personal health information and challenges to contextual integrity. *The Information Society*, 35(1), 36–51.
- Xuehua, J. (2018). SERVQUAL – Model-based fuzzy evaluation of express service quality. *International Journal of Transportation Engineering and Technology*, 4(1), 20–23.
- Yousef, H. S. A. (2016). Utilizing mobile applications in smart E-government in Jordan. *International Journal of Scientific & Technology Research*, 5(11), 269–272.
- Zakaria, A., Ahmad, S. S., Omar, M. W., & Alhady, S. M. A. S. A. (2018a). The effect of relationship marketing, customer satisfaction and service quality towards customer loyalty: A case study in XYZ SDN BHD. *International Journal of Accounting*, 3(11), 98–104.
- Zakaria, Z., Idris, K., Samah, B. A., & Abiddin, N. Z. (2018b). Understanding the dimension of job resources, personal resources and transformational leadership in boosting work engagement level among employees in public sector. *International Journal of Academic Research in Business and Social Sciences*, 8(10), 1035–1051.
- Zhang, Y., Zhang, L., Zhang, X., Yang, M. M., Zhang, S., Li, S. J., & Huang, Y. Y. (2018). Hospital service quality and patient loyalty: The mediation effect of empathy. *Journal of Business & Industrial Marketing*, 33(8), 1176–1186.
- Zyad, M. A., Al-Hajla, A., Nguyen, B., & Jayawardhena, C. (2018). A review of service quality and service delivery. *Business Process Management Journal*, 24(1), 295–328.

Chapter 9

Digital Trends in Asian Hotel Industry



Narentheren Kaliappen and Azizul Hassan

Abstract In 2020, almost all sectors including hospitality were affected in some way by new waves of digital innovation. In order to satisfy the changing demands of customers in the digital age, hotels must go through digital transformation to remain ahead of both traditional rivals and market disruptors in a rapidly changing competitive climate. This requires hotels to have the best approach to technology, creativity, data-focused and customer-centric service, backed by appropriate working culture. Several digital trends (Artificial intelligence, Mobile technologies, Chatbots, Robots, Digital kiosks, Blockchain, Internet of Things, and Virtual reality, and Augmented reality) in hotel industry are discussed together with real-life applications in line with their respective operations. The practical implications and future research suggestions are also presented. This will be helpful to develop smart hotels to ensure post-pandemic survivability and sustainability. This chapter will also assist the hotels' top management in making decisions and policies regarding the usage of digital tools in hotel operation. This chapter also includes real examples from Asian hotels.

Keywords Digital · Trends · Hotel industry · Technology · Asia

Introduction

In 2020, almost all sectors including hospitality were affected in some way by new waves of digital innovation. Recent trends in the hospitality industry indicate that the industry intends to turn its attention to different settings to meet the growing

N. Kaliappen (✉)

School of International Studies, College of Law, Government, and International Studies,
Universiti Utara Malaysia (UUM), Kedah, Malaysia
e-mail: narentheren@uum.edu.my

A. Hassan

Tourism Consultants Network, The Tourism Society, London, UK

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_9

customer interest-tailoring digital content at their fingertips (Nevron, 2020). Our mobile devices have transformed the means of how we use mass media substance forever. Whilst several industries are stalling the unavoidable, hospitality technology developments will require to evolve rapidly to remain significant. As we transition into an immersive future, we can see some innovations evolving and crashing with developments in hospitality tourism and industries. We should expect to see more advancements in hospitality technologies using a range of intelligent technologies to minimize operating costs and boost guest experience while also exploiting new income sources. The most successful business enterprises of the future are most likely to invest in data systems that collect, analyze, and market data.

Nevron (2020) revealed that there are not many ways to be creative when it comes to the hospitality industry. However, as our lives become more dependent on digital technologies, this change would affect all industries, including hospitality. It is worthy to note that digitalization is a significant shift, much more significant than the Internet. The hospitality industry is threatened by accelerating technological developments, increased consumer power, and increased competition. Digital innovation is thus essential to the hospitality industry's sustainability in touristy destinations and the guests' interest in the tourist market (Ristova & Dimitrov, 2019; Ristova & Maglovski, 2018). Immediate access to the information on the Internet has been enabled by digital technology for hotel guests through any means of digital devices such as PC, laptops, tablets, or smartphones, with mobile bookings in accordance with constant development. They are often supposed to not only remember their actions, backgrounds, and interests but to make use of them for even more assistance and personalization. Mobile applications should also be used more efficiently to lower hotel advertisement costs and effectively reach potential guests (Ristova & Dimitrov, 2019; Kwon et al., 2013). Guests can reserve hotels, opt to lodge in the house of a stranger, and check on their smartphone for online hotel reviews, all while linked to the Wi-Fi hotel.

This medium can all be achieved separately or at its particular moment. With hospitality being a high-tech and high-touch business, it is also expected that the guest experience moves simultaneously within the area. The digitalization in the hospitality industry is needed in general to handle the loss of control over consumption, growing competition, and the likelihood of commercialization and interacting digitally with suppliers, partners and employees, and customers.

This chapter aims to explore and expand how artificial intelligence (AI) is used in hotels' management and its implementation in various operations, such as distribution, sales, service to the customers, advertisement, relationships, and customer responses. This chapter highlights top digital trends of AI, Mobile technologies, Chatbots, Robots, Digital kiosks, Blockchain, Internet of Things (IoT), and Virtual reality, and Augmented reality. This chapter provides real examples in the global hotel industry of the value of any digital trend.

Digital Trends in the Hotel Industry

Emerging more quickly than ever, digital technologies in the hospitality industry are anticipated to become universal immediately alongside several of the newest gadgets developed throughout the last decade. Increasing studies and surveys of current trends in the hospitality industry indicate that guests demand special attention and personalized entertainment only to grow over time. The growth in customers' demands is most likely because we see another new degree of rivalry in current trends in the hospitality industry. Hoteliers continue to aim to enhance their guests' satisfaction, and what improved approach to achieve so than concentrate on existing and emerging trends in hospitality and bring a new entertainment platform to their rooms' comfort.

Artificial intelligence (AI) production has a massive effect on relationships with clients, workers, and other stakeholders. In particular, AI is gradually incorporating analytical, intuitive, and empathic skills (Huang & Rust, 2018), allowing new communication methods to be taken into account in business strategy. As the modern digital era emerges and new developments in the hospitality industry advance, AI will become increasingly part of the hospitality industry's existing trends throughout 2020. More companies are adopting new technology and are starting to see the advantages. Not only can the launch of AI offer a lot of innovative business prospects to hotel owners in the hospitality industry, but for the most part, a brand-new objective. Nevron (2020) discussed an unparalleled customer experience, and above all, a more seamless and organized operation for visitors during their stay can be expected with the AI implementation. AI has only recently begun to enter the mass market. However, as its influence only expands, it will undoubtedly perform a crucial part in all the newest developments in the hospitality industry.

Besides being the most critical personalized content on the list, the key reason for the shift is also how the content is delivered to the customer, whose demands continually evolving concurrently with technology. As a result, a more difficult phase is being taken; AI facilitates the automation of processes and services, recently being used in frontline services to communicate directly with clients (Van Doorn et al., 2017). This chapter concentrates on some of the evolving digital trends of the hotel industry.

Mobile Technologies

Mobile connectivity, be it via smartphones or tablets, enables potential customers to find the best hotel in many locations. In advance, for additional hotel amenities, the client may check the various types of rooms and the spa and dining facilities, and other services. In other words, mobile technologies are turning intangible hotel services into tangible services. Since we have learned that digital technologies penetrate each part of lives, and hotels must realize that practically, nearly every guest

registered in the hotel, spa, or resort is equipped with a smartphone. Several hotels have also been using social media to promote hotel guests' registration, primarily through a website-based sign-in program and share their Twitter experience with friends and followers on Instagram and Facebook. If this technological trend continues, hotels should expect guests to use these platforms to provide feedback, complain about their experience, and praise their stay with more social media engagements.

One of the apparent advancements in mobile technologies is mobile applications. Mobile applications among the hotel industry have established the guest experience in a real way. Since the hospitality industry's service seems to have the highest value, the need to engage, communicate, and attract is crucial. In recent years, the importance of mobile apps in hotels has increased rapidly. More hotels concentrate on their implementation. The chances of returning guests are higher if hotels consider guests as individuals instead of homogeneous groups, and mobile apps elevate that. The prospective client will easily visit several hotels from the respective hotel business, regardless of where the hotels are located. The customer will make a reservation directly after selecting a particular hotel. If the customer wishes, they can look at the hotel room layout and select a particular room. The potential guest will also notify the hotel of their expectations for establishing the room via the app. Guests may also order several additional facilities, including food and drink, extra pillows, and any other auxiliary tasks they need. It will be there in their room upon arrival. Mobile applications also allow different functions for the guest at any convenience, in addition to just booking (Ristova & Dimitrov, 2019; Lukanova & Ilieva, 2019).

For instance, many prominent international hotel companies such as Marriott, Starwood Hotels & Resorts with their Starwood Preferred Guest, Hilton with Hilton HHonors App and AccorHotels Group are the precursors of mobile apps. Hilton Worldwide (2017) reported that they have carried out various studies since implementing its mobile app, representing members of Hilton HHonors of more than 40 million. The findings remain explicit and demonstrate that consumers would like more options and control. Almost 90% of hotel guests convey unusual reaction on the opportunity they get to pick the room they will be staying. This feedback proves that mobile applications help the hotel industry cater to each guests' preferences.

Besides following Accor (2017), AccorHotels Group, as one of the most prominent European international chain, also provide further proof of mobile technologies in the hotel industry. AccorHotels.com launched MoodMatch, a revolutionary technology where this platform is solely focused on tourist moods and experiences. Thirty-four main features have been outlined by the AI platform, which is vital to potential customers to select a hotel based on examining over 100 million reviews by visitors and experts in tourism. The platform identifies a specific collection of characteristics for each hotel worldwide; hence Hotel DNA is established as a content platform with four categories that a potential customer can choose from that corresponds to his particular preferences when he seeks a hotel through MoodMatch. As a result, the platform demonstrates the distinctive number of characteristics that

directly conforms with the classification chosen by customers toward these hotels (Lukanova & Ilieva, 2019; Accor, 2017).

Similarly, Virgin Hotels established a preferential program intended to generate extraordinary experiences called 'The Know.' In their mini-bar, guests can tailor what kind of drinks they want, and the hotel will have them already upon their arrival by filling in the online questionnaire. For instance, guests can first check-in then get in touch with the staff in charge any time before their arrival for a hassle-free process. The guest can also get information on exclusive deals, weather predictions, and tourist attractions in advance.

The cost of introducing and using the new technology can be quite distinctive on most occasions. Therefore, it is entirely appropriate that these emerging developments are mostly open to large hotel companies. Nonetheless, given the importance and role of emerging technology in hotels' modern growth, independent hotels too, are increasingly beginning to invest in them to enhance the experience of their guests. This pattern can be seen when an Austrian hotel, Schani Wien, via a mobile application, allows its guests to choose a level, view, size of the room, and other features. It also allows guests to directly link to the hotel, the weather prediction, unlock the room, and order airport transmission and flight check-in (Lukanova & Ilieva, 2019; Hotel Schani, 2020, Ivanov & Webster, 2017).

Chatbots

Chatbots are computer systems which can answer a text or verbal commands and questions, provide feedback in the position of an individual, is also identified as simulated agents, instant message bots and manufactured conversational objects (Shum et al., 2018; Lasek & Jessa, 2013; Allison, 2012). AI is transforming business rapidly, and chatbots are becoming an essential customer support channel, driven by AI. Smart support bots can engage with clients on every platform, either mobile websites, mobile applications, desktops, or social media. Clancy (2016) claimed that Hilton had taken steps since 2016 to distinguish its approach with the addition of AI to its wireless concierge services. Instead of utilizing an online travel platform such as [Hotels.com](https://www.hotels.com), the idea is to persuade more guests and tourists to make use of Hilton's online booking services available on the website. There will be a chatbox to help and support him according to his particular needs while the customer is searching.

In line with Dickinson (2017), maximizing guest experience while conforming to the hotel is one of the significant benefits of the chatbot. The chatbot is always accessible and can accommodate guests from various nationalities as a multilingual application. Simultaneously, this contributes to lessening the workload of employees. This occurrence might allow the hotel to gather and examine the behavioral patterns of chatbots while optimizing facilities and contributions while the guest interacts with chatbot throughout their stay. The tracing of behavioral pattern, in turn, would enhance loyalty to the brand.

During the guest's stay at the hotel, there will be types of chatbot technology available, essentially, virtual concierge and chatbot concierge. This medium is extremely suitable for guests who like automatic interaction, want easy admission to specific information, want to save time instead of contacting an employee and wait for their response. Chatbots remains a relatively new technology for the hotel industry and are mainly used by big hotel chains such as Marriott, Novotel, Hyatt, and Holiday Inn. Private and minor hotels are also operating with instant messaging systems supported by humans, a more financially reasonable option for them. On a touch screen put at the hotel lobby or a smartphone application, even on a tablet provided for the guests at their arrival, the chatbots implementation can be accomplished across various customer service platforms. Guests may request the same facilities and amenities that would be provided by a human concierge. Guests can find information on the brand, the hotel and the nearby enticements and eateries, the weather information, the flight status- via chatbot technology. The integration of AI and chatbot enhance the purpose of a chatbot to understand the messaging style of guests and better suit their demands and individual preferences (Lukanova & Ilieva, 2019).

According to Accor (2017), AccorHotels Group's Mercure brand released 'BOT,' a minute assistant, as an instant messaging solution back in February 2017. This handy tool helps visitors and neighborhood residents to explore the 'local scenes' surrounding the guests, simply through geographical location and authorization to be led. Similarly, The Cosmopolitan in Las Vegas has 'Rose,' an AI concierge that help guests book restaurants and spa services and provide insider information, such as secret menu items, at the hotel bar. More than one thousand conversation threads were developed regarding developing 'Rose' to Offer visitors ways to book experiences such as restaurant bookings, spa treatments, tickets for events, and spontaneous activities such as self-directed art tours. Hotel guests are introduced to Rose by obtaining her card at the registration desk with their key and are encouraged during their stay to ask Rose for something. Hotel guests are introduced to 'Rose' by receiving a card with their key at the reception desk and are encouraged to ask 'Rose' for anything during their stay. 'Rose' provides them with insider information, such as secret menu items to help move visitors to bars and clubs and offer to raise house spending (Morgan, 2020).

As Goncalves (2017) demonstrated, digital technology's real revolution has yet to come and established its first signs in the hospitality industry. It was evident that chatbots would turn out to be an essential part of hotel operations' future while being pursued by many when Facebook and Slack were first launched in 2016. The 24/7 availability that chatbots can provide is one of the crucial qualities that is deemed useful for hotels as they can accommodate questions at any given time, day or night.

Robots

As indicated by recent papers, the applications of robots can be found in various hotel departments both at the front and back offices (Zeng et al., 2020; Ivanov et al., 2017; Pullen, 2017; Murison, 2016; Lopez et al., 2013). International Organization of Standardization (2012) defined robots as programmable systems with independency dictated through their capacity to carry out anticipated duties without human intervention. Murphy, Hofacker & Gretzel (2017) mentioned that the robots are categorized into three groups – manufacturing robots, professional, and personal service robots in which these three types of robots can be used in the hospitality industry. To give an instance, back-office operations like hotel restaurant dine preparation or cleaning rooms, industrial robots and specialist robots can be used. In comparison, in front office activities, such as concierge, room service, and entertainment, personal robots are more likely to be used.

The Japanese Henn-na Hotel is one of the pioneers and famous examples to be discussed in specialized literature regarding robotics implementation in hotel management. The hotel is in Sasebo, Nagasaki, in Huis Ten Bosch theme park and it opened in 2015 and is the first in the world to have robots in its operation. The robots perform multiple jobs from the front desk, housekeeping, concierge services and even baggage room operations. Furthermore, hotel room doors are opened with facial recognition software (Rajesh, 2017). Many hotel companies have been using robots in recent years, mainly for concierge service, entertainment, room cleaning and room service. Savioke, the technology firm, is a forerunner in creating an independent robot for indoor service in the hospitality industry. The butler robots are created to relay guests' order of various things (Savioke, 2017; Martin, 2016). The name of the robot manufactured is Relay; however, every hotel named the robot individually. For instance, Wally is for Residence Innit, Crowne Plaza with Dash, and Botlr is for Aloft.

Autonomous relay robots have first been used in Asia by an international hotel brand, Hotel Jen. The Relay robots can be seen at their hotels in Singapore. Singapore's M Social Hotel has AURA, their first guest-facing butler robot. The butler robot has a closed section where the items ordered by the guest are placed, most often are necessities like snacks, water, or toothbrush. At the top of the robot, the delivery room number is dialed on a tiny monitor. The usage of Wi-Fi, sensors, and 3D cameras help the robot navigates around the house. When it is not in operation, the robot reverts to the reception area and rejuvenates its batteries. Butler robots can be utilized to charge electronic home appliances, serving coffee and other beverages at planned gatherings like business conferences together with deliveries to guest rooms (Joseph, 2017; Ward, n.d.).

Plus, the concierge is also one of the departments where robots are beginning to be used. The usage of robots has actively utilized Connie, a concierge robot that works for Hilton Worldwide, which operated by IBM's Watson AI; Mandarin Oriental Hotel has Pepper in Las Vegas; Mario for Marriott in Belgium; and Chi Hira Kanae by Toshiba for Japanese hotels (Chestler, 2020; ReviewPro, 2016).

Concierge robots facilitate guests' check-in process, supply hotel service information, or touristy recommendations (Logan, 2016; Tussyadiah & Park, 2018). With every interaction with visitors, the artificially intelligent concierge robots learn and expand their expertise, allowing them to provide complete and precise details.

In addition to performing tasks such as delivering goods and providing various data, both concierge and butler robots accomplish a different role, symbolize themselves as attractions. Other concierge robots can dance, speak, tell on stories, and strike poses for pictures, like Pepper. Data gathering is an important role those hotel robots can perform. Robots may gather an array of data concerning guests' expectations, contentment, purchasing habits, and more activities in the course of engaging with guests. This process will help hoteliers obtain and use useful information to design an incredibly customized experience and thereby enhance the amount of returning customers.

The new San Gabriel Hotel, opened in 2018 by the Sheraton hotel chain in Los Angeles, proves that robots are becoming more and more trendy. Whereas other hotels only have one or two robots, Aethon, an autonomous mobile robots' provider, will have eight robots at this hotel (Aethon, 2017). One of them will take visitors to destinations on the first floor, acting as a bellboy robot, while the other robots will operate as butlers. These illustrations demonstrate that hotels companies are progressively beginning to use robots to minimize operational costs, increase efficiency, and boost customer service, both back and front office operations.

Digital Kiosks

Act as a new approach for systematic hotel service; digital kiosks can be a practical inclusion to each one of the hotel's strategy. Hotels give guests the chance to register themselves by installing digital kiosks, eliminating the reception's waiting period. Hotel guests were able to choose from multiple languages for check-in where usually the language options cannot be spoken of by receptionists. According to its specifications, the self-service program shows the guest many room styles and gives them a chance to elevate their choices. The guest evaluates the hotel's check-in and stays procedures, complete the necessary details, then scan fingerprint for confirmations. The kiosk issues a guest key card after the check-in procedures have been completed. This medium also offers the guest the chance to pay their bills by check-out. In this way, digital kiosks accommodate complete computerization of hotel service check-in and check-out procedures (Shaw, 2014; Lui & Piccoli, 2010; Ostrowski, 2010; Makarem et al., 2009).

Software firms like NCR, Clock, and IBM partner together with several big hotel chains such as Marriott, Hilton, Hyatt, and Sheraton, with hundreds of remote kiosk installation locations worldwide. By adding a digital kiosk even at luggage claim area at the airport, Hilton goes further. It implies that guests of Hilton can also check-in at the airport even before they arrive at the hotel. New features that are not accessible at reception are added to self-service apps to improve hotel kiosks' use.

Airline Web Check-in is one of the features. A software module with interactive maps can be included in self-service technology. Guests can find various locations close to the hotel or get hold of directions to their room and other hotel facilities.

Self-service kiosks are used for check-in and act as self-service stations that permit guests to check-out hastily. Locations of the kiosks are in the hotel lobby and available 24/7. After self-check-out, their room number and credit card credentials will appear on the digital screen. Guests may then gain access to their bills, check them, and pay. By improving guests' preference and comfort, minimizing delays, and boosting guest hands-on control over the arrival and departure course, digital kiosks that operated in hospitality enhance guests' experience. Digital kiosks' introduction offers a potential opportunity for hotels to raise sales by providing up-selling and one-to-one marketing of additional services.

Internet of Things (IoT)

Meant for the enhancement of guest experience and optimized costs, IoT in the hospitality industry is best described as a system of digital appliances and machines that interconnected throughout the Internet. To keep in personalizing customers' experience, many hotels have broadened their digital technology range into this. With changing times, IoT implementation in the hospitality sector is progressing. It commenced opportunities for technological driven automation for hotels and made it possible for guests to be approachable (Mistry, 2020). To serve guests better, the hotel industry is discovering and welcoming the IoT while improving their management's operational quality. These are some of the components that IoT offers for hotels.

Festa (2016) reported that some hotel companies, including Peninsula Hotels, use tablet technology in rooms for this purpose. Guests can monitor room temperature, lights, alarm setting, switch to television, pull the curtains, place order for room service, and ask for spa facilities with the tablet. Plus, nearly 5000 rooms of Wynn Las Vegas have already been introduced by 'Amazon Echo,' a voice-based activation platform. Hilton tested the first mobile-centred 'Connected room' hotel room where you can monitor the temperature, lighting, blinds, and thermostats with only touches on your telephones. "Connected room" is an ongoing innovation solution from Hilton, making it more straightforward for hotels to keep pace with rapid technological modifications. The breakthrough is in Hilton's DNA, commencing contractor Conrad Hilton acquiring Hilton's first property, and becoming a settler in the hospitality industry almost century ago. Hilton again sets new standards in the hospitality industry with several developments later, giving visitors a vivid experience while traveling.

For Marriott, which needs to continuously innovate the universal encounter for guests for their numerous brands, it is vital to building an insightful approach. Correspondingly, Marriott is in the progress of establishing their own IoT as they have partnered with Samsung and Legrand to launch smart rooms capable of

conducting various automated tasks, including providing facilities such as a simulated assistant, yoga exercises before a huge mirror, and the ability to attach images of friends and family during the stay with digital frames. The trend is straightforward: the idea of smart rooms would take the hotel industry to a stage that was unimaginable five years back. Now, guests can just pick up where they left off, resume watching Netflix and continue listening to the music on Spotify as soon as they register at the hotel and enter the room. Plus, to optimally maximize room temperature and light, the bed's sensor will be alerted when guests wake up or asleep (Ristova & Dimitrov, 2019).

Sooner rather than later, all these IoT resolutions are destined to revolutionize the hospitality industry. Hotel brands such as Marriott are already heading into hotel technology's future. However, the IoT implementation investment may only be a single expense, but it is demonstrated to be benefitting to all industries for the long run. There is one mission for the hospitality industry to concentrate on, which is guest satisfaction. Furthermore, IoT hotels have seized the proper niche and have been continually developing their essential services. IoT is now geared up to make customers feel at home, pampered, and enjoy the hotel stay to the fullest.

In the coming years, many new IoT trends in hospitality will emerge to enhance technology in the hospitality industry further. The IoT is rising rapidly, and the hospitality industry is evolving with the rapid speed of innovation and the increasing opportunities for smart hotel solutions. Smart hotels will soon become the trend, as hotel owners want to deliver the very best in guest facilities and modern amenities.

Blockchain

Conforming to what Zsarnoczky (2018) has claimed, the latest advances in technology and innovation in living spaces are all related to the alternative payment methods that can also be used in tourism. The development of a novel payment system has led to the advent of Bitcoin and other cryptocurrencies. The blockchain payment system is a decentralized ledger that records a continually increasing list of data blocks, preventing data from being counterfeited or altered. A list of transactions and the outcomes of calculations made by the programs stored consists of one block. For instance, if a customer buys any cryptocurrency or some other form of currency, then transfers it to another partner who exchanges it immediately, any loss caused by exchange rate fluctuations can be avoided by both partners. Plus, the whole transaction takes only minutes instead of the average few business days. This solution will provide anyone in the tourism industry with a new innovative, and revolutionary payment option.

The blockchain system's applicability is independent of currency rates. It is not the exchange rate that matters in the case of cryptocurrencies. Instead, the currency's actual value resides in protecting blockchain technology and the simple, open, unalterable, and decentralized recording method. This payment system provides a new level of encryption protection and intervention-free activity, and the data

managed in the system cannot be changed in any way. Another significant advantage of the method is that the transactions are realized without intermediary agents, thus eliminating any extra transaction costs. Today's leading service intermediaries, such as [Booking.com](#), Agoda, Airbnb, and other platforms are predicted to lose some of their market positions when the "maturity" of blockchain payment solutions, as customers and service providers are likely to deal with their transactions directly (Pilkington, 2016).

Virtual Reality (VR) and Augmented Reality (AR)

With its use in video games, VR is best known to offer a three-dimensional, computer-generated world that can be accessed by a person. Nevertheless, its ability to enable users in a "virtual world" to control objects or perform a series of acts, with special sensory equipment (headsets and data gloves), has rendered it an indispensable instrument for the industry. VR has been used for training for nearly three decades, especially for hazardous or difficult duties. Among its earliest applications: simulators to train pilots in flight cockpits. Today, VR is widely used to help surgeons plan complicated procedures to help scientists tackle molecular structure issues (Hotel 2025, 2017).

In light of the hospitality industry, VR has significantly made its way into hotel management's betterment. As reported by Oracle (Hotel 2025, 2017), Marriott International included VR technology in large booths in New York City as a part of their 'Travel Brilliantly' crusade, where guests could teleport themselves to destinations such as Tower 42 in London or bright coastlines of Hawaii. The VR experience surrounded participants with visions, sounds, smells, and climatic conditions, like warmth and haze. The campaign's goal is to connect with and encourage travellers to book a trip, particularly tech-savvy millennials. Similarly, some hotels already use VR to show prospective guests their property: imagine viewing stunning views from a hotel balcony or being whisked away on a helicopter tour.

Oracle (2017) market analysts predict that consumer sales of VR devices may surpass 38 million units by 2020. Moreover, some think they will become as commonplace as mobile devices, even given away with cell phone contracts, maybe. Such widespread acceptance paves the way for hoteliers to accept virtual reality marketing, but it will also raise the demand for more creative and individualized approaches.

Meanwhile, emerging advancements in the hospitality industry similarly consist of something known as augmented reality. Augmented reality is a technology that extends and applies layers of digital knowledge to our physical world. AR does not build its virtual artificial world as a substitute for the real one, unlike VR. AR emerges and adds sounds, videos, and graphics to a clear view of an actual world. New doors for hotels have been opened by the ability to overlay data on the guest world. AR can be used to take guests on a hotel tour, highlight the property's facilities, and share details of the area (Morgan, 2020).

With the advent of the Internet and smartphones, AR carried out its second phase of return and is primarily identified with the digital notion after being discovered back in 1990. Different augmented reality applications will influence our lifestyles, communion, entertainment activities, and are steadily heading into the acceptance process, not just as an element of the latest trends in the hospitality industry, but also as part of everyday routines in our busy schedules. For example, the walls of every room of U.K.'s Premier Inn Hub contains a map of the local area in the form of AR. Then they can discover about local interests when tourists point a smartphone on top of the map and get recommendations for the best activities to do around the area. So, with a computer-generated picture projection, the short description of it is a vision of the actual-world environment, altering reality's perception (Nevron, 2020).

Although AR is yet a significant aspect of the latest hospitality trends, customers ought to anticipate more industry adoption in the coming years. AR-powered signs can have the opportunity for hotel managers and restaurant owners to guide visitors to various locations, as well as delivery or check-in spots, making it easier to steer at the proximity of the hotel and other areas. As an element of latest developments in the hospitality industry, some properties are already using AR to create a more convincing and thematic hotel experience as several restaurants have been taking full advantage of AR technology for promotional.

Digital Trends in the Asian Hotel Industry

Most of the world's population lives in the Asia region. It is a massive platform with many possibilities for astute hospitality marketers (Hotel News Resources, 2019). Many cultures and mindsets coexist in the field, and each country has its interests and approaches. With this approach at hand, Asian tech giants are quick to spot opportunities in the hospitality sector by attempting to push their innovations into the market while feeding the creativity needs of hotel chains to increase productivity and enhance the customer experience (Lim, 2018).

For instance, a hotel named Henn-Na in Tokyo, Japan utilized robot innovation in an attempt to reduce staffing costs. At the reception, guests are given options to speak to a beguiling Japanese female robot or, if they prefer, a dinosaur that has been programmed to speak their language during the check-in process. Besides, luggage will be carried to the room by robots, and there also will be an in-room robot that functions similarly to a personal butler to provide guests with utmost convenience during their stay (Lo, 2019).

Singapore-based and a leading developer in Malaysia, Hatten Land, planned to launch their own blockchain-based rewards app to retain and incentivize their Melaka retailers and customers. StayCay, the said app, is a platform that allows users to book discounted hotel stays in advance and redeem reward points at a variety of locations, including shopping, lodging, food and beverage, and wellness. As blockchain acts as a digital ledger that keeps track of real-time transactions by connecting rewards through their diverse portfolio of ventures, Hatten Land believes

they will ultimately form an international alliance of hotels and retailers that will attract more customers in the future (Chin, 2018).

Furthermore, Aloft, a hotel in the heart of Bangkok, Thailand, which opened in late 2011, is the grand dame of hi-tech hotels. A number of their guestrooms and suites are equipped with FINGI, a room key that can act as a personal smartphone and is referred to as Touch Rooms. The key can be used outside of the hotel vicinity, like navigating the complicated lanes or alleys near the hotel or reserve tables in local restaurants. FINGI also functions as the center to control the brightness of lighting and the air conditioning temperature inside the room (Lo, 2019).

In the Maldives, Hilton has invented Hilton Honours Access. This guest program allows guests to engage in a new holiday experience called “A Maldives Island Adventure,” which can be redeemed with Hilton Honors Points. Moreover, innovative island resorts in the Maldives, such as Hurawalhi’s Kudadoo Maldives Private Island and Amilla Fushi, are among the earliest to offer in-room iPads that enable guests to do anything from book dinner to create personalized island experience itineraries. The use of iPads will help boost in-room spending by sending direct promotions to guests (Manik, 2018).

These examples depict that Asia countries are open to venture and willing to adopt the technology-induced world that revolves around the hospitality industry. Like Japan and China, some of the Asia countries are the pioneer footprint for this setting, where they have set specific benchmarks of technology excellence for hoteliers worldwide.

Practical Implications

The digital trends presented have been if not explicitly, implicitly implanted throughout the operations in the hotel industry. For instance, to ease and develop the infrastructure advancement, smart IoT and AI has been used in room maintenance and other facilities like conserving energy and water and strengthen the security system. It can also be seen in human resources (HR) level where the training and development activity, payroll and scheduling, and employee engagement were all achieved practically with the aid of cloud-based HR system, Machine Learning and chatbot. These mediums have made things easy and efficient for processes that involve immaculate touch and handling.

Moreover, the check-in and check-out process were made easy with digitalization, like the usage of facial recognition and mobile key with Radio-frequency identification (RFID) reader instead of the regular key-in-the-hole access and digital kiosks for smooth deliverance. The operations and services level, e-menu, in room dining robots, IoT sensors and e-housekeeping apps are used for the ordering of food and beverage, housekeeping and leisure activities alike. This is ideal for manual labour work where it helps to reduce error and increase efficiency with appropriate and precise handling. This chapter provides an overview to hoteliers on integrating the technology innovation into their daily routine. This will be helpful to

develop smart hotels to ensure survivability and sustainability post-pandemic. This chapter will also help the hotels' top management in making decisions and policies regarding the use of digital tools in hotel operation.

Conclusion and Future Research

Therefore, the usage of AI in hotels' management is explored and its implementation in various operations, such as distribution, sales, service to the customers, advertisement, relationships, and customer responses has been analyzed. Several digital trends (Artificial intelligence, Mobile technologies, Chatbots, Robots, Digital kiosks, Blockchain, Internet of Things (IoT), and Virtual reality, and Augmented reality) in hotel industry has been highlighted. Real-life applications of the digital trends in line with their respective operations has also been discussed. In conclusion, it will most likely be human contact and innovative technology that better serves both customers and companies that make a future of current trends in the hotel industry.

The rapid adoption and the use of the former digital technology trend are now generally recognized in the entire segments of the world. Along with a technologically, increasing directed society, customers now can experience efficient business services. Notably, it is true of the hospitality industry, a trend that led users to expect products and services to be targeted, more active, and equally effective. The experience of visitors is the most critical feature for a hotel to achieve goals. Unless the hotel provides a fantastic experience, it is likely to hard to retain and gain loyal and new customers.

The future of current hospitality trends will most likely include human interaction and modern, reliable technology that fits businesses and customers best. It is simple to presume that guests favor human interaction, but we ought to beware in making assumptions. To add to the indicators that indicate a constructive reaction to technology, the change of the latest trends in the hospitality industry often provides other benefits.

The scholarly research on implementing digital trends in the hotel industry is still somewhat constrained, offering a variety of future research prospects. Future research might apply how diverse people with different age group perceive digital trends in the hotel businesses and guests' attitudes to the use of digital technology in different hotel categories, like luxury or economy. It demonstrates the stance of different types of trips (i.e. leisure, working, cultural, wellbeing, and the type of robots used). The enactment of digital trends in the hospitality industry will persist and will obtain its place in each layer of management, concerning future growth, as long as it does not violate ethics and regulation.

References

- Accor. (2017). *MoodMatch: AccorHotels.com and Travelsify offer internet users a new way of finding the hotel that suits them best*. Retrieved from: <https://press.accor.com/%e2%80%8bmoodmatch-accorhotels-com-and-travelsify-offer-internet-users-a-new-way-of-finding-the-hotel-that-suits-them-best/?lang=en>. Accessed 30 Dec 2020.
- Aethon. (2017). *Sheraton hotel to use TUG mobile robots from Aethon*. Retrieved from: <https://www.aethon.com/sheraton-hotel-to-use-tug-robots/>. Accessed 30 Nov 2020.
- Allison, D. A. (2012). Chatbots in the library: Is it time? *Library Hi Tech*, 30(1), 95–107.
- Chestler, D. (2020). The future is now: How robots are storming the travel industry. *SiteMinder*. Retrieved from: <https://www.siteminder.com/r/trends-advice/hotel-travel-industry-trends/future-robots-storming-travel-industry/>. Accessed 4 Dec 2020.
- Chin, C. (2018). Hatten land to go places with blockchain-backed rewards app. *Edge property*. Retrieved from: <https://www.edgeprop.sg/property-news/hatten-land-go-places-blockchain-backed-rewards-app>. Accessed 4 May 2020.
- Clancy, H. (2016). Meet the chat technology behind Hilton’s online concierge. *Fortune*. Retrieved from: <https://fortune.com/2016/11/07/hilton-online-concierge/>. Accessed 2 Dec 2020.
- Dickinson, S. (2017). Back to basics: What is a chatbot and does my hotel need one? *Hospitality net*. Retrieved from: <https://www.hospitalitynet.org/opinion/4084472.html>. Accessed 30 Nov 2020.
- Festa, J. (2016). This is how in-room tablets will change your experience at hotels in 2016. *USA TODAY*. Retrieved from: <https://www.usatoday.com/story/travel/roadwarrior-voices/2016/02/19/hotel-tablets/80631526/>. Accessed 30 Dec 2020.
- Gonçalves, P. (2017). How chatbots are changing the hospitality industry. *Medium*. Retrieved from: <https://medium.com/hijiffy/how-chatbots-are-changing-the-hospitality-industry-6c1946abfdbb>. Accessed 1 Dec 2020.
- Hilton Worldwide. (2017). *Travel easier with the Hilton Honors App*. Retrieved from: <https://www.hilton.com/en/corporate/>. Accessed 4 Dec 2020.
- Hotel News Resource. (2019). *10 hospitality trends to look for in Asia*. Retrieved from: <https://www.hotelnewsresource.com/article108560.html>. Accessed 4 Dec 2020.
- Hotel Schani. (2020). *Schani Hotels in Wien*. Retrieved from: <https://www.hotelschani.com>. Accessed 4 Dec 2020.
- Huang, M.-H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), 155–172.
- International Organization of Standardization. (2012). *Robots and robotic devices — Vocabulary*. Retrieved from: <https://www.iso.org/obp/ui/#iso:std:iso:8373:ed-2:v1:en:term:2.2>. Accessed 4 Dec 2020.
- Ivanov, S., & Webster, C. (2017). Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies – A cost-benefit analysis. In V. Marinov, M. Vodenska, M. Assenova, & E. Dogramadjieva (Eds.), *Traditions and innovations in contemporary tourism* (pp. 190–203). Cambridge Scholars Publishing.
- Ivanov, S., Webster, C., & Berezina, K. (2017). Adoption of robots and service automation by tourism and hospitality companies. *Revista Turismo & Desenvolvimento*, 27(28), 1501–1517.
- Joseph, S. (2017). How Japan’s hospitality robots could improve customer service. *Business destinations*. Retrieved from: <https://www.businessdestinations.com/relax/hotels/japans-hospitality-robots/>. Accessed 3 Dec 2020.
- Kwon, M. J., Bae, J., & Blum, C. S. (2013). Mobile applications in the hospitality industry. *Journal of Hospitality and Tourism Technology*, 4(1), 81–92.
- Lasek, M., & Jessa, S. (2013). Chatbots for customer service on hotels’ websites. *Information Systems Management*, 2(2), 146–158.
- Lim, S. (2018). Why Asia leads the race in smart hotel technology. *Hotel-Online*. Retrieved from: https://www.hotel-online.com/press_releases/release/why-asia-leads-the-race-in-smart-hotel-technology/. Accessed 4 May 2021.

- Lo, R. (2019). 5 hi-tech hotels in Asia that use robots and apps to serve guests. *South China Morning Post*. Retrieved from: <https://www.scmp.com/magazines/style/tech-design/article/2185690/5-hi-tech-hotels-asia-use-robot-concierges-and-apps>. Accessed 4 Dec 2020.
- Logan, R. (2016). Robots could take over hotel industry by 2020 as travellers welcome assistance from automatons. *Daily Mirror*. Retrieved from: <https://www.mirror.co.uk/news/world-news/robots-could-take-over-hotel-7529303>. Accessed 1 Dec 2020.
- López, J., Pérez, D., Zalama, E., & Gómez-García-Bermejo, J. (2013). BellBot. A hotel assistant system based on mobile robots. *International Journal of Advanced Robotic Systems*, 10(1), 1–11.
- Lui, T.-W., & Piccoli, G. (2010). Integrating self service kiosks in a customer-service system. *Cornell Hospitality Report*, 10(6), 4–14.
- Lukanova, G., & Ilieva, G. (2019). Robots, artificial intelligence, and service automation in hotels. In S. Ivanov & C. Webster (Eds.), *Robots, artificial intelligence, and service automation in travel, tourism and hospitality* (pp. 157–183). Emerald Publishing Limited.
- Makarem, S. C., Mudambi, S. M., & Podoshen, J. S. (2009). Satisfaction in technology-enabled service encounters. *Journal of Services Marketing*, 23(3), 143–144.
- Manik, M. (2018). Five trends that will drive Maldives' hospitality industry. *Hotelier Maldives*. Retrieved from: <https://hoteliermaldives.com/destination-marketing-maldives-hospitality-industry/>. Accessed 4 Dec 2020.
- Martín, H. (2016). Cutting edge: Robots deliver fun with hotel room service orders, and they don't expect a tip. *Los Angeles Times*. Retrieved from: <https://www.latimes.com/business/la-fi-hotel-robots-20160207-story.html>. Accessed 1 Dec 2020.
- Mistry, S. (2020). How can IoT in hospitality industry grow your hotel business? *eZee Absolute*. Retrieved from: <https://www.ezeeabsolute.com/blog/iot-in-hospitality-industry>. Accessed 2 Dec 2020.
- Morgan, B. (2020). 10 examples of customer experience innovation in hospitality. *Forbes*. Retrieved from: <https://www.forbes.com/sites/blakemorgan/2020/02/20/10-examples-of-customer-experience-innovation-in-hospitality/?sh=39b7a0572033>. Accessed: 2 Dec, 2020.
- Murison, M. (2016). Are robots the future of the travel industry? *Travelshift*. Retrieved from: <https://travelshift.com/robots-travel-industry-future/>. Accessed 2 Dec 2020.
- Murphy, J., Hofacker, C., & Gretzel, U. (2017). Dawning of the age of robots in hospitality and tourism: Challenges for teaching and research. *European Journal of Tourism Research*, 15, 104–111.
- Nevron. (2020). Current trends in the hospitality industry 2020. *Nevron Blog*. Retrieved from: <https://www.nevron.eu/blog/current-trends-in-the-hospitality-industry-2020-take-on-digital-future/>. Accessed 1 Dec 2020.
- Oracle (2017). *Hotel 2025*. Retrieved from: https://www.oracle.com/webfolder/s/delivery_production/docs/FY16h1/doc31/Hotels-2025-v5a.pdf. Accessed: the 4th December, 2020.
- Ostrowski, C. (2010). Check-in kiosk risk/reward potential has polarizing effect on deployment. *Hotel Business*, 19(8), 12–14.
- Pilkington, M. (2016). Blockchain technology: Principles and applications. In F. X. Ollerros & M. Zhegu (Eds.), *Research handbook on digital transformations* (pp. 225–253). Edward Elgar Publishing.
- Pullen, R. (2017). Automation of the hotel experience is the future. *HNN*. Retrieved from: <https://www.hotelnewsnow.com/Articles/144164/Automation-of-the-hotel-experience-is-the-future>. Accessed 30 Nov 2020.
- Rajesh, M. (2017). Inside Japan's first robot-staffed hotel. *The Guardian*. Retrieved from: <https://www.theguardian.com/travel/2015/aug/14/japan-henn-na-hotel-staffed-by-robots>. Accessed: The 4th December, 2020.
- ReviewPro. (2016). *Are robots changing the way that guest experience is measured in the hotel industry?* Retrieved from: <https://www.reviewpro.com/blog/robots-changing-way-guest-experience-measured-hotel-industry/>. Accessed 2 Dec 2020.

- Ristova, C., & Dimitrov, N. (2019). Digitalization in the hospitality industry: Trends that might shape the next stay of guests. *International Journal of Information, Business and Management*, *11*(3), 144–154.
- Ristova, C., & Maglovski, A. (2018). Transforming hospitality in the digital era, factor for competitiveness in the tourist destination. *The 7th International Congress HOTELPLAN 2018*. Belgrade: The College of Hotel Management. The 2nd–3rd November, 2018.
- Savioke. (2017). *Savioke Official Website*. Retrieved from: <https://www.savioke.com>. Accessed 4 Dec 2020.
- Shaw, R. (2014). Hotels test self-serve kiosk acceptance. *Hotel & Motel Management*, *219*(1), 1–55.
- Shum, H., He, X., & Li, D. (2018). From Eliza to XiaoIce: Challenges and opportunities with social chatbots. *Frontiers of Information Technology & Electronic Engineering*, *19*(1), 10–26.
- Tussyadiah, I. P., & Park, S. (2018). When guests trust hosts for their words: Host description and trust in sharing economy. *Tourism Management*, *67*, 261–272.
- Van Doorn, J., Mende, M., Noble, S. M., Hulland, J., Ostrom, A. L., Grewal, D., & Petersen, J. A. (2017). Domo arigato Mr. Roboto: Emergence of automated social presence in organizational frontlines and customers' service experiences. *Journal of Service Research*, *20*(1), 43–58.
- Ward, D. (n.d.). Hotel robots are taking over jobs in the hospitality industry. *Hcareers*. Retrieved from: <https://www.hcareers.com/article/employer-articles/hotel-robots-are-taking-over-jobs-in-the-hospitality-industry>. Accessed 3 Dec 2020.
- Zeng, Z., Chen, P., & Lew, A. A. (2020). From high-touch to high-tech: COVID-19 drives robotics adoption. *Tourism Geographies*, *22*(3), 724–734.
- Zsarnoczky, M. (2018). The digital future of the tourism & hospitality industry. *Boston hospitality review*. Retrieved from: <https://www.bu.edu/bhr/2018/05/31/the-digital-future-of-the-tourism-hospitality-industry/>. Accessed 4 Dec 2020.

Chapter 10

Analysis of the Use of Digital Technologies in the Tourism Sector: Evidence from Kazakhstan



Makhabbat Ramazanova, Khusen Ibragimov, and Gulnur Saspugayeva

Abstract In contemporary times, digital technologies are recognized as a vital tool in socio-economic development in many countries, as well as their prerequisite is recognized for many industries, including tourism. The growth of information and communication technologies, demand for digitalization in various economic sectors, challenges many destinations towards the introduction and development of digital technologies in the tourism sector. In this context, the objective of the present book chapter is to explore the current state of the digital technology application in the tourism industry and identify the limitations and problems associated with their implementation in the case of Kazakhstan, as an emerging and promising tourism destination. Using the gravity model, we examine the impact of information and communication technology on the tourism demand of Kazakhstan for the period of 2000–2018. The secondary data has been compiled and decomposed from international organizations, the ministries, national and regional authorities of Kazakhstan. The study updates traditional policy implications and provides remarkable recommendations for applications of digital technologies in the tourism development of the country.

Keywords Technology · Digital · Tourism · Analysis · Kazakhstan

M. Ramazanova (✉)

Department of Tourism, Heritage and Culture & Researcher, REMIT-Research on Economics, Management, and Information Technologies, Portucalense University, Porto, Portugal
e-mail: ramazanova@upt.pt

K. Ibragimov

Department of Applied Economic Analysis, University of Alicante, Alicante, Spain

G. Saspugayeva

Department of Environmental Protection Management and Engineering,
L. N. Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_10

Introduction

In the last decades, information and communication technology (ICT) has become the main resource to drive the tourism industry in developing and developed countries. The involvement of ICT in economic activities leads to many advantages, especially in the tourism sector. Specifically, tourism products and services are more competitive and become available to purchase by the internet. ICT intensifies the tourism sector more competitively as a result, it reduces the price of goods and attracts more tourists to a destination. The positive effect of ICT on tourism demand are highly studied in the literature (Shehzad et al., 2019; Rehman et al., 2020). Few studies have addressed the question of how ICT leads to an increase in the volume of tourist arrivals and departures in the destination and origin countries. The impact of ICT on tourist arrivals from the perspective of destination and origin countries remains ambiguous in the tourism literature (Wahab, 2017).

Thus, this study analyzes the effect of ICT on international tourist arrivals to Kazakhstan from 122 countries of origin for the period of 2000–2018 using the traditional gravity model. The study estimates the tourism demand of Kazakhstan to the extent to which the development of ICT in the origin and destination countries could encourage the number of international visitors in Kazakhstan. Static balanced panel data set of 122 countries over the ninetieth-year periods. The gravity model is estimated using a static panel estimator. The obtained result presents practical implications and a novel contribution to the development of tourism in the region. Kazakhstan is a leading destination in Central Asia with over 8 million tourist arrivals in 2019. On the path of the Silk Road, Kazakhstan attracts a thousand international tourists with its cultural and natural heritage sites. The tourism sector contributed to the economic growth of Kazakhstan by 5.2% in 2019 (UNWTO, 2019), Kazakhstan placed 52nd out of 176 countries in the development of information and communication technologies in 2017 (ITU, 2021). The process of digitization of the tourism sector in Kazakhstan is under the influence of trends, which refer not only to the domestic tourism business but also to the number of global trends.

Literature Review

It is widely recognized that tourism is one of the most important industries in the world, playing an essential role in improving the economic growth and sustainable development of many countries worldwide. Tourism makes a significant contribution to the world's GDP by 10% and constitutes 10% of the world's total jobs, as one of the largest employers (UNWTO, 2020). Tourism influences social development and contributes to the preservation of cultural and historical heritage. Therefore, many countries attempt to improve their economic situation by focusing on tourism as a potential source of economic diversification and enhancement.

One of the important segments of the tourism industry is E-tourism which is associated with the use of ICT by tourists and service providers. According to the estimations of the World Economic Digital Transformation Initiative (WEF, 2018), digitalization in travel and tourism is expected to create up to USD 305 billion of value for the industry through increased profitability from 2016 to 2025. Undoubtedly, the expansion of the digital platform will influence the tourism industry. Analyzing the implementation of ICT practices in Asian destinations, it can be seen the benefits and advantages (Shrestha & Jeong, 2016). Other authors also indicated that there is a positive correlation between tourism demand and e-tourism (Buhalis, 2003; Buhalis & Deimezi, 2004; Mihajlovic, 2012).

Ramos and Rodrigues (2013a) in their turn explored the importance of ICT for tourism demand in developing countries from 1975 to 2010 and concluded that internet users and the ratio of government expenditures in ICT to GDP had positive and significant effects on the tourism demand in these countries. Bethapudi (2013) investigated the effect of ICT on the tourism industry in India and showed that all the ICT indices have positive and significant impacts on tourist arrival to India. Rajamohamed (2016) found out that ICT has a positive and significant effect on tourism in Thailand. Bekteshi and Bekteshi (2017) investigated the influence of ICT indices on the tourism sector in Albania during 2015 and found out a positive correlation between ICT quality and the tourism demand.

While other researchers analyzed the impact of ICT on small and medium tourism enterprises of Middle Eastern countries and stated that the possibility to access the internet and other tools has a positive influence on the tourism demand. They reinforced the role of ICT in companies, reporting that it may help economic sectors to improve the competitive status, quality process and reduce the costs (Feshari, 2017).

As can be seen from the analysis above and several case studies, and application of ICT in the tourism sector at the macro and micro levels, positively influence tourism demand at a destination. Nevertheless, some studies revealed that the relationship between ICT indices and international tourism has not yet been considered empirically in a developing countries. This is the case of a developing country like Iran (Karimidizboni, 2013). Author of research states (Sadr, 2013) that ICT enables effective data processing and communication, organizational benefit, and provides enormous capabilities for consumers. ICT tools have facilitated business transactions in the industry by networking with trading partners, distribution of product services and providing information to consumers across the globe. On the other hand, consumers are also using online tools to obtain information and plan their trip and travel. Information is the key element in the tourism industry.

It is also the case of Kazakhstan, an emerging tourist destination with great potential and offer for various types of visitors. However, due to several challenges tourism is not yet in its full exploration and is the subject of scientific analysis. Existing challenges in the country such as the lack of marketing strategies, the infrastructure quality, a lack of professionals in the tourism and hospitality sectors, the transport connection between regions, environmental issues result in difficulties affecting the tourism sector development (Abubakirova et al., 2016; Erdavletov & Koshkimbaeva, 2006; Ramazanova et al., 2019a; Syzdykbayeva et al., 2015).

Despite a limited number of studies conducted about ICT in tourism, the authors recognize the information support for the tourism business and its digitalization are a strategic resource that ensures the development of internal and external tourism (Ospanov & Satybaldinova, 2020). The researchers investigated the main directions and trends of digitalization in tourism, to identify technologies for the implementation of digital tourism in Kazakhstan. Garkavenko & Tiberghien (2015) conducted interviews with tourism businesses in Kazakhstan and revealed that the majority of tourism businesses stated the advantage of the implementation of ICT. However, the authors pointed out that the introduction of ICT technologies in tourism businesses in Kazakhstan is low compared to western countries and one of the reasons can be a lack of qualified staff in tourism with skills and competencies in IT. In their turn, Ziyadin et al. (2019) stated the importance of creating a competitive tourism market with adequate infrastructure, well-connected transportation services among regions, tourist attractions and entertainments, as well as effective information and communication tools. The authors reinforce the introduction of ICT, in particular mobile solutions in event organizational management, which can facilitate networking during the event, assist with navigation and information search among other advantages.

Although few studies attempted to explore ICT application in tourism or its impact, a lack of studies have been observed in the relationship between tourism demand and application of ICT in the tourism sector. Hence, to fill this gap, the present chapter of the book aims to identify the ICT factors influencing tourism demand in Kazakhstan for the period of 2000–2018.

Tourism Sector in Kazakhstan

Recognizing the role of tourism as one of the world's largest economic industries, stimulating new economic activities, several developing countries prioritize tourism as one of the essential tools of economic and social growth. This is the case of the Republic of Kazakhstan, which is an emerging and still unexplored destination for visitors.

The tourism activity is mainly based on natural attractions (such as its varied and unique geographical landscapes, natural parks, flora and fauna), together with an exquisite and authentic cultural heritage (Kuttybayeva, 2015). Kazakhstan, being an unexplored and emerging tourist destination, represents an interesting case study, due to its history, culture, hospitality, geographical position, size, and heritage (Ramazanova et al., 2019b).

The number of international tourist arrivals increased to 8,515,000 million in 2019 and 8,789,000 in 2018 (Fig. 10.1). Kazakhstan was the host of the international exhibition Expo 2017, called Future Energy 2017, which enhanced the country's recognition as a tourist destination.

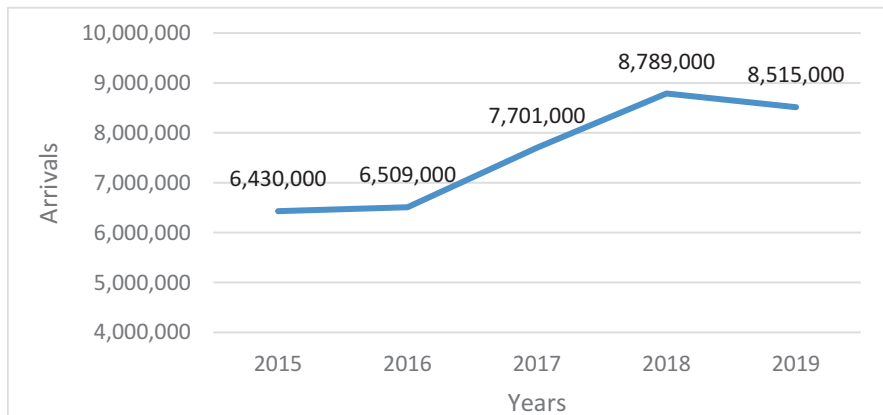


Fig. 10.1 Total arrivals to Kazakhstan from 2015 to 2019 (Source: UNWTO, 2020)

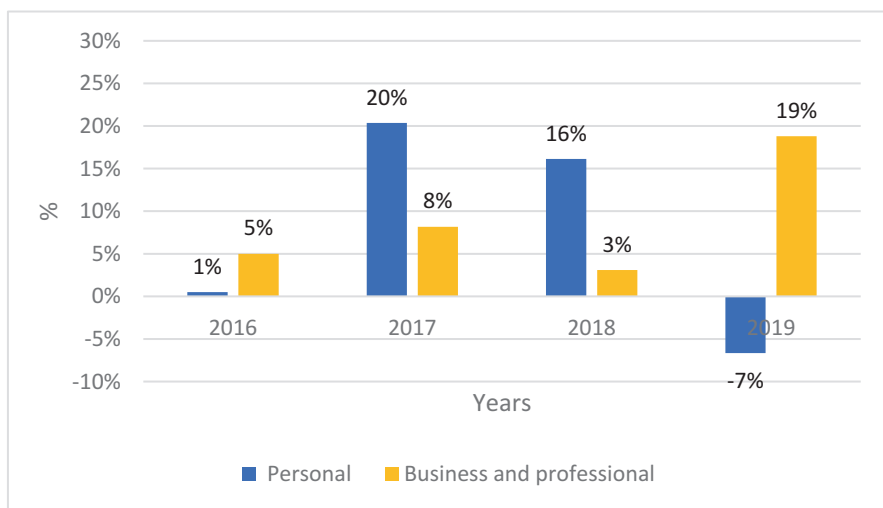


Fig. 10.2 Arrivals by the main purpose of travel (Source: UNWTO, 2020)

However, it should be noted that according to experts, the country uses its tourist potential only by 10–15% and, as a result, its ranks is lower compared to other destinations in terms of income from inbound tourism (Sheikh & Suyunchaliyeva, 2019).

Tourism literature defines two main groups of the purpose of the trip such as personal and business and professional. As can be seen in Fig. 10.2 personal purpose which usually includes leisure is the main purpose of visit in 2017 and 2018. However, it is interesting to note, that in 2019 the personal motives data

showed a negative trend, while business purpose has significantly increased to 19% compared to 2018 (3%). This can be explained by the positive impact of the organized exhibition in 2017, which has attracted a business interest among the foreigners.

In the case of domestic tourism, a relatively slight growth can be observed during the 2015–2018 years, which represents 5% of the average annual growth. However, in 2019 the number of domestic trips has decreased to 15% (Fig. 10.3).

In the case of outbound tourism, Fig. 10.4 shows a gradual growth of the number of departures from 2016 to 2019. The interest in traveling and visiting other destinations increased among Kazakhstan people. As a result, many tourism intermediary companies grow, as well as the improvement in provided services can be observed. Another interesting observations made by Ziyadin et al. (2019) is that the main proportion of tourism is the outbound tourism, where the Commonwealth of Independent States (CIS) countries, both in terms of entry and outbound tourism, occupy a leading position of 91% in 2016.

The range of services offered by local tour operators kept on increasing from year to year. For example, the number of tourist accommodation has reached 18,583 in 2019, with annual growth of 4% in relation to 2018 (UNWTO, 2020). We can also observe a significant positive trend in the food and beverage serving activities, where quantitative growth is observed during the last 5 years (Fig. 10.5).

However, despite the increasing tendency of tourism development indicators in Kazakhstan, the share of tourism in the national total GDP is only nearly 1.6%. Kazakhstan is in 80th place in the Travel and Tourism Competitiveness Index overall ranking among 140 countries, according to the World Tourism Organization (UNWTO, 2019), Tourism is not yet at the level of its development adequate to maximize its potential. Natural resources, rich cultural and historical heritage are not sufficient for tourism development. Other challenges in the country mentioned above such as the lack of marketing strategies, the

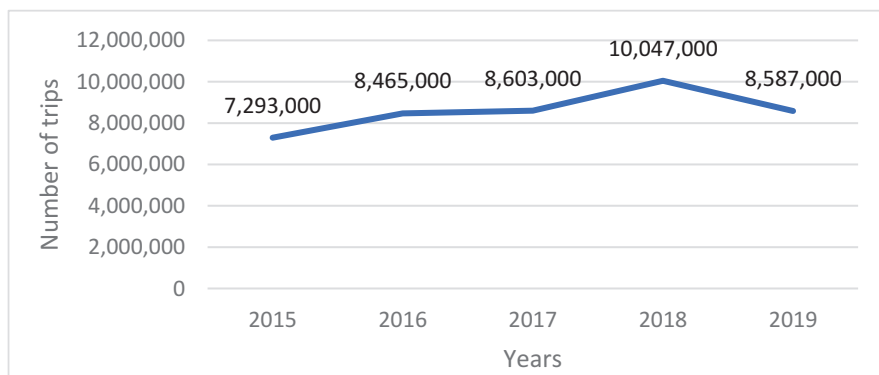


Fig. 10.3 Domestic tourism trips from 2015 to 2019 (Source: UNWTO, 2020)

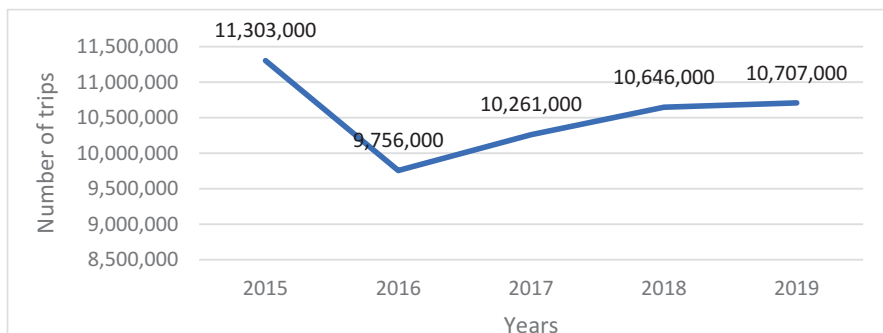


Fig. 10.4 Departures from 2015 to 2019 (Source: UNWTO, 2020)

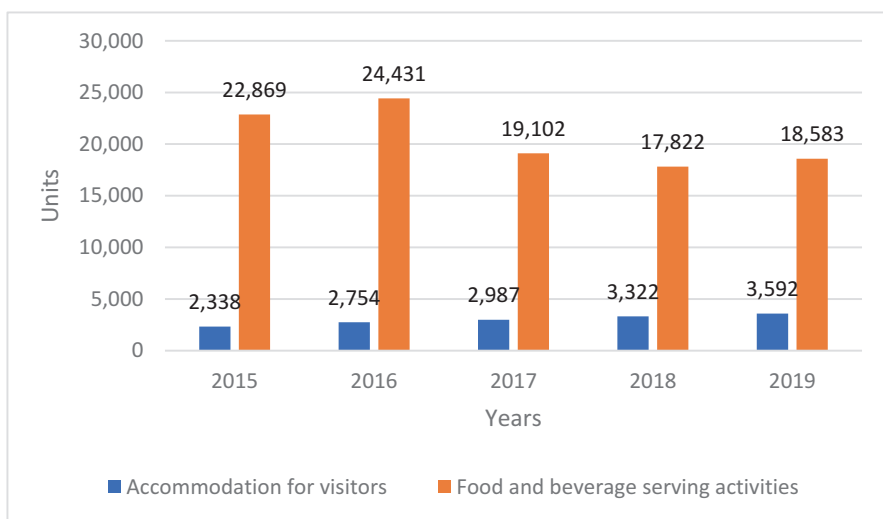


Fig. 10.5 Number of tourism establishments (Source: UNWTO, 2020)

infrastructure quality, weak skills of professionals in the tourism and hospitality, environmental issues result in difficulties affecting the tourism sector development (Abubakirova et al., 2016; Ramazanova et al., 2019a; Syzdykbayeva et al., 2015). According to Kazakh Tourism (2019), the main challenges in tourism development are the accessibility of information, poor marketing, prices for tourism products and services, as well the quality of infrastructure. With the fast-growing tendency in digital technologies in tourism and hospitality businesses, a special attention should be paid to the analysis of the situation in the area under study with the intention to increase tourism demand (Watkins et al., 2018).

ICT in Tourism in Kazakhstan

In the world ranking of the development of information and communication technologies in 2017 (ITU, 2021), Kazakhstan is in 52nd place out of 176 countries, without changing its position since 2015. Despite the country being in the CIS region, among the three leaders, ranking 3rd after Belarus (32nd place) and Russia (45th place), they are still improvements are needed to increase the position of the country.

The issue of the need to create a tourism industry in Kazakhstan was raised a long time ago. However, unlike the highly developed countries of the West, tourism in Kazakhstan, as well as in Russia and other CIS countries, is still not perceived as a fully-fledged branch of the sector of serving social and cultural needs and this is currently the subject of scientific analysis. In general, the concept of «tourism» is still associated with sports and health, and not with the economy that generates significant revenue.

The State program for the development of the tourism industry for 2019–2025 is concerned with the importance of digitalization in the tourist services market. As a result of the implementation of the Program and other strategic directions, it is expected and believed that the country will rise in the ranking to 30th place by 2022, 25th place by 2025 and 15th place by 2050 (Ziyadin et al., 2019).

The National Company “Kazakh Tourism” also recognizes the need for the introduction and diversification of ICT tools in the Kazakh tourism market. One of the key projects of the national company is the national tourism portal (Kazakhstan.travel), where foreign tourists can get acquainted with the peculiarities and sights of the country, get the maximum information for traveling in Kazakhstan. The portal also has a section for business that allows tour operators, travel agencies, artisans and souvenir shops to post information about their routes, goods and services free of charge (Kazakh Tourism, 2019; Ziyadin et al., 2019).

“Kazakh Tourism” National Company was established in 2017 following numerous successful events held in the country to continue the promotion of Kazakhstan globally as a travel destination. “Kazakh Tourism”, being the country’s brand manager for tourism and a subsidiary of the Ministry of Culture and Sports, ensures comprehensive and holistic positioning of the country both internationally and domestically. Kazakh Tourism places its focus on marketing and promotion of the country, attracting investments into tourism, and implementing the National Tourism Development Strategy until 2025.

The information in Kazakh, Russian, English languages can be consulted on the website of the company (<https://kazakhstan.travel/>). This website presents four facets of Kazakhstan’s tourism – the 4 E’s: Eco, Ethnic, Entertainment and Events. There is information about touristic paths in Kazakhstan. Main journey locations are Nur-Sultan, Almaty, Shymkent and space tourism in Baikonur.

Analyzing the ICT use in tourism in the context of the attractive country regions, the cities, where the level of well-being and IT-enlightenment of the population and number of internet users is higher are Almaty and Nur-Sultan. Almaty is one of the

main commercial and cultural cities in the South of Kazakhstan. In 2017, the (<https://visitalmaty.kz/>) website was launched, and its accounts were opened on social networks, where travelers can get useful information about Almaty and its attractions. Almaty (which means Apple City) is Kazakhstan's first capital. This city is very modern and has its unique flavor, possibly that of apples. Almaty is a god-send for those travelers who prefer outdoor recreation.

The capital of the country, located in the North of Kazakhstan is Nur-Sultan (Astana). It is in the heart of the Eurasian continent, equally accessible and open to all directions of the world. The city attracts guests from all over the world with its unusual appearance and unique architectural design, as well as with its cultural and business events on a global level. It was here that the exhibition EXPO-2017 was organized and brought Kazakhstan even greater international fame and recognition.

ACT Kazakhstan (Analysis & Consulting Team) established in 2008 is one of the largest and fastest-growing inbound tour operator companies in the Republic of Kazakhstan. It has two offices in Almaty and Nur-Sultan, and provides the widest range of tourist products and services in more than 20 cities and 5 resorts in Kazakhstan.

Activity is conducted in five main directions and is represented by the following brands:

- Almaty City Tour – programs and excursions in Almaty and Almaty region, tours in Kazakhstan and Central Asia;
- Astana City Tour – programs and excursions in Nur-Sultan and Akmola region, tours in Kazakhstan and Central Asia;
- ACT Adventure – active tours, adventures and expeditions in Kazakhstan;
- ACT MICE – organization of business trips and events in Kazakhstan;
- ACT Training – conducting of training and seminars in the field of service and hospitality (ACT, 2021).

In May 2017, the Kokshetau Tourist Information Center “VisitAqmola” was established following the Action Plan for the development of the tourism industry of the Akmola region for 2017–2019. Akmola region is one of the main tourist region located in the North of Kazakhstan, containing national natural parks, such as “Kokshetau”, “Buiratau” and “Burabay”. The region has a unique natural potential as Burabay, Zerenda and Korgalzhyn among others and interest in exploring their tourism potential is growing (Mussina et al., 2019; Ramazanova et al., 2019b; Yegemberdiyeva et al., 2020).

The main goals of “VisitAqmola” are the formation and dissemination of information about the unique tourism potential of the region, as well as promotion, support of new business entities and their further information support in the field of tourism activities. VisitAqmola has developed a new Internet resource about the tourism potential of the Akmola region (<https://www.visitaqmola.kz/en/>) in three languages. The Internet resource takes into account new trends in web design with the use of wide-format video, non-standard content presentation and maximum convenience of using the resource by tourists. In this direction, a mobile application for

Table 10.1 Main touristic websites in Kazakhstan

Main touristic websites	Main websites for tickets
https://kazakhstan.travel/ https://qaztourism.kz/ru https://city-tour.kz/index.php https://someplace.kz/ru https://kazkurort.kz/ https://tengritravel.kz/ https://www.tripadvisor.ru	Tickets.kz Chocotravel.com Santufei.com Aviata.kz Aviablet.kz Biletix.kz

Source: Elaboration of authors (2021)

gadgets is being developed with the ability to read QR codes from tourist sites (on the iOS and android operating systems) with synchronization of the portal interface.

Main tourist websites used in the country are presented in Table 10.1. The mentioned websites provide information about the travel, transfer, accommodation, meals, as well as health procedures and various excursion programs, maps, routes in the country. Some websites collect up-to-date information about interesting places and routes for traveling in Europe and other continents.

Widespread use of modern information technologies and an increase in the number of Internet users had a significant impact on the development of e-commerce. The population of Kazakhstan has become increasingly active in making purchases using various online Services.

As for the services for booking travel services, there are already a lot of them in the Kazakhstan market: Tickets.kz, Chocotravel.com, Santufei.com, Aviata.kz, Aviablet.kz, Biletix.kz among others.

Empirical Approach and Data Specification

This study has conducted the correlation of information technology with tourism demand in Kazakhstan. The research approach is started with a discussion of the gravity equation. The gravity model is extensively applied for estimating international trade flows between two countries (Anderson & van Wincoop, 2003) international tourism flows (Khadaroo & Seetanah, 2008; Okafor et al., 2018; Waqas-Awan et al., 2020) or immigration flows (Balli et al., 2016; Karemera et al., 2000; Lewer & Van den Berg, 2008; Santana-Gallego & Paniagua, 2020).

In recent years the gravity model has become a very popular approach in the tourism literature with consistent outputs and high goodness of fit (Karemera et al., 2000; Lorde et al., 2015; Santana-Gallego & Paniagua, 2020; Xu et al., 2019). Moreover, the Gravity model explains the bilateral tourism flows between two countries are directly interacted to the countries' economic size and inversely

proportional to the distance between them. The simple gravity model for tourism flows between two countries i and j can be expressed as follows:

$$F_{ij} = G \frac{M_i^{\beta_1} M_j^{\beta_2}}{D_{ij}^{\beta_3}} \quad (10.1)$$

Where, F_{ij} is the tourism flows between countries i and j ; M_{ij} is the economic mass between countries i and j , D_{ij} is the distance between countries i and j ; and G is a constant.

It is foremost to be noted that, information communication technology is crucially considered as a key factor in modelling tourism demand. Tourism demand can be identified for several or individual countries, states, regions and local areas. Regarding the type of visit, demand can be disaggregated relative to holiday or business as well by type of tourist such as nationality, education, age, gender (Lim, 1997).

International tourism demand can be formulated as follows:

$$TA_{jt} = f(T_{It}, K_{It}, O_{It}, D_{Jt}) \quad (10.2)$$

Where, TA_{It} is the number of tourist arrivals from the country of origin I to country of destination J (e.g., Kazakhstan) at time t ; T_{It} is a costs of transport, which denotes the costs of traveling from country of origin to destination; K_{It} is a variable denotes that, income per capita in the country of origin at period t ; O_{It} and D_{Jt} are qualitative factors related to the country of origin and destination, respectively. Additionally, multiplicative function (f) implies the inclusion of the natural logarithms of the original variables.

The simple gravity equation forms simply by transforming multiplicative forms of Eq. (10.2) and expressed as

$$TA_{It} = \beta_0 + \beta_1 \ln Dist_{It} + \beta_2 \ln GDPpc_{It} + \beta_3 O_{It} + \beta_4 D_{Jt} \quad (10.3)$$

Deardorff (1998) and Santeramo & Morelli (2016) highlight that Eq. (10.3) can be amplified by the set of explanatory variables in logarithm form as a result we can obtain an augmented version of gravity Eq. (10.4) as

$$\begin{aligned} \ln TA_{It} = & \beta_0 + \beta_1 \ln DISTANCE_{It} + \beta_2 \ln GDPpc_{It} + \beta_3 \ln GDPpc_{Jt} \\ & + \beta_4 RPRICE_{It} + \beta_5 BORDER_{It} + \beta_6 COLONY_{It} + \beta_7 Net_{Jt} \\ & + \beta_8 Net_{It} + \lambda_{IJ} + \delta_t + \mu_{It} \end{aligned} \quad (10.4)$$

Where \ln shows natural logarithms; I and J are country of origin and destination sub-indexes. t is the period (2000–2018); β_0 is an intercept, $(\beta_1, \dots, \beta_8)$ are parameters to be estimated; μ_{It} is a well-behaved disturbance term. λ_{IJ} and δ_t are country-pair and year fixed effects used to capture bilateral countries characteristics over time such as gross domestic product per capita and relative price.

Data

According to the aim of this study, we define the dependent and independent variables. As a dependent variable, the international tourist arrivals (TA_{it}) to Kazakhstan from 122 countries from 2000 to 2018 is used. The inbound tourism dataset is obtained from the World Tourism Organization statistics library (UNWTO, 2019). Real gross domestic product per capita for the country of origin ($LnGDPpc_{it}$) and destination ($LnGDPpc_{jt}$) is used as a proxy of personal income and national wealth (Crouch, 1995; Lim, 1997), and obtained from the World Bank Development Indicators (World Bank, 2021). Distance is measured in kilometers between capital cities of origin and destination and used as a proxy for travel costs (Eilat & Einav, 2004; Fourie & Santana-Gallego (2013)). The relative price ($Rprice_{it}$) shows the price ratio of goods and services in Kazakhstan relative to origin countries. The relative price is measured based on the consumer price index (CPI) of Kazakhstan in terms of origin countries adjusted by the bilateral exchange rate (Morley, 1994). The data for the consumer price index and the exchange rate is taken from World Bank Development Indicators of the World Bank. The variable of interest, the number of internet users in origin (Net_{it}) and Kazakhstan (Net_{jt}) are used as a proxy of information technology development to support tourism in the country and taken from the Information and communication technology database (ITU). It enables easier communication, connecting a tourist to a travel agency, being aware of sight-seeing in the destinations; booking preferred flights, Cruise, Hotels (Barman & Nath, 2019; Naude & Saayman, 2005; Ramos & Rodrigues, 2013b). Regarding the control variable, having a common border ($Border_{it}$) and sharing a colonial ($Colony_{it}$) relationship are assigned as dummy variables which if take 1 if the country of origin and Kazakhstan have a common border or share a common colonial relationship between them, zero otherwise. These variables are used to capture the purpose of a tourist traveling to a destination (Demir & Gozgor, 2019; Khalid et al., 2020). These variables are obtained from Research and Expertise on the World economy database (CEPII).

Table 10.2 reports the statistical summary of each variable. The number of observations (Obs) indicates the number of observations in the sample population. Mean

Table 10.2 Descriptive summary of the variables

Variable	Obs	Mean	Std.Dev.	Min	Max
$\ln TA_{it}$	2310	5.991	3.036	0	15.286
$\ln GDPpc_{it}$	2297	8.718	1.572	4.718	12.152
$\ln GDPpc_{jt}$	2318	8.637	0.794	5.633	9.539
$\ln Rprice_{it}$	2216	2.066	2.719	-4.813	7.268
$\ln Distance_{it}$	2318	8.542	0.686	5.273	9.743
$Border_{it}$	2318	0.041	0.198	0	1
Net_{it}	2317	32.589	31.195	0.67	78.9
Net_{jt}	2230	37.096	30.412	0	99.65

Source: Stata 16 output

shows the average value of each variable used. Std.Dev. represents the estimated standard value. Min and Max describe minimum and maximum value of each variable used in this study.

The gravity equation is estimated using three estimators such as pooled ordinary least squared model (POLS) (Saha & Yap, 2014; Rosselló et al., 2017; Waqas-Awan et al., 2020), fixed effects (FE) (Fourie et al., 2020; Martins et al., 2017; Poprawe, 2015) and random effects (RE) (Ibragimov et al., 2021; Saha & Yap, 2014; Xu et al., 2019).

Results and Discussion

The result of gravity Eq. 10.4 represents in Table 10.4. The poolability test rejects the use of pooled ordinary least squared (POLS) estimator, and Random effects (RE) is found to be the most applicable estimator based on the Hausman tests (Table 10.3). Additionally, the POLS and FE estimators are estimated for comparison aim.

The obtained results justify that all expected sign of variables supports the economic theory and gravity model concept. Economic size of origin ($\ln GDP_{pc_i}$) and destination ($\ln GDP_{pc_j}$) are statistically significant and have a strong positive effect on tourism flows in Kazakhstan. Suggesting that, a 1% surge in income in the origin countries increases the number of international tourist arrivals to Kazakhstan by 0.4%. Similarly, an increase in the economic outputs of Kazakhstan tends to encourage the volume of tourism in this country. The relative price ($\ln Rprice_{it}$) is not statistically significant. Transport costs ($\ln Distance_{it}$) is statistically significant and has a strong negative impact on tourist arrivals to Kazakhstan by 2%. Neighboring countries of Kazakhstan are considered to be the main tourist generating region, which has a strong positive effect on the tourism demand of Kazakhstan. The variable of interest, the number of internet users (Net_{it}) is statistically significant and has a negative impact on tourist flows in Kazakhstan. Implying that the development of the level of information communication technology cannot progress tourism of Kazakhstan in the short term. Since it is a gradual process in which society should

Table 10.3 Model selection diagnostic tests

<i>Poolability test</i>	
Statistic	Result
F(7, 117) = 63.03 Prob > F = 0.0000	Reject H_0
H_0 : All of the fixed effects are zero; H_a : Reject H_0 .	
<i>Hausman test</i>	
Statistic	Result
chi2(5) = 7.36 Prob > chi2 = 0.1951	Accept H_0 , in favor of RE
H_0 : All the fixed effects are zero; H_a : Reject H_0 .	

Source: Stata 16 output (2021)

Table 10.4 ICT on tourism development inKazakhstan

	(1)	(2)	(3)
	POLS	RE	FE
$\ln\text{GDPpc}_{it}$	0.243 (0.201)	0.455*** (0.109)	0.412** (0.159)
$\ln\text{GDPpc}_{jt}$	0.015 (0.214)	0.325** (0.159)	0.803*** (0.150)
$\ln\text{Rprice}_{it}$	0.069 (0.075)	0.104 (0.065)	0.088 (0.134)
$\ln\text{Distance}_{ij}$	-1.999*** (0.327)	-2.022*** (0.327)	
Border_{ij}	4.684*** (0.935)	4.466*** (0.990)	
Net_{jt}	-0.001 (0.006)	-0.016*** (0.002)	-0.016*** (0.002)
Net_{it}	0.032*** (0.010)	0.009*** (0.002)	0.008*** (0.002)
Constant	19.293*** (2.716)	15.777*** (2.348)	-4.340** (1.788)
Observations	2139	2139	2139
R-squared	0.553	0.550	0.398
Country-pair effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Hausman test		7.36 (0.1951)	

Source: Stata 16 output (2021)

Standard errors are in parenthesis

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

be involved and acknowledge the use of ICT in an emerging country of Kazakhstan. On the other hand, an increase in the number of internet users of origin countries (Net_{jt}) considerably increases the tourism flows in Kazakhstan.

Conclusion

This study examines the effect of ICT on international tourist arrivals to Kazakhstan from 122 countries of origin from 2000 to 2018 using the gravity model. The results reveal that the infrastructure of communication and technology is gradually progressing in emerging country of Kazakhstan which cause a neutral effect on tourism development in the short term. On the other hand, in the long term, it is highly expected that the new level of communication and technology in Kazakhstan could significantly boost tourism development.

Moreover, the present study findings revealed a positive relationship between income in the origin countries and the number of international tourist arrivals to Kazakhstan. Thus, from the marketing perspective, a special focus should be on the international markets with growing economic situations. On the other side, according to the results, one of the interesting and important markets should be considered neighboring countries of Kazakhstan, since there exists a strong positive effect on tourism demand of Kazakhstan.

The country has already recognized the tourism sector as a potential economic driver and effective tool for moving from a natural resources dependent economy to a more diversified one and started to take steps towards supporting tourism activities. State national program has been elaborated with several regional tourism development strategies concerning the improvement of the tourism market and its competitiveness. Nevertheless, the results urge country policymakers and tourism stakeholders to take quick more practical actions subject to ICT development and considering the demand of potential visitors. The results highly emphasize that the role of ICT is not extensively applied to the tourism sector of Kazakhstan. As indicated by previous researchers a number of the tourism sector is still facing many challenges related to tourism infrastructure, quality of products and services, low competencies of tourism staff, weak marketing strategies and low ICT application in services. Thus it is highly recommended to invest in ICT to promote tourism products and services which lead to a reduction in the price of goods and services, consequently increase the interest of visitors and the number of tourist arrivals. From the marketing point of view, it recommended reducing the transport costs for international tourists traveling from long-haul countries.

The creation of a modern competitive tourism market in Kazakhstan as a promising tourist destination is able to make a significant contribution to the development and diversification of the country's economy, as well as contribute to the conservation and effective use of cultural and natural heritage.

References

- Abubakirova, A., Syzdykova, A., Kelesbayev, D., Dandayeva, B., & Ermankulova, R. (2016). Place of tourism in the economy of Kazakhstan Republic. *Procedia Economics and Finance*, 39, 3–6.
- ACT (Analysis and Consulting Team). (2021). *Home*. Retrieved from: <https://kazakhstan.act-global.com/en/about/>. Accessed 20 May 2021.
- Anderson, J. E., & van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1), 170–192.
- Balli, F., Balli, H. O., & Jean Louis, R. (2016). The impacts of immigrants and institutions on bilateral tourism flows. *Tourism Management*, 52, 221–229.
- Barman, H., & Nath, H. K. (2019). What determines international tourist arrivals in India? *Asia Pacific Journal of Tourism Research*, 24(2), 180–190.
- Bekteshi, L., & Bekteshi, J. (2017). Use of ICT and development of tourism sector in Albania. *European Scientific Journal*, 13(25), 138–149.
- Bethapudi, A. (2013). The role of ICT in tourism industry. *Journal of Applied Economics and Business*, 1(4), 67–79.

- Buhalis, D. (2003). *E-tourism – Information technology for strategic tourism management*. Financial Times/ Prentice Hall.
- Buhalis, D., & Deimezi, O. (2004). E-tourism developments in Greece: Information communication technologies adoption for the strategic management of the Greek tourism industry. *Tourism and Hospitality Research*, 5(2), 103–130.
- Crouch, G. I. (1995). A meta-analysis of tourism demand. *Annals of Tourism Research*, 22(1), 103–118.
- Deardorff, A. (1998). Determinants of bilateral trade: Does gravity work in a neoclassical world? In J. A. Frankel (Ed.), *The regionalization of the world economy* (pp. 7–32). University of Chicago Press.
- Demir, E., & Gozgor, G. (2019). Does freedom of the press enhance inbound tourism? *Current Issues in Tourism*, 22(20), 2550–2565.
- Eilat, Y., & Einav, L. (2004). Determinants of international tourism: A three-dimensional panel data analysis. *Applied Economics*, 36(12), 1315–1327.
- Erdavletov, S. R., & Koshkimbaeva, U. T. (2006). Modern tourism of Kazakhstan and problems of its development. *Proceedings of the International Scientific and Practical Conference “Tourism and Recreation: fundamental and applied research”* (pp. 129–137). Retrieved from: http://www.geogr.msu.ru/cafedra/recr/conf/MSU_Tourism_Conf_I_2006.pdf. Accessed 25 May 2021.
- Feshari, M. (2017). The role of ICT indices in tourism demand of Iran (the FMOLS co-integrating approach). *Iranian Journal of Economic Studies*, 5(2), 209–221.
- Fourie, J., & Santana-Gallego, M. (2013). The determinants of African tourism. *Development Southern Africa*, 30(3), 347–366.
- Fourie, J., Rosselló-Nadal, J., & Santana-Gallego, M. (2020). Fatal attraction: How security threats hurt tourism. *Journal of Travel Research*, 59(2), 209–219.
- Garkavenko, V., & Tiberghien, G. (2015). *ICT diffusion and the digital divide in tourism: Kazakhstan perspective*. Tourism in Central Asia: Cultural Potential and Challenges.
- Ibragimov, K., Perles-Ribes, J. F., & Ramón-Rodríguez, A. B. (2021). The economic determinants of tourism in Central Asia: A gravity model applied approach. *Tourism Economics*. <https://doi.org/10.1177/13548166211009985>.
- ITU (International Telecommunication Union) (2021). *The ICT Development Index (IDI): Conceptual framework and methodology*. Retrieved from: <https://www.itu.int:443/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx>. Accessed 28 May 2021.
- Karemera, D., Oguledo, V. I., & Davis, B. (2000). A gravity model analysis of international migration to North America. *Applied Economics*, 32(13), 1745–1755.
- Karimidzboni, R. (2013). The impact of ICT on tourism industry in Iran. *Interdisciplinary Journal of Contemporary Research in Business*, 4(11), 680–685.
- Kazakh Tourism. (2019). *Annual report for 2018*. Retrieved from: <https://qaztourism.kz/en/about-kazakhstan>. Accessed 20 May 2021.
- Khadaroo, J., & Seetanah, B. (2008). The role of transport infrastructure in international tourism development: A gravity model approach. *Tourism Management*, 29(5), 831–840.
- Khalid, U., Okafor, L. E., & Shafiqullah, M. (2020). The effects of economic and financial crises on international tourist flows: A cross-country analysis. *Journal of Travel Research*, 59(2), 315–334.
- Kuttybayeva, G. (2015). Critically evaluate different types of tourism in Kazakhstan. *Science Time*, 2, 119–125.
- Lewer, J. J., & Van den Berg, H. (2008). A gravity model of immigration. *Economics Letters*, 99(1), 164–167.
- Lim, C. (1997). Review of international tourism demand models. *Annals of Tourism Research*, 24(4), 835–849.
- Lorde, T., Li, G., & Airey, D. (2015). Modeling Caribbean tourism demand: An augmented gravity approach. *Journal of Travel Research*, 55(7), 946–956.

- Martins, L. F., Gan, Y., & Ferreira-Lopes, A. (2017). An empirical analysis of the influence of macroeconomic determinants on World tourism demand. *Tourism Management*, *61*, 248–260.
- Mihajlović, I. (2012). The impact of information and communication technology (ICT) as a key factor of tourism development on the role of Croatian travel agencies. *International Journal of Business and Social Science*, *3*(24), 151–159.
- Morley, C. L. (1994). The use of CPI for tourism prices in demand modelling. *Tourism Management*, *15*(5), 342–346.
- Mussina, K., Dulatbekova, Z., Baimbetova, A., Podsukhina, O., & Lemanowicz, M. (2019). The current state and prospects for the development of Akmola region as a tourism destination. *Journal of Environmental Management & Tourism*, *10*(8), 1934–1946.
- Naudé, W. A., & Saayman, A. (2005). Determinants of tourist arrivals in Africa: A panel data regression analysis. *Tourism Economics*, *11*(3), 365–391.
- Okafor, L. E., Khalid, U., & Then, T. (2018). Common unofficial language, development and international tourism. *Tourism Management*, *67*, 127–138.
- Ospanov, M. G., & Satybaldivina, A. A. (2020). Digitalization in the tourism industry of the republic of Kazakhstan-features of the use of smart technologies. *Заметки ученого*, *12*, 95–100.
- Poprawe, M. (2015). A panel data analysis of the effect of corruption on tourism. *Applied Economics*, *47*(23), 2399–2412.
- Rajamohamed, H. R. K. (2016). *Analyzing the importance of ICT in tourism industry with reference to Thailand*. Retrieved from: <https://ssrn.com/abstract=2739491>. Accessed 20 May 2021.
- Ramazanova, M., Bulai, M., Ursu, A., Tortella, B. D., & Kakabayev, A. (2019a). Effects of tourism development on surface area of main lakes of Shchuchinsk-Burabay resort area, Kazakhstan. *European Journal of Tourism Research*, *21*, 69–86.
- Ramazanova, M., Tortella, B. D., & Kakabayev, A. (2019b). Tourism development in Kazakhstan. *Journal of Tourism and Development*, *31*, 35–45.
- Ramos, C. M., & Rodrigues, P. M. (2013a). Research note: The importance of online tourism demand. *Tourism Economics*, *19*(6), 1443–1447.
- Ramos, C. M., & Rodrigues, P. M. (2013b). The importance of ICT for tourism demand: A dynamic panel data analysis. In Á. Matias, P. Nijkamp, & M. Sarmento (Eds.), *Quantitative methods in tourism economics* (pp. 97–111). Physica.
- Rehman, O. U., Liu, X., Rauf, A., Slama, M. B., & Amin, W. (2020). Internet tradition and tourism development: A causality analysis on BRI listed economies. *Tourism Economics*, *26*(6), 926–957.
- Rosselló, J., Santana-Gallego, M., & Awan, W. (2017). Infectious disease risk and international tourism demand. *Health Policy and Planning*, *32*(4), 538–548.
- Sadr, S. M. H. (2013). The role of ICT in tourism industry on economic growth: Case study of Iran. *European Journal of Business and Management*, *5*(17), 159–165.
- Saha, S., & Yap, G. (2014). The moderation effects of political instability and terrorism on tourism development: A cross-country panel analysis. *Journal of Travel Research*, *53*(4), 509–521.
- Santana-Gallego, M., & Paniagua, J. (2020). Tourism and migration: Identifying the channels with gravity models. *Tourism Economics*. <https://doi.org/10.1177/1354816620972597>
- Santeramo, F. G., & Morelli, M. (2016). Modelling tourism flows through gravity models: A quantile regression approach. *Current Issues in Tourism*, *19*(11), 1077–1083.
- Shehzad, K., Liu, X., Rauf, A., Arif, M., Mazhar, S., Sohail, N., & Amin, W. (2019). Revolutionising tourism development in China: An effective role of ICT and Western Silk Road project. *Asia Pacific Journal of Tourism Research*, *24*(9), 965–977.
- Sheikh, A., & Suyunchaliyeva, M. (2019). Tourism industry development: Digitalization and implementation aspects. *KazNU Bulletin, Economic Series*, *127*(1), 257–265.
- Shrestha, D., & Jeong, S. R. (2016). An ICT framework for tourism industry of Nepal: Prospect and challenges. *Journal of Internet Computing and Services (JICS)*, *6*, 113–122.
- Syzdykbayeva, B., Raimbekov, Z., Khydyrbekuly, D., Temirbulatova, M., & Bayandinova, A. (2015). Research note: Evaluation and projection of economic indicators of tourism development in Kazakhstan. *Tourism Economics*, *21*(6), 1315–1322.

- The World Bank (2021). *Data Bank: World Bank Development Indicators*. Retrieved from: <https://databank.worldbank.org/source/world-development-indicators>. Accessed 20 May 2021.
- UNWTO (World Tourism Organization) (2019). *Compendium of Tourism Statistics by the World Tourism Organization*. Retrieved from: <http://www.e-unwto.org/loi/unwtotfb>. Accessed 20 May 2021.
- UNWTO (World Tourism Organization). (2020). *UNWTO Annual Report 2019*. UNWTO.
- Wahab, I. N. (2017). Role of information technology in tourism industry: Impact and growth. *International Journal of Innovative Research in Computer and Communication Engineering*, 5(2), 260–263.
- Waqas-Awan, A., Rosselló-Nadal, J., & Santana-Gallego, M. (2020). New insights into the role of personal income on international tourism. *Journal of Travel Research*, 60(4), 799–809.
- Watkins, M., Ziyadin, S., Imatayeva, A., Kurmangalieva, A., & Blembayeva, A. (2018). Digital tourism as a key factor in the development of the economy. *Economic Annals-XXI*, 169(1–2), 40–45.
- World Economic Forum (WEF) (2018). *Digital Transformation Initiative*. Retrieved from <http://wef.ch/2ic3iNF>. Accessed 20 May 2021.
- Xu, L., Wang, S., Li, J., Tang, L., & Shao, Y. (2019). Modelling international tourism flows to China: A panel data analysis with the gravity model. *Tourism Economics*, 25(7), 1047–1069.
- Yegemberdiyeva, K., Yushina, Y., Khen, A., Temirbayeva, R., & Orazbekova, K. (2020). Assessment of the natural-recreational resources of the Akmolra region (based on the example of the Shchuchinsk-Borovoye resort area) for the purpose of sustainable development of tourism. *GeoJournal of Tourism and Geosites*, 30(Suppl. 2), 818–826.
- Ziyadin, S., Koryagina, E., Grigoryan, T., Tovma, N., & Ismail, G. Z. (2019). Specificity of using information technologies in the digital transformation of event tourism. *International Journal of Civil Engineering and Technology*, 10(1), 998–1010.

Chapter 11

Technology Application in the Iranian Tourism Industry



Shirzad Mansouri

Abstract The current century is distinguished with the great eye-catching role of technology and technology applications in different industries. Its role has been significantly efficient and effective in the tourism industry and its development is particularly significant in developing countries and in emerging markets (Shabani & Hassan, 2017). Today technology is known as a base and integrative part for development and strategic planning in the sustainable development of tourism and hospitality. This is due to the unconditional reality that tourism has faced in mobile computing and communication, new products design, smart organization design and innovative tourism products, types and ways of tourism promotion and marketing to help both people and their governments to consider a great share of contribution that technology can make to such sustainable development in this Industry. Iran – a country with wide diversity in climate, land, culture, languages, architecture, ethnic and historical features, as well as human capital – has high potential in tourism attractions and significant international ranking in terms of heritage sites, climate diversity and price competitiveness. The mentioned high potentials in tourism and hospitality couldn't flourish without technology. This chapter presents a review and an explanation of Iranian developments in technology and its inevitable impact on Iranian tourism sustainable development and its contribution to Iranian economic, social and environmental developments. Further, it introduces certain issues and challenges that lay ahead of such developments, plus technological innovations that can bring more hope for Iran's future role in world tourism development.

Keywords Technology · Application · Iran · Tourism · Industry

S. Mansouri (✉)

Tourism & Hospitality Department, International College, Rajamangala University of Technology, Bangkok, Thailand

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_11

Introduction

Technology development and its impact on different industries is an inevitable part of this century's advancements. The tourism industry is not an exception. The technology development is currently moving at a rapid pace, and countries, particularly developing ones, are adopting technology as an integrative part of their development, especially in tourism and travel contexts. The activity of the industry, as well as tourist attributes and behavior, have been influenced by this integrative component (Pearce, 2011). In recent years, the rapid growth and connectivity of technology and tourism has paved the way for even more significant changes in our perception and practice of tourism innovations. It has contributed to cultural understanding, nations' communication, and the establishment of peace in the world. Further to this, many tourist organizations, such as accommodations providers, airlines, and travel agencies, were forced to adapt due to the increasing popularity of the internet and high demand for technological devices and applications. The effective application of internet technology is an essential part of the travel industry's business communication and marketing strategies. This essential part contributes to decision-making and buying intentions with lower risks and uncertainty at lower price. These efforts for Iran, as a developing country, can bring more intellectual and smart tourists, introduce the country in a worldwide level, and increase gross national growth (Karimidizboni, 2013). The earned revenue through technological developments and their applications in tourism industry can outweigh the country's oil revenue which is under severe sanctions by the US government. The impact of technology and its applications on tourism and their current practices and challenges in Iran is the main purpose of the current chapter. Therefore, the chapter includes: technology application in Iran's tourism; technology application in heritage and cultural tourism in Iran; technology application in health and medical tourism in Iran; technology application and security for tourism in Iran; and technology application challenges and tourism future in Iran.

Technology Application in Iran's Tourism

Prior to Covid-19 pandemic, the boom in Iranian tourism reflects certain changes that occurred. This was expressed in a recent Anadolu Agency report written by Mehdi (2019) that was titled "Iran Tourism Grows 1.9 % to Account for 6.5 % of GDP". According to this report, Iran's travel and tourism sector grew by 1.9% in 2018, contributing US\$1.158 trillion Rials (US\$8.83 billion) to the country's economy and 1334 jobs (5.4% of total employment). The report also stated that international visitors to Iran spent 168,954 billion Rials (US\$1.28 billion) in 2018 and that foreign arrivals were expected to be 6.5 million in 2019.

According to Mehdi (2019), the Iranian Ministry of Cultural Heritage, Handicrafts, and Tourism reported the number of international visitors to Iran

increased by 40.66% in spring 2019 compared to the same time last year. The expansion of tourism facilities, major investments in the tourism sector, the issuance of electronic visas, and visa exemptions for certain countries all contributed to this development. In the previous Iranian calendar year (ending March 20, 2019), approximately 7.8 million tourists' visitation in Iran reflecting a 52.5% rise over the previous year.

These efforts made by Iranian officials for attracting tourists, introducing the country in global level raised gross national growth. Karimidizboni (2013) emphasized that income that the country could earn through technology applications in tourism to attract tourists would outweigh even the oil revenues. Tourism can create strategic value by providing the necessary infrastructure and substructures. It goes without saying that Iran's climate diversity, rich cultural and historical backgrounds tied with an ancient civilization and the nature of the four seasons made the country unique in the field of tourism. Technology today is an effective tool for turning the current tourism potentials into great opportunities for economic development and prosperity of the nation. The following parts will demonstrate such developments and the impacts of technology in tourism in Iran.

Fortunately, the emphasis and significance placed on information and communication technology in the growth of global tourism infrastructure is both fascinating and thoughtful. The establishment of Iranian airlines, as well as their integration with international world airlines, paved the way for IT integration with the tourism industry in Iran. Prior to this, tourism marketing and activities were done through travel agencies. Today these activities are done through internet technology which in turn created many online opportunities and activities for Iranian small and medium tourism organizations. By using technology in tourism, tourists and tourism businesses perform easier operations and provide higher quality and lower cost services for their customers. These services are: obtaining transparent, correct, and reliable details; completing all visa requirements; booking hotels and recreational facilities – tourism; reservations and car rentals; obtaining bus and train tickets; and purchase travel and tour programs.

One of amazing kind of services and experiences is the virtual tours and quick access to information for banking, booking, and application for various types of activities in tourism and hospitality.

Technology and the Internet of Things (IOT) have produced new industries and business environments, as well as updated distribution networks. Via networking with other trading partners, clients, and visitors, as well as delivery of products, services, and information to consumers around the globe, technology applications and resources have streamlined business dealings in the tourism industry (Feshari, 2017). On the other hand, tourists and travel consumers usually obtain the essential information to plan their journey and travels based on the availability of information online; therefore, making information the key specification in the tourism sector is one of special characteristics of technology applications in tourism industry.

Furthermore, tourism organizations such as hotels, restaurants, leisure bits, and tourist destination systems need technology to implement various strategies such as integrating various sectors such as digital infrastructure, human infrastructure

(which includes skilled labor, vision, and management), subsidies for internet service providers, and creating an integrated network for online advertisement or official endorsement for online marketing, websites maintenance and updating, and creation of electronic connections between all respective sectors (Feshari, 2017).

Although Iran has certain privileged potentials, lack of proper marketing and advertising environment, technology applications still has limited noticeable share in the tourism sector. This may be attributed to certain constraints on the nature of tourism and its related operations enforced by sanctions imposed on the state system, as well as limitations imposed by the government on the types of tourists and their arrival in Iran. Yet some developing countries such as Malaysia and the United Arab Emirates with investment on technology applications, have created many opportunities for their countries (Feshari, 2017). Therefore, efforts have been made to apply technology to change the current situation and improve its strategic applications in the context of tourism. For such a purpose, some effective measures have been taken to use technology for information transformations and advertising of tourist attractions, facilities, and other services.

The absence of unity and integrity in technology applications and tourism activities hinders service provisions for tourism development in Iran. This issue is in dire need of finding the growing needs and requirements country should take into consideration in its policy and planning for tourism development. In brief, Iran needs some fundamental changes in tourism planning and policies and their implementations in actual situations. Various studies emphasized on existing positive correlation between tourism demands and technology applications (Mihajlovic 2012; Buhalis, 2003). The review of such studies highlights remarkable reduction of transaction and operational costs in the destination countries. There is a great need for more empirical studies in countries like Iran to identify the technology indices and international tourism. Bearing such a goal in mind, Feshari (2017) conducted a study to fill this gap. The empirical model's findings revealed a long-term relationship between information and communication technology (ICT) indices and tourism demand indicators such as the number of tourists arriving in Iran. Furthermore, other explanatory variables such as living expense, real exchange rate, and behavioral habit had negative and positive effects on tourism demand. The study's significant policy implications include government spending in ICT indices such as increasing the share of ICT expenditures in GDP and improving ICT efficiency, this needs particular discussion which is not the focus of current chapter. The following sections will concentrate on issues and challenges related to technology application in Iran's tourism sectors such as Iranian heritage and cultural tourism, health and medical tourism and security for tourism.

Technology Application in Heritage and Cultural Tourism in Iran

In recent years, most tourists have been more digitally native, thus tourist's interaction with heritage and ancient locations and cultural heritage might not seem exciting anymore and it used to be. This rings the bell for the countries where cultural heritage and ancient locations are the reflection of old civilization and its history for the tourists, particularly the Middle East countries as the cradle of civilization, are potentially sources of attractions for revenue and known as number one travel destinations in the world. This ring seems louder for Iran as it has been known for its rich heritage sites. This drives the vitality of digital technology integration to augment cultural heritage sites and more smart interactions with visitors. The inevitable increase of smartphone users and their easy accessibility to smartphones applications and inputs such as camera, microphone, counters, features of biometrics, light sensing, editing capacity and GPS as well as data collection capacity from different sources offer a firm foundation for developing innovative ways of marketing cultural heritage locations and sites as a destination development program for any governmental departments to use the opportunity of technology applications for sustainable tourism development. Furthermore, the everyday advancement in information technologies, particularly in mobile growth, demonstrates that technological costs are significantly reduced, as 4G telecom networks will be replaced by 5G networks, which are both faster and more efficient, in the near future (Shubita & Saleh, 2020). These developments have created more opportunities for Iran Cultural heritage system and the local communities to develop firm planning for post pandemic period. Iran, as a country that accepted the convention on the 26th February 1975, has the eligibility for including 22 cultural heritage sites till 2019 (See the map below). These locations in the map show the high potential and demands for cultural heritage in Iran (UNESCO World Heritage Centre, n.d.: p.4) (Fig. 11.1).

Technology has given visitors more time and options for travel while also contributing to overall economic development. This happens when an increasing amount of data and communication enters our lives. As a result, people in the tourism industry and Iranian officials must adapt to the unstoppable wave of progress brought about by this transition. No sector would be untouched by technological advancements and inventions. However, it is possible that it has had a greater effect on the travel industry than on other industries. Companies in the travel industry have become more competent as a result of technological advancements. Companies in the travel industry have become more competent as a result of technological advancements. New techniques for information collection, information investigation, information trade, information sharing, and communications are included in the technology application associated with information (Gretzel, et al., 2015).

Government efforts to pave the way for tourism growth in cultural heritage sites have recently been made. Iranian tourist guides from World Heritage Sites

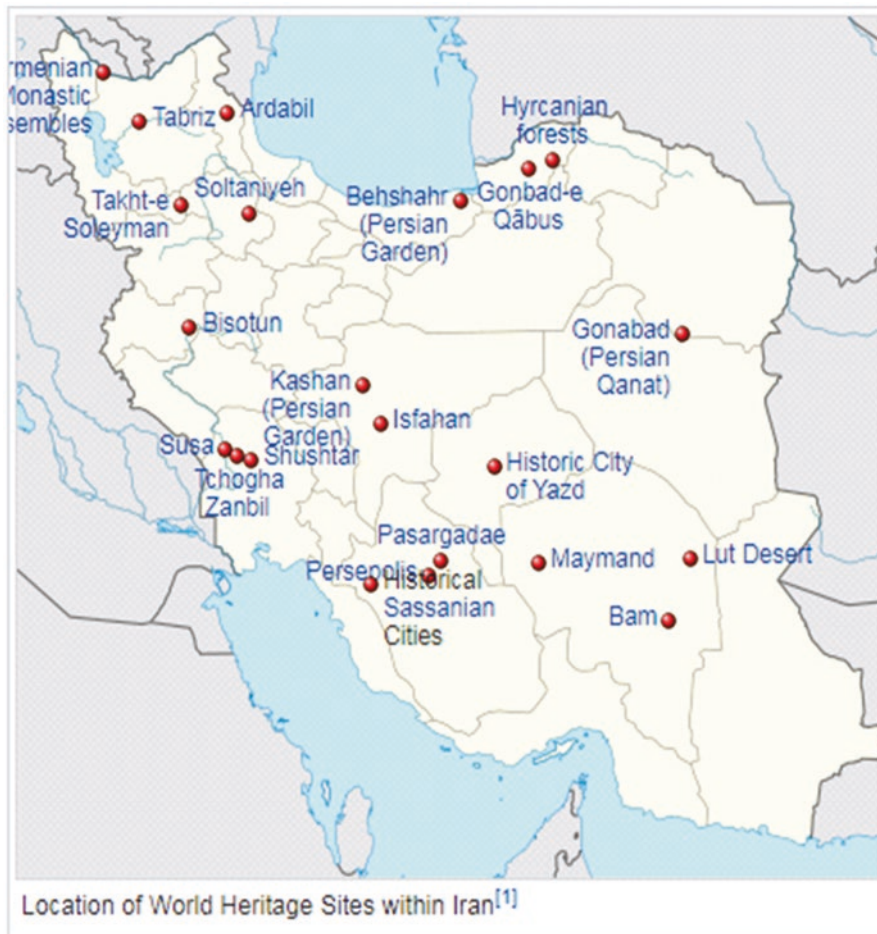


Fig. 11.1 Location of World Heritage Sites within Iran. (Source: UNESCO World Heritage Centre, n.d.: p.4)

participated in the “Online Training of Trainers for World Heritage Specialist Guides” from December 12 to 17, 2020, to develop their awareness of World Heritage Sites and become certified trainers of World Heritage Specialist Guides in Iran. The participants were a mixed group from the Ministry of Cultural Heritage, Tourism and Handicrafts, (MCHTH) and the Iranian Federation of Tourist Guides Association (IFTGA), bringing the private and public sectors together to discuss best tourism practices and issues concerning the cultural tourism industry.

The outbreak of COVID-19 made an essential and evolving challenge to the tourism sector. It stopped travelling and visiting these beautiful rich cultural sites. Meanwhile, real, pandemic prevention and control are top priorities in all countries around the world, and the tourism industry is committed to supporting all steps

taken to combat the outbreak. Furthermore, cultural sites and heritage tourism survive when they are open to the public, and the flood of visitors will help them improve in terms of finance and infrastructure. As a solution, technology and its dependents such as virtual reality can be more than a tool that gives a realistic interaction with the real world. Technology applications particularly virtual reality can bring the past to real present world for visitors who love to join the adventure of visiting the real cultural sites.

Traditions and misconceptions from the past are being brought to life by virtual tourism. Though maintaining cultural authenticity, Iranian cultural heritage officials are attempting to use technology to ensure long-term sustainability, viability, and productivity for cultural tourism items. The Ministry of tourism explores how innovation and technology generate new opportunities for the cultural tourism. They open invitation and academic seminars are held to encourage academics to enter the arena.

The World Crafts Council, for example, designated the City of Hamadan Province as the World Pottery Capital in July 2016. Another example will be in the same place, Alisadr Cave, the world's largest water cave, where incredible sights would be the main attraction for virtual tours. In tourism, particularly, in cultural and heritage tourism, the sense of sight is extremely essential. Cultural tourism experiences profoundly dependent on visual stimulation and sight-seeing as Guttentag (2010) mentioned. This kind of stimulation brings emotional reactions and triggers customer's decision making.

These technology applications save cultural and heritage tourism from complete failure till recovery from COVID-19 brings new wave of good news for cultural and heritage sites. Further, United Nations Educational, Scientific and Cultural Organization (2020) officials in Iran in line with Iranian Ministry of Cultural Heritage, Tourism and Handicrafts (MCHTH) emphasized that World heritage and tourism stakeholders share joint responsibility for protecting common cultural and natural heritage sites through proper tourism management. This includes educating the young generations and updating guides as the most necessary and essential moderator between tourist and the destinations' cultural heritage resources.

Technology Application in Health and Medical Tourism in Iran

Every day increase in the quality of technology applications and on line services have created great opportunities for tourists and local customers to utilize the internet platforms and technology devices to book and use services and products on line. In the competitive markets and environments, various companies and institutes need to focus on their customers. Successful customer services and maintenance with them will reduce the costs of services and customers will have numerous options, service providers who will stick in customer's mind. Health and medical tourism

and its related subcategories have received a great deal of attention due to their potentials and competitive advantages they can provide for customers.

Iran as a significant and important country in the Middle East has potential advantages in medical tourism industry. There are many opportunities, including low-cost, high-quality healthcare, qualified doctors, and marginal natural and historical attractions. A structured and robust program to ensure the growth of the medical tourism industry was discussed as a major obstacle in the policymaking process, as was the lack of mechanisms to collect information about tourists' health status, inefficient information systems, and legal issues. Telecommunications and technological advancements play an important role in building a solid infrastructure to improve political, social and legal issues in this industry. Health data and information about service providers, their products and customers' demands need health informatics which is an interdisciplinary field of information science, technology and health care that deals with medical resources, medical equipment and medical methods to improve acquisition, storage, retrieval and use of health and biomedicine data.

In recent years, Iran could take advantage of such information technology and medical science to pave the way for some potentials on health data collection and their medical implications in tourism. Certain studies introduced more applications of the information by electronic health care which has been adopted by the European Union countries (Rezaei-Hachesu et al., 2017). The study also introduced Electronic Health Record (HER) which is information technology systems and its related infrastructure from medical organizations or hospitals and clinics. The systems try to collect patients' data through medical registries. This will provide the opportunity for tourist's personal medical data be accessible globally over HER network. Further suggestions are made to use telemedicine. It refers to the application of information technology to treat and monitor patients while they live far away from hospital or medical centers. This is used in areas where medical specialists are not available. HER will surely help medical tourism and health care managers to reduce costs and value health development throughout the country.

Further to the above mentioned, virtual social network is one of the most common technology applications related to tourism. The virtual social network systems are to help tourists before they travel, while they are travelling and even after they travelled to a destination. The systems particularly virtual medical communities such as academic communities, nurses, doctors and physicians' communities have provided a solid foundation through which different stakeholders can communicate among and between travelers and the health organizations.

University students, especially medical students, in Iran after entering the university often live far from family, so the applications of such social networks become more central during the students' period. However, regarding the significant role of the medical university in the training of medical specialists, medical practitioners, social networks are common in Iranian universities and university professors share their data, experience, and practice with their students (Bigdeli & Ghanadinezhad, 2019). This helps managers and policy makers of the country to plan for quick and easy access to these social networks among university professors, researchers, even

patients and hospitals to share scientific information, newly assigned rules and regulations, and patients' data. These networks help the medical world stay in line with other developed countries' advancements and their findings and applications can raise the country's ranking for more collaboration, communication and also business development with higher quality.

As soon as the pandemic comes under control worldwide, and people are vaccinated to stay safe, Iran expects to see more flow of tourists especially medical tourists. Regarding the Iranian aims to boost the number of tourists' arrivals, Iran's medical travel sector even during the pandemic did not stop and a significant number of Iraqis are still travelling to Iran for medical purposes and treatments. Most of these treatments are focused on cosmetic surgery such as rhinoplasty and hair transplants (Youngman, 2021).

Iran's medical tourism has faced various challenges that hinders or slows down its development. The first and the most important issue is the lack of clear strategy and plans for medical tourism at the international, national and regional level. The international sanctions and worldwide pandemic are exacerbating the issue. It is necessary to have clear and long term strategy in dealing with international and domestic tourists. The invitation for more than 60 institutions and stakeholders whose main organizational responsibilities and powers are in field of tourism and health failed to receive the appropriate response (Youngman, 2021).

Second challenge is the lack of medically specialized agency to promote Iran's medical tourism. In recent days, new health tourism start-ups have tried to contribute more to medical tourism development. A Tehran-based Ariamedtour start-up launched its website to respond to the demands of neighboring countries as well as global request for travelling to Iran for medical treatments. The formed agency is offering professional treatments ranging from cosmetic to general surgeries. In an interview with Financial Tribune (2017), the CEO of Ariamedtour emphasized on one of the most important factors that the start-up tries to achieve, transparency. The competitive advantage of the service provider is the transparency with which the company is conducting itself. Moreover, it provides more competitive low price for world class treatment. The service provider also offers medical services for infertility treatments, cosmetics, and hair transplantation. This start-up has received many applicants for its application from Europe, American countries, Pakistan, Iraq and Persian Gulf States. The services are provided despite severe banking hurdles, difficulties in receiving visa. Due to the high demand in the market, the path for more new start-ups has been paved and the high degree of satisfaction from the client side indicates the readiness of the Iranian medical tourism to welcome investment for other business sectors such as logistic, food and accommodations to enter the market for more developments.

In their narrative review on medical tourism in Iran, Rokni and Park (2019) tried to reevaluate the medical tourism in Iran in order to reveal new trends and activities. The review indicated that there are certain pulling factors which led to the improvement of medical tourism in Iran such as affordability of international travel for medical travelers and the improvements in technology and standards of care (Rokni & Park, 2019). The review also referred to certain major challenges which affected

medical tourism. They emphasized on Iran's negative image in the Western countries and the lack of resources and capacity for tackling such negative discourse (Rokni & Park, 2019). Further, the review asked for new policy and planning in accordance with new changes in Iranian political and economic situations. This means a comprehensive policy and monitoring system will be helpful. The other challenges refer to the activity of the middleman and brokers. Trusted and licensed brokers are one solution to the problem associated to Iran's medical travelers who are mostly deceived by unauthorized middlemen. The applications of technology will help the government for eliminating such brokers who create negative image for Iran. Technological application will speed up the monitoring system to present governmentally approved tariffs and offerings for medical treatments to foreign patients and medical tourists. Technological applications and information technology system can accelerate the marketing and medical promotions for the neighboring markets if political unrest in the region provides safe environment for travelers to Iran. This will pave the path for medical travelers from the neighboring countries with whom Iran has common religious, cultural and social similarities and interests.

All in all, medical tourism in Iran is in harmony with the global trends that emphasizes border-based and short distance and culturally oriented travelling situations. As a result, the most realistic solutions to the existing challenges would be the application of independent technologically used system which can market and promote the positive image of the country, eliminate the unauthorized medical brokers and present the positive outcome of centralized policy and planning which can take cultural-oriented elements in to consideration.

Technology Application and Security for Tourism in Iran

Security refers to avoiding anxiety and stress, which can disrupt one's mental peace. Police forces provide favorable and natural conditions in society by enforcing the law and pursuing the goal of maintaining ethnic-social ideals as well as individual and social benefits. Tourism and security, it is arguable, have a reciprocal relationship, importance, and effectiveness. The key point to emphasize is that tourism can only be realized if protection is improved. When tensions arise at the borders, the importance of security becomes apparent. In reality, while the country's attractions can deteriorate with time and circumstance, security and stability may play a critical role in tourism growth. In other words, in any culture, security is the most significant tourism attraction.

Iran is located in the Middle East's geographic center. Iran's religious identity and economic capacities have had a considerable effect on countries in the Persian Gulf region and beyond. Iran has long been regarded as a crossroads between east and west by nations and cultures all over the world. This position among continents, as well as its proximity to the Persian Gulf, which serves as a transit point for oil cargo, elevates Iran's importance for other countries; as a result, any political unrest in this area raises global sensitivities. The transit possibilities of Iran have been

advanced into some special geopolitical properties due to its important position in the region, global exchanges, and profound effects on political-economic evolution in the Central Asia and Indian Ocean-Mesopotamia and Anatolia and Middle-east region.

In recent years, unpredictable security, lack of political stability, a lack of efficient policy, a centralized political system, and low levels of regional collaboration have harmed the tourism potentials of countries in the Persian Gulf and neighboring countries to Iran. However, in recent years, political instability, such as violent behavior and extremism, has had a negative effect on foreign visitors, resulting in an unprecedented situation in the region's tourism industry. Countries in this region did not profit from tourism revenues due to public and private sector concerns about investing in the industry.

Tourists have a limited understanding of the security situation in Iran. This pessimism and ignorance of the Iran security situation reflects the position of western media and their meaningful and important role in pretending that security doesn't exist in Iran. The western media has portrayed a very negative reflection of global public opinion over the last three decades. Tourists had a negative impression of Iran's security situation before visiting the country, but after visiting the country, 80% of them thought it was pleasant and were pleased, while 60% felt insecure and unsatisfied for the sake of law and individual rights (Ghasemi et al., 2014).

Regarding the role of western media in presenting Iran as a dangerous place, substantial and significant international work is needed, and Iran's truth must be portrayed to the world through the use of the internet and technology applications, and they must have trust and confidence in the people and destinations they visit. Tourism growth in Iran requires an effective and high-speed technology infrastructure as well as software applications. Customer-management relationships and supply chain management can be combined into a centralized source using technology, which streamlines a range of operations including inventory collection, purchasing, distribution, tracking, payment, and reporting. Customers may use new technology and social and economic ratings to share information and read feedback on destinations, hotel and restaurant quality, and environmental and social conditions (e.g. social media sites like Instagram, Twitter, and blogs).

On the other hand, some believe that new media in Iran has certain challenges and these challenges affected Iranian tourism sector. In his study on the functions of new media in tourism, Heidari (2014) stated that the country's entire media capacity is not being used to build tourism strategies and methods, and there is a significant divide between media and tourism organizations that, if not bridged, would make realizing the tourism industry's programs and goals difficult. The findings revealed that there is a connection between the realization of new media's key functions and the development of tourism strategies. Furthermore, the findings revealed that some new media in the tourism sector were unable to perform their functions effectively. The other challenge is rooted in American sanctions against Iranian technology applications. For example, the latest example of new challenges is Apple removed Iranian apps from App Store overnight without any warning. This means App Store was not able to host, distribute or do business with app developers in Iran.

The integration and application of technology has made visiting Iran simpler than in previous years. Iran's startup ecosystem has recently exploded, resulting in the launch of a slew of useful smartphone apps that will come in handy for tourists navigating the country's cities. The most helpful local and global travel apps that are used in Iran made tourists visits more secure and comfortable. For example, WhatsApp, Telegram, Skype, Google Map and Instagram are international apps used in Iran for connection and navigation. Before and during your visit to Iran, these are the best way to keep in contact with everyone involved in your travel arrangements, including your guide, accommodations, and so on. It's also the perfect way to stay in touch with your friends and family at all times while on the road.

Foursquare is a useful app for discovering new cool places in your neighborhood, such as good restaurants, cafés, galleries, and so on, based on user recommendations. Iranian users are among the app's most frequent users. This app will help you find the best places to eat delectable Iranian cuisine or to grab a cup of coffee and mingle with the friendly locals.

Since Tehran, Iran's capital, is known for its daily traffic, the Tehran Metro is a convenient app for getting around the city more easily and quickly. The Tehran Subway consists of four lines and over 70 stations. While it is not as difficult as the world's major cities, travelers will benefit from having access to a convenient guide and being able to navigate easily underneath the earth. It is a bilingual app.

Snapp is one of the most useful travel applications in Iran. It is an Uber clone that runs in Tehran, Iran's capital city, as well as most of the country's cities today. You can use your Google account to sign up for the app. You can begin using the app by marking your current location and destination after a quick verification. English and French are also included in the latest Snapp edition.

The Road Management Center of Iran's 141 application is one of the most useful for traveling in Iran, as it offers unique features of road conditions as well as anything users need for a safe journey. This center's technical application and website are one of the most comprehensive tourism resources available, and it has quickly become one of the most obligatory and memorable reviews of travel and tourism guides. One of the most useful features of the 141 mobile app is the ability to display the most recent images from surveillance cameras installed around the country.

The provision and maintenance of comprehensive security, both in the international and domestic and national aspects, is a critical step in improving Iran's tourism industry. To achieve such a goal, it is essential to educate the citizens of the country, as well as all visitors from around the world, about the country's proper security. Furthermore, negative aspects of tourism should be removed, and issues such as health, terrorist attacks, and diseases such as Corona should be considered, with other countries being notified. To do so, technology application can pave the way for such great achievement through promotion of international and domestic new media and applications for reflecting real image of destination with such high potentials for world tourism.

Technology Application Challenges and Tourism and Hospitality Future in Iran

Many hospitality and tourism businesses and organizations depend on IT to operate their businesses. This is due to the changing needs of the society. Therefore, customers within tourism and hospitality are looking for unique products and services. The process of daily changes of demands and technology applications require certain capacities and readiness to face new challenges.

As it was earlier mentioned, the successful application of technology needs investment. The lack of foreign investment in Iranian tourism can also be seen as a major mainstream tourism problem, especially in the hotel sector, where both product and service are insufficient for today's international leisure and business market. The standards of service in small, private and indigenous businesses are low throughout the country despite the warmth and genuine hospitable people in local areas. The challenge for hotel and tourism businesses and other related organizations such as small, private, indigenous businesses as the real stakeholders are not included in decision making related to technology applications and planning for technology development tourism.

The emerging economies and fast growing ones such as China, India, and Russia and so on have been growing in recent years and in consequence there has been a rise within the market for higher standards and facilitation. This also includes skills and labor shortage which in turn required to be settled by all stakeholders particularly in terms of technology applications. The issue sometimes gets more complicated by the emergence of social and economic unrests, fluctuation in the exchange market, and unpredictable incidents such as road and airline incidents in the country. As result, Iran is in dire need of an environment in which the tourism and hospitality industry operates to respond to the national and international demands. This might be a replacement approach that can facilitate technology applications, training more skilled labors and personnel and provision of a safe market and atmosphere for tourists and visitors. Easy access to internet and availability of new communication devices and their related services will be one way to settle the challenge.

In the era of the digital economy, the laws which were applicable to the previous economy such the legal system, business practices, etc. will be no longer applicable for new issues. As a result, it is important to consider the implementation of new regulations to address this situation. Even if regulations are inevitable, they should be kept to minimum, taking into account the need to be covered by the law and the need to harmonize with conventional solutions to similar issues.

The successful implementation of technology applications would significantly increase market prospects for small and medium-sized tourism businesses as well as local tourism related industries in the digital economy, allowing the economic development in tourism to grow. As a result, an ecosystem should be developed that allows both tourism organizations and individual business owners to participate equally in the digital economy. In addition to this, through increasing understanding

and awareness about global characteristics of network-based digital tourism development, government should pave the way for continuous exchange of information and policy and planning coordination among different countries.

Multimedia, as a critical technology, has the potential to help boost tourism both locally and globally. Certain basic technology-based technologies and devices that help multimedia, such as large, wall-mounted HD displays, digital sound, and voice capture, improve the efficiency of tourists' experiences in destinations. This failed to happen in Iranian destinations due to increasing prices and to some extent lack of accessibility in the market due to US sanction on Iranian economy.

The removal of sanctions and the outcome of its relaxation will lead to the rise of investment of international hospitality companies and tourism operators in Iran (Khodadadi, 2016). Following Iran's nuclear deal before president Trump administration moved to office, Porter (2015) mentioned that the Iranian government sought to construct more than 200 new hotels throughout the country, and visa requirements for a great number of international tourists were eased.

Following the lifting of sanctions, Iran's tourism industry expects to boom after a period of recession and deterioration. Sanctions removal will pave the way for Iranian financial system and organizations to get connected with the worldwide banking systems that accepts credit cards in the country. This financial assistance would assist Iranian airlines in modernizing their fleets with the aid of aircraft manufacturers. However, it is understood that the situation for Iranian tourism and tourism studies remains precarious, as inter-regional political rivalries prevail and the US continues to issue alerts over re-imposition of sanctions (Dehghan, 2018).

One of the obvious negative impact of such sanctions on Iranian tourism and hospitality is that tourism market is less penetrated with technology (Shabani & Hassan, 2017). This is partly attributed to less competitive nature, which allows consumers to choose the product or service that best meets their needs from a variety of choices. As a result, it is critical to define a particular technology to reflect general tourism technologies as adopted by tourists. Further to this, Shabani and Hassan (2017) emphasized that in the Iranian tourism market, no innovative and sophisticated technology has been identified yet. Therefore, despite general technologies adaptation in Iran by customers, no new sophisticated and updated technology has been applied. Thus, the future success of technology applications in tourism and hospitality in Iran demands adequate knowledge about digital marketing and e-tourism, consumer decision making process of technology use by visitors and consumers and customer behavior in less technology induced social system like Iran. This means Iran needs to strengthen its infrastructure for more innovative technology applications such as Virtual reality and Augmented Reality.

Technology applications in Iran like any other places on earth requires internet connection. This connection services if offered with high quality, governments can bring more benefits to both state run-businesses and private organizations as well as local users. Governments around the world have begun to consider how they can accelerate the deployment of technology that increase access to secure and fast internet. This helps the users use the IoT ecosystem growth.

This means we can expect a future where electronic device that we use can collect and analyze data and automatically certain services are provided for us. Tourism and particularly hospitality industry has the tendency to follow this growing trend to present new services to its customers and guests as well as reduction of costs. Iranian tourism and hospitality can use this opportunity for future of its development.

The future of tourism and hospitality is linked to wearable devices and sensors such smart phones, smart watches and smart clothes, and shoes, etc. These devices can collect users' data such as body temperature (COVID-19 alert), heart rate fitness activities, and locations. Through providing comprehensive knowledge on body organs and structures, medical sensors technology broadens the reach of data collection. The study of this data would enable them to provide a variety of new facilities to their guests, such as room lighting adjustments, room temperature adjustments based on body temperature, room meal menus based on guests' diets, and so on (Kansakar et al., 2019).

Green operation is one of ultimate goals of tourism and hospitality. Green hotels try to save costs by observing and applying certain measures on their properties through leveraging IoT technology. These measure are smart lighting and temperature control, low power consumers' devices such florescent bulbs, LED lights. IoT technology can be used also to control water consumption through smart bathrooms' shower heads, smart sinks, flow controlled toilets, etc.

More services could be provided if IoT technology is applied in hotel industry and tourism in Iran. Kansakar, Munir and Shabani (2019) mentioned building automation and monitoring for better maintenance, automated check-in and check-out digital concierge will lead to improvement of the guest satisfaction. Services like these will be appealing to technology savvy users as well as guests with disabilities. Managerial and operational efficiency will be increased through application of automation building. The monitoring system will detect the room occupancy, provide house-keeping services schedule, check utility systems like automated doors, windows, pipelines, elevators, power lines, and preventive maintenance services before any problems occur.

Future prosperity does not come without its challenges. These challenges need to be targeted by the Iranian tourism and hospitality through adaptation of new technological infrastructures for sustainable development. Kansakar, Munir and Shabani (2019) listed four major challenges which are related to the application of IoT in hospitality.

Hospitality Services Providers (HSP) develop their own solutions based on the own system metrics and methodologies. This results in the absence of standardization. In other words, there is a diverse spectrum of implementations which are fundamentally to provide a similar set of services. Despite the implementation aspects of their system within a single hotel, these implementations are not extended to be applicable in inter-organization scopes. This means hospitality needs interoperability. Interoperability refers to the ability of diverse networks and business processes to communicate, exchange data, and share information and expertise (Maheshwari & Janssen, 2014). A cloud-based common platform for data communication among applications is required to bring smartness to the hospitality ecosystem. Both

stakeholders should be able to access the details they need for demand predictions and strategic plans, and dynamic data should be interchangeable (Buhalis & Leung, 2018). This will ensure that the data of visitors and consumers is correctly used and preserved. This will ensure that the data of visitors and consumers is correctly used and preserved. This seems to be important in order to save visitors from physical, economic, and social dangers.

The collection and processing of guest data is an essential part of the hospitality service chain. The implementation of the new technology and service systems in the hospitality industry is bound to increase data volume exponentially. Personalization of the guest experience significantly leads to the rise in data volume. To offer personalized services to customers, hotel management systems must evaluate guest preference profiles as well as data from IoT devices about the status of the surrounding world. This data management requires a very specialized infrastructure of technology applications. Iranian science and technology sector hopes to modernize its infrastructure and upgrade its industries with the impending relaxation and lifting of sanctions. This will likely lead to the boom of foreign investment inflows.

In order to provide highly customized services to guests, hospitality service providers (HSP) must track guest preferences, behavior, and location. Within this monitoring of guests' data, behaviors, and interactions, the service provider should ensure that guests and visitors personal data are used and kept safe so that they can protect their guests and visitors from various social, economic, and physical risks. To prevent data leakage and theft, these apps can use strict encryption protocols to ensure that communications with guests and visitors are secure and private. The level of protection and safety that any hospitality service company should provide for their guests and tourists is critical to their potential success.

Guests' satisfaction and loyalty is highly achieved if the service is provided with high accuracy and without any miscommunication and misunderstanding. If this is provided by human interference, it will be open to many criticisms and complaints. The digitalization of interaction between guests and service providers will reduce human factor and will increase higher accuracy and control. The optimal results of such digitalization will be responsiveness of the service providers that in turn will bring more guests' satisfaction and loyalty. These systems can also respond to demands from visitors faster than any dedicated hotel staff. This greatly improves guest response time and adds to the seamless atmosphere that guests demand. Repair and maintenance requests can be managed easily in highly advanced technology infrastructure hotels with large-scale IoT installations because most IoT sensors and devices can identify and self-diagnose issues. Hotel rooms should be occupied as soon as possible after renovations and replacements, reducing business loss due to repairs. To improve responsiveness, hotel networks must be equipped with more computing capacity and open access to visitors (Kansakar et al., 2019).

Understanding such challenges and recommendations is the initial step that will lead to the successful promotion of Iranian tourism growths. Tourists' sentiments are inextricably linked to political climate; therefore, only improved ties with other countries, and thus a better image, would enable Iran to fully grow its tourism industry and its economic situation in general. Iranian hotels like other tourism sectors

are in need of finding ways to stand out in hospitality landscape. One way to achieve this goal is offering personalized modern comfort through technology applications. The future travelers are millennial travelers who have strong digital expectations. In reality, they use their phones for everything from entertainment to ordering food. The incorporation of cutting-edge technologies would satisfy their needs to travel and spend more.

References

- Buhalis, D. (2003). *E-tourism—information technology for strategic tourism management*. Harlow: Pearson.
- Bigdeli, Z., & Ghanadinezhad, F. (2019). Analysis of Iranian faculty information sharing in social networks: The case of Shahid Chamran University. *Journal of Studies in Library and Information Science*, 25(26), 1–12.
- Buhalis, D., & Leung, R. (2018). Smart hospitality—Interconnectivity and interoperability towards an ecosystem. *International Journal of Hospitality Management*, 71, 41–50.
- Dehghan, S. K. (2018). *Trump plans to enforce sanctions against Iran state TV, says source*. The Guardian. Retrieved from: <https://www.theguardian.com/world/2018/jan/08/trump-plans-to-enforce-sanctions-against-iran-state-tv-says-source>. Accessed 31 March 2021.
- Feshari, M. (2017). The role of ICT indices in tourism demand of Iran (the FMOLS co-integrating approach). *Iranian Journal of Economic Studies*, 5(2), 209–221.
- Financial Tribune (2017). *Startups are tapping Iran's health tourism potential*. Global Growth Markets. Retrieved from: <https://www.ggmks.com/i-Startups-are-tapping-Irans-health-tourism-potential>. Accessed 31 March 2021.
- Ghasemi, F., Jalalabadi, L., Poormoosavi, R. S., & No, Z. K. (2014). Analyzing the role of security in developing Iran's foreign tourism. *European Online Journal of Natural and Social Sciences*, 3, 210–216.
- Gretzel, U., Koo, C., Sigala, M., & Xiang, Z. (2015). Special issue on smart tourism: Convergence of information technologies, experiences, and theories. *Electronic Markets*, 25, 175–177.
- Gutentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637–651.
- Heidari, A. (2014). The effect of new media on the tourism strategies in Iran. *World Journal of Environmental Biosciences*, 8(3), 38–45.
- Kansakar, P., Munir, A., & Shabani, N. (2019). Technology in the Hospitality Industry: Prospects and challenges. *IEEE Consumer Electronics Magazine*, 8, 60–65.
- Karimidizboni, R. (2013). The impact of ICT on tourism industry in Iran. *Interdisciplinary Journal of Contemporary Research in Business*, 4(2), 680–685.
- Khodadadi, M. (2016). A new dawn? The Iran nuclear deal and the future of the Iranian tourism industry. *Tourism Management Perspectives*, 18, 6–9.
- Maheshwari, D., & Janssen, M. (2014). Reconceptualizing measuring, benchmarking for improving interoperability in smart ecosystems: The effect of ubiquitous data and crowdsourcing. *Government Information Quarterly*, 31, S84–S92.
- Mehdi, S. Z. (2019). *Iran's tourism booming despite US sanctions: Iran's travel and tourism sector grew by 1.9 percent in 2018*. Anadolu Agency. Retrieved from <https://www.aa.com.tr/en/culture/iran-s-tourism-booming-despite-us-sanctions/1570822>. Accessed: 31 March 2021.
- Pearce, P. L. (2011). *Tourist behaviour and the contemporary world*. Channel View Publications.
- Porter, L. (2015). Iran hopes to welcome 20 million tourists a year following nuclear deal. *The Daily Telegraph*. Retrieved from: <https://www.telegraph.co.uk/travel/destinations/middle-east/iran/articles/Iranians-more-than-eager-to-welcome-tourists/>. Accessed 31 March 2021.

- Rezaei-Hachesu, P., Safadari, R., Ghazisaeedi, M., & Samad-Soltani, M. (2017). The applications of health informatics in medical tourism industry of Iran. *Iran Journal of Public Health*, 46(8), 1147–1148.
- Rokni, L., & Park, S. (2019). Medical tourism in Iran, reevaluation on the new trends: A narrative review. *Iranian Journal of Public Health*, 48(7), 1191–1202.
- Mihajlovic, I. (2012). The impact of information and communication technology (ICT) as a key factor of tourism development on the role of Croatian travel agencies. *International Journal of Business and Social Science*, 3(24), 151–159.
- Shabani, N., & Hassan, A. (2017). Augmented reality for tourism service promotion in Iran as an emerging market. In V. Nadda, S. Dadwal, & R. Rahimi (Eds.), *Promotional strategies and new service opportunities in emerging economies* (pp. 116–129). IGI Global.
- Shubita, A., & Saleh, Y. (2020). The application of artificial intelligence technology in cultural heritage development. *International Journal of Recent Technology and Engineering*, 8(5), 1140–1146.
- United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020). *UNESCO Tehran Cluster Office in collaboration with the Ministry of Cultural Heritage, Handicrafts and Tourism Organization (MCHTH) concluded the “Online Training of Trainers for World Heritage Specialist Guides” in Iran*. Retrieved from: <https://en.unesco.org/news/unesco-tehran-cluster-office-collaboration-ministry-cultural-heritage-handicrafts-and-tourism>. Accessed 31 March 2021.
- UNESCO World Heritage Centre. (n.d.). *Iran (Islamic Republic of)*. Retrieved from: <https://whc.unesco.org/en/statesparties/ir/>. Accessed 31 March 2021, p.4.
- Youngman, I. (2021). *Understanding Iran’s medical travel sector*. Retrieved from: <https://www.imtj.com/>. Accessed 31 March 2021.

Chapter 12

Hospitality Curriculum Reform with the Integration of Big Data Technology for Bachelor Program in China Mainland and Taiwan: Exploration of the Stakeholders' Perspectives



Yuanyuan Zong, You-Yu Dai, and Bingwang Xue

Abstract Big data technology has expedited the curriculum reform for hospitality undergraduates in 4-year bachelor program since it brings innovations to the daily operation in hotel industry. This paper conducts a deep interview on four types of experts from the mainland of China and Taiwan with aims to primitively understand how big data technology is applied on and integrated into the hospitality curriculum reform. The competence positioning, input resources and the scope of course applied with big data are included in the dimensions of curriculum reform. Relevant categories and items reflect the stakeholders' views from four types of experts. Theoretical and practical suggestions are thus offered to provide reference for big data course building in hospitality curriculum.

Keywords Big data · Hospitality curriculum for bachelor program · Expert interview · Course building

Y. Zong (✉)

Tourism Management School, Wuhan Business University, Wuhan, China

Department of Marketing and Tourism Management, National Chiayi University,
Chiayi City, Taiwan

Y.-Y. Dai

International Business School, Shandong Jiaotong University, Weihai, China

B. Xue

Tourism Management School, Wuhan Business University, Wuhan, China

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_12

Introduction

Big data technology is generally defined as an emerging technology of processing and analyzing a huge volume of real-time data and big data is featured with five V's dimensions (i.e. Volume, Variety, Velocity, Veracity and Variability) (Gandomi & Haider, 2015). Its methods are gradually applied in hotel and tourism industry during these 5 years. The issues on the application of big data in hospitality are mainly focused on customer behaviours like accommodation experience (Barnes et al., 2020), brand recognition (Giglio et al., 2020), customer satisfaction (Jia, 2020), attributes of customer preference (Cheng and Jin, 2019) and etc. Prior studies of hospitality education within three years were lacked in the area of big data-oriented curriculum reform. Only a few researchers mentioned conceptual suggestions for big-data integrated with other courses like Human Resource Management (HRM) or validated the influence of big data on tourism/hospitality (Adeyinka-Ojo et al., 2020; Martin-Rios et al., 2017; Ogbeide et al., 2020).

As for the big data teaching practice in hospitality curriculum, some hospitality and tourism schools in Taiwan (e.g. National Kaohsiung University of Hospitality and Tourism or NKUHT, and National Chiayi University or NCYU) have introduced big data workshops for students and faculty or added the big data course as selected course into curriculum. In order to respond to big data course building, several universities have launched the constructions of big data experimental labs for Master program of Tourism Administration. However, so far there are very few hospitality or tourism schools that have an overall development for big data course, which demonstrates the related teaching is lag behind the industrial application and academic researches.

Given the lack of systematic exploration on how to integrate the big data content into hospitality courses in curriculum reform, the hospitality education community are in urgent need of finding out the possibility and feasible ways of integrating the big data content into the hospitality curriculum in 4-year bachelor program. In the following sections, the authors briefly review on both academic and educational research of big data in hospitality. Then the dimensions, categories and items on three interview questions are explored from different stakeholders' views. The conclusions also provide practical and theoretical foundation for big-data-oriented course integration in hospitality education.

Literature Review

Academic Research of Big Data in Hotel Management

Big data is defined as a very large set of structured and unstructured data (De Mauro et al., 2015). Gandomi and Haider (2015) classified five definitions of big data based on an online survey of 154 global executives to show how differently the executives

understand on the definition of big data. 28% of executives acclaim big data represents massive growth of transaction data, including data from customers and the supply chain. 24% of them think big data is new technologies designed to address the volume, variety, and velocity challenges of Big Data. 19% of them regard big data as a requirement to store and archive data for regulatory and compliance. 18% of them explain big data to be explosion of new data sources (i.e. social media, mobile device, and machine-generated devices) (Gandomi & Haider, 2015). In practice of hotel big data application, collecting and analysing big data from supply chain, service encounter, online review and transaction records are typical areas applied with this technology. Many hotel management and owners have witnessed product design, sales predication and service satisfaction optimization are enhanced by applying big data technology (Pan & Yang, 2017; Zhao et al., 2019).

Most of related researches published in the recent 3 years see big data technology as a method of data collection and apply it on exploration study of accommodation experience, satisfaction, customer profiling, brand cognition as well as other empirical studies. On exploring employee-tourist encounter experience value, Barnes, Mattsson, Sørensen and Jensen (2020) tested the model and revealed the importance of the factors for leveraging perceptions of satisfaction, service and value using a large sample of hotel review text crawled by big data technology. Likewise, the big data analysis shows that location, amenities and host as three key attributes are influencers on Airbnb accommodation experience (Cheng & Jin, 2019). In the area of hotel brand cognition, the big data method also improves the preciseness of results to identify what impact the experience of staying in luxury hotels from the perspective of customer by crawling visual data online, further support to transform the insights into brand experience, and improvements in luxury hotel brand communications (Giglio et al., 2020). Another big data application area is CRM. Efficient client profiling is addressed through big data analysis on large amounts of available information in the Customer Relationship Management (CRM) systems (Talón-Ballesterero et al., 2018).

Education Research of Big Data in Hotel Management and Other Business Area

To date, there are very few researches concerning the combination of the hospitality curriculum and big data. On discussing the possibilities that hospitality/tourism curriculum can be integrated with big data, Ogbeide, Fu, and Cecil (2020) pointed out the difference in competence positioning between data analyst and hospitality/tourism data analyst, thus a better method for establishing a program should combine the data-oriented skills with hospitality and tourism domain skills. Some researchers conducted a content analysis on related literature to explore the role of digital literacy and employability skills influencing hospitality operations. Moreover, they have identified the areas that big data technology would be integrated with

hospitality innovation and employability skills include AI, service robot, cloud computing, social media tools, mobile Apps, Google Analytics and Property Management System (PMS) Operations (Adeyinka-Ojo et al., 2020).

In terms of a specific hospitality course, big data content can be an updated addition to hospitality human resource management (HRM) teaching as well. For instance, students learn to leverage new technology and new HRM metrics in a teaching case where the strategic dimensions of HRM are combined with practice-driven data analysis anchored in HR analytics and HR big data mining. The results show HRM course integrated with big data teaching content will make students easier to identify, develop and improve managerial skills (Martin-Rios et al., 2017).

Most literature has merely discussed establishing information curriculum integrated with big data technology. A very few numbers of education research studies paid attention to interdisciplinary combination between big data course and other business curriculum. There is one exception paper toward integration of Big Data, technology and information systems competencies into the accounting curriculum. Which come to conclusion that accounting competencies, foundation competence and broad management competencies are leveraged and available teaching resources are elicited in the process of course integration with big data technology (Sledgianowski et al., 2017). However, there is a distinct void in prior education study on combination of big data with hospitality curriculum in bachelor program. Thus, our three objectives are to attempt to make clear: first, what the competencies are positioned when integrating big data content into the hospitality curriculum? second, what kinds of teaching resources are indispensable for big-data-oriented hospitality curriculum? and finally, what courses can be applied with big data content and what are possible methods for integrating big data into hospitality curriculum?

Method

Expert Interview

The expert interview, developed considerably since the early 1990s, has been widely recognized as a method of qualitative empirical research. Designed to explore expert knowledge, the expert interview is another qualitative method to collect data from expert source and conduct a content analysis on these data (Dai et al., 2020; Meuser & Nagel, 2009). When planning the hospitality curriculum reform, a dearth of scholars and educators have adopted the expert interview to explore the innovative perspectives. Through expert interview on 11 hospitality and tourism program directors in Asia, the strong role of industry stakeholder on curriculum design is identified and the issues such as objectives of the programs, graduate competencies, the subject material and accreditation are also discussed in regional comparison between Southeast Asia and East Asia (Oktadiana & Chon, 2017). Another example

is examining hospitality industry managers' perspectives on sustainability in education by in-depth interviews with 11 managers in Northern California. These expert interviews show sustainability will be a new standard in the hospitality, further providing a robust evidence to incorporate it into the hospitality curriculum (Millar & Park, 2013).

The previous expert interviews on hospitality education demonstrate that experts consist of school educators, hospitality managers, technical specialists or combination of three stakeholder identities above. Followed the theoretical sampling to select the interviewees, the reliability and validity of interview on multi-stakeholders is much stronger than another single stakeholder interview. In line with the research objectives, the interview questions unfold as follows. First, what are the competencies positioning for hospitality undergraduates in the process of integrating big data content into hospitality curriculum? Second, what the essential resources are input into big data-oriented hospitality courses? and finally, what hospitality courses can be integrated with big data technology? And what methods are effective to realize these integrations?

Data Collection

Data collection was undertaken from December, 2020 to February, 2021. Utilizing their social and academic connections, the researchers adopted snowball sampling to recruit 12 experts for interview, who are working as hospitality teacher (HT), big data teacher (BDT), hospitality managers (HM), big data engineer in hotel industry (BDE) or both. Due to the fact that the hospitality teaching faculty of mainland of China and Taiwan comes from related trades, most of experts have combination of these four identities mentioned above, proving the qualifications of working experience these experts possess for interview. The profiles of experts can be seen in Table 12.1.

Considering the social distancing impacts of COVID-19, the researchers conduct a video interview for each expert via WeChat or Facebook Messenger. The time for each expert interview was limited in the range of 30–45 min. The researchers raised the three interview questions for experts while recording the answers the experts gave. Besides, the ambiguous or oversimplified answers from experts were clarified or elaborated in more details, which ensure the content depth and accurateness (Patton, 1990). After completing all interviews, the researchers manually transformed and double-checked the verbatim transcripts from the auditory recording.

Table 12.1 Profile of experts participating in an interview

Respondent	Category of stakeholder	Education	Work experience (in year)	Country/Region
R1	BDT	PhD	29	TW
R2	HT	PhD	8	TW
R3	BDT, HT	Master	15	CN
R4	BDT, HT	Master	6	CN
R5	BDE	Bachelor	25	CN
R6	BDE, HM	Master	12	TW
R7	HT, BDT	PhD	30	CN
R8	BDE, HM	Bachelor	12	CN
R9	BDE, HM	PhD	10	CN
R10	BDE, HM	Bachelor	12	CN
R11	HM	MBA	30	CN
R12	BDT, HT	PhD	5	TW

Source: developed by the authors, 2020

Data Analysis

The researchers applied ground theory on categorizing the transcripts by three steps of open coding, axial coding and selective coding. In the process of coding steps, a set of three answers from every expert were completely verified in the regard of consistency. Then items, categories and dimensions are gradually selected based on the principles of categorization. All the values for the inter-rater reliabilities exceeded the threshold value of 0.8 (Kassarjian, 1977; LeBreton and Senter, 2008). With purpose of guaranteeing the validity of data analysis, the processing of meaningful units followed triangulation which contributes to reduce the bias of coding and decoding. Generally speaking, the triangulation is applied in such situation: when the two researchers are unable to reach the consensus on a specific categorization, the third researchers will get to examine and give final evaluation which categories and dimension will the items are classified into (Dai et al., 2020; Patton, 1990).

Results

Competencies Positioning

For the first question, two dimensions coded from the expert transcripts are identified as: (a) Big data analytical competence and (b) Big data processing competence. Many experts acclaimed that hospitality undergraduates are not possessed with information data analytical foundation. Nevertheless, the programme objectives required graduates to have the analytical capabilities for existing data sets. For this reason, the students should put big data analytical competence as priority on the premise that they are quite familiar with the background knowledge of hotel

operations. The majority of experts prefer to emphasize the analytical competence rather than processing competence on the basis that the students have a good knowledge of operational routines, strategies and situations applied with big data technology. According to the frequency statistics, big data analytical competence the students must grasp include operational competence, strategic competence, processing competence, creative competence and framing competence in descending order. Another dimension is big data processing competence which comprises two competencies of data crawling and data cleansing (see Table 12.2).

In the dimension of big data analytical competence, 5 categories are referred in expert interview as (1) *Operational competence*. This competence requires students

Table 12.2 Dimension, categories, items and frequency for Big data competence positioning

Dimension	Categories	Item	frequency
Big data analytical competence	1. Operational competence	Revenue mgt.	12
		AI application	11
		Divisional resources flow	10
		Product& service portfolio	9
	2. Strategic competence	Pricing	12
		Sales strategy	11
		Promotion channel	9
		Inventory management	7
	3. Processing competence with basic report data	a. Mastering the basic statistics knowledge	9
		b. Grasping the competence of basic data processing with excel\ SPSS	8
	4. Creative competence for hospitality business mode	Understanding thinking change for hospitality operation	8
		Understanding thinking change for hospitality service	7
	5. Framing competence for big data application fields	AI operation	6
		AI service	5
		AI engineering	3
Big data processing competence	1. Data crawl competence	a. Use Python or R program to crawl the data	5
		b. Use another software to crawl the data	4
	2. Data cleansing competence	a. Batch processing with specific software	5
		b. Data wrangling with Python	5

Source: developed by the authors, 2021

use big data flow to analyse revenue performance, AI application effects, resource flows and product and service portfolio. (2) *Strategic competence*. Pricing, sales strategy, promotional channel and inventory management are the main areas that apply big data-oriented strategic competence. (3) *Processing competence with basic report data*. This competence calls for the basic statistics knowledge and the competence of basic data processing with Excel and/or SPSS, which students must handle this prerequisite knowledge. (4) *Creative competence for hospitality business mode*. This is high ranked competence for hospitality students in bachelor program. Most experts suggested students should understand that hospitality operation and service have been changed with the trend that big data technology will change the business mode to be more data-science sensitive than merely relying on rule of thumb. And (5) *Framing competence for big data application fields*. Students are asked for to know how to frame big data application fields and make sense of the big data technology in hospitality management. So far it is not feasible for students to think of comprehensive application with big data. However, experts recommended the three domains that use big data is AI operation, AI service and AI engineering in hotel industry.

In the dimension of big data processing competence, experts acclaimed that students majored in hotel Information Technology (IT) management should master basic big data crawling and cleansing. Two approaches for students to deal with crawling and cleansing are: (1) to employ R or Python programming; and (2) to use other localized crawling tools. However, since numerous websites are anti-crawling, thus students with IT career plan must learn the basic crawling and cleansing programming with R or Python. All these viewpoints can be seen in the following excerpts:

Our positioning for cultivated the hospitality students' competence is mainly focused on analytical competence with big data, rather than processing competence. Due to their career requirements in hospitality, the big data are often processed by the IT specialists, what they need to do is to read the data precisely with their hotel operational background (R7).

Teaching Resources Input

All experts mentioned teaching faculty, teaching facilities and big data source are three dimensions of teaching resources input into hospitality big data course (See Table 12.3). The methods of qualifying teaching faculty are divided into three categories (i.e. introducing faculty specialized in big data, inner training, and co-teaching) with IT manager in hospitality industry. Since most hospitality schools have established the cooperated networking of hotels for student internship, teaching faculty for big data courses can be found by introducing IT managers or trainers in the first step. By cooperated teaching with IT managers or trainers, the hospitality teachers have more chance to update their knowledge of industrial status quo and accumulate teaching experience for hospitality big data. This cooperated teaching practice can enhance integration level of the hospitality courses with big data. But

Table 12.3 Dimension, categories and frequency for resources input into Big data--oriented hospitality courses

Dimension	Categories	frequency
Qualifying teaching faculty	1. Co-teaching with IT manager in hospitality industry	12
	2. Introducing faculty specialized in big data	10
	3. Inner training	7
Constructing teaching facilities	1. Purchasing revenue Mgt. Software	11
	2. Purchasing Opera PMS	11
	3. Purchasing Restaurant & Catering Management Software like micros	8
	4. Set up reservation apps	6
	5. Simulation software or ERP	5
Updating the big data base	1. Purchasing the real data from business data company	9
	2. Acquiring open data from NGO or local government	10
	3. Obtaining local data from hotel	3

Source: developed by the authors, 2021

if the curriculum is in urgency to cover data course, introducing new teacher directly is more preferred among expert's opinions and inner training is the last choice since it's more time-consuming.

In terms of constructing teaching facilities, a lot of experts have mentioned five categories, which refer as purchasing software on revenue, PMS, restaurant & catering and setting up Apps or simulation software. All experts emphasized that purchasing the education version of hospitality software is essential for students to simulate data operations. For instance, ten experts have recommended the Sales Module of OPERA Cloud Property Management or Micros to be a terminal to acquire real-time data from hotel members and conduct simulated big data case for students. Based on the big data analysis of preferred customer portfolio, the students can deeper understand the logics of making pricing and sales strategy. Several experts hold that big data can be acquired by booking Apps or WeChat mini program as well. While a few BDEs and HMs suggested Cesim ERP or simulation software such like Hiyield would be an alternative, a majority of experts still insist that purchasing the education version of main hospitality software be a once-for-all option.

All experts indicated the big data base needs to update once teaching facilities have been installed. At present, the data have been preset by suppliers or compiled by teachers when teaching software was purchased. Most of experts assumed the big data for hospitality teaching is not actually "big data" due to the fact teaching data was often sourced from a single hotel in a case study. However, the interviewed

experts tended to define hospitality big data in teaching as comparative big data sourced from all members of a specific hotel brand or a regional hotel industry. The volume of these data is qualified as relatively small sample for big data set, thus functioned as “big data” base for teaching purpose.

The big data base for teaching should be updated through three ways. (1) *Purchasing the real data from Business data company*. Many experts have referred STR data service as a reliable option because of STR profession for hospitality data collection and analysis. (2) *Acquiring Open data from NGO or local government*. Regional hotel associations or tourism bureaus in mainland of China and Taiwan regularly conduct hospitality statistics as a main task of official data collection. According to the practical routine, the open data needs to be verified and corrected by teachers for the reason that official data may be distorted when hospitality is in time of depression. (3) *Obtaining local data from cooperation hotels*. Students feel more familiar with local hospitality operation and get a sense of accomplishment when dealing with local data. Therefore, some experts preferred to obtain local data functioned as big data set in order to increase teaching effects. Relevant comments are provided in the following remarks:

The most important thing we must consider is to introduce teaching faculty that specialized in Big data. If the hospitality teacher and big data teacher can cooperate to open related course, it would be much better for teaching teamwork (R1).

Buying software just wants sufficient fund for purchase while how to update real big data source is a concern (R6).

The data we input should be real data from hospitality. Besides accessing to data from STR, the lecturer must ensure the big data is about the region students are located. So, students will feel their research assignment is more local contextual and connected with target to serve the local industry (R12).

The Scope of Courses Applied with Big Data and the Methods of Building Big Data Course

In the view of the fact that big data courses are offered in very a few hospitality schools with 4-year bachelor program, experts shared their opinion based on their own expertise, teaching and training experience in order to identify what courses are fit for integration with big data technology. The scope of courses is listed as Hotel Marketing, Revenue Management, Opera PMS Management, Human Resource Management and Hotel engineering & inventory Management (See Table 12.4).

In the teaching content of Hotel Marketing, big data technology is mainly applicable on online review and word-of-mouth (WOM) management of hotels, online ads effects, online travel agency (OTA) cooperation and channel selection, online service & product portfolio and CRM. All types of experts believed the guiding role of big data analysis on online review and WOM. If the teachers develop more new cases concerning online review monitoring, students get a better understanding of

Table 12.4 Dimension, categories, items and frequency for the course scope applied with big data

Dimension	Categories	Items	frequency
Types of courses applied with big data			
	1. Marketing	a. Online review & WOM	12
		b. Online advertising effect	10
		c. OTA selection	10
		d. Online product portfolio	9
		e. CRM	8
	2. Revenue management	a. Big data analysis on sales performance and indexes	12
		b. Commission management	9
	3. Opera PMS operation	a. Get access to updated big data	10
		b. Understand the hotel operation through Opera PMS and identify the data source from various flows	9
	4. Human resource management	a. Personnel recruiting	6
		b. Staffing management	6
		c. HR outsourcing	3
	5. Engineering & Inventory Management	a. Inventory cost control	5
		b. Purchasing management	4
		c. Energy control	4
Method for course opening	1. Open new course of big data in hospitality		11
	2. Open workshops of big data in hospitality		7
	3. Supplement existed courses with the content of big data		6

Source: developed by the authors, 2021

the power of big data integrating with hotel reputation management. Both HMs and BDEs pointed out the online marketing effects of hotel are measured with the items about the online ads' effects, the performance of different OTA channels, online accommodation portfolio and CRM. These items, as experts mentioned, can be assessed by the application of big data methods. One typical example is to teach students analyse online ads effects measured by click ratio and purchase rate after crawling the primary data. Their understanding on how to apply big data in hotel marketing issues will be deeper through such cases.

Revenue management is the second category that mentioned by experts to be applicable with big data. Average daily room (ADR), occupancy rate (OCC), and revenue per available room (RevPAR) are representative revenue indexes for measuring hotel operation and sales performance. Considering commissions paying to OTA have increased by 30% of total sales, many experts emphasized the importance

of commission management by providing another big data case for comparing the return rate between hotel independent marketing and OTA marketing.

As the third category of the applicable scope of course, OPERA PMS assists with getting an access to update big data and helps students understand the division operation in hospitality. Almost every expert has referred OPERA PMS as a necessary operational software to make students identify data flows fundamental to big data collection. Through OPERA PMS, students can grasp the implications of big data flows among functional divisions in hotel operation.

Some experts working as hotel managers or Human resource trainer, suggested inner recruitment and staffing should be of higher efficiency if these workloads are processed with big data technology. For example, labour outsourcing and staffing allocation through online sharing platform have been regarded by a few HMs and BDEs as an emerging opportunity for controlling labour cost and related overheads. This kind of platform has been generating the big data flows on human resource and running by the algorithm of big data. As a result, that's why human resource is termed as the fourth category of the applicable scope of course.

Although Hotel Engineering and Inventory Management is listed as selective course in most hospitality schools in the mainland of China and Taiwan, several experts acclaimed the power & utilities control should be part of hotel engineering management since most hotels tend to be environmentally friendly as well as cost-efficient. If big data technology is applied to track the customer usage habit on linens, utilities etc., then proper low-carbon option will be designed in the areas of inventory cost control, purchasing management and energy control, which contributes more big data-oriented cases in Hotel Engineering and Inventory Management course. Some experts' views are described in the following excerpt:

If PMS can update the data sourced from OTA, many cases can be studied in online marketing area. For instance, we can analyse the online WOM of our hotel by text-mining reviews (R5).

All sorts of flows generated from hotel operational activities can be read as data. Big data technology is a tool to detect and collect these flowing data. So, any issues occurred in functional divisions like marketing, revenue management and engineering will be solved through big data analysis (R10).

Given existing facilities and teaching faculty for establishing hospitality big data course, the majority of experts suggested this course should open independently for sophomores with 32–48 hours and 3 credits. All the Taiwanese experts and three Chinese experts preferred hiring big data teachers or trainers from Hotel IT department to conduct pilot workshops for students and hospitality lecturers before initiating big data course. These workshops will make students understand the areas of big data application, read and analyse the data flows from revenue management, marketing, OPERA PMS and engineering in the hospitality. However, if there is no qualified big data teacher while the hotel IT trainers have no sufficient time spent on complete course teaching, cooperated teaching by school teachers and IT trainers will be an alternative for curriculum integrated with big data.

Since IT trainers from hotels supplement existed courses with the content of big data, the hospitality teacher will gradually learn to apply big data technology on their main courses, which enable the curriculum reform toward the big data-orientation. No matter what method the hospitality teachers will take for building big data course, understanding implication of the big data in hotel operation cases will be a top priority in related course objectives. As many experts have mentioned in their remarks:

IT Trainers from hotels are better invited to introduce big data knowledge for hospitality students and teachers through a series of workshops...I teamwork with some teachers to resign the courses by adding big data teaching content (R3).

Discussion and Conclusion

This study provides big data-orientated directions and detailed measures for hospitality curriculum reform through deep interviews on 12 experts from the mainland of China and Taiwan. In prior research, many experts have reached a consensus that the following skills are required for data analysts: analytical skills, IT and programming skills, business and domain knowledge, and interpersonal skills (Jacobi et al., 2014). But for most hospitality students, to cultivate them the big data analytical competence is more vital than data processing competence. When the graduates get into the hospitality career, they are only required to read and analyse the data implications for dealing with hotel operation, then know to solve current problems while data crawling and processing tasks are sourced to data analysts. Under the hospitality education system of mainland of China and Taiwan, one of education objectives is to motivate students to enter the hospitality world as their career choice. This career-oriented objective entails the students to achieve big data analytical competence in hospitality positioned with five sub-competences: operational competence, strategic competence, processing competence with basic data, creative competence and framing competence.

The results of this study also indicate qualifying teaching faculty, constructing teaching facilities and updating the big data base as three dimensions for resource input for big data course in hospitality curriculum. Previous research has proved four types of faculty training in the competency-based curriculum development are an expert, webinar, phone conferences, and self-study (Echols et al., 2018). However, the experts suggested co-teaching with IT managers is the best option while introducing big data teacher will be an effective alternative in a short term. The last way for qualifying the teachers is to rely on inner training because hospitality teachers dominantly lack data science education background.

In light of constructing teaching facilities, a lot of experts recommended to purchase the education version of hospitality software widely used in hotel operations (e.g. Ideas, Opera PMS, Micros etc.). These types of software have recently been updated to be cloud-based, thus result in obtaining big data available without limitation of time and space. Besides of setting up reservation Apps, some experts regarded

that purchase simulation software or ERP can replace hospitality software and updated data will be provided by these software suppliers for free. As for how to acquire big data, the feasible data sources are real data set purchased, open data from NGO or local government and local data from regional hotels. The experts have proposed the practical requirements for data quality are real-time, real and local, which encourage teachers to verify for teaching purpose.

When discussing the scope of course integrated with big data, most of experts emphasized any area where data flows of capital, labour and energy etc. Are generated will be considered to be the content of hospitality big data course. The results show the scope of hospitality courses applied with big data includes marketing, revenue management, OPERA PMS operation, human resource management, engineering & inventory management. The combination of these courses and big data technology indeed reflects the stakeholders' perspectives on the value of data flows sourced from OTA marketing, WOM management, revenue management and green engineering.

It is widely accepted that establishing big data course independently or workshops as introductory training will be very effective for curriculum reform. Moreover, several universities like Beijing Union University and Les Roches Jinjiang Hotel school at Shanghai (LRJJ) adopt the simulation software or ERP to assist with revenue management teaching, which show us how to supplement existed course with big data technology. So far, a growing number of schools have made endeavors to conduct a demonstration course and these demonstration courses have diversified stakeholders' plan to open big data course in both schools and hotels. To sum up, the scope of courses will expand as these demonstration practices show their teaching effects.

Despite the application of big data technology into hospitality curriculum reform is later than academic research on big data topics in hospitality, the areas and issues of related academic study in turn reveal the trend of big data application in hospitality. From these interviews, big data course has been merely designed for Master Program. In support of establishing the similar course for Bachelor Program, we have proposed a number of factors and restrictions for educators to focus on:

To What Extent Big data Technology Is Applied in Regional hospitality Industry?

If cooperated hotels are located in an area that is less developed in big data technology, real data and teaching assistance to schools are definitely unable to realized, thus this laggard industry status quo will be a barrier for big data course building.

To What Extent the Teaching Faculty from Schools and Hotels Can Cooperate with Each Other for Course Building and Curriculum Reform?

Teachers can seize this cooperation opportunity to research consensus on teaching objective, chapters arrangement, allocation periods and credits. Besides the hospitality teachers can follow up with the demonstration courses of big data, which can update and reform the main courses in hospitality curriculum in a short time. Nevertheless, the cooperation level is also impacted by relationship between schools and industries, qualities of resource input and hospitality education policy.

To What Extent the Software Can Simulate the Hotel Operation?

As experts have mentioned there are two types of software to simulate the operation from which big data can be acquired and analysed. First, the education version of hospitality software like OPERA PMS. Second, simulation software like ERP or Hiyield. As for the source of big data source, it's more feasible to evaluate which types of software are optimal to purchase since the data source matched with software will be a kind of upcoming cost. A real, real-time and local data are prospected for better simulation to analyse big data.

To What Extent the Curriculum Reform Value Is Anchored Toward Practicality?

There is evidence that some schools have already purchased the software or established a big data lab in order to pass the university evaluation from Ministry of Education. Yet without adequate teaching assistance for course building, the big data-oriented reform will receive few effects. Consequently, it calls for the scientific attitude to adopt cost analysis to evaluate whether big data course is worth being built for hospitality curriculum reform. What's more, the deans need to consider if this course development is ready to make curriculum reform practical rather than generate face effects.

Acknowledgement The authors would thank for financial support from teaching research grant of Wuhan Business University ("Hospitality curriculum reform integrated with big data technology for bachelor program", Grant No. 2018 N005) and The National Social Science Fund of China (Grant No. 20BGL219). Also, thanks are also due to the experts participating in interviews and anonymous reviewers.

References

- Adeyinka-Ojo, S., Lee, S., Abdullah, S. K., & Teo, J. (2020). Hospitality and tourism education in an emerging digital economy. *Worldwide Hospitality and Tourism Themes*, 12(2), 113–125.
- Barnes, S. J., Mattsson, J., Sørensen, F., & Jensen, J. F. (2020). Measuring employee-tourist encounter experience value: A big data analytics approach. *Expert Systems with Applications*, 154, 113450.
- Cheng, M., & Jin, X. (2019). What do Airbnb users care about? An analysis of online review comments. *International Journal of Hospitality Management*, 76, 58–70.
- Dai, Y.-Y., Zhang, X., & Feng, X. (2020). Conceptualization research of travel comfort: A preliminary study. *Ottoman: Journal of Tourism and Management Research*, 5(2), 662–680.
- De Mauro, A., Greco, M., & Grimaldi, M. (2015). What is big data? A consensual definition and a review of key research topics. In *AIP Conference Proceedings*. American Institute of Physics, 644(1), 97–104.
- Echols, D. G., Neely, P. W., & Dusick, D. (2018). Understanding faculty training in competency-based curriculum development. *The Journal of Competency-Based Education*, 3(2), e01162.
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137–144.
- Giglio, S., Pantano, E., Bilotta, E., & Melewar, T. C. (2020). Branding luxury hotels: Evidence from the analysis of consumers' "big" visual data on TripAdvisor. *Journal of Business Research*, 119, 495–501.
- Jacobi, F., Jahn, S., Krawatzek, R., Dinter, B. and Lorenz, A. (2014). Towards a design model for interdisciplinary information systems curriculum development, as exemplified by big data analytics education. In *Proceedings of Twenty Second European Conference on Information Systems*. Tel Aviv: the 9th–11th June.
- Jia, S. S. (2020). Motivation and satisfaction of Chinese and US tourists in restaurants: A cross-cultural text mining of online reviews. *Tourism Management*, 78, 104071.
- Kassarjian, H. H. (1977). Content analysis in consumer research. *Journal of Consumer Research*, 4(1), 8–18.
- LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods*, 11(4), 815–852.
- Martin-Rios, C., Pougnet, S., & Nogareda, A. M. (2017). Teaching HRM in contemporary hospitality management: A case study drawing on HR analytics and big data analysis. *Journal of Teaching in Travel & Tourism*, 17(1), 34–54.
- Meuser, M., & Nagel, U. (2009). The expert interview and changes in knowledge production. In A. Bogner, B. Littig, & W. Menz (Eds.), *Interviewing Experts* (pp. 17–42). London: Palgrave Macmillan.
- Millar, M., & Park, S. Y. (2013). Sustainability in hospitality education: The industry's perspective and implications for curriculum. *Journal of Hospitality & Tourism Education*, 25(2), 80–88.
- Ogbeide, G. C., Fu, Y. Y., & Cecil, A. K. (2020). Are hospitality/tourism curricula ready for big data? *Journal of Hospitality and Tourism Technology*. <https://doi.org/10.1108/JHTT-09-2017-0081>.
- Oktadiana, H., & Chon, K. (2017). Why do we teach what we teach? Perspectives from Asia's hospitality and tourism program directors. *Journal of Teaching in Travel & Tourism*, 17(4), 281–299.
- Pan, B., & Yang, Y. (2017). Forecasting destination weekly hotel occupancy with big data. *Journal of Travel Research*, 56(7), 957–970.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Thousand Oaks, CA: SAGE Publications.
- Sledgianowski, D., Gomaa, M., & Tan, C. (2017). Toward integration of big data, technology and information systems competencies into the accounting curriculum. *Journal of Accounting Education*, 38, 81–93.

- Talón-Ballester, P., González-Serrano, L., Soguero-Ruiz, C., Muñoz-Romero, S., & Rojo-Álvarez, J. L. (2018). Using big data from customer relationship management information systems to determine the client profile in the hotel sector. *Tourism Management*, *68*, 187–197.
- Zhao, Y., Xu, X., & Wang, M. (2019). Predicting overall customer satisfaction: Big data evidence from hotel online textual reviews. *International Journal of Hospitality Management*, *76*, 111–121.

Chapter 13

Technology Application in the Chinese Tourism Industry



Mohammad Musa, Preethu Rahman, Zhi-rong Kang,
and Syed Far Abid Hossain

Abstract Technology has brought exciting changes to our lives by altering our decision-making, communicating, learning, entertainment, etc. Tourism is a dynamic practice that needs tools for decision-making and competition in economic, social, and environmental sustainability demands. In the current era of high technology and development, big data, artificial intelligence, virtual reality, augmented reality, “3S” technology, and smart tourism are widely applied in all aspects of social life. It plays a good role in the promotion and growth of the tourism industry. This chapter intends to determine the significant technological changes, influences, and customers’ relationship with the industry in recent years. We defined and proposed philosophical, methodological, technical, and realistic uses of technology for the Chinese tourism industry to support advanced technical services to satisfy customers’ needs. Future technologies suitable for Chinese tourism are systematic planning and layout of scenic spots, investigation and evaluation of tourism resources, destination planning, tourism information management and application, tourism environment monitoring, etc. The future technology gradually becomes familiar for travelers to China since it promotes its tourism industry 3.0. and industry 4.0 worldwide. The Internet and the Internet of Things (IoT) include inserting

M. Musa (✉) · P. Rahman

International Business School, Shaanxi Normal University, Shaanxi, China

College of Tourism and Hospitality Management, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

e-mail: musa@snu.edu.cn

Z.-r. Kang

International Business School, Shaanxi Normal University, Shaanxi, China

S. F. A. Hossain

College of Tourism and Hospitality Management, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

School of Management, Xi’an Jiaotong University, Shaanxi, China

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_13

sensors with vehicles, suitcases, buildings, etc., to make substantial improvements to the travel industry. Technical innovations and institutional changes are the reason for the evolution of the Chinese tourism industry.

Keywords Technology · Smart tourism · “3S” technology · Industry 4.0 · Customer experience · Augmented reality (AR) · Virtual reality (VR)

Introduction

From the printing press to the internet, innovation and technological development have become essential drivers for notable changes in people's lives. Each of the incredible developments has let us investigate unseen ways. Technology and innovation could be a vital portion of the business's tourism industry and improve customer experience. Tourists around the world may find the best hotels for themselves, reserve a room, search the most accessible routes to reach a tourist destination, learn about the other visitors' comments, have lingual support or interactive experience in a museum, and may get a personalized excursion, so on so forth. This list is endless and what makes it possible is the technology and innovation. It is critical for stakeholders to keep up with the most recent innovation patterns inside the industry, particularly within the imperative time of epidemic like COVID-19. From the holiday destination we chose to return from our journey, innovation and travel play an essential role. According to a Google Travel survey, 74% of vacationers plan their trips online, up from 13% previously (Vidal, 2019).

The industrial organization has a significant impact on the rate of productivity and innovation of the industry. Technological innovations and institutional changes in the organization are the main driving force to promote evolution and development. Institutional changes help enterprises operate in a more relaxed environment and implement resources in a larger space. They also help the evolution and development of organizational capacity in the tourism industry. Technology, including information technology and management techniques, enhance efficient operating at a greater enterprise-scale and a larger geographical scale. Under the synergetic effect of technical and institutional factors, industrial organization evaluates continually, and the direction and extent of this evolution decide the competitiveness of the industry. The synergetic effect of technical and institutional factors promotes the evolution of the different types of organizations, thus impelling the travel industry's expansion.

The tourism industry in China has grown rapidly and gradually becomes a crucial national economic system. China took three decades to complete the historic leap from a great tourism resources country to a great tourism industry country. According to the United Nations World Tourism Organization (2019), China now accounts for more than a quarter of the money spent by outbound visitors, paying twice as much as the next-largest spender, the United States. In China, only 5% population has a passport, while others are using the travel pass. As a result, the

Chinese government issues about ten million new travel documents per year. China's tourism industry has made substantial progress since reforming and opening. Technologies improve the consumer experience, increase the amount of data collected by connected devices, and broaden analytics' reach and creates the opportunity of delivering genuinely personalized customer experiences and potentially create new products and services. The application of technology and networking in China's tourism has developed significantly since 1997. Especially during SARS in 2003, network technology showed its incomparable advantages as it is rapid and convenient and without any personnel contact. According to related experts, booking flights, hotels, and scenic spots are the applications of network technology in China's tourism industry. This technological development is combined with the application of network technology in epidemics like SARS in the hope of further development of China's tourism (Xiang-yu & Jie, 2005) (Fig. 13.1).

Today's technology is inclusive and smart. Smart technologies like mobile devices, digital platforms, big data, open data, the internet of things (IoT), three-dimensional printing, socially interactive robots, artificial intelligence, virtual reality, augmented reality, Blockchain, NFC, QR codes are transforming the tourism industry and creating new opportunities, new challenges. This chapter is about the technology used in tourism, provides a valuable contribution for people interested in tourism, as a professional, researcher, student, and decision-maker. It includes two sections that emphasize: the present and future scenario of technological applications in Chinese tourism, and the importance of technologies to enhance the customer experience.

We aim to show how smart technologies can influence the consumer relationship in the tourism industry and presents tools and techniques applicable to the sectors

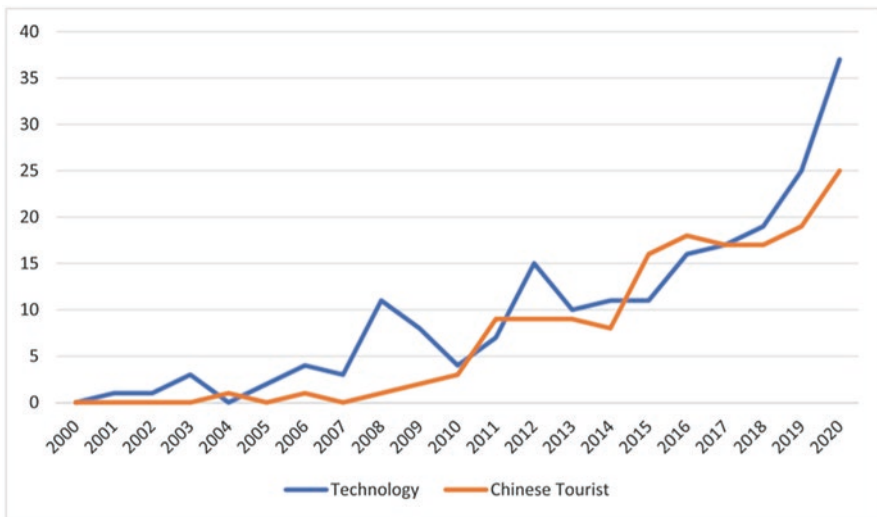


Fig. 13.1 “Technology“and “Chinese tourist” research (2000–2020). (Source: Wu et al., 2020)

under analysis. The chapter's objective is to bring together similar academicians who are committed to seeking scientific and rational solutions to challenges and provide a forum for them to share their views, put forward ideas or models, and contribute to the field with their inspiring insights.

The Present Scenario of Technological Applications in Chinese Tourism

“3S” Technology for China's Tourism

Knowledge is becoming increasingly relevant in tourism as the economy grows. It is entirely essential to use modern technologies to deal with complex tourism planning and management. Remote sensing (RS), geographic information system (GIS), and global positioning system (GPS) have all been used in China's tourism industry in recent years (Ting & Qiao, 2011). The traditional techniques and procedures are incapable of adapting to the condition of the tourism industry's accelerated growth. The core technologies can collect, process, and apply information, and the outstanding characteristics are high-speed and real-time information collection and processing, high precision, and quantifiable information application. The technology has been widely used in resources, environment, population, and disasters (Li Yulin & Lingling, 2020). For the comprehensive improvement of the level of tourism management and services, the systematic planning and layout of scenic spots, the careful design of tourist routes, and the optimal allocation of time and space need a rich geographic information system (Li Yulin & Lingling, 2020).

The progress of remote sensing (RS), geographic information system (GIS), and global position system (GPS) started in China in the early 1980s. The Chinese central government formulated a proposal for remote sensing technologies in China at the end of the 1960s. Since then, remote sensing sensor research and development have been included in National Five-Year Plans. The new remote sensing tools have been used to explore resources and observe the environment (Chen et al., 2000). RS and tourism have a similar feature in that they cross disciplines and application areas and have piqued the attention of geographers, economists, industry, environmental planners, anthropologists, and archaeologists. As a result, the opportunity for RS applications in tourism is substantial.

According to many case studies on China's tourism, it can be identified that the current applications of RS in China include the following aspects: first, to determine the physical environment and the location of the tourism destination, especially the remote destinations of Chinese southwest and northwest; second, to investigate tourism resources quantity and quality, which several Chinese provinces have adopted; third, to draw all kinds of integrated tourist maps for the tourism planning, including the map of tourist resource, the distribution map of tourist place, landscape pictures, literal introduction, advertisement, etc.; fourth, to employ the technology of virtual reality and remote sensing data to make dynamic tourist planning,

which can facilitate the product promotion and marketing to the potential tourists; fifth, to use it as the substantial data source of GIS to make tourist planning geographic information system to service for the tourist decision and the host environment.

GIS applications in tourism and recreational planning demonstrate that GIS is a powerful and valuable technology Ting and Qiao (2011), which can help with tourism preparation and decision-making. In many Chinese case studies using GIS technologies for tourism, GIS architecture and network research were carried out. The number of prospects for GIS implementations in tourism planning is as follows (Farsari & Prastacos, 2004): first, visitor flow control includes using GIS to define the significant visitor activity spaces within a destination and the flows between destinations. Authorities can enforce strategic infrastructure plans (e.g. building public transportation systems linking various tourist activity spaces). Second, the stock of equipment and material utilization: This includes the use of GIS concerning the question of environmental justice (namely, the fact that tourism may not benefit all segments of society equally). It also includes compiling a resource inventory to recognize overlapping, and compatible land uses and practices, accessible facilities, and natural resources. Third, assessing the effects of tourism development: Geographic information systems (GIS) can be used to illustrate the effects of tourism on different industrial sectors in a time-series and spatial format (Chen, 2006).

GPS used in China's tourism is relatively less than GIS, mainly employed by adventurous activities (Ting & Qiao, 2011). Some Chinese planners try to use it to track the tourist location in the large desert and forest areas; besides, GPS technology is also used for ecotourism visitors to investigate the migration of birds. The use of GPS in tourism management could improve the modernization and safety of tourism enterprises and the development of new tour fashion. GPS devices have the advantage of obtaining accurate data over land-based tracking methods. This is used to investigate micro-level data, such as studies that document the number and density of visitors visiting historic towns, attractions, theme parks, and so on so forth, all of which necessitate high-resolution data (Shoval & Isaacson, 2007). Employing GPS and GIS for data collection and management is now a new method for investigating, evaluating, and managing tourism resources (Ting & Qiao, 2011). Some Chinese tourism companies offer boat trips along rivers, lakes and bays and uses GPS to support it. The actual track of each trip could be recorded and are available for users to view. It is possible to display the paths taken, and the speed reached. The route data could be made available as an image displayed on the internet or mapping software (Ting & Qiao, 2011).

The increasingly mature "3S" technology can be used as a new technical means of the tourism industry to make up for the traditional research methods' flaws, and "3S" technology is a modern comprehensive surveying and mapping technology based on RS, GPS, and GIS, combined with network technology, communication technology, and other technologies (Li Yulin & Lingling, 2020). It is increasingly applied to tourism resource investigation and assessment, destination preparation, tourism knowledge management and implementation, tourism climate monitoring, etc. to provide public tourism, shopping, navigation, and positioning.

Virtual Reality (VR) and Augmented Reality (AR) Technologies in Tourism

The innovation and growth of tourism technology and apps accessible by smart devices offer greater diversity in tourism and tour operations. Augmented reality (AR) and virtual reality (VR) applications focused on smart technology are viewed as new resources for raising awareness and collecting knowledge about visitors, and delivering information to tourists. Cultural, scenic spots cover many ancient buildings, like graffiti, carved arts, and activities, and it is easy to damage these ancient buildings and monuments. In the current phase of tourism resource creation, we will use AR and VR technologies to view all sorts of scenic spots publicly in a three-dimensional manner so that the public can feel as if they are in actual circumstances, in order to encourage the development of the urban tourism sector and preserve the urban ancient buildings and structures. While protecting tourism resources, we can maximize tourism resources' development by using this tremendous innovation of recent times.

AR means overlaying computerized imagery on the user input, resulting in a live video feed of the physical surroundings. AR lets users keep track of their location through GPS-enabled smartphones or devices (Çeltek, 2020a, b; Goswami, 2020; Taylor, 2013). This technology allows for integrating new knowledge into an existing image (Berryman, 2012; Çeltek, 2020a, b; Craig, 2013; Goswami, 2020). The very first purpose of an augmented reality device is to project the physical world into the third dimension in order to make the physical world more realistic for the user and allow them to communicate with it (Azuma et al., 2001; Çeltek, 2020a, b; Goswami, 2020). AR can be applied to various interface technologies such as Heads-Up Displays (HUDs) (Çeltek, 2020a, b). AR as a technique blends a real-time vision with simulated computer-generated images, resulting in real-time augmented reality experiences (Çeltek, 2020a, b). Thus, Hassan and Rahimi (2016) and Çeltek (2020a, b) described AR as an advanced visual technology that blends reality with computer- modelled images in the current medium. A similar description was addressed by (Jung et al., 2015) and (Dadwal & Hassan, 2016) and defined Augmented Reality as a mix of real-world digital imaging computer simulations.

AR allows tourism companies to erratically integrate the computer-based digital future into actual existence, which appeals to tech enthusiasts (Craig, 2013; Çeltek, 2020a, b). Tourists may profit from smartphone AR apps in many ways that include looking for posting or swapping information and helpful tips, as well as leaving notes on a site or destination within a vast network. As a result, the interaction between different users, such as tourists, can be improved, and an exchange of experience among tourists can be created (Çeltek, 2020a, b). Personal computers with webcams, kiosks, digital signage, window screens, mobile phones and laptops, AR supported glasses, and head-mounted displays are examples of AR platforms used in tourism (Craig, 2013; Çeltek, 2020a, b; Jung et al., 2015).

Augmented reality can be assorted in four groups: marker-based, marker-less, projection-based, and superimposition-based (Chung et al., 2015; Çeltek, 2020a, b; Jung et al., 2015; Dadwal & Hassan, 2016) (Fig. 13.2):

- The position and the orientation of the marker are determined and placed on the virtual material in a **marker-based augmented reality** that is identified by Çeltek (2020a, b) where recognition of the markers by image processing methods involves rapid and lower processing power, a camera, and QR code and equivalent points are used.
- In **markerless augmented reality**, technologies like GPS, speed meters, and accelerometers are used as distinct virtual reality in the absolute increased reality. This technique uses virtualization according to the device’s location through the extensive use of cell phones and creating the data.
- Virtualization is possible in two or three dimensions in **projection-based augmented reality**. Artificial light can be projected onto a physical plane in a two-dimensional version to determine how the consumer interacts with it, while a three-dimensional immersive hologram can be produced with laser-plasma technology in a three-dimensional version.
- Item detection is used in **superposition-based augmented reality**. In its virtual reality image, the associated object is identified and superimposed.

Virtual reality is defined as the computer-generated platform, created by a three-dimensional and artificially simulated environment, which empowers people to get a similar experience like actual situation, identified by tourists’ requirements and needs, travel plans, places people wish to visit, and activities focused on objectives. The virtual environment is made by joining intelligent programming and equipment to help clients feel connected with the original climax (Çeltek, 2020a, b). Digital simulations were created using digital computers in the early years of virtual reality technologies. Today, 360-degree images and videos are found in augmented reality devices and are mounted on them (Wei, 2019).

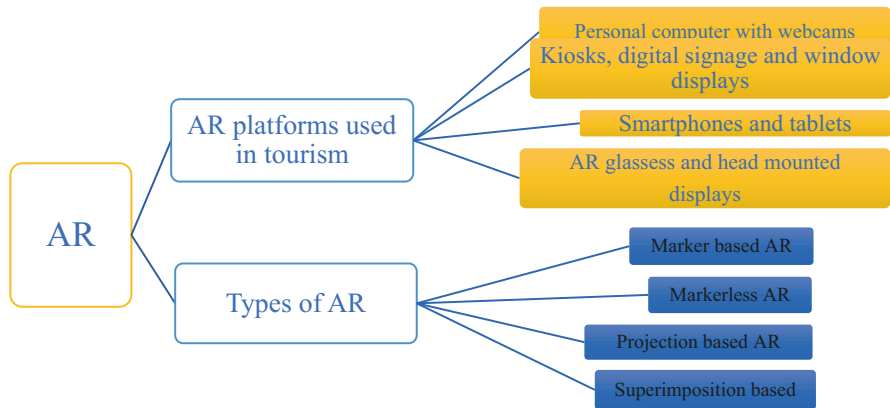


Fig. 13.2 AR platforms and types. (Source: Chung et al., 2015; Craig, 2013; Çeltek, 2020a, b)

A device with enormous computer capacity and an input headset consists of three main components. Virtual reality is used in a simulator (such as, gloves, joysticks, pedals, and motion platforms like, Virtuix Omni). Sensors (magnetometers, accelerometers, gyroscopes), optics, a video screen, etc., are all included in the head package (Ali & Kemal, 2020). VR technology is currently and potentially developing into six major tourism areas: planning, management, communications, history, education, accessibility, and the protection of the heritage (Guttentag, 2010). VR allows visitors in epic tourist activities (such as amusement park rides) to explore blended reality, a blend of simulated and interactive experiences (Wei, 2019).

The new virtual reality technology, which integrates computers, human interaction, and sensor technology, is connected with different technical methods. It forms three-dimensional images and stimulates peoples' senses from different angles, such as vision and hearing, so that the public can experience different natural landscapes and ancient buildings (Xinyun & Yibo, 2020). With the help of virtual devices, the interaction between virtual devices and the public can have improved, and practical application of virtual technology also can create a "real world" with the help of a new interactive way and then solve the problem of overcrowding in the busiest week (Xinyun & Yibo, 2020).

There are three types of virtual reality simulation: non-immersive stimulation, semi-immersive stimulation, and utterly immersive stimulation (Ali & Kemal, 2020).

Several sensory organs are stimulated in non-immersive augmented reality to avoid interfering with the users' environmental reality. A gateway or window allows the user to access this three-dimensional computing world. i.e., when you boot up your favorite game on your PS4 or Switch, that gaming world is a non-immersive virtual reality. However, Desktop-based virtual reality devices are inexpensive and easy to use.

The user is partly embedded into the 3D space world of semi-immersive virtual reality (i.e. a multi-user experience with 3D sound and massive projection screens). For example, partially immersive virtual reality can help pilots experience flying a plane. The user is heavily interested in the virtual world in 4D videos with flight simulations, but is not different from its reality.

Many senses are triggered by the hardware which is attached to the user end and fuses with the virtual area to cover the user's field of view entirely in totally immersive, enlarged realities. Digital reality fully immersive offers practical consumer interfaces (i.e., isolating the user from the real world and often offering a single user experience), such as Oculus Quest, HTC Vive etc. (Ali & Kemal, 2020).

Due to the availability of cost-effective VR viewers such as Google Cardboard and a range of VR-related tourism material, anyone will experience virtual city tours and tourist attractions worldwide. There are no limits to the potential for virtual mass visits to actual tourist destinations (Tussyadiah et al., 2018) (Fig. 13.3).

Several scholars have recently examined the advantages of virtual reality in the travel and tourism sector. From the view of tourists', VR involves increasing the enjoyment of tourism (Bonetti et al., 2019; Çeltek, 2020a, b; Moorhouse et al. 2018), promoting and coping with enjoyable social encounters (Çeltek, 2020a, b). Because of the benefits of VR, businesses and destinations that have adopted it have

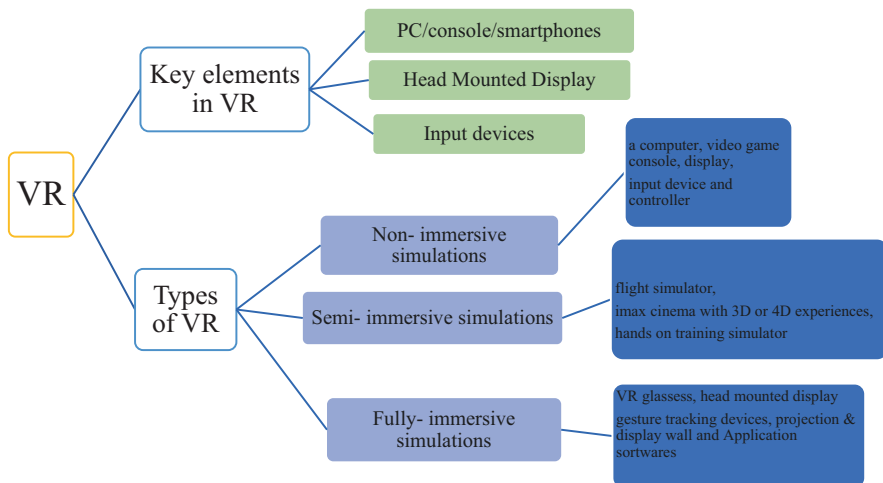


Fig. 13.3 Key elements in virtual reality and the types of virtual reality. (Source: Adapted from Çeltek, 2020a, b)

considered considerations such as promoting, sales, and delivery (Çeltek, 2020a, b; Moorhouse et al., 2018), revenue creation, preservation, and heritage security (Çeltek, 2020a, b). VR research has also shown that it can promote cultural heritage and arts from a tourism standpoint (Çeltek, 2020a, b; Marasco et al., 2018). Table 13.1 outlined below the benefits and drawbacks of AR and VR in tourism.

Smart Technology in the Tourism Industry

Artificial intelligence is most widely used for society’s needs and practices as the foundation of advanced and emerging technology. In order to represent the population, tourism companies, government bodies, and other persons or organisations more effectively, Smart tourism incorporates the current physical resource and information tools and creates a new tourism format. It is widely accepted that intelligent tourism entails the use, for example, of the high-tech internet of things, cloud computing, highly efficient data collection, intensive data mining, tourism planning, and growth connectivity networks of the next decade, tourism expertise, development of business, industry management etc. (Wang Jun, 2020).

Technological advancements are one of many reasons that play a vital part in the advancement of tourism. People would not achieve economic growth and a safe and fast journey if technical progress did not occur. Companies in the tourism and hospitality industry could not offer their services to the guests in such quality and quickly without technology. Technology has made a positive contribution to tourism and has been a significant factor in tourism growth. The relationship between tourism and technology has begun to pique scientists’ interest, especially after the

Table 13.1 Benefits and drawbacks of AR and VR in tourism

	Benefits	Drawbacks
Augmented reality	<p>Brands that elicit favorable reactions gain recognizability in the minds of consumers, The navigation empowers users to create new types of contact, which, in turn, encourages new ways of communicating</p> <p>Unlike traditional media, there is no geographic or temporal constraint on our use of space and time. It offers consumers a way to present their material to others.</p> <p>In comparison to other newspapers, it is significantly less expensive.</p> <p>It serves the needs of tourists who need travel-related knowledge about the community.</p> <p>It enables the seamless availability of different resources, up-to-to-date information, which is very useful and at the right time and just right.</p> <p>It has much versatility concerning distributing messages, photographs, or content.</p> <p>Offers interactive explanations which integrate map-based data and add-on details.</p> <p>Increases market recognition.</p> <p>Market reputation.</p> <p>Geo-targeting.</p> <p>Interactive marketing.</p> <p>Personalization, viral marketing, socialization, emotional connection, repeat engagement.</p> <p>Provides filtered content specific to the traveller’s desires and helps to provide a more personalized experience.</p>	<p>AR is a highly sophisticated and complex service.</p> <p>AR does not have any fixed standards.</p> <p>Tall buildings can affect the efficiency of existing GPS systems in smartphones (it may happen even indoors).</p> <p>It includes privacy-related problems.</p> <p>Ethical issues and user issues.</p> <p>It is dependent on the user’s permission or involvement.</p> <p>People are not conscious of it and do not appreciate it.</p>
Virtual reality	<p>Practical advertising.</p> <p>Encourages tourists to visit actual museums and serves as an indirect publicity tool for attractions.</p> <p>Allows visitors to see previews of destinations, as well as their respective sights and services.</p> <p>Sustainability and heritage protection.</p> <p>VR systems can be used for direct marketing as well.</p> <p>Try and buy.</p> <p>Customer engagement.</p> <p>Increasing brand awareness.</p> <p>Brand reputation.</p> <p>Gamification.</p> <p>Full immersion.</p>	<p>It is dependent on the user’s permission or involvement.</p> <p>Its health implications are also unknown.</p> <p>People have a poor understanding of how to take care of it.</p>

Source: Bonetti et al. (2019), Çeltek (2020a, b), He et al. (2018), Moorhouse et al. (2018), and Tussyadiah et al. (2018)

1980s. Information and communication technologies (ICT) have played a critical role in the economic growth and transition of tourism since the 1980s (Ince & Samatova, 2020; Porter, 2001). Many tourism scientists investigated the relationship between tourism and technology from different angles. Buhalis and Law (2008)

and Navío-Marco et al. (2018) in their study titled “Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of tourism research” and “Progress in information technology and tourism management: 30 years on and 20 years after the Internet-Revisiting Buhalis & Law’s landmark study about e-Tourism“, respectively has attempted to analyze the impact of recent advances in information technology on tourism. Again Buhalis (1998), in his study titled “Strategic Use of Information in the Tourism Industry,” examined methods for using innovations in the tourism industry. Buhalis and O’Connor (2005), in their study titled “Information Communication Technology Revolutionizing Tourism,” researched information and communication technology in tourism.

Even though tourism is a labor-intensive industry, technical advancements are important historical landmarks in tourism. Technology plays a vital role in the tourism growth process. Since technology influences the form, type, and standard of services offered in lodging, transport, food and beverage firms, and entertainment and leisure industries, it also directly impacts the quality of tourism destinations (Ince & Samatova, 2020). The global impacts of new technologies have substantially impacted tourism enterprises’ innovation practices to deliver higher quality and high-performance offerings to their visitors. Tourism businesses benefit from various applications in different countries worldwide, including smartphone phones, remote check-in and check-out transactions, smart devices, cloud technology, virtual reality applications, and augmented reality applications. The advancement of information and communication technology continues.

Smart tourism is a system that focuses on improving the quality of life of visitors and takes advantage of information technology that is commonly used for this purpose. G. Philips first discussed intelligent tourism in 2000 as a long-term, profitable, and complex solution to developing, diversifying, and commercializing tourism businesses and goods (Ince & Samatova, 2020). The World Tourism Organization (WTO) established it in 2015 by combining it with the principles of information and communication technology (ICT) and smart destinations (Yalçinkaya et al., 2018). Smart tourism is an expression of a shift from a product-oriented to a service-oriented mindset (Ince & Samatova, 2020; Gretzel et al., 2015) and developed as a system.

According to Ince and Samatova (2020), smart tourism consists of tourists, services (enterprise), AI, destinations, public enterprises, internet and connectivity, and cloud technology (Fig. 13.4, Table 13.2).

In the field of smart tourism application of artificial intelligence technology has been widespread, especially the identification of patterned image content, including fingerprint recognition, text recognition, iris recognition, face recognition, plate identification, etc. (Yalçinkaya et al., 2018). The video analysis technology can identify the video stream with continuous state characteristics, analyze and judge the clustering behavior characteristics, and promote scenic spots’ safety management to a new height. Based on the aforementioned artificial intelligence technology’s integrated application, the scenic area’s security management’s delicate operation can be realized.

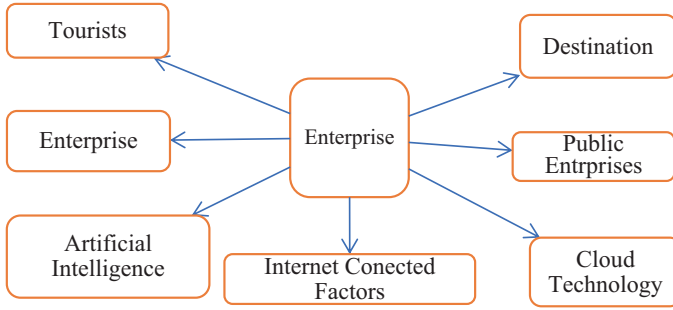


Fig. 13.4 Smart tourism scheme. (Source: Ince & Samatova, 2020)

Table 13.2 Tourism applications in smart tourism

Tourism applications in Smart tourism destinations	Subsidiary functions	Destination compounds	Smart tourism destination dimensions
Allows tourists to witness digital recreations of touristic areas as well as time travel.	Interpretation	Attraction	Smart people, smart mobility
The vehicle tracking system offers a real-time transportation network and information and delivery to end-user computers.	Planning	Accessibility	Smart life, smart mobility
To allow them, the hotel should create an energy demand dependent on environmental sustainability and conduct energy audits.	Sustainability	Facilities	Smart environment
A multilingual application provides various services, such as an electronic travel guide and various visitor packages.	Guidance	Accessible packages	Smart people, smart mobility
NFC tags and QR codes are used to access information about nearby points of interest via mobile devices.	Estimate (close) marketing	Activities	Smart mobility
A Complaint Management System is provided by different ICT networks, such as SMS or smartphone apps, which guide complaints from visitors to the appropriate officers.	Feedback	Subsidiary equipment	Smart life

Source: Buhalis and Amaranggana (2013)

Artificial intelligence technology aims to simulate certain intelligent human behavior, using computer software and hardware, including theoretical research and technological practices, the acquisition and expression of know-how, information retrieval, logical reasoning, comprehension of natural languages, smart robot, etc. Encouraging and using artificial intelligence technologies in intelligent tourism has given us a new chance to improve conventional tourism.

Big Data, Artificial Intelligence, and Their Implications in the Tourism Industry

In the tourism industry, the application and promotion of artificial intelligence technology have laid a scientific and technological foundation for smart tourism development (Çeltek & Ibrahim, 2020). It has been widely used in tourism services, scenic spot management, market forecasting, and other aspects and has played a role in promoting the tourism industry's development.

In order to connect with visitors and meet their needs with personalized offerings, tourism firms use artificial intelligence and big data. Via big data, tourism professionals can find out more about their customers. The greater their expertise, the more they will serve their customers. AI has been a major part of operations because it adds real benefit and will continue in this trend (Çeltek & Ibrahim, 2020). Tourism firms, as in many other sectors, use AI tools to decrease costs and fix bills. For multiple purposes enterprises use artificial intelligence, including involvement with prospective customers, the analysis of increasing data volumes, the attraction of the target audience, the rapid gathering of knowledge, summary information, decision-making and customer contacts (Çeltek & Ibrahim, 2020).

Travel requires repeated analyzes of documents by different categories of people. Complex boarding and liquidation processes (particularly for cruise ships) are in place, which will help reduce the need for this paper process. Tourists can use airports, immigration, customs, and board aircraft with facial recognition without inspecting their travel papers. With a quick face check, customers can use blockchain integration and face recognition technologies to pay in restaurants and duty-free stores. Technology from Blockchain permits the use of reliable documents to complete transactions (Saulat, 2018). Through artificial intelligence, tourism companies may save money, eradicate human error and provide better service. In the touristic industry, data mining is further use of AI. Filtering a large volume of information rapidly can lead to concrete conclusions regarding consumers or opportunities. The hotel collected information on its guests using artificial intelligence and evaluated this information for overall results through samples and online reviews (Revfine.com, 2021).

The term "big data" refers to a vast collection of data sets that cannot be analyzed or processed using conventional data analysis techniques (Xu et al., 2020). It is referred to as 5V: Volume, Velocity, Variety, Verification, and Value (Atalay & Celik, 2017; Çeltek & Ibrahim, 2020). Big data technology can help tourism businesses gain helpful knowledge such as a deeper understanding of tourists' behavior, recognizing changing tastes and needs, and tracking tourists' geographical position. For example, based on their tastes, online behavior, and geographical location, it is possible to recommend hotels, restaurants, and activities to visitors (Elisabeth et al., 2013). Some big data applications also help you to monitor the efficacy of tourism policies and regulations. It retrieves data from any source and analyzes it to find answers that can save money and time, create new projects and plans, and make wise decisions (Çeltek & Ibrahim, 2020). Marriott International is the best example

of a hotel chain leveraging big data to estimate its rooms' optimum price. The approach is based on the development of relevant algorithms for quicker and more precise data processing. It allows sales accounting to be available through the internet and expanded through all activities of a hotel chain, including restaurants, catering, and conference facilities.

MGM Resorts International is a travel organization that has used extensive data analysis to further its personalization approach. The corporation effectively used Facebook's big data software, resulting in a 300% growth in sales over 3 years. Airlines can predict market demand by analyzing macroeconomic and weather records (Davenport, 2013). Hilton, a global travel corporation based in the United States, employs new data architecture to derive knowledge from data to serve consumers best. Hilton relies on data mining to gain a 360-degree view of each client, including booking data, customer profile data, and even information on how guests use the hotel's services. Gaining these experiences enables Hilton to properly understand and value its clients, resulting in more repeat trips and happy visitors (Brar, 2019).

Many of the advantages of AI and machine learning occur behind the scenes, which is why we concentrated on B2B organizations that use AI-based applications or platforms to assist travel and tourism firms with conversions and engagement on the backend. Hotels will micro-target their consumers, thanks to artificial intelligence and big data. Since each customer is exceptional, it is critical to building customized deals for each one. Some guests are more inspired by rewards with a unique experience, such as local cuisine or microbrew tastings or an upgrade to VIP status, than by discounts. Marketers can use big data analytics to fit the best deal to the right buyer, and AI can guarantee distribution at the right time and to the right user (Çeltek & Ibrahim, 2020).

The Future of Technological Applications in Chinese Tourism

Industry 4.0 and the Tourism Sector

"Industry 4.0" is a new revolution in the modern era. Industry 4.0 brought significant revolutions in the tourism industry (Bilotta et al., 2020) and motivated tourists to visit various destinations (Lin et al., 2018). Industry 4.0 is a technologically enhanced and technology-oriented method to attract consumers in various arena. The most common or well-known industry 4.0 adoptions are: Big Data, Automation system, Virtual Reality (VR), Augmented Reality (AR), Robotics, and so on so forth (Liao et al., 2017). China, at present, is pretty good at using various applications of industry 4.0 (Zupan Korže, 2019). However, the need to use this in the tourism industry is a new phenomenon. The tourism industry's success may depend highly on this industry 4.0 application and usage (Stankov & Gretzel, 2020). Tourist's experience of industry 4.0 in the tourism industry has been positively discussed in

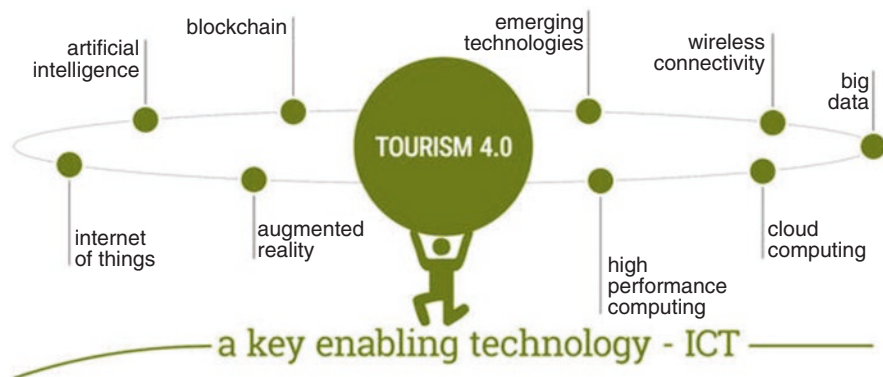


Fig. 13.5 Tourism 4.0. (Source: Peceny et al., 2020)

the scholarly articles. An example here to include is the usage of blockchain technology in the Chinese tourism industry. The impact of industry 4.0 on the Chinese tourism sector can also influence travelers worldwide due to the advanced technological benefits. Sharing bikes, sharing electronic vehicles in China have already been popular among tourists. Day by day, technology will be more sophisticated and attract more people to sustainable tourism development. So, the blessing of industry 4.0 enabled the tourism industry as tourism 4.0 (Peceny et al., 2020) (Fig. 13.5).

E-Customer Relationship Management in Tourism

E-customer relationship management in tourism can ensure frequent exposures for the tourism industry. However, to do so, basic CRM could be the initial tool (Dorcic et al., 2019) to be more digitalized. It is to mention that E-customer relationship management in tourism has not yet been discussed as a well-researched topic. E-Customer Relationship Management in Tourism can build a solid customer base that can be contacted frequently, and organisations can save many advertising costs in this regard. In the case of e-customer relationship management in tourism, e-wom is a very effective phenomenon. If the tourism industry has an ideal e-customer relationship management system, then the existing customers will be satisfied and comment positively on the website or in the App system (Ince & Samatova, 2020). Besides, rating or ranking by the existing customers is also vital. Sound and systematic e-customer relationship management can ensure a good rating for the organization (Fig. 13.6).

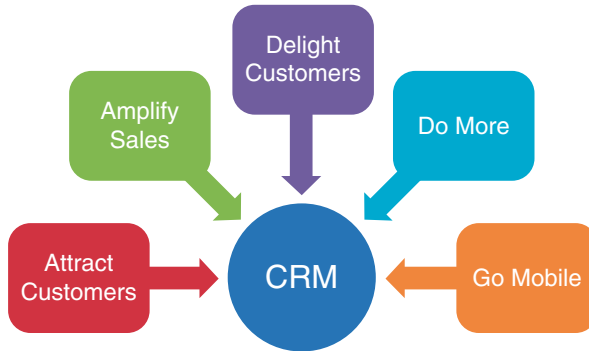


Fig. 13.6 Tourism CRM System. (Source: trawex, 2021)

Smart Applications in Tourism

Smart applications are widely used in the tourism industry nowadays (Bodkhe et al., 2019). In the contemporary era, the applications are getting smarter. For example: with updated applications from mobile operators, tourists can enjoy seamless Wi-Fi connection anywhere. Smart application is not only for Internet usage but also for any aspect like ticketing, hotel booking, or tour plan booking (Ince & Samatova, 2020). Technology-enabled smart applications in various sectors can attract tourists (Dorcic et al., 2019). For example, hiring a car or even a bicycle through a smart application system can attract many travelers to a particular destination. Especially in China, the traveling option is vast. There are numerous destinations. Destination-based smart applications can promote the tourism industry in China.

Smart Tourism Destinations

“Nobody can be a true hero unless he has been on the Great Wall”- this is a prevalent quote that indicates the necessity to visit such an excellent tourist destination. Whether the destination that is the great wall in China is smart tourism destination or not. Well, as per the observation of the authors, the answer is complicated. That is why making the destination equipped (Lamsfus et al., 2014) with modern technology and apps may further enhance the interest of the travelers. Also, The Forbidden City and the Imperial Palace in Beijing could be further digitalized. For example: if specific attraction-based Apps (Gretzel et al., 2015) could be internationally available to use with a common currency (Boes et al., 2015) like USD or RMB, then people will be able to book for many attractions. In the city of Xi’an in China, the terracotta army has been recently attracted a lot internationally. However, this is located far away from the capital and even far away from the city. As a result, sometimes the travelers face difficulty (Bodkhe et al., 2019) to visit that particular

destination. If there are any digitalized benefits to overcome these problems, more and more people will visit the terracotta army. A smart tourism destination means developing the specific attraction (Wise & Heidari, 2019) and ensuring all the relevant facilities. Summer Palace is another popular destination that is just 15 km away from Beijing. To enjoy this destination, tourists have smart information (Gretzel et al., 2016) via various Chinese and international Apps. These architecturally attractive tourist attractions should be promoted (Desdemoustier et al., 2019) with smart tourism facilities.

Smart Municipalities in Tourism

Smart Municipalities in Tourism's components and dimensions are a contemporary phenomenon (Ceglia et al., 2020). In the recent literature, scholars discussed smart energy efficiency to attract more customers (Ayaz & Akay, 2020), tourism as a smart information transfer globally, the technologies to build smart cities, and the benefits, solving the social and economic complications by building and maintaining smart Municipalities and so on. Besides, information and communication technology can integrate social and community development (Neumann et al., 2019). The tourists receive a positive image about a particular region that might be discussed on various social media (Urrutia-Azcona et al., 2020). In this way, more and more people come to know the tourism development with modern technology. The Chinese government continuously improves various municipal areas' overall image (Kadeřábková & Jetmar, 2010). As an example: digitalized maps for tourists to find a specific destination, voice translator device in various places, digital help desk in various places of interests such as in the airport or in front of big shopping complexes are successful inclusion of smart technologies (Sandoval-Almazan et al., 2015) in the tourism industry in China.

Conclusion

When considering the most influential factors affecting the global tourism industry over the last two decades, two terms stand out: modern technologies (He et al., 2018; Tussyadiah, 2020) and Chinese tourists (Chen & Huang, 2017; Wu et al., 2020). Though emerging technology continues to drive the evolution of the global tourism industry, the Chinese tourist sector has captured global destinations' interest. Smart tourism technology's rapid progression creates new possibilities for tourism growth. More travel destinations are using smart technology to draw more visitors and enhance their travel experience. Travel experience satisfaction has a positive impact on both visitors' enjoyment and intent to return, and it is strongly linked to tourism technologies. Outbound Chinese travelers have increased dramatically, and modern technology devices, platforms, structures, and networks have

continued to shape industry environments, accelerating tourism growth at an exponential pace.

Technology's rapid progression has radically altered the way Chinese visitors travel around the world. The influx of Chinese visitors has prompted service providers and resorts to implement cutting-edge technologies (e.g. mobile payment). These two movements have modified tourism habits, encouraged infrastructure growth, and energized an unprecedented wave of technological creativity, transforming communication and travel experiences for tourists in a global society. With technology-enabled creativity evolving alongside the industry both at home and abroad, the subject of digital technology and technology-mediated Chinese tourists can flourish. On the cusp of the third decade of the twenty-first century, the global tourism market, as well as the global scholarly and technical class, are currently confronted with unparalleled obstacles as well as exciting prospects. Nonetheless, the emergence of new technologies and tourism and the activation of an increasingly globalized civil society will remain a constant theme to which the Chinese tourism industry, scholarly and technical culture, and others will continue to contribute.

References

- Ali, D., & Kemal, B. (2020). Smart hotels and technological applications. In Ç. Evrim (Ed.), *Handbook of research on smart technology applications in the tourism industry* (pp. 323–343). IGI Global.
- Atalay, M., & Celik, E. (2017). Büyük Veri Analizinde Yapay Zekâ ve Makine Öğrenmesi Uygulamaları – Artificial intelligence and machine learning applications in big data analysis. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 155–172. (In Turkish).
- Ayaz, N., & Akay, B. (2020). Smart municipalities in tourism. In Ç. Evrim (Ed.), *Handbook of research on smart technology applications in the tourism industry* (pp. 391–413). IGI Global.
- Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., & MacIntyre, B. (2001). Recent advances in augmented reality. *Computer Graphics and Applications*, 21(6), 34–47.
- Berryman, D. R. (2012). Augmented reality: A review. *Medical Reference Services Quarterly*, 31(2), 212–218.
- Bilotta, E., Bertacchini, F., Gabriele, L., Giglio, S., Pantano, P. S., & Romita, T. (2020). Industry 4.0 technologies in tourism education: Nurturing students to think with technology. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 100275.
- Bodkhe, U., Bhattacharya, P., Tanwar, S., Tyagi, S., Kumar, N. & Obaidat, M. S. (2019). BloHosT: Blockchain enabled smart tourism and hospitality management. *IEEE CITS 2019: 2019 IEEE international conference on computer, information and telecommunication systems*. Beijing: The 28th–30th August.
- Boes, K., Buhalis, D., & Inversini, A. (2015). Conceptualising smart tourism destination dimensions. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 391–403). Springer.
- Bonetti, F., Pantano, E., Warnaby, G., Quinn, L., & Perry, P. (2019). Augmented reality in real stores: Empirical evidence from consumers' interaction with AR in a retail format. In M. C. tom Dieck & T. Jung (Eds.), *Augmented reality and virtual reality: The power of AR and VR for business* (pp. 3–16). Springer.

- Brar, K. (2019). Hotels using big data to check out guests; by putting customers into segments, they can offer a tailored and better experience. *SPH Digital News*. Singapore Press Holdings Ltd.
- Buhalis, D., & Amaranggana, A. (2013). Smart tourism destinations. In Z. Xiang & I. Tussyadiah (Eds.), *Information and communication technologies in tourism 2014* (pp. 553–564). Springer.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research. *Tourism Management*, 29(4), 609–623.
- Buhalis, D., & O'Connor, P. (2005). Information communication technology revolutionizing tourism. *Tourism Recreation Research*, 30(3), 7–16.
- Buhalis, D. (1998). Strategic use of information technologies in the tourism industry. *Tourism Management*, 19(5), 409–421.
- Ceglia, F., Esposito, P., Marrasso, E., & Sasso, M. (2020). From smart energy community to smart energy municipalities: Literature review, agendas and pathways. *Journal of Cleaner Production*, 254, 120118.
- Çeltek, E., & Ibrahim, I. (2020). Big data, artificial intelligence, and their implications in the tourism industry. In Ç. Evrim (Ed.), *Handbook of research on smart technology applications in the tourism industry* (pp. 115–130). IGI Global.
- Çeltek, E. (2020a). Progress and development of virtual reality and augmented reality technologies in tourism: A review of publications from 2000 to 2018. In Ç. Evrim (Ed.), *Handbook of research on smart technology applications in the tourism industry* (pp. 1–23). IGI Global.
- Çeltek, E. (2020b). Progress and development of virtual reality and augmented reality technologies in tourism: A review of publications from 2000 to 2018. In Ç. Evrim (Ed.), *Handbook of research on smart technology applications in the tourism industry* (pp. 1–23). IGI Global.
- Chen, G., & Huang, S. (2017). Understanding Chinese cultural tourists: Typology and profile. *Journal of Travel & Tourism Marketing*, 35, 1–16.
- Chen, R. J. C. (2006). Islands in Europe: Development of an island tourism multi-dimensional model (ITMDM). *Sustainable Development*, 14(2), 104–114.
- Chen, S., Zeng, S. & Xie, C. (2000, 05/01). Remote sensing and GIS for urban growth analysis in China. *Photogrammetric Engineering and Remote Sensing*, 66(5), 593–598.
- Chung, N., Han, H., & Joun, Y. (2015). Tourists' intention to visit a destination: The role of augmented reality (AR) application for a heritage site. *Computers in Human Behavior*, 50, 588–599.
- Craig, A. B. (2013). *Understanding augmented reality: Concepts and applications* (1st ed.). Morgan Kaufmann.
- Dadwal, S. S., & Hassan, A. (2016). The augmented reality marketing: A merger of marketing and technology in tourism. In Information Resources Management Association (Ed.), *Mobile computing and wireless networks: Concepts, methodologies, tools, and applications* (pp. 63–80). IGI Global.
- Davenport, T. H. (2013). At the big data crossroads: Turning towards a smarter travel experience. *Amadeus IT Group*. Retrieved from: <https://amadeus.com/documents/en/blog/pdf/2013/07/amadeus-big-data-report.pdf>. Accessed 13 Mar 2021.
- Desdemoustier, J., Crutzen, N., & Giffinger, R. (2019). Smart City appropriation by local actors: An instrument in the making. *Technological Forecasting and Social Change*, 142, 129–141.
- Doric, J., Komsic, J., & Markovic, S. (2019). Mobile technologies and applications towards smart tourism – State of the art. *Tourism Review*, 74(1), 82–103.
- Elisabeth, E., Nock, R., & Célimène, F. (2013). Demonstrator of a tourist recommendation system. In V. Bhatnagar & S. Srinivasa (Eds.), *Big data analytics. BDA 2013* (Lecture notes in computer science, Vol. 8302) (pp. 171–175). Springer.
- Farsari, Y., & Prastacos, P. (2004). GIS applications in the planning and Management of Tourism. In A. A. Lew, C. M. Hall, & A. M. Williams (Eds.), *A companion to tourism* (pp. 596–608). Blackwell Publishing Ltd..

- Goswami, G. (2020). Augmented reality's applications and future in business. *Forbes*. Retrieved from: <https://www.forbes.com/sites/forbescommunicationscouncil/2020/10/15/augmented-realitys-applications-and-future-in-business/?sh=47332c2f2b3c>. Accessed 18 Mar 2021.
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179–188.
- Gretzel, U., Zhong, L., & Koo, C. (2016). Application of smart tourism to cities. *International Journal of Tourism Cities*, 2(2).
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637–651.
- Hassan, A., & Rahimi, R. (2016). Consuming “Innovation” in tourism: Augmented reality as an innovation tool in digital tourism marketing. In P. Nikolaos & B. Ilenia (Eds.), *Global dynamics in travel, tourism, and hospitality* (pp. 130–147). IGI Global.
- He, Z., Wu, L., & Li, X. (2018). When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management*, 68, 127–139.
- Ince, C., & Samatova, G. (2020). Smart applications in tourism. In Ç. Evrim (Ed.), *Handbook of research on smart technology applications in the tourism industry* (pp. 345–370). IGI Global.
- Jung, T., Chung, N., & Leue, M. C. (2015). The determinants of recommendations to use augmented reality technologies: The case of a Korean theme park. *Tourism Management*, 49, 75–86.
- Kadeřábková, J., & Jetmar, M. (2010). Selected issues of the development of small municipalities in the Czech Republic, financing of municipalities. *European Countryside*, 2(2), 102–117.
- Lamsfus, C., Martín, D., Alzua-Sorzabal, A., & Torres-Manzanera, E. (2014). Smart tourism destinations: An extended conception of smart cities focusing on human mobility. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 363–375). Springer International Publishing.
- Li Yulin, L., & Lingling, L. (2020). Analysis of the application of “3S” technology in domestic tourism development research. *Gansu Science and Technology*, 36(20), 49–51. (In Chinese with English Abstract).
- Liao, Y., Deschamps, F., Loures, E. D., & Ramos, L. F. (2017). Past, present and future of industry 4.0 – A systematic literature review and research agenda proposal. *International Journal of Production Research*, 55(12), 3609–3629.
- Lin, D., Lee, C., Lau, H., & Yang, Y. (2018). Strategic response to industry 4.0: An empirical investigation on the Chinese automotive industry. *Industrial Management & Data Systems*, 118(3), 589–605.
- Marasco, A., Buonincontri, P., van Niekerk, M., Orłowski, M. & Okumus, F. (2018, 2018/09/01/). Exploring the role of next-generation virtual technologies in destination marketing. *Journal of Destination Marketing & Management*, 9, 138–148.
- Moorhouse, N., tom Dieck, M. C., & Jung, T. (2018). Technological innovations transforming the consumer retail experience: A review of literature. In T. Jung & M. C. tom Dieck (Eds.), *Augmented reality and virtual reality: Empowering human, place and business* (pp. 133–143). Springer International Publishing.
- Navío-Marco, J., Ruiz-Gómez, L. M., & Sevilla-Sevilla, C. (2018). Progress in information technology and tourism management: 30 years on and 20 years after the internet – Revisiting Buhalis & Law's landmark study about eTourism. *Tourism Management*, 69, 460–470.
- Neumann, O., Matt, C., Hitz-Gamper, B. S., Schmidhuber, L., & Stürmer, M. (2019). Joining forces for public value creation? Exploring collaborative innovation in smart city initiatives. *Government Information Quarterly*, 36(4), 101411.
- Peceny, U., Urbančič, J., Mokorel, S., Kuralt, V., & Ilijaš, T. (2020). Tourism 4.0: Challenges in marketing a paradigm shift. *Consumer Behavior and Marketing*. <https://doi.org/10.5772/intechopen.84762>
- Porter, M. (2001). Strategy and the internet. *Harvard Business Review*, 79(3), 63–78.
- Revfine.com. (2021). *How to use artificial intelligence in the hospitality industry*. Retrieved from: <https://www.revfine.com/artificial-intelligence-hospitality-industry/>. Accessed 26 Marc 2021.

- Sandoval-Almazan, R., Cruz, D. V. & Armas, J. C. (2015). Social media in smart cities: An exploratory research in Mexican municipalities. *2015 48th Hawaii international conference on system sciences*. IEEE, the 5th–8th January.
- Saulat, A. (2018). Four ways AI is re-imagining the future of travel. *Mindtree*. Retrieved from: <https://www.mindtree.com/blog/four-ways-ai-re-imagining-future-travel>. Accessed 26 Mar 2021.
- Shoval, N., & Isaacson, M. (2007, January 1). Tracking tourists in the digital age. *Annals of Tourism Research*, 34(1), 141–159.
- Stankov, U., & Gretzel, U. (2020). Tourism 4.0 technologies and tourist experiences: A human-centered design perspective. *Information Technology & Tourism*, 22(3), 477–488.
- Taylor, B. (2013). Augmented reality applications – From the consumer to the business. *Creative Guerrilla Marketing*. Retrieved from: <http://www.creativeguerrillamarketing.com/augmented-reality/augmented-reality-applications-from-the-consumer-to-the-business/>. Accessed 6 Mar 2021.
- Ting, X. & Qiao, C. (2011). Applications of 3S technology for China’s tourism planning and management. *The conference on web based business management* (pp. 973–976).
- trawex. (2021). *Tourism CRM System*. Retrieved from: <https://www.trawex.com/travel-crm-system.php>. Accessed 7 Mar 2021.
- Tussyadiah, I. (2020). A review of research into automation in tourism: Launching the annals of tourism research curated collection on artificial intelligence and robotics in tourism. *Annals of Tourism Research*, 81, 102883.
- Tussyadiah, I. P., Wang, D., Jung, T. H. & tom Dieck, M. C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, 66, 140–154.
- Urrutia-Azcona, K., Tatar, M., Molina-Costa, P., & Flores-Abascal, I. (2020). Cities4ZERO: Overcoming carbon lock-in in municipalities through smart urban transformation processes. *Sustainability*, 12(9), 3590.
- Vidal, B. (2019). The new technology and travel revolution. *WAM Global Growth Agent*. Retrieved from: <https://www.waremarketing.com/blog/tourism-and-technology-how-tech-is-revolutionizing-travel.html>. Accessed 11 Mar 2021.
- Wang Jun. (2020). Discussion on the application of artificial intelligence technology in smart tourism. *Management and Technology of Small and Medium-sized Enterprises*, 9, 173–177. (In Chinese with English Abstract).
- Wei, W. (2019). Research progress on virtual reality (VR) and augmented reality (AR) in tourism and hospitality: A critical review of publications from 2000 to 2018. *Journal of Hospitality and Tourism Technology*, 10(4), 539–570.
- Wise, N., & Heidari, H. (2019). Developing smart tourism destinations with the internet of things. In M. Sigala, R. Rahimi, & M. Thelwall (Eds.), *Big data and innovation in tourism, travel, and hospitality* (pp. 21–29). Springer.
- World Tourism Organization (UWNTO). (2019). *Guidelines for the success in the Chinese outbound tourism market*. UNWTO.
- Wu, L., Fan, A., & Shen, H. (2020, October 1). Embracing the future: New technology and mediated Chinese tourists. *Journal of China Tourism Research*, 16(4), 487–493.
- Xiang-yu, L., & Jie, Y. (2005). To observe the application of network technology in China’s tourism from ‘SARS time’. *Journal of Chongqing Vocational & Technical Institute*, 14(4), 44–48.
- Xinyun, D., & Yibo, G. (2020). The application of virtual reality technology in the development and protection of tourism resources in Zhaoqing. *Wireless Internet Technology*, 17(19), 157–158.
- Xu, F., Nash, N., & Whitmarsh, L. (2020). Big data or small data? A methodological review of sustainable tourism. *Journal of Sustainable Tourism*, 28(2), 144–163.
- Yalçinkaya, P., Atay, L., & Karakas, E. (2018). Smart tourism applications. *Gastroia: Journal of Gastronomy and Travel Research*, 2, 34–52.
- Zupan Korže, S. (2019). From industry 4.0 to tourism 4.0. *Innovative Issues and Approaches in Social Sciences*, 12(3), 29–52.

Chapter 14

Technology Application in the Japanese Tourism Industry: Destination Promotion



Shunsaku Hashimoto

Abstract In this part, focusing on Okinawa as one of the attractive resorts in Japan and examine how the hotel industry uses technology applications for destination promotions. Recently Okinawa is remarkably developed in tourism. Especially in Onna-son, during several years, many hotels had been constructed. How do these hotels use technology application and promote attractive the hotel? Investigating these hotels, verifying the results, and presenting the effects and challenges of destination promotion. Two hotels are targeted for this research: Hyatt Regency Seragaki Island and Halekulani Okinawa. Both of these hotels are famous in the world. These new hotels are constructed in the last 2 years in Okinawa. The research method is mainly adopted interview and analysis. Firstly, interviewing Manager in these hotels. Secondly, analyzing the results of the interview, extracting common points and differences. Finally, these results, showing what effects there are and what challenges there are. As a result, the first thing that was recognized was the importance of the facility management system. It is the system that manages the facilities that support the system directly related to the guest, and it is said that the system directly related to the guest such as reservation, accommodation, customer management will function effectively for the first time when this system functions effectively. In addition, in a system directly related to guests, it will not function effectively unless the core system and subsystems are closely linked.

Keywords Okinawa · Hotel industry · Facility management · PMS · Cooperation

S. Hashimoto (✉)

Faculty of Global and Regional Studies, University of the Ryukyus, Nishihara, Japan
e-mail: shunh@grs.u-ryukyu.ac.jp

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_14

Introduction

It can be said that the degree of satisfaction at a tourist destination varies greatly depending on where you stay. The impression of the tourist destination depends on whether or not the tourists have a comfortable stay. Therefore, it can be said that hotels play a large role in tourist destinations. In this part, I interviewed and considered the technologies and systems introduced for guests to get a comfortable stay in Okinawa, which is one of Japan's leading marine resorts, using two representative hotels as an example.

In recent years, the number of tourists to Okinawa has increased significantly. According to the statistics of the Ministry of Culture, Tourism, and Sports of Okinawa Prefecture, the number reached about 10 million in 2019, exceeding 10 million for the first time. This is the seventh consecutive year of increase. Of these, about 7.23 million were domestic tourists, and about 2.93 million were foreign tourists. The largest number of foreign tourists by country is Taiwan with about 930,000, followed by mainland China with about 750,000, South Korea with about 380,000, and Hong Kong with about 250,000 (Okinawa Prefecture, 2020). It has become. One of the characteristics is that there are many tourists from neighboring countries. It shows that it is not well known worldwide yet. However, on the contrary, there is a possibility that Okinawa as a tourist destination will develop. It can be said that the higher the name recognition of countries other than neighboring countries, that is, other regions such as Asia, Europe, and the United States, the more foreign tourists can be expected. Of course, this was before the spread of COVID-19, and what will happen in the future is uncertain, not just in Okinawa.

By the way, the popular areas in Okinawa are concentrated on the west coast. This is due to the fact that it is essential for tourists to spend a relaxing time on the beach and watch the setting sun. As mentioned above, the rapid increase in the number of tourists in recent years has caused a hotel rush in this area. Both of the two hotels targeted this time are hotels that were recently built on the west coast and are known around the world. One is Hyatt Regency Seragaki Island, Okinawa. Needless to say, it belongs to Hyatt, which is known as one of the largest hotel chains in the world. The other is Halekulani Okinawa. This is the first overseas hotel of a luxury resort hotel with a long history in Hawaii.

Hyatt Regency Seragaki Island, Okinawa

Initially, I visited with the intention of interviewing the latest technology that directly affects the guest. However, the result was that I realized how the basic technology related to facility management plays an important role for the guest to spend comfortably (Hyatt Regency Seragaki Island, Okinawa, 2020).

Hotel Overview

Location: Seragaki, Onna Village, Okinawa Prefecture

Management: Hyatt Japan

Open: August 21, 2018

Number of rooms: 344

The person in charge of engineering responded to the interview. I received answers regarding the following items.

Air Conditioning System

Okinawa is located at the southernmost tip of Japan and has a mild climate throughout the year. Therefore, many hotels in Okinawa do not install a heating system for air conditioning in guest rooms. The main reason is cost reduction. However, although it is only a few days in winter, there are days when the temperature drops below 10 °C, and the guests who stayed at this time felt cold but did not respond, so there are cases where the evaluation is greatly dropped., It leads to losing profits more than cost reduction. At this hotel, we paid attention to this point and introduced the system of PMAC. This is a fan coil unit air conditioner with a heat pump, which is a system that can switch between cooling and heating for each guest room. Therefore, it is possible to respond to each guest's feeling of warmth and cold. It is also based on the fact that management understands that even if the complaint from the guest is trivial, it will be a high cost to deal with it.

Energy Conservation

The purpose of energy-saving is to reduce costs, and the balance of management is attracting attention, but from another perspective, from the customer's perspective, it is possible to reduce the cost of converting to energy and use that amount for services to guests. You can catch it.

Generally, city gas and LPG are often used, but this hotel has introduced LNG to reduce the burden on the environment. Nox and Sox are not emitted from LNG, so there is no environmental impact. Since the tank must be installed, the initial investment is high, but the running cost is low. In addition, supply is stable, and prices are stable. Furthermore, the hot water supply equipment has introduced a cogeneration system, that is, a system that uses preheating, and there is a high awareness of cost reduction.

Room Control System

The characteristic system is a guest room control system named Smart-All-In. With this system developed by NTT Communication, it is possible to grasp the state of the guest room in real-time, including the state of being in the room.

- ON/OFF control of each electric device by a motion sensor when a guest is absent

Twenty minutes after the guest leaves the room, the TV, proof, and air conditioning will be turned off. However, the moment the guest returns and enters the guest room, it turns on and returns to its original state. However, as for air conditioning, it is not possible to instantly return to the original room temperature when absent for a long time, so the room temperature is kept constant while saving energy by repeating ON and OFF within the set temperature ± 3 °C. There are many complaints that it is hot and cold. Suppressing complaints leads to cost reduction.

- Air conditioning ON/OFF control when the window is open

The air conditioning is turned off when the guest opens the window. The air conditioning is controlled so that it does not enter when the outside air enters the cabin. This is not only from the viewpoint of energy-saving but also to prevent dew condensation in the guest room. Okinawa has high humidity and a high incidence of mold. Not only the mold on the wallpaper in the guest room but also the mold on the air conditioner causes a bad odor.

It is linked with OPERA, which is the core system, and the guest name, room number, length of stay, check-in, and check-out status are also displayed on Smart-All-In.

- Benefits of Smart-All-In

For housekeeping

- Since the occupancy status can be grasped in real-time, it is easy to rank the cleaning order.
- You can prevent accidents such as entering the room when the guest is in the room.
- It is easy to determine the cleaning status: Not cleaned, before inspection, available for sale.
- Don't Disturb can be confirmed at the front desk.
- Because you can see when Don't Disturb is turned on, you can deal with complaints such as cleaning omissions. You can answer, "Because the DD was lit, I refrained from cleaning."

For engineers

- Because you can know the occupancy status, it is able to be decided to enter the room only by an engineer, and you can enter the room without accompanying the guest room staff.

- Because the air conditioning status can be determined remotely, it is possible to detect air conditioning problems in advance.
- It is easy to make a maintenance plan because the engineer can confirm the stay schedule of each room without asking the reservation staff.

At present, there are no disadvantages. However, both housekeeping and engineers feel that they are too dependent on the system, and it is possible that confusion will occur if a system malfunction or failure occurs, so even if there is no system, it is usually possible to check and judge manually. You need to be trained. This is also true for other systems. For example, even if the reservation system goes down, you can receive reservations by phone, and even if the front system goes down, if you cannot check-in and check out, it will not be top-notch. For that purpose, it is necessary to know how it works, and the staff must be aware of it on a daily basis.

New System Introduction Plan

Regarding the introduction of services in the future, a system called smart check-in was mentioned. At present, there are cases where guests are lined up for check-in during peak hours and have to wait before entering the guest room. This phenomenon can be resolved as much as possible, and as a privilege for members, the system called smart check-in has been developed. This means that Hyatt members can check in with their smartphones without having to go through the check-in procedure at the front counter and can enter the guest room without waiting even when it is crowded. However, it is undecided whether to introduce it. Not limited to this system, the owner company intends to introduce a new system, and the decision to introduce it will be made after considering the cost and effectiveness. Here, it is important for the site and the owner to communicate closely with each other and for the owner to fully understand the situation at the site. In a common case, a difficult event occurs in the field, and even if a solution is presented, it is not fully communicated to the owner and is left as it is. It can be said that a good relationship between the site and the owner is indispensable for new attempts, not limited to the system.

At the End of the Interview

At the end of the interview, we talked about what the service should be. For example, how to perceive services in Japan and countries other than Japan. Generally speaking, in Japan, service means free of charge, but outside of Japan, it is considered to be accompanied by compensation. And if an irregular request is made by a guest, we will consider how to deal with it, and if it is done, we will receive compensation, but in Japan, we refuse the irregular request due to the convenience of the hotel side. There are many. For example, if a guest who arrives at midnight requests

to provide meals and both the restaurant and room service are terminated, the guest's request is often declined. The reason is that if the hotel does not respond to a sufficient level and the guest's satisfaction is low, the hotel's evaluation will be lowered, and it will be refused. Even if the guest tells staff that anything is fine, still staff refuse. As a result, it would be nice to have a restaurant nearby or a store where you could buy food, but if not, guests would spend the night hungry. One example of a solution is to offer some food after refusing that we can't do enough because we don't have kitchen staff anymore, and we don't get paid because it's not enough is there. This is a temporary loss, but it will increase the hotel's reputation with guests, which should lead to future profits well above the temporary loss. In Japan, it is said that it is important to stand in the position of a guest, but in reality, the convenience of the hotel is prioritized. It provides the service decided by the hotel, not the service requested by the other party. This is just self-satisfaction. Generally, it is said that the standard service level is excellent in Japan. Even if staying at a very cheap hotel, guests won't get terrible service. However, the issue of hotels in Japan is the lack of ideas about what to do to truly stand as a guest. Even if staying at a very cheap hotel, guests won't get terrible service. However, the issue of hotels in Japan is the lack of ideas about what to do to truly stand as a guest. What is required of Japanese hotels in the future is to solve this issue.

Halekulani Okinawa

The next place I visited was Halekulani Okinawa. Halekulani, known as Hawaii's leading luxury resort hotel, opened in July 2019 as its second and first overseas hotel. Here, I interviewed about the system of the entire hotel (Halekulani Okinawa, 2020).

Hotel Overview

Location: Onna Village, Okinawa Prefecture
Management: Mitsui Fudosan
Open: July 26, 2019
Number of rooms: 360

The IT & T manager responded to the interview. I received answers regarding the following items.

Core Hotel System

The core hotel management system (PMS) is placed as the central axis. Major functions are payment, reservation, and customer management. However, the core system alone cannot do business. It is necessary to introduce a subsystem (peripheral) system and connect it to the core system. Periphery is, for example, the following fields.

- POS (point of sales) system
- Room information management system (air conditioning, occupancy confirmation, in-room dining)

Operation

Linking data between PMS and subsystems and between subsystems is an important point. It is important how to convey the information that comes into PMS to the subsystem and to the staff. For example, in the past, it was not possible to share the occupancy status in real-time, so there was an accident in which the housekeeper entered the room even though the guest was in the room. This is called “Assault!” at the hotel. In the current system, there is a sensor in the guest room, and it is possible to check the guest’s presence in real-time, so it is possible to avoid “Assault!”. Even now, hotels in the middle class and below are checking the occupancy with a card key, but if you put a piece of paper in the card key chain, it will be in the same state as the occupancy. However, sensor management can prevent such a situation.

The Relation Between FB (Food & Beverage) and System

The problem of allergies is important for the provision of food. For example, peanut allergies can be life-threatening. In order to avoid this, the system displays the material on the order slip so that it can be identified as an allergic item. Therefore, it is possible to confirm with the guest when serving food. As a religious measure, for example, although we have not yet obtained halal certification for Muslims, we are taking measures to prevent pigs, which are prohibited items, from being included in cooking ingredients.

Front Desk Operation

Check-in is done using a tablet device. In the past, check-in was counter-enabled, even at luxury hotels. However, when check-in is in a rush, guests have to line up. Waiting in line for long periods of time can be even more painful for guests who are tired from long journeys. And this leads to complaints. In fact, there are many complaints about “waiting at check-in” in the evaluation on the hotel reservation site. However, when checking in with a tablet device, guests can enter the room without waiting in line, that is, without waiting. In Japan, there are restrictions on the inn business law, and check-in is required to be done face-to-face. It is effective as a system that can guide guests to the guest room without waiting for guests while complying with the law. And it is the service through people that gives the guests a sense of luxury. Recently, some hotels are compatible with robots, but it is appealing that robots are compatible, and robot-based or unmanned automatic check-in will never give a sense of luxury.

The Relation Between IT (AI) and Hotels

The future hospitality industry will be polarized. Take the taxi industry as an example, human drivers are currently driving taxis, but it is thought that autonomous driving will soon begin, and 50 years later, it will become commonplace. All taxis will be controlled by the control center, taxis will be unmanned, and users will be able to call them using terminals. However, for special occasions such as ceremonial occasions, people will be required to drive. In other words, what luxury means will be a human-mediated service. The intervention of humans is an added value. The same is true for hotels. Hotels that simply seek accommodation will be fully automated, while hotels that seek luxury will require thorough, human-mediated services. It can be said that no matter how much AI evolves, what humans want will not change. Therefore, we should not think about technology. Just because AI is booming, business owners can do something with AI, and even if AI is introduced, it will not be usable in the end. Instead, we must listen to what is required in the field, and the solution is to introduce AI. In other words, what must be done before the introduction of AI is to explore how the work is done and what obstacles are to the smooth execution of the work.

Customer Management

When a reservation is made, it is automatically checked against the profile, and if it is a repeater, the past usage status and guest’s preference are displayed. If the guests have the same surname and the same name, they are compared with the address to

distinguish them. This work is quite laborious by human hands, so in the past, information was accumulated but not used. Even so, it is difficult to grasp and aggregate all guest behaviors, and there are also problems in the system. Interfaces must match to link the core system and peripheral systems, and matching is costly. Furthermore, in order to aggregate all the information in one system, the manufacturer of each system needs to disclose its specifications, but it is also a trade secret for the manufacturer, so there is the problem that it is difficult to meet the request. It would be good if the core system and peripheral systems could be unified by one manufacturer, but it is difficult to unify them because each manufacturer has its own strengths and weaknesses and the functions required at each site are different. However, at present, the way of thinking about software is changing, and in the past, it was normal to buy a system, but now it has changed to a format in which usage fees are paid on a regular basis. However, at present, the way of thinking about software is changing, and in the past, it was normal to buy a system, but now it has changed to a format in which usage fees are paid on a regular basis. This is convenient for the user. The reason is that in the buying system, it must be bought a new one if the user upgrades it, but in the monthly paying system, it will automatically be a new version. In addition, some manufacturers are appealing to make the specifications open access, so in the near future, it will be possible for different manufacturers to integrate the system.

Face Recognition

It is said that customers are most happy when the staff calls their names and greets them (Greene, 1982). Therefore, what is attracting attention is face recognition by AI. If face recognition is introduced, even new staff will be able to identify superior customers in the same way as veteran staff. For customers, the fact that the staff who sees it for the first time recognizes themselves will lead to great satisfaction and will enhance the reputation of the hotel. And vice versa, that is, if you've used it many times and the staff doesn't remember your guests, it goes without saying that the hotel's reputation will decline. Remembering the customer's face and name depends largely on the qualities and awareness of the staff, so It is thought that there is a limit to training alone. Therefore, expectations for face recognition are high. It is still possible to introduce it. However, the equipment is still conspicuous, for example, if the staff wears a shape like large sunglasses, it will be immediately understood by the guest, and on the contrary, it will lead to appealing the low ability of the staff. Since it may be possible, we have not started to introduce it. The development of less noticeable equipment is desired. It is now still possible to introduce it. However, the equipment is still conspicuous, for example, if the staff wears a shape like large sunglasses, it will be immediately understood by the guest, and on the contrary, it will lead to appealing the low ability of the staff since it may be possible, so not starting to introduce it. The development of less noticeable equipment is expected. By the way, in so-called prestigious hotels, it is sometimes talked about that there is

a famous staff who remembers thousands of customers' faces and names (Lunn, 1989). The introduction of facial recognition does not eliminate the role of such staff. Systems modeled on those people will be developed, and their roles will never disappear. The basics are still how to improve the qualities, awareness, and abilities of the staff.

Questionnaire Management System

It goes without saying that utilizing the voices of guests is important not only in hotels but also in corporate management. However, it took a lot of time and effort to collect, collect, and analyze questionnaires, and in the past, it was often just collecting them, just like customer information. However, due to the systematization, labor is not required by automatically sending an email after use and collecting it. The issue is the response rate. The response rate is still low, and trial and error continue as to how to raise this. In addition, if the evaluation is low, it will be dealt with individually, and it has an alarm function so that you can apologize for the next use. Individual qualities and consciousness have a great influence on customer service, and there will be a big difference depending on the staff who respond. It can be said that the issue and purpose are how to reduce this differs depending on the system.

Issues for Human Resources, Especially Management Human Resources

It is said that the Japanese hotel industry lacks human resources to take charge of management. A system using IT and AI should make up for this shortage, but IT is not emphasized in hotel management. IT systems are still perceived as doing calculations. As in other industries, IT systems are considered important for the smooth progress of business processes, and it is desirable to establish a CIO to supervise them. Furthermore, the CIO is required to understand the operation in the field, or at least to have an attitude to understand it. "I'm a system person, so I don't know the operation in the field." And "The system doesn't need to understand the operation." The whole system will not go smoothly.

After the Interview

When I interviewed the system development manager, the important point was not the system but the people who needed it and the people who used it. "If you think about the system first and introduce it, it will fail.", The words that the people in the field must understand what they want to do and what is the obstacle, and the system

must be the solution and aas impressive. In addition, “In the past, systems developed in other industries have been introduced into hotels. However, from now on, systems developed in hotels may be introduced into other industries. Isn’t it? “ In Japan, the hotel industry has been perceived as a lagging industry (Tokue, 2013). For that reason, hotel systems have been introduced in the form of applications developed in other industries. Therefore, it is presumed that there were many cases where the intended results were not achieved because there were cases where it did not match the business of the hotel. The hotel has a wealth of know-how in dealing with customers, and the outstanding services that could only be provided by staff with outstanding abilities can now be provided by standard staff through IT and AI systems. It’s getting better. I realized that it would not be long before the customer service system, which was first developed in a hotel represented by the service industry, will be applied to other industries.

I would like to point out that the application and introduction of the system developed at the hotel to other industries, which was mentioned at the end of the previous section, is very effective for customer management in other industries. This is because, needless to say, the hotel industry is a business format in which services to customers are directly linked to profits, and therefore excellent know-how should be accumulated. If the know-how can be systematized, it should be an effective customer management system for other industries.

Here summarizing the hotel core system again. The hotel’s backbone system is called Property Management System, which is an acronym for PMS. Generally, it refers to the management system of the accommodation department and can centrally manage information related to guest rooms such as reservations, selling prices, number of remaining rooms, and charge settlement. In addition, since it has functions for customer management and inputting reservation routes and messages for each guest, it is possible to utilize the accumulated data for effective customer support and sales activities.

The mainstream in the world is OPERA developed by Oracle. In Japan, NEHOPS developed by NEC is the mainstream. Both manufacturers are large world-renowned companies, not companies that specialize in hotel systems. In order to grasp the characteristics of the hotel and build a system that more effectively reflects the needs of the site, a company that specializes in hotel systems will be able to develop a more effective system (HOTELIER, 2020).

As a company specializing in hotel system development, I would like to take the example of TAP. TAP is a company specializing in the development of hotel systems. With a capital of 80 million yen, it is far from the scale of Oracle and NEC, but it has been steadily achieving results since its establishment in 1985. In addition, the founder, Mr. Etsuo Hayashi (CEO), has established an accommodation facility-related association himself and is continuing efforts to deepen cooperation with the hotel industry and deepen his understanding of hotel operations (TAP, 2020).

The feature of TAP is that it is possible to develop a fully customized system that is independent for each client (TAP, 2020). It can be said that the strengths of small-scale professionals are utilized here. In addition to the core system, we are also developing subsystems, making it easy to unify the concept of the entire system.

Furthermore, no interface between systems is required, which is advantageous not only in terms of operation but also in terms of cost.

In order for the hotel industry to develop, it is effective not to simply introduce the developed system, but to develop the system while sharing issues and solving the issues together. TAP has offices in Tokyo and Okinawa, and has offices on the campus of Ryukyu University in Okinawa, and develops systems in collaboration with not only engineering but also tourism and management faculties (TAP, 2020). Such industry-academia collaboration can be said to be an effective initiative for the development of the hotel industry, which is said to be still immature in Japan.

Conclusion

I interviewed two representative hotels in Okinawa known as beach resorts on the theme of introducing new technology in hotels. At the first Hyatt Regency Seragaki Island, Okinawa, it was found that it is the facility management system that supports the systems that directly interact with customers, such as reservations, accommodation, and customer management. When it comes to the system in a hotel, the first thing that comes to mind is the system that directly involves the customer, such as reservation, accommodation, and customer management, but the hotel where the guest stays, that is, the facility, is well managed. Only then can other systems be enabled. It was once again recognized that good service could be provided to guests only by emphasizing the management of facilities that are usually less conscious.

On the other hand, in the interview at Halekulani Okinawa, we talked about the core hotel management system (PMS). The challenge in the system was the consistency between the core system and the subsystems in each department. The functions required by each department are various, and therefore, in many cases, a system developed by a manufacturer different from the manufacturer of the core system is introduced. However, it became clear that there are many problems that bother the person in charge, such as licensing issues and compatibility issues between systems, in order to integrate systems developed by different manufacturers. In addition, when introducing new technology, it was shown that there are many cases where the process of introduction fails even in-house because the new technology was developed. Recently, due to the evolution of AI, new technologies such as face recognition are being developed one after another. However, first of all, if the management does not listen to what is needed in the field, determine it, and introduce it as necessary, the technology will not be used in the end.

The purpose of introducing new technology in hotels is nothing but to improve the service to guests, gain the support of guests, and as a result, increase profits. However, it cannot achieve its original purpose unless it understands what is required in the field where it comes into direct contact with guests and introduces technology based on that need. It can be suggested that considering this essence, in system development for hotel development, it is effective to collaborate with a specialized system development company familiar with hotel operations and follow the path of learning and developing together.

References

- Greene, M. (1982). *Marketing hotels into the 90s*. Heinemann.
- Halekulani Okinawa. (2020). *Home*. Retrieved from: <https://www.okinawa.halekulani.com/en/>. Accessed 24 Jul 2020. Interview Date: 17 Jul 2020.
- HOTELIER. (2020). *Summary and comparison of hotel management system (PMS)*. Retrieved from: <https://www.hotelier.jp/support/pms.html>. Accessed 25 Jul 2020.
- Hyatt Regency Seragaki Island, Okinawa. (2020). *Home*. Retrieved from: <https://www.hyatt.com/ja-JP/hotel/japan/hyatt-regency-seragaki-island-okinawa/okaro>. Accessed 25 Feb 2020. Interview Date: 21 Feb 2020.
- Lunn, T. (1989, August 20). How to swing unused talent into action. *Sunday Times*.
- Okinawa Prefecture Culture, Tourism and Sports Department. (2020). *Overview of Okinawa Prefecture tourist statistics*. Retrieved from: https://www.pref.okinawa.jp/site/bunka-sports/kankoseisaku/kikaku/statistics/tourists/documents/r1_reki_gaikyou.pdf. Accessed 25 Jul 2020.
- TAP Company Limited. (2020). *Home*. Retrieved from: <https://www.tap-ic.co.jp/en/>. Accessed 25 Jul 2020.
- Tokue, J. (2013). *Management of Lodging Industry*. Dobunkan.

Chapter 15

Mobile Technology and Applications in the Tourism and Hospitality Industry of Hong Kong



Md. Alauddin, Syed Far Abid Hossain, and Mohammad Masrurul Mowla

Abstract The tourism industry of Hong Kong is very charming and Information technology has added a new dimension to this industry. Information technology plays an important role as a part of people's everyday lives, its adoption in trade and commerce is increasing sharply, and the customers of the tourism industry expect all facilities and dealing over online. In this regard, the tourism industries of Hong Kong are trying to adopt the latest technological devices to enrich the sector. Moreover, Hong Kong has created a better reputation for its attractive tourism site seeing places not only in Asia but also all over the world. It is a beautiful city, which attracts millions of tourists. It is eminent for its beautification. Further, it is also known as a clean city in Asia. Due to the highly intense competition, they are using modern technology to diminish costs, boost operational efficiency, and mostly to improve the service quality to gain a competitive advantage. This chapter focuses mobile technology and application in the tourism and hospitality industry of Hong Kong. This chapter also covers how Hong Kong uses technological applications (app) to develop its tourism and hospitality industry.

Keywords Information technology · Application · Tourism · Hospitality · Hong Kong

Md. Alauddin (✉)

Department of Marketing, City University of Hong Kong, Kowloon Tong, Hong Kong

Department of Business Administration, International Islamic University Chittagong (IIUC),
Chattogram, Bangladesh

S. F. A. Hossain

School of Management, Xi'an Jiaotong University, Shaanxi, China

College of Business Administration, IUBAT-International University of Business Agriculture
and Technology, Dhaka, Bangladesh

Md. M. Mowla

Department of Business Administration, International Islamic University Chittagong (IIUC),
Chattogram, Bangladesh

Introduction

Tourism is an economic portent due to its capacity that helps to inspire regional development (Franzidis, 2019). There are new dimensions, which are being added in the tourism and hospitality industry (THI). Every government tries to develop the tourism industry by using information and communication technology. They are adopting innovative and creative ideas to attract a large number of local and foreign tourists.

Information technology (IT) is playing a crucial role in the hospitality and tourism industry over the last decade. It has facilitated the reduction of costs, boost operational adeptness, and improve services and buyer experience. It benefits not only tourists but also tourism entrepreneurs. Both tourists and all stakeholders regarding tourism businesses can benefit from advanced communication and information systems. It has changed the level of customer service levels. Advanced technology has helped this industry replace luxurious human labor with technological labor. It has lessened many complexities of tourists and reduced costs as well.

E-tourism is getting more popular around the globe. It is being advanced using the internet that has an influential impact on the tourism and hospitality industry. Before buying tourism products, customers go to the websites of the tour operator companies and they search for their best options to enjoy their vacations. It helps them get customers' reviews and their previous experiences. The use of information technology in the THI has helped speed up the operations of the tourists and helped the overall traveling process much more enjoyable effectively and efficiently.

The objectives of this chapter are to identify the role of internet and technology in the development of "Hong Kong tourism and hospitality industry" and explain the present scenario of their tourism industry. Moreover, this chapter also focuses how do they use and apply different technologies such as; "big data, artificial intelligence, machine learning, internet of things and mobile technology in the development of their tourism and hospitality industry".

The Importance of the Internet to Tourism

The tourism and hospitality industry is using "Integrated Marketing Communication" to promote their tourism products and services and the internet plays a big role to expand it across the worldwide. It is helping the tourism industry not only message sharing but also build the brand image of the industry. It is also assisting the tourism industry to expand and transfer its data and considered the most suitable way to make a direct relationship with customers and its stakeholders.

Tourists are now adopting their necessary information from the internet and it is helping them get the latest information within a few seconds from across the world. Every tourism business person is using own web portal to provide the required information to the tourists regarding the hotels, motels, and spots etc. Park and

Gretzel (2007: 46) suggest that the “Web has in fact, revolutionized the way Destination Marketing Organizations provide destination information and the manner in which they communicate and interact with consumers and practitioners”.

The tourism industry is considered now as a highly competitive business. For instance, tourists will have a demand for different travel services like; air travel, hotel bookings, online shopping, car hire, and tour services. A number of different tourism organizations typically provides these services to appeal to them to buy from them. For that purposes, a reliable and the efficient website can help them support in designing tourism and travel services (Rita, 2000; Park & Gretzel, 2007; Southern Cross University, 2007). Tourists can make their own plan to travel based on their availability and a well-designed website can fulfill their wishes and demands. Moreover, Tourism destinations “emerge as umbrella brands, hence, destination marketing organizations increasingly have to identify niche markets and develop their interactivity with potential tourists” (Rita, 2000: 2).

Rita (2000: 2) further proposed that “acting as a gateway providing a single entry point to the destination rather than relying on a fragmented number of individual Web sites”. Tourists are getting more benefit now by using the internet and when they get any lucrative offers like discounts or incentives they try to book as soon as possible following the website. They can plan in their own ways to pass their leisure time and enjoy the vacations. By using the information and communication technology, they are getting access for consuming tourism products and services (Connolly et al., 1998), further it is helping the tourists to make a better decision for travel (Vellas & Becherel, 1999).

The Internet is playing an important role in encouraging and allotting tourism products and services and it is also expediting the enlargement into new segments. It has made the tourist’s decisions easy and simple. By using the internet, they can make better decisions to purchase tourism products and services. The significance of the Internet to this industry is, mostly witnessed in supporting travelers make decisions (Lau et al., 2001).

Mobile Application in Tourism

Tourists are being benefitted in many ways by using different mobile application and Smartphones helps them in their journey (Kenteris et al., 2009; Wang & Fesenmaier, 2013) and have a noteworthy impact on the travel activity. Wang et al. (2011) argue that today’s travelers want risk free travelling enjoyment and try to avoid uncertainty in their journey and they use smartphone as a helping hand to gather all sorts of information throughout all trip phases. In most cases, they rely on mobile technologies to search for information about transportation, accommodation, attractions, etc. Furthermore, tourists enjoy gaming, listening to music, photographing, sharing pictures, watching movies, or reading news by using smartphone in their trips.

Promotion of Innovation and Technology

According to Innovation and Technology Commission (2020), this is the driver for economic growth and helping to increase the competitiveness of Hong Kong tourism industries. In November 2015, the “Innovation and Technology Bureau” (ITB) was established to frame holistic (I&T) policies, thereby raising the development of I&T and related industries in Hong Kong. Moreover, it is helping to improve the quality of life of the citizens of Hong Kong. In her Policy Address in October 2017, the Chief Executive set out eight major areas to step up Government’s efforts to develop I&T, namely increasing resources for “research and development“(R&D), pooling “technology talent”, providing “investment funding”, providing “technological research infrastructure”, reviewing “legislations and regulations”, opening up “government data”, bettering “procurement arrangements and popularizing science education”.

Tourism Scenery in Hong Kong

According to Hong Kong Tourism Board (2015), the tourism industry is a big pillar of Hong Kong’s economy. In 2013, it accounted for 5% of Hong Kong’s GDP. It employs about 269,700 workers, or 7.2% of the total workforce. In 2014, tourist arrivals increased by 12% from 2013 to 60.8 million, accounting for 5% of Hong Kong’s GDP. It hires about 271,800 workers, or 7.2% of the total workforce. The following year, tourist arrivals dropped by 2.5% to 59.3 million, a drop of 2.5% from 2014. It contributed around 5% of Hong Kong’s GDP in 2016 and employed about 258,900 people, accounting for around 7% of total jobs. It contributed about 4.5% of Hong Kong’s GDP in 2018 and employed about 257,000 workers, or around 6.6% of the total workforce. Total tourist arrivals dropped 14.2% to 55.91 million in 2019, reflecting the effects of recent local social events. In the first 5 months of 2020, the Coronavirus Disease 2019 (COVID-19) has taken a heavy toll on Hong Kong’s tourism industry, with overall tourist arrivals falling by 88.2% year-on-year to 3.50 million (Table 15.1 and Fig. 15.1).

Use of Technology in the Hong Kong Tourism and Hospitality Industry

Hong Kong is adopting the latest technology in their tourism industry to attract the large number of tourists. They are using big data, artificial intelligence, machine learning, internet of things, etc. Some uses and application of tourism and hospitality industry of Hong Kong are discussed below:

Table 15.1 Number of visitor arrivals Hong Kong 2008–2019

Number of visitor arrivals in Hong Kong from 2008 to 2019 (in million arrivals)	
2008	29.51
2009	29.59
2010	36.03
2011	41.92
2012	48.62
2013	54.3
2014	60.84
2015	59.31
2016	56.65
2017	58.47
2018	65.15
2019	55.91

Source: Census and Statistics Department of the Hong Kong Special Administration Region Government (2020)

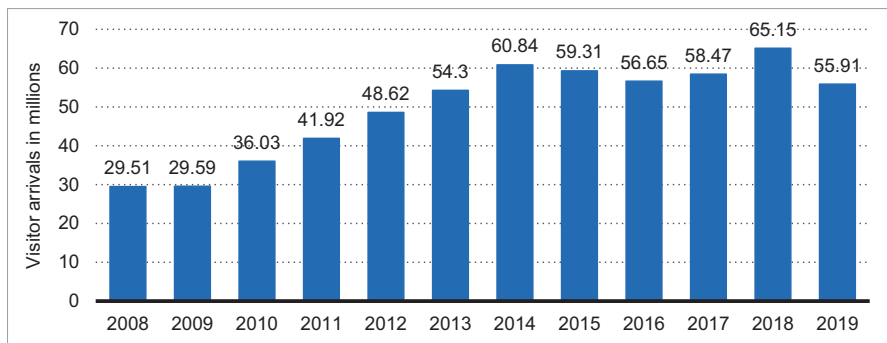


Fig. 15.1 Number of visitor arrivals Hong Kong 2008–2019. (Source: Census and Statistics Department of the Hong Kong Special Administration Region Government, 2020)

Use of Big Data

Big data is a contemporary innovation in the tourism research. Before the application of big data analysis, researchers and experts used mathematical modeling to predict the tourism opportunity. In 2003, as example, researchers predicted that China (7.99 million) is the largest tourism market for Hong Kong, followed by Taiwan (3.86 million), Japan (2.37 million), USA (1.77 million) and UK (0.97 million) in 2008 (Song et al., 2003). The advantage of big data in the tourism may have stronger prediction because it can utilize data from users, devices and operations (Li et al., 2018) that can give trustable and more acceptable result. Recent research

investigated different aspect of big data to investigate and analyze different information and different issues in tourism research (Li et al., 2018). Although, current research shows successful implementation and use of big data in tourism, to the best of our knowledge we found really less evidence of big data usage in Hong Kong tourism industry. Tourism researchers may utilize various analytic techniques and adopt big data in the Hong Kong tourism industry for innovative tourism strategies.

Use of Artificial Intelligence and Robotics

Artificial Intelligence (AI) and Robotics are playing vital role in the contemporary era in various sectors such as education and assessment (Hossain et al., 2019). Tourism is not an exception in this regard. Integrated modern technologies are associated to make the AI successful in the tourism industry. The key intention is to improve the overall customer service and travel experience (Samala et al., 2020). Although AI and robotics are unable to exceed the human contribution, those can be helpful and save a lot of money for the business by reducing the employee cost. In particular, during the pandemic, robotics and artificial intelligence gained an increased attention in the technology arena (Zeng et al., 2020). Recent literature identified that people and robots can co-create unique involvements (Tung & Au, 2018). To the best of our knowledge we found really less evidence of AI and robotic usage in Hong Kong tourism industry. Tourism researchers may utilize various AI and robotic adoption in Hong Kong tourism industry for innovative tourism experience.

Use of Machine Learning Technology

Machine learning and its usage in the tourism industry is an example of precipitous change in the tourism and hospitality management. People can remember the holiday experience and machine learning made it much easier than earlier. Ordering through a translating App is an example of ubiquitous machine learning technology where the App works as a machine as instructed by the user (Parvez, 2020). Recent research identified future and current fluctuations by the machine learning (ML). The usage of ML in tourism and hospitality is not similar as other industries. ML is utilized for revenue administration, functioning analytics and consumer understanding development (Wadhe & Suratkar, 2020). To the best of our knowledge we found really less evidence of ML usage in Hong Kong tourism industry. Tourism researchers may utilize various ML adoption in the Hong Kong tourism industry for innovative tourism experience. ML can be used in solving diverse activities and

future forecasts. As a result, in the Hong Kong tourism industry, policy makers can understand the possible increase or decrease in the upcoming season with the help of algorithms used by ML.

Use of Mobile Apps and Smartphone

Recently, the travel and tourism industry in Hong Kong gained an increased attention in using mobile Apps and smartphone. Mostly, the users of smartphones and Apps are young generation and the number of young travelers aged 15–29 has been considered as the fastest-growing tourist segment recently. The top 10 tourism flows and destination according to UNWTO (2020) are UK, Germany, Spain, France, Brazil, Netherlands, USA, Ireland, Italy and Belgium. Surprisingly, there is no Asian country in this list. There are plethora of issues and concerns behind this. However, to improve the situation, for Hong Kong in particular, use of mobile apps and smartphone is an essential tool. People in general are now habituated and used to the upgraded technology of smartphones. As a result, increased focus on tourism development based on mobile Apps and smartphone may enhance the Hong Kong tourism industry. Hong Kong Tourism Board launched various user friendly Apps for smooth travel for the international travelers. Some of the popular apps and useful tools for the tourists are: csl Wi-Fi, HKeMobility, HKG My Flight (Official), Hong Kong Licensed Hotels and Guesthouses, MTR Mobile (Hong Kong Tourism Board, 2020).

The matter to think about is the innovative and emerging technologies based on smartphones. This could be specialized apps based on Hong Kong that can assist the tourists in searching not only travel destination but also with relevant necessary amenities and support. Wi-Fi and mobile internet facility is satisfactory in Hong Kong at present, however, the tourists need to know the facilities in advance (Fig. 15.2).

The picture shown above is an example of the usage of Apps and other relevant facilities in Hong Kong. If travelers carefully scrutinize the overall facilities in Hong Kong, they can easily understand that from arrival till departure from Hong Kong, the usage of Apps and smartphones are everywhere. There is one specific Apps called “Travel Apps”. Also, to get around, there are guidelines, FAQs and customer services. Overall, the scenario of mobile Apps and usage of smartphones are evident in Hong Kong in the contemporary era.



Fig. 15.2 Usage of some common apps in Hong Kong. (Source: Hong Kong Tourism Board, 2020)

Use of the Internet of Things (IOT)

The use of internet of Things (IOT) in Hong Kong tourism is noticeable, however, it could have been better. IoT can be used in transportation to and from the destination, various excursion and attraction areas, local and popular cultural events, tour operating services and overall marketing activities. In addition, IoT can be used in Web Analytics Service (WAS), big data, mass customization, mass customerizaion, business intelligence, Competitive Intelligence (CI) and E-metrics (Wise & Heidari, 2019; Cavada et al., 2017). Wireless technology such as RFID (Radio Frequency Automation Identification) can control and monitor the tourism activities effectively. For example: in various crowd areas such as amusement parks, travelers could be followed and monitored. Wireless Sensor Network (WSN) can compute the number of travelers arrive the destination and based on the limitations, the number can be controlled or monitored. Intelligent chip can be used with the attraction ticket to locate the tourist in case of emergency. Electronic Product Code (EPC) can help the tourists to identify or locate a particular product of their choice. Object Naming Service (ONS) can collect necessary information from the tourist about any facility required. These all are the examples of IoT which are effective and emerging technologies in the Hong Kong tourism industry. Although Hong Kong tourism is developing with latest technologies, IoT should be considered as well.

Applications Used in the Hong Kong Tourism Industry

Following Visit Hong Kong (2021), some useful apps used in Hong Kong tourism industry are discussed below:

My Observatory

The “My Observatory” is a highly popular weather app developed by the Hong Kong Observatory, providing personalized weather services. Users may obtain location specific weather information, as well as notifications of latest weather warnings. If the notification of location specific rain and lightning forecast is turned on, alerts will be issued up to one, two hours in advance when lightning, or rain is detected.

My Flight

It is a popular app used to provide passengers about flight related information. It includes real time flight information, announcements of the latest status updates of saved flights, baggage arrival notice, baggage arrival notice sharing, push notifications of airport special announcement, location sharing and traffic information, passenger guide, ferry & coach schedule, shopping & dining information, food ordering and airport location map.

HKeMobility

Transport Department's "HKeMobility" is an all-in-one mobile traffic and transport application. It enables faster and appropriate search for routes of different modes of transportation, journey time and fares, and circulates real-time traffic news to enable tourists and the public to plan for a beautiful travel arrangement.

App1933

The KMB and LWB mobile app, "App1933", provides users with the latest bus route information and estimated bus arrival times to help with journey planning. The point-to-point route search function provides the most appropriate route to the destination, while passengers can be notified to get off the bus when approaching the designated bus stop by the alight reminder function. Users can find their way to the nearest bus stop by using GPS and obtain route information from a customer service representative using Live Chat.

CitybusNWFB

"CitybusNWFB" App by New World First Bus Services Limited and Citybus Limited provides passengers an intelligent travelling experience with Next Bus Arrival Time Enquiry, Route Information to Sightseeing Spots, Point to Point Route Search and Alight reminder.

Wi-Fi.HK

Wi-Fi.HK mobile app facilitates tourists and the public to search “Wi-Fi.HK” venue locations in Hong Kong which are offered by public and private organizations. The main feature of Wi-Fi.HK service is the provision of at least 30 min of free Wi-Fi usage with no need for registration and no download of Apps by tourists and the public.

Conclusion

This research explained the uses & application of technology in the tourism and hospitality industry of Hong Kong and how it has renovated and improved a lot than before in the tourism and hospitality industry. This chapter also investigated the most recent scenario of tourism in terms of technology acceptance and adoption in Hong Kong. The authors also analyzed various issues related to tourism, such as mobile apps and technology in the tourism industry and hospitality industry, big data and artificial intelligence in the tourism and hospitality industry, machine learning and internet of things etc. This information will help the tourists get the updated information regarding the usage of information technology in the tourism and hospitality industry in Hong Kong.

Through the representation with upgraded technology, tourism industry in Hong Kong reinforces numerous benefits and advantages for the tourists that made the industry more attractive than before. Findings of this study explore that Hong Kong tourism industry is adopting different technologies such as mobile apps and different technology that is helping them to provide superior services to the tourists and earn huge revenues from this sector.

This research will help in different stakeholders of tourism and hospitality industry. First, it will benefit the local and foreign tourists. Secondly, it will help hotel and motel managers. Finally, this research will be helpful for the academicians, policy makers and tourism entrepreneurs etc.

The basic drawback of this research is the lack of empirical data that can help add more information. Thus, future research can focus on ensuring both valid and reliable data to present an inclusive research output.

References

- Cavada, D., Elahi, M., Massimo, D., Maule, S., Not, E., Ricci, F., & Venturini, A. (2017). Tangible tourism with the Internet of things. In B. Stangl & J. Pesonen (Eds.), *Information and Communication Technologies in Tourism, 2018* (pp. 349–361). Springer.

- Census and Statistics Department of the Hong Kong Special Administration Region Government. (2020). *Hong Kong monthly digest of statistics, February*. Census and Statistics Department of the Hong Kong Special Administration Region Government.
- Connolly, D. J., Olsen, M. D., & Moore, R. G. (1998). The internet as a distribution channel. *Cornell Hotel and Restaurant Administration Quarterly*, 39(4), 42–54.
- Franzidis, A. (2019). An examination of a social tourism business in Granada, Nicaragua. *Tourism Review*, 74(6), 1179–1190.
- Hong Kong Tourism Board. (2015). *Hong Kong: The facts*. Retrieved from: https://www.tourism.gov.hk/pdf/FactSheet/2015/tourism_fact_sheets_2015_en.pdf. Accessed 28 Feb 2021.
- Hong Kong Tourism Board. (2020). *Travel apps*. Retrieved from: <https://www.discoverhongkong.com/in/plan/traveller-info/travel-apps.html>. Accessed 28 Feb 2021.
- Hossain, S. F., Shan, X., & Nurunnabi, M. (2019). Is M-learning a challenge? *International Journal of e-Collaboration*, 15(1), 21–37.
- Innovation and Technology Commission. (2020). *Hong Kong: The facts sheets*. Retrieved from: <https://www.gov.hk/en/about/abouthk/factsheets/docs/technology.pdf>. Accessed 28 Feb 2021.
- Kenteris, M., Gavalas, D., & Economou, D. (2009). An innovative mobile electronic tourist guide application. *Personal and Ubiquitous Computing*, 13(2), 103–118.
- Lau, K. N., Lee, K. H., Lam, P. Y., & Ho, Y. (2001). Web-site marketing for the travel-and-tourism industry. *Cornell Hotel and Restaurant Administration Quarterly*, 42(6), 55–62.
- Li, J., Xu, L., Tang, L., Wang, S., & Li, L. (2018). Big data in tourism research: A literature review. *Tourism Management*, 68, 301–323.
- Park, Y. A., & Gretzel, U. (2007). Success factors for destination marketing web sites: A qualitative meta-analysis. *Journal of Travel Research*, 46(1), 46–63.
- Parvez, M. O. (2020). Use of machine learning technology for tourist and organizational services: High-tech innovation in the hospitality industry. *Journal of Tourism Futures*. <https://doi.org/10.1108/jtf-09-2019-0083>
- Rita, P. (2000). *Internet marketing destinations in the global tourism marketplace. Proceedings INET 2000*. Retrieved from: https://web.archive.org/web/20160103041524/http://www.isoc.org/inet2000/cdproceedings/7a/7a_2.htm. Accessed 28 Feb 2021.
- Samala, N., Katkam, B. S., Bellamkonda, R. S., & Rodriguez, R. V. (2020). Impact of AI and robotics in the tourism sector: A critical insight. *Journal of Tourism Futures*. <https://doi.org/10.1108/jtf-07-2019-0065>
- Song, H., Wong, K., & Chon, K. (2003). Modelling and forecasting the demand for Hong Kong tourism. *International Journal of Hospitality Management*, 22, 435–451.
- Southern Cross University. (2007). *Destinations online: Approaches for regional tourism organisations*. Southern Cross University.
- Tung, V. W., & Au, N. (2018). Exploring customer experiences with robotics in hospitality. *International Journal of Contemporary Hospitality Management*, 30(7), 2680–2697.
- UNWTO (2020). *UNWTO tourism data dashboard*. Retrieved from: <https://www.unwto.org/unwto-tourism-dashboard>. Accessed 28 Feb 2021.
- Vellas, F., & Becherel, L. (1999). *The international marketing of travel and tourism*. Macmillan Press.
- Visit Hong Kong. (2021). *Hong Kong: Useful apps*. Retrieved from: <https://www.visithongkong.gov.hk/main/usefulApps?language=EN>. Accessed 28 Feb 2021.
- Wadhe, A. A., & Suratkar, S. S. (2020). Tourist place reviews sentiment classification using machine learning techniques. *2020 international conference on Industry 4.0 Technology (I4Tech)*.
- Wang, D., & Fesenmaier, D. R. (2013). Transforming the travel experience: The use of smartphones for travel. In L. Cantoni & Z. Xiang (Eds.), *Information and communication technologies in tourism 2013* (pp. 58–69). Springer.
- Wang, D., Park, S., & Fesenmaier, D. (2011). *An examination of information services and smart-phone applications*. Retrieved from: https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1179&context=gradconf_hospitality. Accessed 28 Feb 2021.

- Wise, N., & Heidari, H. (2019). Developing smart tourism destinations with the internet of things. In M. Sigala, R. Rahimi & M. Thelwall (Eds.), *Big data and innovation in tourism, travel, and hospitality* (pp. 21–29). Springer.
- Zeng, Z., Chen, P., & Lew, A. A. (2020). From high-touch to high-tech: COVID-19 drives robotics adoption. *Tourism Geographies*, 22(3), 724–734.

Chapter 16

The Mobiquitous Role of M-tourism Application in Driving Sustainable Tourism Sector in Thailand



Hasanuzzaman Tushar, Md Abdus Salam, Rubaba Nawrin,
and Saima Rahman

Abstract The unprecedented growth of technological breakthroughs in the field of tourism is making a huge impact on the development and sustainability of the industry. The study focuses on the role of Information and Communication Technology (ICT) in general and mobile based tourism related application (m-tourism) in particular to develop sustainable tourism sector in Thailand. The paper outlines and presents a comprehensive overview of the usages mobile based application in tourism industry from the viewpoints of both consumer (demand side) and service provider (supply side). The research then discusses the acceptance, costs, and affordability of m-tourism applications in the context of Thailand. The study views that m-tourism applications enable a consumer to search information, book or purchase, and evaluate, and service provider to operate and manage businesses in Thailand and globally anytime from anywhere in more flexible, ubiquity, adoptable, and attractive way. In addition, there are few challenges in m-tourism applications that have been addressed at the end of the chapter.

H. Tushar (✉)

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

School of Human Resource Development, National Institute of Development Administration, Bangkok, Thailand

e-mail: tushar@iubat.edu

Md. A. Salam

Bachelor of Accountancy Program, Faculty of Business Administration, St. Theresa International College, Nakhon Nayok, Thailand

R. Nawrin

Faculty of Business Administration, St. Theresa International College, Nakhon Nayok, Thailand

S. Rahman

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

Keywords M-tourism · ICT · Tourism application · Sustainable tourism · Thai tourism · Thailand

Introduction

The rapid technological advancement fosters the global opportunities for tourism and hospitality businesses. The technology driven re-engineering introduced a new paradigm-shift in the tourism industry in terms of identifying destination, making purchase decision, booking and payment methods, and developing, operating, and distributing product and services globally (Bethapudi, 2013; Gössling, 2021). This notion of ICT integration has directly associated with the concept of e-tourism for the purposes of developing and promoting the tourism related products and services globally (Kononova et al., 2020). The exponential breakthroughs of mobile and innovative telecommunication technology empower the tourists and suppliers to access more information and always available for communication which is conceptualized as mobile tourism (m-tourism). In particular, the m-tourism is a mobile application based technology (e.g., mobile devices, apps, tablet pc, and few others) that assists a tourist to search information, book or purchase, and evaluate and enables a supplier to operate and manage businesses, and serve guests anytime, from anywhere in more flexible, ubiquity, and adoptable way (Naramski & Herman, 2020). Considering the inseparable nature of ICT and tourism business relationship, this chapter provides readers an insider view of m-tourism application and its role in developing sustainable tourism sector in Thailand.

Thailand has enjoyed the rich benefits of its tourism and hospitality industry throughout the years for lush beaches, diverse natural beauty, and smiling people. The nation, located in South East Asia, is a famous tourist destination with a tropical environment where nature provides abundant resources to attract tourists. Thailand is considered by visitors from all over the world as a prominent tourist destination with sandy beaches, hilly mountains, and amazing people.

Therefore, the tourism industry is considered a highly strategic sector in the Thai economy. During 2019, Bangkok was the most visited city in the world where as two other cities made their places in the top 20 lists (Millington, 2019). The importance of tourism in national development is also undeniable. This sector is a major contributor to the Thai economy; during 2020 Tourism contributed about 22% of the GDP (Knoema, n.d.). Some opines that the accelerated growth of the tourism industry is only comparable with the fast-paced development of ICT (Buhalis & Law, 2008). Throughout the past decades, international tourism has outgrown the commodity trade of the whole world (World Tourism Organization, 2017). At the same time, the rate of internet penetration in the world is 64.2% in 2020 (Internet World Stats, n.d.).

In response to that, all the service providers and consumers in this sector proactively integrated technology in the various operations. This industry includes hotel and other accommodations, all three mediums of transportations (land, sea and air),

amusement venues, places of historical interests, national parks, culinary business (especially near tourist spots), and so on. Integration of technology in tourism service is visible in every place. All the airlines and hotels operating in Thailand have their online platforms where customers from any place in the world contact them directly to avail their facilities. On the other hand, if we look at tourists' actions, they tend to use technology to get information about various services such as booking hotels, purchasing flight tickets, accessing activity information of a particular place, and so on.

The remainder of this chapter is structured from the perspectives of consumer or tourists and suppliers or service providers integrated with ICT in general and mobile application in particular. To obtain this, the study addresses the perspectives of consumer aligned with m-tourism in the four stages of decision making process (i.e., information search, evaluation of alternatives, purchase decision, and post-purchase behavior). The study then examines the usage of m-tourism application by service providers/suppliers in the five dimensions (i.e., strategic and operation management, revenue management, marketing, guest service, and sustainability). In addition, the acceptance, cost and affordability, challenges of m-tourism applications have been discussed at the end of this chapter.

The Role of Mobile Technology on Tourism Sector in Thailand

Mobile technology has significantly changed the customer experience and south Asian countries utilizing the opportunity the most (Kate, 2019). Both government and service providers giving an effort to get the best out of mobile devices and applications for businesses, especially for the tourism industry. Tourism Authority of Thailand (TAT), the government organization to look after the tourism sector of the country, launched its mobile application "Amazing Thailand" more than ten years ago to promote the industry and to ensure tourists' convenience (Hengtrakulsin, 2010). The organization has its presence in all common platforms including Facebook, Twitter, Instagram, and so on. Many major hotels, commercial tourist destinations, and airlines have their websites to provide information and take bookings. Besides, the service providers ensured visibility through different sites like Agoda, [Booking.com](#), Traveloka, and so on. Facebook page is another common method for smaller Thai businesses to reach domestic as well as international consumers.

Furthermore, mobile technology is widely used for payment, prompt assistance, and feedback collection. Real-time assistance services are open to tourists remotely via mobile devices. TAT initiated their Live chat service for immediate support to all tourists on different platforms of mobile devices (Tourism Authority of Thailand, n.d.). Mobile payment has also become the preferred method of transaction for both consumers and service providers, during 2019, about 67% of Thais made mobile payments in stores (Kate, 2019). All these facilities brought a continuously increasing number of tourists to the kingdom till the COVID-19 crisis and the country is

looking forward to post-pandemic tourist flow with the help of their strong mobile technology-based services (BOT, 2020). Implication of mobile based information technology on tourism is explored considering the aforesaid two major themes: consumers (demand side), service providers (supply side).

Perspectives of Consumer (Demand)

Information Search

It is not a long time when people used to gather travel ideas from their friends and families and newspaper articles. Planning to visit a new destination needed a long time to decide as the availability of information were not plenty at that time. With the change of time, more specifically through the technological advancement, now-a-days, information is in the hands of everyone. People can find their necessary traveling information anytime through the internet. The accessibility of information brought a huge transformation in both consumer and suppliers' point of views (Januszewska et al., 2015). Previously, tourists were mostly dependent on the limited offer of inadequate traveling agencies, typically on local services. Now they are overwhelmed of receiving information from various sources around the world. The mobile technology made it easier than before. Having internet connection on the mobile phone allows the people to gather any travel related information in an instance (Khatri, 2019).

Consumers use numerous platforms to receive their necessary information to travel. The most popular search engine Google is the preferred one to the tourists while searching data. The travel bloggers post various blogs which covers a wide range of selection in numerous places in the world. Travel blog websites such as trip advisor creates an open platform where tourists share their travel experiences. They can post pictures, write their journey in details and reply the questions if any potential tourist wants to visit to that particular places. Therefore, anyone who wish to visit in certain places they can just visit to the site from their mobile phone and generate the necessary ideas. The idea is not only limited to travel blogging sites. A number of social media plays a significant role to generate information. Social media sites like Facebook, Instagram, YouTube offers numerous platforms to the travelers to have open conversation about a place and the visitors can have all access if they have a mobile phone with basic internet connection. In Facebook, many traveling groups invite people to join their groups and share their ideas on traveling related activities. This conversation allows people to learn not only about a place but also know the information on selecting proper airlines to travel, best location to stay in a hotel and move places which are both touristy and local. Instagram, another powerful social media platform, allows visitors to post their travel activities using various filters. This creates strong engagement between the post creators and the followers. This platform also uses influencers to promote places, products or

services in specific areas. Influencers could easily reach to millions of their followers and promote the destination. Another social media platform YouTube brings enormous changes by allowing people to make a video and post on their sites. Therefore, travelers when they visit places they capture their moments in a video and post it into YouTube. From there, the potential travelers also gather ideas about the places. Drew Binsky, Nas daily are the most popular travel vloggers who had millions of subscribers and once they publish their videos it reaches to the huge group of people within a minute. General people who never visited any particular places can also get ideas from them instantly. In addition to the travel vloggers, the tourism authority of many countries uses this platform to promote their country's specific place. All these social media platforms have their own mobile applications which are more convenient to the mobile users as they could access the apps in anywhere.

Because of the transformation of information technology, all the hotels and airlines provides their information online. Therefore, the customers can access to the hotel and airlines' websites to get the necessary information of their traveling. Sometimes, the hotels and airlines provides online discount therefore, using mobile device customers also get that facilities. The online third parties also play a major role in this area. Travel sites like booking.com, [agoda](http://agoda.com), expedia.com, tripadvisor.com offer attractive deals when customers book the hotel or airlines from them. To be competent in the industry, majority of the travel sites offer mobile application software which are easy access for the travelers to reach the information.

Evaluation of Alternatives

Once the customers get necessary information, it's time for them to evaluate the alternatives. Since there are plenty of options to gather information, most of the time the travelers get overwhelmed with overflowing the information. According to Kim, Kim, Ki and Magnini (2016), information media has enormous influence on the psychology of a traveler. After careful analysis of the information, the travelers could make a choice which would best suit them. In this regard, the mobile devices particularly the smartphones help them a lot. In all the smartphones, there is an inbuilt maps application which helps the customers to evaluate their location properly. The most used maps in the mobile device is the Google maps. Users of Google maps not only can see the location but also will be able to find nearby hotels, attractions, eating place, shopping malls, and transportation facilities such as nearby metro or bus station and so on. All this information are significant issues while the tourists evaluate their information. Using this app in the mobile phone allow the tourists to carefully evaluate their alternatives to select the best hotel that allow them to access maximum place with less expense in their journey. In addition, third party online sites also play a competitive role. Majority of the time they give lesser price than the hotel or airline's original price. Sometimes, they offer off-season deals through their mobile applications. Lots of discounts are available when the customers buy their services from their mobile apps. In addition, the followers of social

media influencers want to visit the places where the influencers recommended them to visit. The follower groups often try to replicate their memories as they have observed from their desired influencers. As the tourists always are connected with the internet with their mobile phones, they can reach to their information within a minute. All these offers turn to lucrative options while choosing a destination for an upcoming visit for a tourist.

Purchasing Decision

Purchasing decision is greatly influenced by the tourists' accessibility of the information. With mobile gadgets, it becomes a popular way among the people to learn about the places from numerous sites. After carefully investigation, customers come into a point to take their purchasing decision. While searching for a place to visit, people always look for a recommendation to get a good facility in terms of price, location, attraction and other deals. The mobile phone tremendously affects the purchasing behavior among the customers. They could possibly take an overnight decision to visit a nearby attraction or make a plan for overseas destination.

To facilitate their purchasing decision, all the service holders, now-a-days, provide payment options in their mobile apps. Almost all the service points integrate visa and master card options in their apps through which customers can pay their bills. In addition, the third party sites also offer coupon codes which the customers can use while purchasing a ticket for airlines or book a hotel. Some even offer redeem options while the tourists can use their points in their next travel booking. The consumers get these all access in their mobile devices which significantly change their buying capacity and behavior to plan their upcoming travel. According to Lee, Denizci, and Law (2013), availability of internet made the customers as the business partners of all stakeholders' in tourism industry.

Post-Purchase Behavior

Due to digitization process, peoples' life becomes more convenient than ever before. The situation escalates to a higher point than ever once traveling agencies integrated their services with mobile technology. With a basic internet connection, consumers can search millions of data in a minute which improves their decision making process. While it influences their buying behavior, it also facilitates them on their post purchasing behavior. Customers who visit a new place after purchasing the services through mobile technology have the option to give a review on their visited place. This way they could validate on the earlier travelers sharing ideas while they add their unforgettable memories. Their rating creates significant impact on the service providers as a negative comment might lose the potential customers who look for the information from their mobile phone at that time.

The mobile applications allow the customers to make a hassle free journey (Aldebert et al., 2011). As the applications hold the personal information on the tourists they don't need to print their booking materials and carry with them all the times. Rather, the mobile applications hold the information. Once the customers check in the hotel or airlines, they can simply show their purchase information through the apps. The hotels or airline companies also prevail the customers' information in advance and make themselves prepare.

Perspectives of Service Provider (Supply)

Strategic and Operational Management

Information and communication technology (ICT) plays a crucial role in modern business management. Buhalis and Law (2008) believe that strategic and operational management has been redesigned by the tourism business service providers with the help of ICT. It facilitates businesses with two major benefits; cost reduction and competitive advantage. As this chapter mentioned earlier, the majority of the customers are now using ICT with the help of mobile devices. Hence, the service providers consider mobile-friendly operational management of their business. Although m-tourism is a new phenomenon in tourism research, lately many researchers were interested to explore several areas of m-tourism. Surveying international tourists Trakulmaykee and Benrit (2015) proved that mobile perceived compatibility (MPC) has a positive relationship with the intention to use mobile tourism guides (MTG). MPC indicates the degree of compatibility of the available mobile innovation with existing needs behavioral patterns and so on (Rogers, 1995). It indicates that the tourism service providers have to use the technology which is consistent with the international users' needs because those tourists come with a pre-perceived idea from their experience of using such apps (Kim and Nam, 2016). Several efforts have been observed by various stakeholders including the government of Thailand and service providers. Government with its Tourism Authority of Thailand (TAT) website and mobile app facilitating tourists to have access to various online services. Private Service providers also competing to grab customers' attraction. One way of doing this is developing a mobile app to facilitate tourists with detailed information about the local facilities. Two such experimental cases showed success; one is Tourich Application for Chiangrai province (Noinan et al., 2018) and another one is PhayaoILoveU by Chaiwongsai et al., (2018) for Phayao SoLoMo tourist. Similar strategic management effort is also observed in agriculture (Prayukvong et al., 2015).

Revenue Management

The use of mobile devices for online shopping in the tourism industry is rising along with other sectors. A 2015 study showed that 25 percent of Orbitz Worldwide product mix is sold through m-devices and 50 percent of trip advisor users access the service by mobile devices (Schaal, 2015). Product or services offered by the tourism industry is intangible in nature, it made the task of determining the pricing strategy a major challenge for such businesses during changing situations. Proper revenue management helps businesses to maximize profit by considering available fixed capacity and market demand (Abad et al., 2019).

To cope with the competition tourism firms are adding value to their business by providing extraordinary facilities as their unique selling point. One such initiative is providing different activities for disabled people making that information available through mobile apps. Similar efforts were observed in medical/therapeutic tourism (Habes et al., 2018). The hotel and the airline industry are also efficiently utilizing their customized mobile applications to gather data about occupancy rates to price the product and services competitively (Cross, 2016).

Besides, an effort to adopt mobile banking services into service providers' day to day activities has been observed. Many small businesses like street food vendors are also accepting m-transfer by using QR codes, especially, in post-COVID-19 business practice.

Marketing

Marketing and distribution is one of the business activities affected most by the development of information and communication technology. Service providers who modify the marketing and advertisement strategies with the change of modern technology gain a competitive advantage in the industry. Statistics demonstrates about 90 percent of Thais use mobile internet and, on average, spend five hours a day surfing the internet using mobile devices. The top two online activities of the Thai people are using social networking sites (97%) and online shopping (58%) (Kemp, 2020). This piece of information provides a signal to the service providers where to get their potential customers.

Smartphones and other handheld devices brought a variety of choices through different applications, images, and videos from different sources, social networking sites, and so on. As those features are mostly free and provide unlimited browsing options, marketers found a new horizon of marketing. Besides tourism-specific applications (own and third-party apps to book hotels, flights, entertainment sites), businesses are focusing on social media as a new platform of marketing and advertising (Hew et al., 2018). Most of the Thai tourism businesses have their own social media page (very often Facebook) as it provides them the opportunity to reach the customers regarding their product and services beyond the limit of time and place

(Tan et al., 2017). The Thai government also took the initiative to utilize social media marketing on several occasions. One such event was the “Amazing Thai Taste” campaign by TAT that promotes agriculture and gastronomy tourism and the “Amazing Thailand Luxury” campaign to attract high-end tourists (Berno et al., 2019).

Guest Service

Mobile devices facilitated tourists with continuous communication with other tourists, tour agents, service providers, and so on. This spontaneous and real-time communication facility forced service providers to reconsider their traditional customer service model. Numerous channels broadcast user-generated content (UGC) in different formats to potential tourists. Review provided by the service receivers of a specific business have a strong influence on the perception of future clients/guests of that facility. There is many research explored such relationships in various platforms, such as Expedia (Xiang et al., 2017), [Booking.com](#) (Mariani et al., 2019), Airbnb (Cheng & Jin, 2019), Google Maps Local Guide and Trip Advisor (Taecharungroj & Mathayomchan, 2019).

To provide better customer services Thai tourism industry adapted mobile application-based facilities in different locations including medical tourism, spiritual tourism (Ploadaksorn & Angkanannon, 2018), and of course recreational tourism. The application-based services are useful especially in the national parks and city tours (Somkait et al., 2014).

Customers’ feedback on the businesses’ mobile sites and third-party sites also helps the service providers to develop their future services to match the customer requirement. Moreover, Thai tourism service providers are emphasizing e-Security as it is easier to be cheated online. It was found that tourists consider the tourism advertisement on social media and other sites as useful information as long as it does not lead them to phishing sites (Erawan, 2016).

Sustainability

Sustainability in tourism indicates the model of business that delivers tourists with the services according to their needs without compromising the protection of the environment, historical places, people, and culture (World Tourism Organization, 2005). M-tourism facilitates government and other stakeholders to maintain sustainable tourism. Tourism businesses provide information through social media and other platforms to educate tourists about the rules and norms of visiting sensitive places. TAT promotes sustainable tourism with their Value of Experience and Unique Local Thai Experience campaigns (Tourism Authority of Thailand, 2017). Service providers innovated new tourism concepts based on sustainability, creative

tourism. Creative tourism is defined as tourism to understand ourselves by experiencing different cultures and traditions (Tiyaphipat, 2017).

In sum, the tourism sector is very keen on receiving benefits from technological advancement to increase its competitiveness besides the social and economic integration. Thailand believes that ICT brought a major change in global tourism trends which is an essential element for sustainable growth in this sector. Without the proper help of ICT, sustainable development in the tourism sector cannot be achieved. Therefore, Thailand has been active in integrating ICT in general and mobile technology in particular with the tourism industry.

M-tourism Application in Sustainable Tourism Development

Before the smartphone era, traveling would require a lot of planning months ahead. Nevertheless, even after so much planning, tourists would face a lot of challenges and uncertainties due to not having proper access to information on the country they are trying to visit. The challenges include things such as booking air tickets, hotels accommodation, getting around a new place, language barriers, currency exchange issues etc. (Tan et al., 2017). With the introduction of smartphones, tourism industry has been on the rise in terms of success and sustainability due to the ease at which tourists can access information, plan and make decisions. Smartphones comes equipped with a variety of application which includes m-tourism applications. The m-tourism apps provide users a range of information and services about any country without the requirement of browsers (Tan et al., 2017). Tourists can arrange their travel plans, purchase tickets and accommodations and improve their adventures with these apps (Castañeda et al., 2019). Furthermore, m-tourism applications allow tourists to have a more customized experience (Tussyadiah & Wang, 2016) thus allowing more flexibility and efficiency.

The ease at which traveling can be planned and executed through these m-tourism apps are provoking more people to travel to different countries. Tourists are able to get things done instantly and effortlessly according to their schedule, read reviews and view images of the places they can visit, thus being more encouraged to travel. AcApps such as Skyscanner and Traveloka helps users to compare and book the cheapest flights available to Thailand. Confirmation and tickets are sent directly to their email address, so there is no need to carry documents around and it can be accessed from anywhere, anytime, thus contributing to sustainable tourism. In Thailand, m-tourism applications such as [Booking.com](#), Agoda and Airbnb helps tourists to book accommodations effortlessly from almost anywhere in the world. Apps such as Grab and ViaBus can be used to ensure affordable, safe and fast tour around tourist spots. Whether it is a Thai local delicacy or an international cuisine, apps such as Wongnai and Foodpanda can be used to choose from a variety of options based on the ratings and reviews of other tourists. Furthermore, apps such as Klook and Amazing Thailand makes booking single or group tours around the notable tourist spots a piece of cake and apps such as Google Translate and Thai

Best Dict makes it easier to overcome the language barrier between tourists and locals (Monaworld, 2020). The increasing rate of smartphone users around the world is making tourism easier and the m-tourism apps are greatly responsible for the development and sustainability of tourism in Thailand.

Acceptance, Cost, and Affordability of M-tourism Applications

Smartphones have now become a social paradigm and people are increasingly becoming dependent on the use of smartphones for any task. Thus, the acceptance of m-tourism apps rising at a fast rate. According to a study conducted on the Technology Acceptance Model (TAM) in mobile tourist guide (MTG) context of Thailand, there are two main factors that influences the international tourists' willingness to use m-tourism applications- perceived usefulness (PU) and perceived ease of use (PEU) (Trakulmaykee et al., 2016). It was further found out that their proposed extended model of the TAM confirmed that PU and PEU along with perceived compatibility (PCP), perceived content quality (PCQ) and perceived appearance quality (PAQ) had a positive influence on the international tourists' willingness to use m-tourism applications (Trakulmaykee et al., 2016). This study thus validates the fact that acceptance of m-tourism apps is growing rapidly. Most m-tourism apps available on Google Play or the App Store are free to download thus acceptance becomes lesser on an issue given that a typical smartphone user uses fewer than a dozen apps on a regular basis (Castañeda et al., 2019).

The cost of the m-tourism applications should not solely be considered in financial terms only. The price value of these apps is considered to be the cognitive trade-off for the users between the benefit received from these apps by the consumers and the monetary cost of using those (Shaw & Sergueeva, 2019). Although, almost all of these apps are free to use, however there are still some costs involved for example data charges for downloading the apps, storage, access to the app, the initial learning of using the app etc. As long as the consumers recognize the benefits they get from using the applications are greater than the costs associated with it, the price value remains positive. In the context of m-commerce, there is a strong correlation between the value of an online application and the intention to purchase (Shaw & Sergueeva, 2019). In terms of affordability of the m-tourism applications, anyone who owns a smartphone can download these apps and use them. However, some applications may incur initial charges for account creation, subscription etc., most of the applications are totally free to use.

Challenges of M-tourism Applications

According to Beça and Raposo (2013) M-tourism applications are gaining momentum in terms of popularity everyday as they are gradually becoming more available in a cross-platform manner. Furthermore, these applications are providing increasing number of benefits and ease of use which is driving more tourists towards them. However, many of these applications are still not totally tourist oriented. This means that a significant number of users of these apps feel that the solutions provided by these applications are not specific to their particular needs. Santos et al. (2019) identified that there are a number of limitations which the users pointed out, which included but not limited to – lack of access to specific POI related multimedia content, technical difficulties relating to cross platform usage of these applications which does not let the users access all the services from different devices; various communication system specifications for the context of indoor and outdoor usage; minimal thought concerning creation and promotion of communities with access to content based on participation of users.

Smartphones are available to most users around the world, however, getting data access with a good speed still remains a challenge in most parts of the world. Most of these applications require a stable data connection, which might create issues for many users using these apps. In most countries, data is costly, let alone not readily available, thus many users face difficulties in getting the most out of the m-tourism applications. Furthermore, as stated by Fullwood, Quinn, Kaye, & Redding (2017), some of the applications may not be as user-friendly in terms of ease of use thus confusing a lot of its users who in turn ends up getting rid of the app. Despite of the challenges faced by the creators of the m-tourism applications, they are working hard towards addressing these issues and overcoming them. Furthermore, the number of m-tourism applications available on the market today are increasing gradually which gives the users a variety of options to choose from according to their needs and specification (Beça & Raposo, 2013).

Conclusion

The unprecedented growth of technological breakthroughs led us to rethink about the future of the tourism industry. Emergence of the continuous technological innovation is making consumers and service provider's life easier. Since the introduction of the m-tourism applications, planning a tour of Thailand has become as easy as it gets for the tourists from all over the world. Furthermore, social media acts as a source of marketing with many people sharing their experience, along with promoters using social media as the means of reaching out to people sharing the beauty and amenities Thailand has to offer for tourists. With more and more people getting interested to visit Thailand, m-tourism apps are making their travels possible with minimal effort and maximum efficiency. Airlines companies, hotel chains and

various other service providers creates partnerships with such m-tourism applications to provide further discounts and amenities specifically to tourists who are using these applications. This creates a win-win situation for both the tourists who can get cheaper deals and the service providers who can drive more business towards them. This symbiosis is greatly enhancing the tourism industry as a whole. Thus, it can be safely said that the M-tourism applications are playing a vital role in the development of sustainable tourism in Thailand and all across the globe.

References

- Abad, P., De la Fuente-Cabrero, C., González-Serrano, L., & Talón-Ballesteros, P. (2019). Determinants of successful revenue management. *Tourism Review*, 74, 666–678.
- Aldebert, B., Dang, R. J., & Longhi, C. (2011). Innovation in the tourism industry: The case of tourism. *Tourism Management*, 32(5), 1204–1213.
- Beça, P., & Raposo, R. (2013). *m-Tourism 2.0: A Concept where mobile tourism meets participatory culture*. Retrieved from: <http://agrilife.org/ertr/files/2013/02/7.pdf>. Accessed: the 3 Apr 2021.
- Berno, T., Dentice, G., & Wisansing, J. J. (2019). *Kin kao laew reu young* ('have you eaten Rice yet')?: A new perspective on food and tourism in Thailand. In E. Park, S. Kimand, & I. Yeoman (Eds.), *Food tourism in Asia. Perspectives on Asian Tourism*. Springer.
- Bethapudi, A. (2013). The role of ICT in tourism industry. *Journal of applied economics and business*, 1(4), 67–79.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the internet- the state of eTourism research. *Tourism Management*, 29(4), 609–623.
- Castañeda, J. A., Martínez-Heredia, M. J., & Rodríguez-Molina, M. Á. (2019). Explaining tourist behavioral loyalty toward mobile apps. *Journal of Hospitality and Tourism Technology*, 10(3), 415–430.
- Chaiwongsai, J., Srisungsittisanti, B., & Rojanavas, P. (2018). Kwan Phayao tourism promotion and support mobile and web application. In *2018 international conference on digital arts, media and technology (ICDAMT)* (pp. 147–151). Chiangrai: IEEE.
- Cheng, M., & Jin, X. (2019). What do Airbnb users care about? An analysis of online review comments. *International Journal of Hospitality Management*, 76, 58–70.
- Cross, D. (2016). A history of revenue management and the advent of next-generation RM. *Journal of Revenue Pricing Management*, 15(3–4), 293–298.
- Erawan, T. (2016). Tourists' intention to give permission via mobile technology in Thailand. *Journal of Hospitality and Tourism Technology*, 7(4), 330–346.
- Fullwood, C., Quinn, S., Kaye, L. K., & Redding, C. (2017). My virtual friend: A qualitative analysis of the attitudes and experiences of smartphone users: Implications for smartphone attachment. *Computers in Human Behavior*, 75, 347–355.
- Gössling, S. (2021). Technology, ICT and tourism: From big data to the big picture. *Journal of Sustainable Tourism*, 29(5), 849–858.
- Habes, M., Alghizzawi, M., Salloum, S. A., & Ahmad, M. (2018). The use of mobile technology in the marketing of therapeutic tourist sites: A critical analysis. *International Journal of Information Technology and Language Studies*, 2(2), 48–54.
- Hengtrakulsin, A. (2010). Tourism Authority of Thailand Raises its Digital Profile, Introducing the 'Amazing Thailand' Mobile Application. *PR Newswire*. Retrieved from: <https://www.prnewswire.com/news-releases/tourism-authority-of-thailand-raises-its-digital-profile-introducing-the-amazing-thailand-mobile-application-112491374.html>. Accessed 4 Apr 2021.

- Hew, J. J., Leong, L. Y., Tan, G. W. H., Lee, V. H., & Ooi, K. B. (2018). Mobile social tourism shopping: A dual-stage analysis of a multi-mediation model. *Tourism Management*, *66*, 121–139.
- Internet World Stats (IWS). (n.d.). *Internet growth statistics*. Retrieved from: <https://www.internet-worldstats.com/emarketing.htm>. Accessed: the 18 Mar 2021.
- Januszewska, M., Jaremen, D. E., & Nawrocka, E. (2015). The effects of the use of ICT by tourism enterprises. *Service Management*, *2*(16), 65–73.
- Kate (2019). *Consumers moving away from traditional forms of entertainment and media consumption*. Retrieved from: <https://www.pwc.com/th/en/press-room/press-release/2019/press-release-29-03-19-en.html>. Accessed 7 Apr 2021.
- Kemp, S. (2020). Social media users pass the 4 billion mark as global adoption soars. *We are social*. Retrieved from: <https://wearesocial.com/blog/2020/10/social-media-users-pass-the-4-billion-mark-as-global-adoption-soars>. Accessed 8 Apr 2021.
- Khatri, I. (2019). Information Technology in Tourism & hospitality industry: A review of ten years' publications. *Journal of Tourism and Hospitality Education*, *9*, 74–87.
- Kim, S., & Nam, C. (2016). Hallyu revisited: Challenges and opportunities for the south Korean tourism. *Asia Pacific Journal of Tourism Research*, *21*(5), 524–540.
- Kim, J., Kim, P. B., Kim, J.-E., & Magnini, V. P. (2016). Application of construal-level theory to promotional strategies in the hotel industry. *Journal of Travel Research*, *55*(3), 340–352.
- KNOEMA (n.d.). *Thailand - Contribution of travel and tourism to GDP as a share of GDP*. Retrieved from: <https://knoema.com/atlas/Thailand/topics/Tourism/Travel-and-Tourism-Total-Contribution-to-GDP/Contribution-of-travel-and-tourism-to-GDP-percent-of-GDP>. Accessed 27 Mar 2021.
- Kononova, O., Prokudin, D., & Tupikina, E. (2020). From e-tourism to digital tourism. Terminologically review. In *CEUR workshop proceedings* (Vol. 2784, pp. 164–177). RWTH Aachen University.
- Lee, H. A., Denizci, G. B., & Law, R. (2013). An examination of the relationship between online travel agents and hotels: A case study of choice hotels international and Expedia.com. *Cornell Hospitality Quarterly*, *54*(1), 95–107.
- Mariani, M. M., Borghi, M., & Gretzel, U. (2019). Online reviews: Differences by submission device. *Tourism Management*, *70*, 295–298.
- Millington, A. (2019). The 19 most visited cities around the world in 2019. *Business Insider*. Retrieved from: <https://www.businessinsider.com/most-visited-cities-around-the-world-ranked-2019-9>. Accessed 8 Mar 2021.
- Monaworld. (2020). *Best Apps for Thailand Travel – Top 10 Useful Apps in Thailand*. Retrieved from: <https://thaiest.com/blog/useful-apps-for-travelling-in-thailand?fbclid=IwAR2UIZs5IDfyjaWPCJIS5nlyImeJjfOhKoBfiNYB3r0FWVfVikNJ0fnhazc>. Accessed: the 28 Mar 2021.
- Naramski, M., & Herman, K. (2020). The development of Mobile tourism in the upper Silesian metropolitan area of Poland. *Sustainability*, *12*(1), 44.
- Noinan, K., Somprasitwit, N., Jaisungnern, S., Sranoi, A., Nount, K., & Wicha, S. (2018). Route recommendation for local tourism: The empirical system of Chiang Rai province. In *2018 international conference on digital arts, media and technology (ICDAMT)* (pp. 285–290). Chiangrai: IEEE.
- Ploadaksorn, P., & Angkanannon, K. (2018). Gathering requirements and designing Mobile application Phra Mahathat Woramahawihan Temple for Thai tourists. *Journal of Management Sciences Surattthani Rajabhat University*, *5*(2), 85–104.
- Prayukvong, W., Huttasin, N., & Foster, M. J. (2015). Buddhist economics meets agritourism on the Thai farm. *International Journal of Culture, Tourism and Hospitality Research*, *9*(2), 183–199.
- Rogers, E. M. (1995). Diffusion of innovations: Modifications of a model for telecommunications. In *Die diffusion von innovationen in der telekommunikation* (pp. 25–38). Springer.

- Santos, F., Almeida, A., Martins, C., Gonçalves, R., & Martins, J. (2019). Using POI functionality and accessibility levels for delivering personalized tourism recommendations. *Computers, Environment and Urban Systems*, 77, 101173.
- Schaal, D. (2015). *The state of mobile booking 2015*. Retrieved from: <http://cdn2.hubspot.net/hub/449646/file-2570942564-pdf/29-SkiftReport-State-of-MobileBooking-20151.pdf>. Accessed 8 Mar 2021.
- Shaw, N., & Sergueeva, K. (2019). The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value. *International Journal of Information Management*, 45, 44–55.
- Somkait, C., Sakchai, J., & Sompod, K. (2014). *Android application development for tourism in Kanchanaburi province*. Nakhorn Pathom Rajabhat University.
- Taecharungroj, V., & Mathayomchan, B. (2019). Analysing TripAdvisor reviews of tourist attractions in Phuket, Thailand. *Tourism Management*, 75, 550–568.
- Tan, G. W. H., Lee, V. H., Lin, B., & Ooi, K. B. (2017). Mobile applications in tourism: The future of the tourism industry? *Industrial Management & Data Systems*, 117(3), 560–581.
- Tiyaphipat, I. (2017). Basic of Creative Tourism. Paper presented at the 49th IASTEM International Conference. San Francisco, LA: the 20th-21st March.
- Tourism Authority of Thailand (TAT) (2017). *TAT's marketing plan 2018 to heighten Thailand as a preferred destination*. Retrieved from: <https://www.tatnews.org/tats-marketing-plan-2018-to-heighten-thailand-as-a-preferred-destination/> Tourism Authority of Thailand. Accessed 28 Feb 2021.
- Tourism Authority of Thailand (TAT) (n.d.). *TAT Contact Center*. Retrieved from: <https://www.tatcontactcenter.com/en/About-us>. Accessed 8 Feb 2021.
- Trakulmaykee, N., & Benrit, P. (2015). Investigating determinants and interaction quality effects on tourists' intention to use mobile tourism guide. *International Journal of Innovation and Technology Management*, 12(01), 1550005.
- Trakulmaykee, N., Trakulmaykee, Y., & Hnuchek, K. (2016). Statistical analysis: Improvement of technology acceptance model in mobile tourist guide context. *Journal of Advanced Management Science*, 4(3), 181–186.
- Tussyadiah, I. P., & Wang, D. (2016). Tourists' attitudes toward proactive smartphone systems. *Journal of Travel Research*, 55(4), 493–508.
- World Tourism Organization (UNWTO). (2005). *Making tourism more sustainable - a guide for policy makers* (pp. 11–12). UNWTO.
- World Tourism Organization (UNWTO). (2017). *Yearbook of tourism statistics*. UNWTO.
- Xiang, Z., Du, Q., Ma, Y., & Fan, W. (2017). A comparative analysis of major online review platforms: Implications for social media analytics in hospitality and tourism. *Tourism Management*, 58, 51–65.

Chapter 17

Virtual Tourism Experience: A Tale from Malaysia



Sharina Osman

Abstract The tourism and hospitality industry is one of the sectors that have witnessed more remarkable changes brought by technology. Technology is paramount that contributed a lot towards the success of this industry around the world. However, even though the adoption of technology in the tourism sector is outraging, the infestation of the world Pandemic Coronavirus has made the industry even more dependable on technology. The movement restriction and the concern of being infected change how people look at travelling. Exploring the world from the comfort of their own home is the fundamental concept of virtual reality travel that is currently seeing a surge in popularity. These virtual reality travel experiences aim to create a feeling that is as much like being in the actual destination possible. These are made possible with the advancement of technology. Although virtual travel may never replace traditional travel, just as travel platforms, from print to social media, the evolution and application of new technology, virtual travel potentially become as popular as actual travel exploration. This chapter elucidates the virtual tourism experience and explores how far the virtual experience helps ramps up tourism in Malaysia. It also discusses the intriguing possibilities around virtual travel experience, collected from the involvement of the participants of the MyVirtual Experience Program.

Keywords Technology innovation · Virtual tourism experience · Tourism · Malaysia

S. Osman (✉)
Head of Tourism Section, Business School, Universiti Kuala Lumpur (UniKL), Kuala Lumpur, Malaysia
e-mail: sharina@unikl.edu.my

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_17

Introduction

The hospitality and tourism industry is one of the sectors that have witnessed more remarkable changes brought by technology. Technology is paramount that contributed a lot towards the success of this industry around the world. However, even though the adoption of technology in the tourism sector is outraging, the infestation of the world Pandemic Coronavirus, better known as COVID-19, has made the industry even more dependent on technology. The COVID-19 pandemic resulted in a substantial decrease in the number of tourists, quantified by the World Tourism Organization as 70% of the international arrivals during the first eight months of 2020 (World Tourism Organization, 2020).

Due to the implications of travelling that may cause the spread of the airborne diseases, many countries imposed movement restriction – inbound and outbound and the closure of borders, resulting in changes in how people look at travelling. Even for some countries like Malaysia, many economic activities, including those related to tourism, such as culture, gastronomy, entertainment, adventure, etc., have disappeared due to the closure of leisure venues and the curfew imposed. However, the need to travel and get away from everyday life persists. In this context, industry players have to innovate ways to face mobility restrictions. One of the ways is offering online experiences through technology platform or Virtual Reality (VR). In other words, online experiences organized by hosts from the country highlighting tourism activities of their place. It questions the capability of Virtual Reality (VR) is in replacing physical travel. This chapter elucidates the extent to which the virtual tourism experience of Malaysian industry players can revive the tourism industry.

Virtual Reality Applications in Tourism

The proliferation of VR capitalizing on the emergence of technology that utilizes realistic computer-generated three Dimensional virtual environment (VE) seeing a surge in popularity, especially in Western countries like Las Vegas, Mexico etc. (Rahman & Bhowal, 2017). VR was first introduced in the early 1960s (Horan, 1997), but its application and development since 2000 are changing the landscape of the tourism industry. As immersive digital environments become more pervasive in the lives of tourists, their use is becoming increasingly important to the tourism industry (Mura et al., 2017). Tourism planning and management, marketing and knowledge sharing, culture, education, accessibility, and heritage preservation can be applied in the use of VR (Guttentag, 2010; Wiltshier & Clarke, 2016).

The application of VR has the potential to replace actual travel to tourist destinations (Wagler & Hanus, 2018; Tussyadiah et al., 2017). This is due to the fact that in a VR environment, all variables could be modified in the attempt to construct the perfect virtual tourist experience (Slater & Sanchez-Vives, 2016). VR is defined as a computer-based simulation that allows incorporating the participants with the

multi-sensory information stimulating auditory, visual, or kinesthetic that enables realistic responses from the environment they embedded in. Regardless of the travel phase or function of the VR application, immersive images for tourism purposes are created by stitching together several overlapping images to produce 360-degree panoramic views, such as walk-throughs of outdoor scenes or lodging establishments. These virtual reality travel experiences aim to create a natural feeling for the user as much like being in the actual destination. These are made possible with the advancement of technology capable of inducing mental state and imagination. The experiences through adopting VR are so naturally as if they are physically transported to tourist sites and attractions. Similarly, the adoption of VR also referred to the virtual environment (VE) that experienced by the users or virtual tourist/visitor (Kim, 2005). Although virtual travel may never replace traditional travel, just as travel advertising platforms, from print to social media, the evolution and application of new technology, virtual travel potentially become as popular as actual travel exploration.

The use of VR in the tourism sector has already gained grounds across the globe. It helps to enhance experiences at touristic sites, for educational purposes during the trip and marketing tool (Guttentag, 2010). It typically deals with on-site applications for heritage, culture, ecological, historical event, etc. Head-mounted displays (HMD) are frequently used in museums, exhibition, and gallery to make interactive objects convey information or simulate a phenomenon. For example, a close look at the volcano or exploring the cave during stone-aged. HMD accompanied by headphones and gloves or other supporting tools to create virtual tactile sensations can add the feeling of immersion increase even more (Gutiérrez et al., 2008). At this point, VR is seen as a complement rather than substitution, replacing the actual visit to the destination. It helps to enrich the experience of tourist to the attraction point or destination. On the other hand, VR can substitute for travel when the location is no longer accessible or highly challenging and destroyed sites (Slater, 2018). A trip to outer space, climbing Mount Everest, the frozen wastes of the Antarctic or visiting old temples in the Amazon may not be possible for most of us; therefore, VR helps substitute the experience.

The favorable implications of VR for tourism are:

- Hassle-free holidays, where all of the variables can be altered to offer the tourist the best possible experience thus avoiding many of the flaws of conventional vacations. It also a low-cost way of travelling.
- Accessibility to closed destinations, the past and the future, can visit inaccessible destinations or move forward or backwards in time. Rather than visiting the actual destination, which is not free of violence, tourists may stay in another location to enjoy other natural features in these destinations.
- Preservation of natural landscape and environment conservation is possible, where a large number of tourists' activities can deteriorate the natural resources, the habitats of native flora and fauna, and environment such as the coral and marine life, defacement of caves associated with tourists/visitors (Odum & Oguamanam, 2019). VR has the potential to reduce the number of visitors and

tourists to a destination while still preserving the ecosystem's integrity. Furthermore, the carrying capacity can be reduced since the number of people who visit a tourist site physically will decrease; because the total hours spent on natural attraction are reduced.

- Opportunity for disabled tourists and those who have health challenges, bringing the travel experience to those with physical handicaps or debilitating illnesses. Also, VR eliminates accessibility barriers for elderly or disabled travelers.
- Virtual conferencing, which has the potential to drastically reduce the amount of business travel.
- Tourists may visit protected or hazardous tourism sites that are not open to the public, as well as locations and attractions that no longer exist (Hobson & Williams, 1995; Sussmann & Vanhegan, 2000; Egger, 2016) or even to immerse themselves in places that do not exist at all, for instance, fantasy worlds (Cheong, 1995).

Negative implications of VR for tourism are:

- Limited “real experience”, especially given the social nature of tourism, it may encourage active participation in local heritage and culture rather than passive observation.
- A decline in the patronage of existing destination will cripple the already less-visited tourism sites. Consequently, contributes to a huge ripple effect on job opportunities and income in tourist destinations. Tourists would be more likely to travel if VR provides them with an all-inclusive package about a destination that includes more than just one spot (Guttentag, 2010, Tussyadiah et al., 2017).
- The dependence of developing countries on their tourism revenues would have an effect on numerous destinations, which includes both underdeveloped and remote from the more extensive tourism consuming areas of the world. In other words, what the host community stands to gain when tourists/visitors visit their tourists'/ heritage sites through VR. Although virtual reality may help in the promotion and preservation of heritage sites, the economic effect may be lost.
- Health risks that have been reported by some writers as a result of immersion or the use of VR equipment.
- Limited reminiscence curtailing the documenting and reliving of holiday memories, as well as the collection of tangible mementos.
- Social implications of creating a generation of potential VR addicts who are unable or unwilling to communicate with fellow human beings.
- Infringement of copyright will be in question. The issue of intellectual property laws will arise when companies use the landscape image of the destinations in VR gadgets. For instance, an infringement has been reported by the Indian government when the government of Bangladesh constructed a replica of the Taj Mahal (Guttentag, 2010). In other words, VR developer makes economic gains without income accruing to the actual destination's developer or operator.

This chapter is written based on the content of the various documents, interviews and social media platforms of the industry players and the local tourists of the virtual experience.

The tourism industry in Malaysia has become one of the world's attractive destination. As mentioned in Thrust, one of the Ninth Malaysia Plan, the state Government said that tourism would become the industry that boosts the value chain on the several focused areas. As mentioned in Business News in the Star Online (2017), the tourism sector formed as the third-largest contributor to the Malaysian economy and maintains a formidable industry that generated RM73.3 billion to the national treasury in 2016. Malaysia registered a total of 4,332,722 international tourist arrivals in 2020, down 83.4% as compared to 26,100,784 recorded in 2019 (Tourism Malaysia, 2021a). Malaysia had record a declining growth in the number of tourist arrivals, but Malaysia is not alone in this. As accordance to the World Tourism Organization (UNWTO), an 84% reduction in arrivals were recorded for the Pacific and Asia. Following the data from the Pacific Asia Travel Association (PATA), Malaysia's ASEAN neighbours saw a substantial drop in tourist numbers, including Singapore (-85.7 percent), Thailand (-83.2 percent), Vietnam (-78.7 percent), and Indonesia (-75 percent) (PATA, 2020). The economy in Malaysia greatly depends on the tourism industry (UKEssays, 2018). Thus, increasing the tourism activities will be resulting in multiplier effects in the other economic sector such as the hotel industry, retails, restaurant and transportation. It shows that Malaysia needs the tourism industry to boost the economy and increase popularity.

Malaysia's Experience

In the Malaysian context, the application of VR in tourism products is still limited. The adoption of VR in tourism has been met skepticism because many destinations depend on tourism to create economic value. The more tourist visited their places, the more income the host community will get to generate. The monetary gains from tourist and visitors aid the conservation and maintenance of the sites. Similarly, at the national level, the country relies greatly on revenue generated by tourism activities and business. The influx of tourist expenditure and foreign investments in tourism infrastructure enhance the host country's economy and enhance the native population's standard of living. Therefore, it is in the country's best interest to attract as many tourists to the country to physically experience tourism.

Developing VR tools can be costly to many, especially small tourism business operators hence the application of VR can only be offered by large operators. For example, VR is widely used to enhance the tourists' experience through an entertainment tool at the famous Resort Worlds Genting at Genting Highland, located about 45 minutes away from Kuala Lumpur. It offers an indoor and outdoor theme park suitable for all ages. VR is designed in various entertainment applications by integrating relevant input and output devices efficiently. Tourists can explore the setting and interact with 3D objects and scenarios to provide a more realistic

experience to enhance their visit. These experiences give users an immersive experience in the virtual world by visualizing 3D objects and scenarios and controlling the scene in a realistic setting. Hence, they get the opportunity to virtually explore the attractiveness of the tourism destination as if it is accurate. However, to experience VR, tourists have to visit the place physically. The service has not been extended remotely where ideally, tourist can still enjoy it from home. Before the outbreak of COVID-19, VR offered pretty much confines within the specific attraction spot, but the country's tourism landscape will change dramatically globally that create demands for a broader application of VR.

Virtual Reality as a Marketing Tool

A commonly discussed topics are the adoption of VR in the perspective of tourism marketing. VR will have a powerful impact on the marketing of tourist destinations, wildy the known and unknown, popular and unpopular, creating avenues for multiple explorations of varieties of tourism attractions in Malaysia. Considering the intangible nature of most tourism products and services (Wang et al., 2017). VR has the potential to enhance the inspiration and information phases of the consumer journey by allowing tourists to get a “taste” of the tourism experience while still engaging with reliable and rich information. It can pique people's attention and encourage them to view the virtual promotional experience, resulting in increased interest and a positive attitude toward the destination (Tussyadiah et al., 2017). It can create curiosity and willingness to view the virtual promotional experience, leading to more substantial interest and a positive attitude towards the destination. For instance, destination marketing organizations, hotels, or other tourism stakeholders have employed web-based virtual tours for communication and attention-capturing purposes (Hyun & O'Keefe, 2012). They allow the virtual tourist to “experience” the destination before going there, and they convert experiential attributes into searchable attributes. When compared to conventional brochures, the adoption of VR could result in better advertising impact (Wan et al., 2007). Also, the intent to share the advertisement experience with others or recommend the destination is more significant if the destination is promoted in VR rather than on a website with static photos or 2D videos (Griffin et al., 2017).

In Malaysia, due to the limitations imposed by the COVID-19 pandemic, numerous campaigns and promotions for the country's tourism industry are now focusing on virtual methods. Taking full advantage of the virtual experience, Malaysia will introduce a “virtual café” for the first time called *Malaysia Truly Asia Café Corner*, highlighting Malaysia's niche products such as specialized scuba diving for the disabled, bird-watching, medical tourism, Malaysia's islands and beaches, national parks, and UNESCO heritage cities (Tourism Malaysia, 2021b). Through this platform, Tourism Malaysia is looking for opportunity to discuss possible collaborations and partnerships by leveraging the business-to-business (B2B) platform. Markets proposed for these collaborations include France, Spain, Portugal, Turkey,

Germany, Moscow, Ukraine, Austria, Italy, Czech Republic, the Balkan Region, and Sweden. Apart from promoting and increasing Malaysia's exposure in the European market, Tourism Malaysia also wants to improve connectivity from main long-haul destinations to Malaysia and use international events like ITB Berlin to attract tourists.

Tourism Malaysia participated in the virtual tourism exhibition AVIAREPS Southeast Asia Virtual Roadshow, conducted in a fully 3D environment, allowing both buyers and sellers to communicate thru their avatars, giving the appearance of a virtual exhibition, in safety and the comfort of everyone's choice of locations without border limitation. Over 500 leading outbound agencies from Southeast Asia are virtually showcasing 33 sellers' goods, destinations, and services (ASEAN). Online business-to-business (B2B) matchmaking appointments allow both sellers and buyers to interact with people who share their interests and maximize tourism business networking opportunities, rekindling old relationships while forging new ones. This exhibition serves as the best alternative platform for buyers and sellers worldwide to discuss their travel businesses amid the current COVID-19 outbreak, limiting physical interaction and travel.

Furthermore, the Ministry of Tourism, Arts and Culture Malaysia (MOTAC), through its agency Tourism Malaysia launched Interactive Digital Brochures, a microsite site that breathes new life into the rebranding of Tourism Malaysia pamphlets via interactive browsing on *ebrochures.Malaysia.travel*. For starters, Tourism Malaysia's top five digital flyers were uploaded on the site, namely Malaysia Travel Guide, Kuala Lumpur, the Dazzling Capital City, Langkawi, and the Jewel Kedah, Islands and Beaches and Adventures with Nature. Unlike the publication of pdf-formatted e-brochures that can only be downloaded and printed, the new digital version of the site now incorporates various multimedia elements such as text, audio, graphics, animation and video for more practical information delivery. The site is user-friendly and more responsive, making it easier for people to access the flyer via technological devices such as tablets, smartphones and laptops. The content of the digital brochure is also easily shared through various other applications such as Facebook, Twitter, WhatsApp and email.

In addition to adopting Google Analytics for data analytics and search engine optimization (SEO) for greater access, the site, specially designed with a more modern and stylish display, and can also be updated instantly. This site configures Google Maps links to help tourists and travel operators plan their trips, choose suitable accommodation and inform the facilities around them such as petrol stations, restaurants, parking facilities and hospitals.

Malaysia My Virtual Experience

When physical travel is restricted, as in the current circumstances, people may choose virtual travelling as a sense of escapism and a break from mundane day-to-day work. In a different approach to virtual reality, tourism players in Malaysia find

ways to stay afloat leveraging on the technology platform. For example, LokaLocal (www.lokalocal.com) VR transforms the way people discover destinations in Malaysia. It offers a 360-degree interactive experience to inspire globetrotters to visit Malaysia. The VR platform is integrated with stories, videos, audio and other elements featuring information about the country's exciting places that can be accessed from any device. The platform creates 143 virtual tours of various accommodation providers, travel attractions, events and interesting places. A tourist is required to tap on the link in each destination's image to enter the 360-degree virtual storytelling experiences. Destinations are categorized to make it easy for the tourist to select their destination based on their interest. The category includes outdoors, beaches, family-friendly, museum and art & culture. Besides, the platform also provides advice like travelling tips and things to do at a particular destination. Many tourist attraction has benefitted from the VR platform. For instance, the Mah Meri Cultural Village now has a virtual tour so visitors can have a glimpse of the indigenous heritage center. Going virtual also facilitates content discovery for venues and activities and, in some cases, boosting engagement and providing real value.

The digital initiatives aim to build the foundation for recovery amidst the slow rebound of tourism in Malaysia. The business is not usual where players need to adjust and strategies to ensure the country's tourism industry keeps alive. Even though the VR platform provided by LokaLocal offers a 360-degree virtual experience, it does not allow social interactions. The pre-recorded voices used to explain the information of the destinations is pretty much one-way communication.

Another virtual experience program in Malaysia known as Malaysia Virtual Experience Program or MyVXp introduced by the Tourism Productivity Nexus and Malaysia Productivity Corporation (MPC) to transform the offline product into a virtual experience maximizing the technology and digital platform. This program aims to amplify the new normal of experiencing tourism—virtual travel of a virtual tourist. It is also helpful as the marketing tools to upsell tourist attractions and destinations in the country once the physical travel ban is lifted. (Fig. 17.1).

The central to the platform is the content that showcases online experiences and the storytelling skills to attract the audience. The unique part of the program is that it encourages tourism operators to join on board to promote the abundance of local touristic products that the country offers virtually. Additionally, the program is also open to the common folk to showcase any good experience, talent or workshops they can offer. The local host needs to create the content to showcase online, and virtual products will be listed for anyone to view for a reasonable fee. As of late October 2020, MyVXp has successfully on board 600 Malaysia hosts onto the collaborative platform listed, such as Kofkino (<https://www.kofkina.com>) and Explore Malaysia Virtually (<https://www.exploremalaysiavirtually.com>) (Tourism Productivity Nexus, n.d.; The Star Online, 2020a). Tourist can browse any collaborative platform to find the local host with activities or any destination of interest. They will also handle online bookings for online activities for the local host and connect to tourist via live sessions. When the booked sessions are live through various platforms such as Microsoft Teams, Google Meet or Zoom, or even Facebook Live, to name a few, tourist will need to log on through their phone or any devices



Fig. 17.1 Malaysia Virtual Experience. (Source: <https://www.facebook.com/myvxp>)

to enjoy the online experience with the hosts. Most of the showcases are real-time; hence tourist can interact with the hosts while watching. Imagine interacting with live Malaysian presenters or guides hosting an hour online doing all sorts of things. It can be a tour of a place that tourists dream of visiting but cannot, a talk about a burning question of history that they want to know, or an on-screen workshop to showcase a craft, or even cook a new dish. All the experience can be enjoyed from the comfort of the home.

So far, it yielded more than 90% (The Star Online, 2020b) on the overall satisfaction index based on the performances and deliveries of the online experiences. According to the showcases' responses received from the attendees as mentioned by a virtual tourist who expressed how she loved the learning through the virtual experience. She gained something from the showcase. "This on-site virtual tour gives one of a kind experience; I totally loved it. It was like being transported to the beautiful Morten village. Shaukani made it so lively, explaining the details of the beautiful houses, herbs in the garden, traditional clothing, and so much more. I liked the way he engaged with the locals on the way, and it made me feel like I was there walking along together. There were even some "virtual" cooking and food tasting, and they looked delicious! I took notes of the kuih recipe shared during the tour, so I can try making them on my own. Great tour, very informative and fun, highly recommended!" (Reviewer 1, Explore Malaysia Virtually, n.d.).

Similarly, this virtual tourist expressed his satisfaction and was having fun with the approach the local host took, "The format of the experience was super excellent and interactive. I liked how Tajuddin introduced the culture, food and traditions using fun quizzes. I was surprised that he balanced the experience well between introducing his country and letting the guests have fun. I would highly recommend

this experience to people who want to enjoy the Malaysian culture with their friends and family and solo travellers like me!” (Reviewer 2, Explore Malaysia Virtually, n.d.).

Another virtual tourist also provides commendable feedback on her experience, “A fantastic first-hand experience of getting to know Malaysia virtually. The session was conducted in an interactive way, with guests learning culturally rich information on Malaysia in a low stakes fun quiz session. My experience was even more special as I had my 12 yr. old daughter joining the session” (Reviewer 3, Explore Malaysia Virtually, n.d.).

Indeed, it has helped to get the business running though not at full speed. It is also a source of income for industry players because most of the virtual showcase offers a small fee, from RM15 to RM50, depending on subject, complexity, and demand. The pioneer ten showcases such as Santai with Fredo, the Untold Beauty of Semporna, Santika Musical Sing-Ang-Klong, back to Nature with Min House Camp, Oil Painting with Aishah, and Negeri Sembilan: Where Women Rule the Clan, each has generated revenue between RM 800 – RM 1200 per one-hour show (Tourism Productivity Nexus, n.d.). Imagine if one host can produce ten showcases a month at RM 30 per ticket to a crowd of 30 guests. These fees are translated into RM 9000 revenue for the host of the virtual experience. MyVXp is formulated based on the 5R approach to reset tourism, namely, Reinvent Product, Research Target Market, Remodelling Marketing and Promotion, Ride-on Technology and Recalibrate the Industry. It also builds on the key activities that make a complete system to the program, including resources, partnerships, costs, value proposition, customer relationship, channel, marketing plan, payment gateway, and revenue stream (Tourism Productivity Nexus, n.d.).

Conclusion

Emerging technologies, for instance VR, have influenced both the tourism supply-side and tourist behavior. VR may be adapted for tourism development in developing nations, but its adoption should count on the receptivity and readiness of the country that wish to adopt it. While the application of VR during the pre-travel phase and on-site is becoming common, VR yet to provide more authentic tourism experiences and improve the sense of presence.

The adoption of VR today is still limited in application in Malaysia due to its challenges and advantages. It is often available at large companies or tour operators, and the usage is within the attraction site. Instead of adopting immersion VR, Malaysian tourism players capitalize on technology platforms to offer a virtual experience known as MyVXp. It has successful help move the tourism industry and benefited many, not only the tourism operators but also the ordinary people who have any interesting content to showcase.

Travelling enables social and cultural interactions, which cannot be delivered with today’s technology. Social interactions or collaborative spaces, which play an essential role in tourism experiences, will be restricted in VR experience. To

conclude, VR can be an alternative type of tourism or a way to enhance travel experiences through technology innovation but not to the extent of replacing physical travelling.

References

- Cheong, R. (1995). The virtual threat to travel and tourism. *Tourism Management*, 16(6), 417–422.
- Egger, R. (2016). *Virtual reality in tourism: A short introduction*. Presentation at the Virtual Reality Summit Salzburg 2016. Salzburg University of Applied Sciences (SUAS).
- Explore Malaysia Virtually. (n.d.). *Our Virtual Experience*. Retrieved from: <https://exploremalaysiavirtually.com>. Accessed 23 Apr 2021.
- Griffin, T., Giberson, J., Lee, S. H., Guttentag, D., Kandaurova, M., Sergueeva, K., & Dimanche, F. (2017). Virtual reality and implications for destination marketing. Paper presented at the *International Conference of the Travel and Tourism Research Association*. Quebec: TTRA, the 20th–22th June, 2017.
- Gutiérrez, M. A., Vexo, F., & Thalmann, D. (2008). *Stepping into virtual reality*. Springer.
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31, 637–651.
- Hobson, J. S. P., & Williams, A. P. (1995). Virtual reality: A new horizon for the tourism industry. *Journal of Vacation Marketing*, 1(2), 125–135.
- Horan, P. P. (1997). *The world is what you make it—an application of virtual reality to the tourism industry*. Masters' thesis. Dublin City University.
- Hyun, M. Y., & O'Keefe, R. M. (2012). Virtual destination image: Testing a telepresence model. *Journal of Business Research*, 65(1), 29–35.
- Kim, G. (2005). *Designing virtual reality systems*. Springer-Verlag.
- Mura, P., Tavakoli, R., & Sharif, S. P. (2017). 'Authentic but not too much': Exploring perceptions of authenticity of virtual tourism. *Information Technology & Tourism*, 17(2), 1–15.
- Odum, C. J., & Oguamanam, C. C. (2019). Archaeotourism and archaeological heritage in Igboland. *African Journal of Hospitality, Tourism and Leisure*, 9(4), 639–654.
- Pacific Asia Travel Association (PATA). (2020). *Quarterly Tourism Monitor 4Q2020: Highlights & infographic*. PATA.
- Rahman, S., & Bhowal, A. (2017). Virtual tourism and its prospects for Assam. *Journal of Humanities and Social Science*, 22(2), 91–97.
- Slater, M. (2018). Immersion and the illusion of presence in virtual reality. *British Journal of Psychological*, 109, 431–433.
- Slater, M., & Sanchez-Vives, M. V. (2016). Enhancing our lives with immersive virtual reality. *Frontiers in Robotics and AI*, <https://doi.org/10.3389/frobt.2016.00074>
- Sussmann, S., & Vanhegan, H. (2000). Virtual reality and the tourism product substitution or complement? In *Proceedings of the Eighth European Conference on Information Systems (ECIS)*, (pp. 1077–1083).
- The Star Online. (2017). *Tourism sector to remain third largest contributor to economy*. Retrieved from: <https://www.thestar.com.my/business/business-news/2017/09/26/tourism-sector-to-remain-third-largest-contributor-to-economy/>. Accessed 21 Apr 2021.
- The Star Online. (2020a). *Explore Malaysia virtually through MyVXp: Digital Tourism Unlimited for as low as RM15!*. Retrieved from: https://www.thestar.com.my/news/nation/2020/11/30/explore-malaysia-virtually-through-myvxp-digital-tourism-unlimited-for-as-low-as-RM15!. Accessed 3 March 2021.
- The Star Online. (2020b). *Covid-19: Virtual methods being used for promoting country's domestic tourism, says Tourism Malaysia D-G*. Retrieved: <https://www.malaymail.com/news/malaysia/2020/04/22/covid-19-virtual-methods-being-used-for-promoting-countrys-domestic-tourism/1859241>. Accessed 3 March 2021.

- Tourism Malaysia. (2021a). *International tourist arrivals to Malaysia plunge 83.4% in 2020*. Retrieved from: <https://tourism.gov.my/media/view/international-tourist-arrivals-to-malaysia-plunge-83-4-in-2020/>. Accessed 20 March 2021.
- Tourism Malaysia. (2021b). *Tourism Malaysia lancarkan laman interactive digital brochures*. Retrieved from: <https://tourism.gov.my/media/view/tourism-malaysia-lancar-laman-interactive-digital-brochures>. Accessed 23 Apr 2021.
- Tourism Productivity Nexus. (n.d.). *Home*. Retrieved from: <https://www.myvxp.com>. Accessed 23 Apr 2021.
- Tussyadiah, I. P., Wang, D., & Jia, C. (2017). Virtual reality and attitudes toward tourism destinations. In R. Schegg & B. Stangl (Eds.), *Information and Communication Technologies in Tourism 2017* (pp. 229–239). Springer.
- UKEssays. (2018). *Tourism Industry in Malaysia Tourism Essay*. Retrieved from: <https://www.ukessays.com/essays/tourism/tourism-industry-in-malaysia-tourism-essay.php?vref=1>. Accessed: the 21st April, 2021.
- Wagler, A., & Hanus, M. D. (2018). Comparing virtual reality tourism to real-life experience: Effects of presence and engagement on attitude and enjoyment. *Communication Research Reports*, 35(5), 456–464.
- Wan, C. S., Tsaur, S. H., Chiu, Y. L., & Chiou, W. B. (2007). Is the advertising effect of virtual experience always better or contingent on different travel destinations? *Information Technology & Tourism*, 9(1), 45–54.
- Wang, T. L., Tran, P. T. K., & Tran, V. T. (2017). Destination perceived quality, tourist satisfaction and word-of-mouth. *Tourism Review*, 72(4), 392–410.
- Wiltshier, P., & Clarke, A. (2016). Virtual cultural tourism: Six pillars of VCT using co-creation, value exchange and exchange value. *Tourism and Hospitality Research*, 17(4), 372–383.
- World Tourism Organization (UNWTO). (2020). *Guiding Tourism's Recovery*. Retrieved from: <https://www.unwto.org/tourism-covid-19>. Accessed 3 March 2021.

Chapter 18

Sentiment Analysis and Its Applications in Assessing Visit Preferences Pre and Post COVID-19: An Indonesian Perspective



Putu Diah Sastri Pitanatri, Muhammad Apriandito Arya Saputra,
and I Gde Pitana

Abstract Social media has shown to affect tourist activity and spending. However, research related to travel intentions from a large-scale perspective has remained very limited in Indonesia. This research presents an empirical case study using the text mining process on Indonesian domestic tourists' travel intentions to fill in the missing gap. Text classification was used to categorize whether a tweet includes travel intentions or not by concentrating on tourism-related tweet data from Twitter before and after the COVID-19 pandemic. The process of entity recognition was also used to classify the entities in the Tweet. This study showed that the Indonesian intention to travel was 13.08 percent higher than before the pandemic of COVID-19. Moreover, it was also found that interest in adventure activities increased by 581.25 percent and honeymoon trips by 175 percent. Surprisingly, 92 percent of short-stay intentions concluded in this research. However, Indonesian tourists who want to take a long tour are rising by 215.18 percent. This study's findings also show Indonesian tourists' choice to fly to many destinations, such as Bali, the Riau Islands, and Bandung. A more successful Indonesian tourism promotion strategy is expected to develop as a result of this research. Referring to the study findings, it appears that the current model of promotion is relatively distinct from the existing one. The promotional activities that emphasize and focus on 1) sustainable growth, 2) improved productivity, 3) investment innovation and digital transformation, 4) morals, culture, and social responsibility, and 5) technological cooperation has become increasingly important to be incorporated in various programs by The Ministry of Tourism of Indonesia.

P. D. S. Pitanatri (✉)

School of Postgraduate of Tourism Studies, Universitas Gadjah Mada, Yogyakarta, Indonesia

e-mail: diahsastr@mail.ugm.ac.id

M. A. A. Saputra

School of Business and Management, Bandung Institute of Technology, Bandung, Indonesia

I. G. Pitana

Faculty of Tourism, Udayana University, Kuta Selatan, Indonesia

Keywords Intention to travel · Text mining · Intention detection · Entity recognition · Domestic tourists · Promotional strategies

Introduction and Background

COVID-19 pandemic has changed tourism exponentially. Destinations, which were once blamed for being over-tourism, have now switched to no tourism. The world has finally realized how important this sector is to the upstream and downstream economy flow. Destinations that rely on the tourism sector for their economy; devastated. The question then is, is tourism going to be resilient? Or should the destination be searching for a new sector as life support? These two issues are among the main themes of the numerous tourism discussions and webinars, particularly in the new normal period, when the number of tourists fell drastically, with social distancing followed by travel restrictions.

It is crucial to understand the tourists' mind, their expectations, and travel motivation (Maoz, 2018; Pitana and Pitanatri, 2016; Wang et al., 2016a). However, it is challenging to foresee anxieties and desires through conventional research. Furthermore, during the pandemic, it is also difficult to conduct field research (Gunagama et al., 2020; Lapointe, 2020; Lew et al., 2020; Sigala, 2020). Also, while online questionnaires are available, the amount and quality of the data from online respondents are questioned because it is very difficult to see whether those who completed the survey were "fit" to fill out – and this is one of the benefits of conducting sentiment research through big data.

Sentiment analysis research using big data from social media has the ability to reduce the divide between academia, government, and the business sector. Big data analysis will provide a better picture not just of tourism studies but also of the tourism industry so that 'smart' tourism can be more comprehensively assessed.

With the advent of social media and mobile technology, tourists can exchange satisfactory and unsatisfactory service reviews and impressions without any time or spatial constraints (Adnyani and Pitanatri, 2017; Budiasa and Pitanatri, 2015; Huang et al., 2017). Research has shown that social media and mobile technology have become essential platforms for pre-purchase knowledge sharing (Law et al., 2018; Wang et al., 2016a,b), and online engagement is a key feature of modern customer experience (Femenia-Serra et al., 2019; Shin et al., 2019). Consumer-generated content is communicated through increasingly popular Social Networking Sites (SNSs) such as TripAdvisor, Twitter, and Facebook (Colladon et al., 2019; Liu and Mattila, 2017; Zhao et al., 2019). These unique communication networks have changed the way consumers assess consumer-centric, community-based awareness by enabling them to share their experiences, thereby increasing online interpersonal power and eWOM.

This research aims to identify and share ideas about valuable lessons that may be learned for the tourism sector from the pandemic and the prospects for tourism development that may arise after the outbreak has subsided. The discourse

presented includes a literature study and discussion of tourism development ideas, both from the form and planning ideas for tourism diversification in Indonesia. This is done as an effort to increase tourism resilience at the local, regional and international levels in the time scenario leading to or after the pandemic subsides.

The output of this research is expected to provide the Ministry of Tourism of Indonesia and related authorities with a detailed picture. The study is also expected to be a model that can be duplicated in other destinations. Knowing the trends of tourist sentiment; then, the findings of this study become the basis for further studies to predict tourist motivation when visiting a destination in real-time; attraction of destinations and potential for leakage of tourism in various destinations in Indonesia.

Methodology

The research uses the text mining method/approach. Text Mining is a method of extracting useful information from unstructured text files. Text mining is commonly used to examine an unstructured text, such as the content on social media and websites. This study, therefore, uses Twitter to forecast feelings towards Indonesian tourists before and during the COVID-19 pandemic.

Twitter is being used because it is one of the most common communication channels in the world today. This can be seen from the increase in users of Twitter reported around the world. Based on infographic data (2014–2015) Twitter has 302 million active users, 80 percent of which are from mobile devices. Of these, 37% of Twitter users are between 18 and 29 years of age, while 25% are between 30 and 49 years of age. With such daily users, Twitter receives 500 million tweets every day. As many as 68% are in the form of replies, 26% are in the form of Tweets, and 6% are in the form of tweets (Skift Research, 2020). The growing number of Twitter users can be seen from the millions of tweets that are posted on various topics every day. These tweet data can be in the form of public views of both the economy, social activity, natural phenomena, and trade around the world.

Once the data is collected, Tweet in the form of text must be pre-processed first. Text pre-processing is designed to minimize noise and structure data so that modeling can be performed. Pre-processing tweet data is then modeled on the Text Classification system based on the Naïve Bayes Classifier algorithm, which uses machine learning concepts to decide whether or not a tweet is intended to travel. Tweet data containing the intention to travel will then be further analyzed using entity recognition to identify entities related to the intention/intention of the trip (Fig. 18.1).

Travel intention is a stage in the process of determining whether or not a tweet includes travel intentions. This is intended to avoid the processing of noise in the form of tweets beyond the tourism context. The following are examples of tweets that include and do not contain travel intentions (Table 18.1).

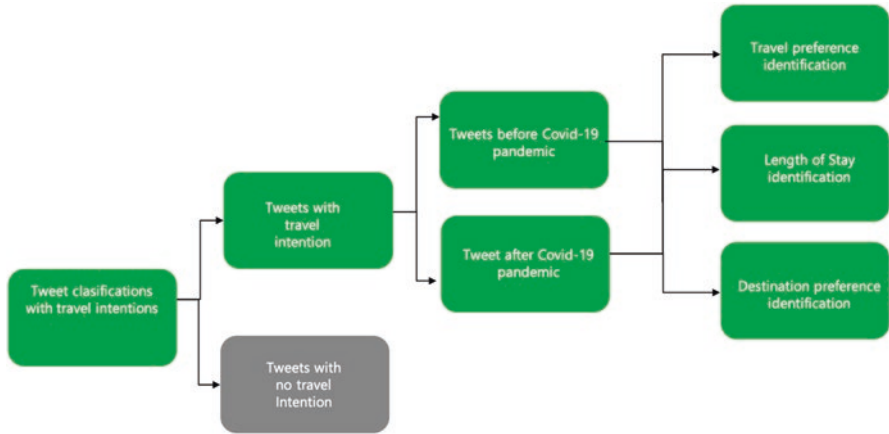


Fig. 18.1 Research Framework. (Source: authors’ construct, 2020)

Table 18.1 Samples of Tweet with and without travel intentions

Tweet with travel intention	Tweets with no travel intention
Looking forward to the upcoming holiday to Bandung ya, let’s forget about diet, hehe	Is it more holidays than usual?
Currently planning for a family vacation to Jogja for the end of the year. Hmm, can’t hardly wait	When I was a student, holidays during school days made me very happy. Now, when I’m a teacher, school holidays are really boring.
Can I dream of having a vacation to Bali.	After reading my father’s novel, I want to write my own novel. But how to write a book, when your teacher just asked me to write a holiday essay, I didn’t know what to write. ‘-’
Can you sleep, then the next day the corona is finished. I really want a staycation, want to go out, need a new atmosphere.	The policy of temporarily closing mount Puntang tourist attraction carried out as a precautionary measure to prevent the transmission of COVID-19.
Wanting a vacation out of town right now. So bored!!	Dear all, dating is not a matter of caffe date, staycation, Netflix and chill. But you’ve got to be able to be your partner’s emotional help, you both have to understand and want to change. Not burnout! If you have a girlfriend, you’d rather be single.

Source: Primary data (2020)

Of the 201,578 tweets that have been collected, 78,505 contain travel intentions, and 123,073 tweets do not contain travel intentions. Furthermore, this study will only use tweet data containing travel intention only.

Results

The Intention of Traveling to Indonesian Tourist Destinations Before and After the COVID-19 Pandemic

Before the COVID-19 pandemic, counted as many as 37,125 tweets containing travel intentions. What is noteworthy is that during the new normal period, the number of tweets indicating the intention to travel actually increased by 13.03 percent or 41.980 tweets. Overall, 47 percent of the data collected included the intention to fly ahead of COVID-19. Meanwhile, the remaining 53 percent is intended to travel, after the new normal period, to domestic visitors (Fig. 18.2).

Interestingly, data have shown that the tendency of Indonesian to travel during the new normal period continues to increase considerably. The intensity of Indonesian who want to take their holiday can be clearly seen in the results of the study. While there is a substantial decrease in the intention to travel after April 2020, the trend of travel for the Indonesian has actually increased. As seen in Fig. 18.3 below, Indonesian were already at the point of getting tired of being “just at home” in May 2020. This may be due to the policy of the Large-Scale Social Constraints, which indicates a desire to leave the house immediately for leisure or tourism purposes.

Figures 18.2 and 18.3 below also confirms the resilience of the Indonesian people to tourism in the face of the COVID-19 pandemic. Traveling has become a requirement for the people of Indonesia so that regardless of the pros and cons of closing destinations, it actually triggers the population to carry out tourism activities.

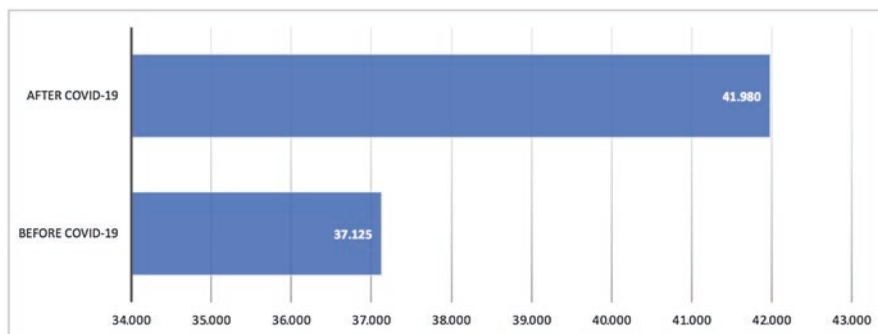


Fig. 18.2 Tweets with the intention to travel before and after the announcement of COVID-19 in Indonesia. (Source: primary data, 2020)

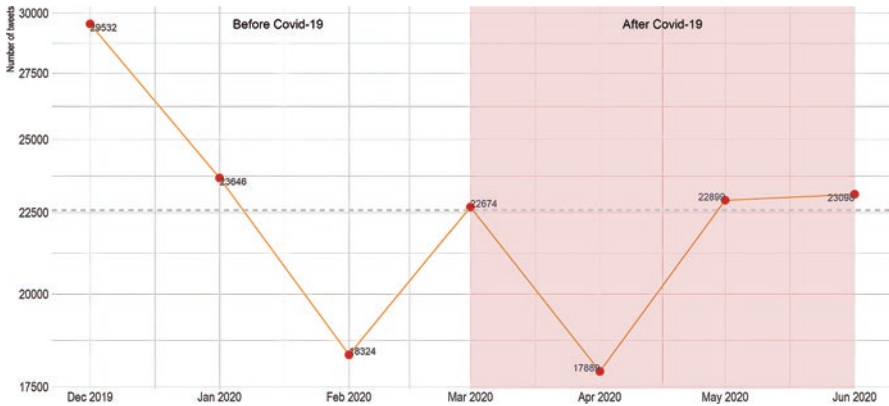


Fig. 18.3 Tweets with Intention to Travel Before and After the Announcement of COVID-19 in Indonesia. (Source: primary data, 2020)

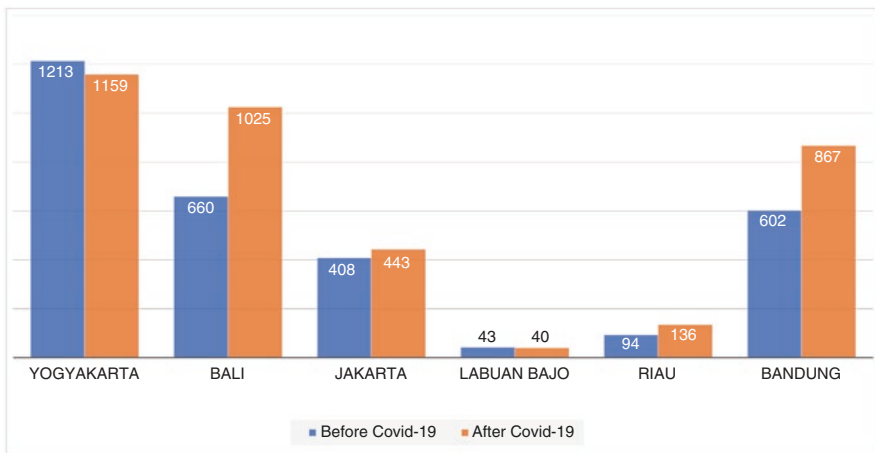


Fig. 18.4 Tourism destination preference. (Source: primary data, 2020)

Destination Preference

In regards to destination preferences, this study confirms that Bali, Yogyakarta and Bandung are the major tourist destinations for Indonesian tourists. This reflects Indonesians’ desire to visit the destinations are relatively high compared to other destinations in Indonesia (Fig. 18.4).

Interestingly, when we examine the changing of preferences, Bali appears to be the most popular destination, with an increase of 55.30 percent from the pre-COVID-19 pandemic. As shown in Fig. 18.5 below, popular destinations in Indonesia have varied during the pandemic. Even though Bali still has its own place in the hearts of Indonesian tourists, other destinations such as Bandung and Riau islands have their own popularity.

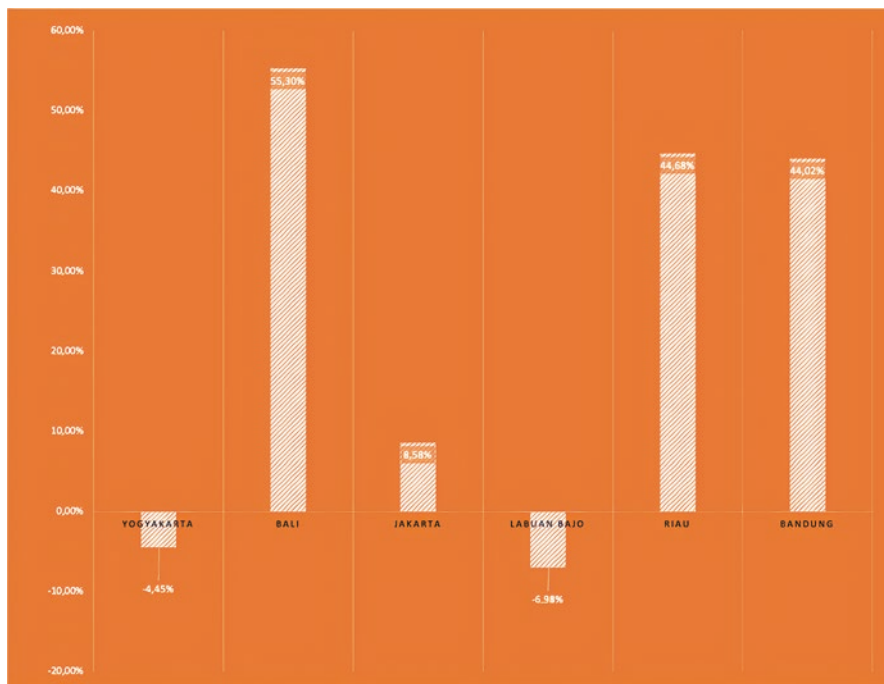


Fig. 18.5 Changing of preference in tourist destination sentiment before and after COVID-19. (Source: primary data, 2020)

While not quite significant, there was a decrease in tourism preferences of -4.45 percent for Yogyakarta and -6.98 percent for Labuan Bajo. Interestingly, the intention to travel to Bandung increased by 44.02 percent and to the Riau Islands by 44.68 percent. It is a good indication of the growth of potential in both areas, particularly for domestic tourists.

Motives of Visit and Visit Period

The next stage of this research is to look into the motive intentions of Indonesian tourists, which will then refer to their potential typology. Figure 18.6 below indicates that gastronomic tourism is Indonesia's leading choice. This means that the potential for gastronomic tourism in Indonesia is very great given the high interest of tourists in carrying out this tourist activity.

From a different viewpoint, it turns out that there are a decline and a rise in the interest of domestic tourists, as seen in Fig. 18.7 below. When viewed from the percentage change, the public interest in conducting adventure activities has risen to 581.25 percent since the pre-pandemic era. There was also a significant rise in the public interest in honeymoon travel and romance, with an increase of 175% over the pre-pandemic period.

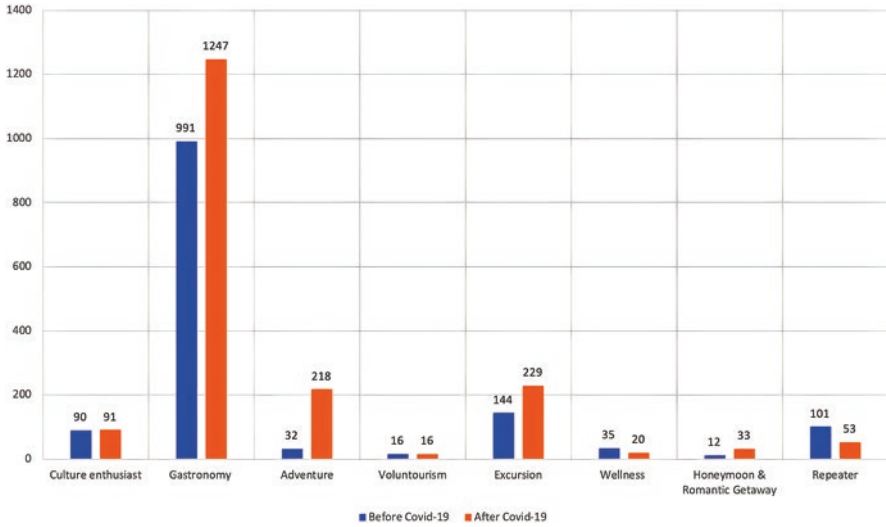


Fig. 18.6 Motives of visit before and after COVID-19. (Source: primary data, 2020)



Fig. 18.7 Changes in the motivation of visit of Indonesian tourists. (Source: primary data, 2020)

Apart from growing the interest of domestic tourists to carry out adventure tourism activities, evolving part is also evident in the well-being and recurrence of tourists. The propensity to conduct wellness tourism activities decreased by 42,86 percent. The same can be seen for visitors who want to “return” to the destinations they visited, which reduced by 47.52 percent.

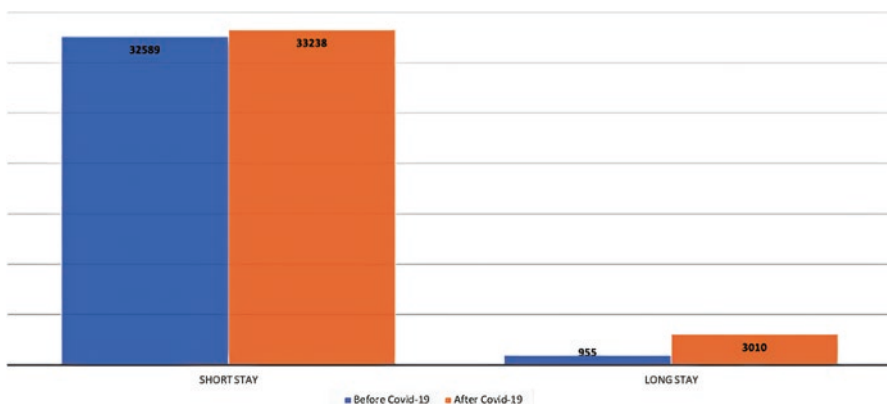


Fig. 18.8 Length of stay preference before and after COVID-19. (Source: primary data, 2020)

Some assumptions support these two outcomes. First, people would reconsider doing wellness tourism because it is directly linked to physical touch. For example, a home massage service was no longer available after the COVID-19 pandemic was announced. Second, group loyalty to destinations is relatively low due to the reluctance to explore destinations that have never been visited before.

This is relatively similar to what UNWTO stated in its release that in post-pandemic, destinations were dominated by local tourists; who want to “explore their territory”. From the study, it was found that the majority of Indonesians prefer short-term travel. Even before the pandemic was announced, the intention of a short visit was already evident, as shown below in Fig. 18.8.

While it is dominated by short-stay preferences; with an increase in intent, it appears that long-stays increased dramatically to 215.18 percent (from 955 tweets to 3010 tweets) of the purpose before the pandemic was declared, unlike the case with the short-stay preference rise, which only rose by 1.99 percent. This means that niche markets that prefer the length of stay in destinations still exist, and these are the potential markets for the industry.

Re-thinking Tourism Promotion

The results of the analysis from the above research are then used to dig deeper into the needs of Indonesia’s promotion. Looking into results on the intention of traveling of Indonesian, their destination preference as well as their motives of visit and visit period; this research shows in the long-term strategy, the development of demand is not about providing low prices destination. Building the confidence of tourists to come to their destinations will be foremost important to establish a sustainable tourism destination in Indonesia. Hence, this study looks into the UNWTO program and adapts it to what is needed for tourism promotion in Indonesia, as shown in Fig. 18.9 below.



Fig. 18.9 Indonesia's New Wave Tourism Promotion Strategy. (Source: authors' construct, 2020)

Sustainable Development

While it seems to be a cliché, the data show that tourists prefer very high adventurous activities, with an increase of 581,25 percent (see Fig. 18.7). This implies that sustainable tourism must be emphasized by maintaining the elements of sustainability, namely the economy, social culture, and the natural environment.

Promotional activities can be made, for example, by promoting destinations that offer an element of adventure in the wider world. It would be a positive promotion if it were expressed in the media that part of the tourism production was also committed to developing sustainable destinations (Christou et al., 2019; Pitanatri, 2019a). Essentially, there are needs to be a joint effort to deal with the change in tourism that underlies post-pandemic tourism. From the data provided, there is also a focus on understanding shifts in tourism attitudes and actions in the new normal period.

Both stakeholders in the field of tourism need to address this by innovating to revive tourism in the future. Mass tourism, which has become the mainstay of many destinations with physical distances, needs to be reconsidered (Chung et al., 2017; Pitanatri, 2019b; Wijayanti and Damanik, 2019). Visits that are individual or in small groups of less than five people and local tours within the region in some destinations will continue to expand even during a pandemic. To ensure that the tour package promotion model, by prioritizing adventure, gastronomy and honeymoon experience as the data analysis outcomes, must be prepared by destinations while retaining sustainability elements.

In this model, stakeholders and the tourism industry, need to train companies so that they can break down the concentration of mass. Alternatives for tourist destinations may be possible for non-mass tourism and border tourism types.

Competitiveness

While it is reported that the mass tourism model is supposed to be victorious again, it will take a long time to allay prospective visitors' fears about the spread of the virus to the crowd (Mufti, 2020). It is crucial from this statement that the competitiveness of a destination is significant. It is a promotional factor that refers to the focus on specific points of sale.

As mentioned in the data analysis, repeater guests who have already arrived at their destination have no intention of returning (see Fig. 18.7). This means that domestic tourists are not loyal tourists. If there is a propensity to repeat the location, the area's tourist preferences would be diminished.

It is also a perfect time to review that the general idea of taking visitors to a destination is diversification of tourism. At the industrial level, growing competition would have consequences for enhancing the quality of human capital. This is a potential for positive input from visitors visiting the destination. Promotions in a new age or promotions that "don't seem to be doing any promotional activities" would be the next trend in the future.

Innovation, Investment, and Digital Transformation

Looking at the analysis results, it appears that the gastronomy experience is one of the trends that emerged after the pandemic. One of the reasons is related to the innovations that have emerged from this creative industry. The pandemic has undeniably spawned micro "from home" businesses, which are dominated by culinary businesses.

Culinary that is packaged in innovation, creativity, and promoted digitally; are proven to attract the consumer to buy (Jansen and Hjalager, 2019; Putra et al., 2018). During the lockdown in Indonesia, restaurants are "force" to make a digital transformation by selling their products online. Product innovation like this has initiated the intention of domestic tourists to taste home-made culinary products.

Apart from product innovation, the digital tourism model can also be considered a solution in the new normal era. In the tourism sector, digitization opens opportunities to expand the market reach that contributes to growth, operational efficiency and sharpens competitive advantage.

Ethics, Culture, and Social Responsibility (Morality, Culture and Social Responsibility)

COVID-19 pandemic has given birth to a new empathetic society in Indonesia. This is also due to the culture of cooperation that has been embedded in Indonesian society. For example, at the beginning of the pandemic (March 2020), many *crowdfunding activities* were intended for both medical personnel and those who were directly

affected by the pandemic. For example, at that time, the Indonesian online motorcycle taxi driver (GOJEK) has become the target for social solidarity. Solidarity is carried out through various initiatives such as viral posts on social media by netizens ordering food through go-food, but the order is for the driver’s family.

Apart from that, the Kitabisa.org website was one of the pioneers to raise funds in Indonesia. As shown in Fig. 18.10 below, fundraising through the #dirumahaja music concert has increased more than 13 billion rupiahs. An even more fantastic amount was collecting more than 32 billion rupiahs with the #kuatbersama from Kitabisa.org. This is something new for Indonesian society. Amid a pandemic, a sense of empathy grows and develops.

From the examples above, the promotion that emphasizes the social side and community empathy will be the new wave. Therefore, destination promotion should be carried out with the aim of “knocking the hearts of potential tourists”. The role of influencers who are right on target with creative content is believed to be able to initiate the promotional activities.

Technical Cooperation and Collaboration

The next promotional model is a technical collaboration where the support of tourism stakeholders is needed in rebuilding destinations that were destroyed by the COVID-19 pandemic. One of the partnerships that can be built is promotion and concern for the cleanliness and health of tourists and business actors.

Tourism industry actors and human resources, along with related stakeholders, such as local governments, communities, and health institutions, must apply prevention and preparedness protocols related to handling COVID-19 in destinations. The promotional emphasis here is not only on selling tour packages but rather on technical efforts that can later rebuild the trust of tourists.



Fig. 18.10 Samples of crowdfunding in Indonesia to minimize the impact of COVID-19. (Source: KitaBisa.com, 2020)

Service providers and hospitality industry workers such as restaurants and hotels also need to have adequate knowledge and be ready so that tourists are not unreasonably rejected for fear. Besides, communication channels must remain open between all tourism stakeholders and local and regional public health authorities as part of a proactive strategic response plan (Hall et al., 2020; Ioannides and Gyimóthy, 2020). In addition, collaborative efforts can also be made by setting up hand cleaning facilities, including the availability of hand sanitizers in public spaces.

Conclusion and Discussions

From the analysis, it appears that the Indonesian people's travel intention is relatively large compared to the pre-pandemic period. This implies positive public sentiment that the tourism sector will be resilient again, although in an undetermined period. Therefore, the readiness, preparedness, and collaboration of tourism industry players and stakeholders are very substantial in preventing and controlling the spread of the COVID-19 outbreak through the tourism sector.

The data show that the new era promotion model is relatively different from conventional promotion. The promotional emphasis that focuses on 1) sustainable development, 2) increased competitiveness, 3) investment innovation and digital transformation, 4) morality, culture, and social responsibility, and 5) technical collaboration is very important to be applied in various promotional programs. Furthermore, technological developments provide opportunities for innovation to build digital tourism as a diversification strategy that can bring tourists virtually. Meanwhile, for the long term, the niche market for domestic tourists can be developed considering the immense potential for this market.

This study's discussion is not a final and recommendation to deal with the condition of tourism that has been battered by the COVID-19 pandemic. Joint efforts to break the chain of disease spread and recovery of the tourism sector need to go hand in hand with full awareness by all society levels. The dynamic developments and changes in these pandemic conditions still allow the opening of various tourism development options and further evaluations over time. Discussions at the next stage regarding post-pandemic tourism can then focus on evaluating the efforts made so that they can be immediately applied to related destinations that have experienced the pandemic's impact.

References

- Adnyani, I. G. A. P., & Pitanatri, P. D. S. (2017). Pengaruh Electronic Word of Mouth Terhadap Keputusan Menginap Bagi Tamu Fit (Free Independent Traveller) : Studi Kasus Di Hilton Bali Resort. *Jurnal Bisnis Hospitaliti*, 6, 1–21.
- Budiasa, I., & Pitanatri, P. D. S. (2015). Perilaku Segmen Pasar Online dalam Membuat Pemesanan Kamar Hotel di Bali. *Jurnal Bisnis Hospitaliti*, 4(1), 78–86.

- Christou, P. A., Farmaki, A., Saveriades, A., & Spanou, E. (2019). The “genius loci” of places that experience intense tourism development. *Tourism Management Perspectives*, 30, 19–32.
- Chung, H. C., Chung, N., & Nam, Y. (2017). A social network analysis of tourist movement patterns in blogs: Korean backpackers in Europe. *Sustainability*, 9(12), 2251.
- Colladon, A. F., Guardabascio, B., & Innarella, R. (2019). Using social network and semantic analysis to analyze online travel forums and forecast tourism demand. *Decision Support Systems*, 123, 113075.
- Femenia-Serra, F., Perles-Ribes, J. F., & Ivars-Baidal, J. A. (2019). Smart destinations and tech-savvy millennial tourists: hype versus reality. *Tourism Review*, 74(1), 63–81.
- Gunagama, M. G., Naurah, Y. R., Prabono, A. E. P., Arsitektur, D. J., Indonesia, U. I., Arsitektur, M. J., Indonesia, U. I., Arsitektur, M. J., & Indonesia, U. I. (2020). Pariwisata Pascapandemi: Pelajaran Penting dan Prospek Pengembangan. *LOSARI: Jurnal Arsitektur Kota dan Pemukiman*, 5(2), 56–68.
- Hall, C. M., Scott, D., & Gössling, S. (2020). Pandemics, transformations and tourism: Be careful what you wish for. *Tourism Geographies*, 22(3), 577–598.
- Huang, C. D., Goo, J., Nam, K., & Yoo, C. W. (2017). Smart tourism technologies in travel planning: The role of exploration and exploitation. *Information and Management*, 54(6), 757–770.
- Ioannides, D., & Gyimóthy, S. (2020). The COVID-19 crisis as an opportunity for escaping the unsustainable global tourism path. *Tourism Geographies*, 22(3), 624–632.
- KitaBisa.com. (2020). *Indonesia Lawan Corona*. Retrieved from: <https://kitabisa.com/campaign/indonesialawancorona>. Accessed 12 Jan 2021.
- Lapointe, D. (2020). Reconnecting tourism after COVID-19: The paradox of alterity in tourism areas. *Tourism Geographies*, 22(3), 633–638.
- Law, R., Chan, I. C. C., & Wang, L. (2018). A comprehensive review of mobile technology use in hospitality and tourism. *Journal of Hospitality Marketing and Management*, 27(6), 626–648.
- Lew, A. A., Cheer, J. M., Haywood, M., Brouder, P., & Salazar, N. B. (2020). Visions of travel and tourism after the global COVID-19 transformation of 2020. *Tourism Geographies*, 22(3), 455–466.
- Liu, S. Q., & Mattila, A. S. (2017). Airbnb: Online targeted advertising, sense of power, and consumer decisions. *International Journal of Hospitality Management*, 60, 33–41.
- Maoz, D. (2018). The mutual gaze. *Annals of Tourism Research*, 49(1), 283–299.
- Jansen, J. M., & Hjalager, A.-M. (2019). Travel motivations of first-time, repeat, and serial backpackers. *Tourism and Hospitality Research*, 19(4), 465–477.
- Mufti, R. R. (2020). Tourism will take at least a year to recover from COVID-19 outbreak: Economists. *The Jakarta Post*. Retrieved from: <https://www.thejakartapost.com/news/2020/04/06/tourism-will-take-at-least-a-year-to-recover-from-covid-19-outbreak-economists.html>. Accessed 12 Jan 2021.
- Pitana, I. G., & Pitanatri, P. D. S. (2016). Digital marketing in tourism: The more global, the more personal. *International Tourism Conference: Promoting Culture and Heritage Culture*. Bali: 1-3 September, 2016.
- Pitanatri, P. D. S. (2019a). Challenging the giants : Factors competitiveness in Ubud Bali contributing to local homestay. *The Journal of Social Sciences Research*, 5(3), 796–802.
- Pitanatri, P. D. S. (2019b). Override parade : isu-isupariwisata berkelanjutan pada destinasi kepulauan di Indonesia. *Media Wisata*, 17(2), 131–149.
- Putra, I. N. D., Raka, A. A. G., Yanthy, P. S., Aryanti, N. N. S., & Pitanatri, P. D. S. (2018). *Wisata Gastronomi Ubud-Gianyar*. Cakra Media Utama bekerja sama dengan Dinas Pariwisata Kabupaten Gianyar.
- Shin, H., Perdue, R. R. and Pandelaere, M. (2019). Managing customer reviews for value co-creation: An empowerment theory perspective. *Journal of Travel Research*, 004728751986713.
- Sigala, M. (2020). Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research. *Journal of Business Research*, 117, 312–321.
- Skift Research. (2020). *The Megatrends Defining Travel in 2020*. Retrieved from: <https://skift.com/2020/01/07/the-megatrends-defining-travel-in-2020/>. Accessed 10 Dec 2020.

- Wang, C., Qu, H., & Hsu, M. K. (2016a). Toward an integrated model of tourist expectation formation and gender difference. *Tourism Management, 54*, 58–71.
- Wang, D., Xiang, Z., & Fesenmaier, D. R. (2016b). Smartphone use in everyday life and travel. *Journal of Travel Research, 55*(1), 52–63.
- Wijayanti, A., & Damanik, J. (2019). Analysis of the tourist experience of management of a heritage tourism product: Case study of the Sultan Palace of Yogyakarta, Indonesia. *Journal of Heritage Tourism, 14*(2), 166–177.
- Zhao, Y., Xu, X., & Wang, M. (2019). Predicting overall customer satisfaction: Big data evidence from hotel online textual reviews. *International Journal of Hospitality Management, 76*, 111–121.

Chapter 19

Ubiquitous Role of Technology Based Social Media Application in the Vietnamese Tourism Industry



Hasanuzzaman Tushar, Syed Far Abid Hossain, Bui Nhat Vuong,
A. K. M. Mohsin, and Mohammad Abu Horaira

Abstract The recent years have evidenced the immense popularity of social media through a technological advancement that has fundamentally introduced a new paradigm in the tourism business globally. The study focuses on the role of social media technology in the tourism sector in Vietnam. The paper mainly outlines and explains an extensive overview of the role of social media in the Vietnamese tourism industry from two perspectives: travellers or consumers (demand side) and market-

H. Tushar (✉)

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

School of Human Resource Development, National Institute of Development Administration, Bangkok, Thailand

e-mail: tushar@iubat.edu

S. F. A. Hossain

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

School of Management, Xi'an Jiatong University, Xi'an, China

B. N. Vuong

Faculty of Air Transport, Vietnam Aviation Academy, Ho Chi Minh City, Vietnam

International Business School, Shaanxi Normal University, Shaanxi, China

A. K. M. Mohsin

Faculty of Air Transport, Vietnam Aviation Academy, Ho Chi Minh City, Vietnam

International Business School, Shaanxi Normal University, Shaanxi, China

School of Management, Xi'an Jiatong University, Xi'an, China

M. A. Horaira

College of Business Administration, IUBAT-International University of Business Agriculture and Technology, Dhaka, Bangladesh

College of Tourism and Hospitality Management, IUBAT-International University of Business, Agriculture and Technology, Dhaka, Bangladesh

ers or service providers (supply side). The research then presents trust and acceptance of social media technology in the Vietnamese tourism sector. The study views that social media technology-enhanced smart tourism can make the Vietnamese tourism industry more attractive among travellers. Different challenges and issues of using social media in the tourism industry have been addressed in the paper. In addition, the future of tourism in Vietnam with the integration of technology and its implication has been outlined at the end of the chapter.

Keywords Social media · ICT · Tourism application · Vietnamese tourism · Vietnam

Introduction

Vietnam has been ranked as one of the rapid growing tourism destinations in the world for its friendly people, multi-ethnic culture, historical heritages, long coastal areas, and wonderful beaches. The role of the tourism industry in Vietnamese socio-economic development has long been affirmed (Giao et al., 2020). Tourism accelerates a country's economic growth and also represents culture to exchange with international peers. In recent years, tourism sector in Vietnam has made steady strides with a variety of products and services, taking advantage of opportunities to promote marketing and communication in many countries. According to the Vietnam National Administration of Tourism (2020), Vietnamese tourism industry has achieved a tremendous milestone in 2019 by attracting over 18 million international visitors, the highest ever. However, Vietnam has not yet had a worthy position on the world tourist map (Baochinhphu, 2019).

In recent years, the trend of Industry 4.0 revolution is spreading with the growing popularity of internet which has significant impact on all fields including tourism. Since then, many visitors have actively used online domain to search information, select service providers, booking or purchasing as well as payment methods. With notable technological innovations, it is not required to go to the service providers physically. Customers can use electronic devices with internet connection to book all types of services for travel planning from anywhere and anytime. Tourism Vietnamese tourism businesses are also quite proactive in forthcoming 4th Industrial revolution, they take it as an opportunity to improve their competitiveness (Giao et al., 2020). Through the integration and transparency of information, businesses have gradually formed some new smart tourism products to sustain with the new technological trend. Social media application is one of the innovations of the technological trend to bridge between consumer and tourism service providers to run their operational activities faster and in a convenient way.

The notion of social media refers to a technological tool that are capable of connecting and communicating, supporting, and collaborating with social learning (Oyelere et al., 2016). Nowadays, social media technology is often categorized into different aspects, such as social networking sites (i.e. Facebook, WhatsApp,

Messenger, WeChat, Line, Telegram, LinkedIn, and few others), multimedia content platform (i.e. YouTube, Dailymotion, Facebook watch, Pinterest, and so on), and collaborative projects (i.e. TripAdvisor, TripConnect, CouchSurfing, TravBuddy, and few others). The significant role of social media on tourism sector is evidenced in many countries globally especially in the Asia Pacific Region (APAC), for example Australia (Pabel & Prideaux, 2016), Bangladesh (Karim, 2018), China (Yang & Wang, 2015), India (Rathore et al., 2017; Ravindran et al., 2018; Sahoo et al., 2017), Indonesia (Dwityas & Briandana, 2017), Japan (Usui et al., 2018), Malaysia (Hua et al., 2017), South Korea (Koo et al., 2013), Thailand (Chu, 2018), Vietnam (Tran et al., 2017) and many others.

Social networks have been introduced to Vietnam in the 2000s in the form of electronic diaries (blog). Up to now, there are about 270 social networks licensed to operate in Vietnam (Vietnamtourism, 2020). Currently, anyone with a smartphone, or a tablet, or a personal computer with an internet connection can join the social network. In addition to the function of communication and community connection, social networks are also an effective tool to help localities in tourism development and assist tourists to receive travel related information and services. Recently, the promotion of tourism products and services through social media is also becoming popular as it helps to increase interactivity and reach a vast number of customers more effectively than other traditional forms of advertising.

According to Bizzvn (2020) in the Vietnam Digital Advertising (2019) report, nearly 64 million Vietnamese are active internet users and the number is expected to increase in recent years. On an average, each Vietnamese spends around 6 hours and 42 minutes daily which is equivalent to 1/4 day to use the internet on all devices. Nearly 2 hours and 33 minutes are employed on social media out of that amount which is above the world average of 2.16 hours (Bizzvn, 2020). Therefore, social media is a channel that allows businesses to promote their products and services on a separate targeted group or fan-page at a very reasonable cost and able to reach prospective consumer faster. Now-a-days, many businesses choose to integrate social media right on their own travel websites to increase interaction and reach more customers effectively.

In fact, many Vietnamese tourism marketers started to employ popular social-media platforms (such as Facebook, Instagram, YouTube, Zalo, and few others) to promote their products and services with an anticipation to reach more travelers. Since these social media platforms are growing popularity and considered as a major influencing factors in travelers' decision making process ever after travel, it becomes obvious for the service providers to follow the trend. To ensure sustainable tourism development in Vietnam, technology plays a very important role in the contemporary phase. The role of social media enhanced the tourism industry in numerous ways, however, the role of technology based social media application in the Vietnamese tourism industry need to gain attention to the scholars and researchers. In the last few years, Apps based tourism gained immense popularity. Tourists experienced relaxed trip with less effort and less cost as well. Based on the recent scenario of technology usage in the tourism industry in Vietnam, this chapter is an attempt to discover the role of technology based social media application in the Vietnamese tourism from two viewpoints consumer or travelers and marketers or service providers.

The Role of Social Media Technology on Tourism Industry in Vietnam

Social media are interactive online digital platforms where content is made, distributed and shared by individuals. Kaplan and Haenlein (2010) stated that social-media is various types of internet based applications that form on the technological underpinnings of Web 2.0, and that concede the foundation and exchange of consumer-generated content. At present, all types of technological innovations on digital communications (i.e. internet, mobile application, social media platforms, and few others) become a daily necessity for billions of users globally. About 4.54 billion individuals are active internet users which is around 59% of the world population (Johnson, 2021). The usage of social media has become an essential component of billions of people across the globe. Around 3.6 billion people were active social media users worldwide in 2020 and the number is forecast to increase to almost 4.41 billion by 2025 (Tankovska, 2021).

Giang (2017) stated it has taken around twenty years to appear Vietnam connecting with the other parts of the globe, the internet now has become an integral necessity for its people. Therefore, the Vietnamese internet generation will be part of the online world with self-awareness or self-flow. The Vietnam National Administration of Tourism reported that 71% international travelers' employed online sources to determine Vietnam as destination in 2017 whereas 64% travelers booked their tour to Vietnam in online domain (Cameron et al., 2019). At the same time, the dramatic transition of digitalization appears to leave the old concept of traditional marketing and adore the fast growth of technological progression because the development of the web services and smart devices, digital marketing turns into a vital component in today's business world. In Vietnam, nearly 100% service providers in tourism industry use social media and websites to foster their products and services to consumers where 50% local service providers use online sales and payment methods (Cameron et al., 2019). The role of social media technology on tourism sector in Vietnam is explored addressing the following two perspectives: consumer (demand side) and service providers (supply side).

Perspectives of Consumer (Demand)

Tourists' Attitude Toward Social media technology in Travel Information Search

The internet and continuous technological innovation has profoundly restructured the tourism related information search process and the way tourists plan for their travels (Xiang & Gretzel, 2010). Specifically, social media plays a crucial role to assist a consumer to plan travel and related product purchasing decision through providing sufficient information that can be accessed from anywhere and anytime.

Social media represents in different platforms (i.e. social networking sites, multimedia content platforms, customer review sites, virtual communities, and collaborative projects). Now-a-days, consumers are enabled to post and share their travel thoughts, experiences, and comments on the different types of social media platforms that produce a substantial amount of consumer generated content (CGC). It then assists as an inclusive tourism-related information hub for others which is more trustworthy and becomes dominant mode in online travel information search (Hua et al., 2017).

The findings of a systematic review study by Rasul, Zaman and Hoque (2020) demonstrates that virtual communities (e.g. Facebook, Twitter, Instagram, YouTube and few others) are the major social media platforms among others to assist travel and tourists' destinations information search in the Asia Pacific Region. In addition, TravelAdvisor and personal blogging are also gaining popularity in travel decision making process. The study of Tran, Phan, Nguyen, and Do (2017) confirmed that the role of social media technology has significant impact on tourists' online travel information search process in the context of Vietnam. The Internet is considered the first channel to find information, where 70% of people use search engines to obtain information before making a purchase (Nguyen et al., 2020). The study demonstrates 83% of consumers use social media sites before making any travel plan.

Uses of Social Media in Consumer's Purchase Decision

Social media is becoming more prevalent and beneficial to travelers. When making travel-related decisions, a large percentage of travelers use search engines. In addition, social media sites that appear in search results are becoming the traveler's preferred source of information. Social media directly influences purchase intent and online advertising, and online communities indirectly influence purchase intent through trust and sufficient information with multimedia content. Therefore, travel companies should pay more attention to online advertising as it is the most important factor influencing purchase intent to attract more potential customers. Generally, purchase intention refers to consumers' subjective judgment, which is reflected after a general assessment of the product or service (Sulthana & Vasantha, 2021). Balakrishnan, Dahnail, and Yi (2014) indicated that purchase intention is influenced by online communities, online advertising and e-WOM (word of mouth), and respondents are interested in engaging and providing feedback about the product through social media that accelerate to increase post purchase intention.

Vietnam shows great potential for e-commerce development in Southeast Asia's tourism industry, with annual growth rates of about 8.9% and 10.2% in the inbound and domestic markets, respectively (Tran & Hue Do, 2016). Many consumers (about 83%) in Vietnam use search engines before making a travel and related product purchase decision, and now more than 1/5 of the population (equivalent to 19.6 million) are Facebook users (Tran et al., 2017). In the hospitality and tourism industry in Vietnam, 87% of travelers' searches are online hotels, 83% are land travel, and

94% are online airline tickets before making purchase decision. In this direction, social media plays a crucial role to assist consumers' purchase decision. However, little is known about global internet users searching for Vietnam as a tourist destination and social media's role in destination presentation.

Role of Social Media in Post-purchasing Behavior

The technological advancement and popularity of social media led consumers to create, post, share, and educate each other about their experiences of travel and related products, brands, services, and issues on various platforms. In sum, these substantial information is referred as consumer-generated content (CGC) that assists to improve consumer's purchasing decision making process and influence their buying behavior. It is evidenced that CGC is more trusted information source than the content provided by marketers and suppliers (Xiang & Gretzel, 2010). Blackshaw and Nazzaro (2004: 4) indicated that CGC with social media is "a mixture of fact and opinion, impression and sentiment, founded and unfounded tidbits, experiences, and even rumor". Social media technology enables a consumer to share information quickly, comment on it and justify the information through various sources. Not surprisingly, since many tourists started to join into the conversation and build a collective intelligence, it will challenge the traditional marketing system of the tourism business. Therefore, it is inherently needed to focus and follow-up a consumers' post-purchasing behavior.

Social media is growing faster as an emerging channel for the global tourism development in general and Vietnam in particular that marketers need to consider to engage online customers better. This is critical when today's online social media platforms and purchases are becoming more popular and dominant mode. Since more and more Vietnamese are joining into the various social media platforms (Facebook, Instagram, Twitter, Line, and many others), they will produce more authentic consumer-generated content through sharing their unforgettable travel moments, reviews, comments, and constructive suggestions. These contents (positive or negative) have a considerable impact on the potential consumers' buying decision who will seek related information through social media search. In addition, social media advertising is having a more significant impact on visitors' willingness to make post-purchases. Therefore, it is vital to take into account online advertising on social media platforms to attract more consumers.

Perspectives of Service Providers (Supply)

Role of Social Media in Guest Services

UNWTO estimates that international arrivals will increase by 3% per annum and therefore the 1.5 billion marks are going to be in view by 2023 and 1.8 billion by 2030 (UNWTO, 2021). According to WTTC (2021), travel and tourism are the biggest part of the world's largest economy that accounted for 9% of worldwide GDP with 30% of exports and 1 out of 11 jobs are created across the world. ICTs are altering the travel and tourism industry worldwide as they employ consumers to evaluate, choose, and purchase the travel related products and services and strengthen the globalization of the business by serving mechanisms to operate and disseminate contributions. In particular, social media provides the travel and tourism industry with the prospect to create upon their guest rapports, strengthen the hotel's online brand image, and prepare search engine optimization (SEO) content. Social media directly support the tourist's decision-making and booking process, as travelers start planning their trips employing a program, depending on social-media platforms for travel stimulation and also analyzing online reviews (positive or negative).

At present, social media is successively benefiting as an important marketing tool providing an implausible advantage which will acquire promising circumstances through advancing and stimulating the travel and tourism industry's practices and activities. In this continuous technological innovation, visual content is significant in travel and hospitality industry, guests need a taste of what they will experience, and that they want to feel engaged with the merchandise or brand. Therefore, a visual-based feed is extremely important within the travel and tourism industry to assist showcase all of these experiences. The traveler's media consumption habits are shifting, in today's world, tourists' are more likely to search photos, videos, and other related visual contents before making a tour plan. Importantly, social media presence and visual contents of service providers are usually enabled to make a quick decision for consumers when proceeding with a purchase plan. It is also important for some tourism service providers to create a public face and human connection to have interaction with their guests through social media platforms as the same way as influencers do.

In Vietnam, most of the travelers search information in different social media platforms for destinations, online hotels, ground travel, and even online flight ticket before making any purchase decision (Tran & Hue Do, 2016). Therefore, it is crucial to grasp the pulse of current technology trends in the travel and tourism industry and be prepared for changes in traveler's behavior. A positive attitude remains for the travel and tourism service providers to expand their scope through social media marketing to provide a better guest-services.

Role of Social Media in Online Marketing

In the recent decades, social media technology has received a significant importance in the tourism industry and gained an enormous influence on travelers' decision making process. In general, the development in ICTs has already resulted a vast change to the both sides of consumers' decision making and service providers' business operation. Consumers are now more sophisticated in terms of checking out the foremost rational options in accommodation, flights and other travel related issues. They usually prefer to have more monetary and experiential benefits by justifying from various sources. In this case, social media technologies and its continuous innovation are tremendously important for the tourism industry. It comprises an enormous sort of tools that make it possible for internet users to share, exchange or post media files and other sorts of information using various channels onto the web. With the consumption of the latest breakthroughs in ICTs and applications (e.g. Facebook, Instagram, YouTube, TripAdvisor, and few others), consumers are ready to share photos, videos, feedback, narratives, and find out other internet users' opinions. The social media platforms seem like a necessity for the tourists and allow them to possess a wide selection of opportunities to organize their trips. Thus, service providers are also continuously in search of the best possible solutions of restructuring their marketing strategies and destination management mechanism to attract consumers. According to AsiaPac Net Media Limited (2020), in Vietnam Digital Marketing report (2020), 65 million active social media users are in Vietnam which associates to 67% market penetration and it is an increasing rate in using social-media. It's a clear indicator for marketers to attract prospective travelers through engaging them with the social-media platform.

Social Media for Communication

The ideology of social media is an arrangement for its user to alter the traditional communication and connect with others to follow their updates, responses, comments on them and sharing or amplifying the content. Generally, humans transmit the information and receive an instant feedback in a basic communication, however, the novelty of social media enables senders and receivers to take a seat and dwell before responding. The sufficient information with combination of photos, videos, reviews, and other related contents bring the consumer and service provider in a single platform. Service providers are enjoying the benefits of this mechanism of social media to make an effective communication with the target customers.

In Vietnam, popular social media like Facebook, Zalo, Instagram, and YouTube have demonstrated the necessity to regularly inquire about destination, brand, and travel related services (Kemp, 2021). In fact, the number of users are projected to increase in the coming years. The continuous connection with the social media facilitated to exchange information in real-time between consumer and service

providers (Dolan et al., 2019). This mechanism led the operation process of the service providers in more convenient way through the latest channel of communication.

Pearce (2005) introduced three domains of travel (i.e. pre-trip, on-site-experience, and post-trip) and travelers prefer to communicate through social media in each of the phases. In the pre-trip phase, travelers usually seek information about accommodation, destination, transportation, expenses, weather, cuisine, and other related products and services. Notably, they use social media as a convenient and faster way of communication and make inquiries to the service providers, analyze it, and choose the best alternatives. During the trip, they look out the nearby events, places of sightseeing, nearby restaurants, clubs, bars, and most visited places through social media like Facebook, Tripadvisor, and consider the recommendation from peers. After or even during the trip, they constantly share the media files and experiences in the social media platforms where the prospective tourists communicate with them to get the recommendations. As a result, service providers started to use social media for effective advertisement, connecting and reaching more customer faster, and building brand loyalty (Arat, 2016).

Social Media for Research and Development

Social media introduces a new paradigm in consumer behavior research and development and has a significant impact on the tourism industry (Leung et al., 2013). It can also be employed the travelers' decision making process even after post-travel. The growing number of social media users enables electronic word of mouth (E-WoM) along with the traditional WoM which is still an influential domain for travelers' decision making process (Nezakati et al., 2015). The previously discussed consumer generated contents (CGC) assists the service providers to understand the travelers' preferences and purchase intention and to process the segmentation strategy to reach the target customer. Social networking sites also gathers an enormous amounts of contents about the consumer's prospective interest in products and services. Therefore, in recent years, marketers have started to take into accounts to the following characteristics of individual travelers' behavior, especially travel and related information search process, purchase intention, post-purchase activities such as review and recommendations (Vinh et al., 2019). Such exploration provides a clear picture of prospective travelers' perception and needs and understanding these behavioral indicators can help service providers to run micro-targeted advertisement and reach relevant prospects and customer faster (Jobber & Chadwick, 2013).

Degenhard (2021) reported that the popularity of social media is increasing due to the tremendous growth of smart phone device users in Vietnam. Thus, the government of Vietnam is promoting and encouraging the development of social media networks through initiatives like *The Digital Vietnamese Knowledge Platform* (Cameron et al., 2019). According to the Digital in Asia (2018) report, there are 64 million internet users and 55 million active social media user in Vietnam which

represents 57% of the whole population. These technological acceptances particularly the increasing number of social media users in Vietnam evidenced the future prospects for the marketers in the tourism sector. With more travelers' turning to social media, service providers must strategically employ it for sustainable development of tourism sector in general.

Trust and Acceptance of Social Media

Trust and acceptance of social media, Facebook in particular, is not a new phenomenon in the scholarly literature. Scholars investigated trust issue along with TAM (Technology Acceptance Model) and discussed the role of technology-enhanced social media in tourism related search (Paris et al., 2010). Trust, as a key determinant, has been investigated in various regions to discover the availability of sufficient information with SNSs (Social Networking Sites) and social media (Alghizzawi et al., 2019). Trust has been recognized as an important driver for the tourists in terms of travel-based information search (Leung et al., 2013). Social media and e-WOM can affect the trust severely (Singh & Srivastava, 2019) as social media is a very powerful SNS platform in these days. Trust is closely associated with online reviews as nine out of ten travelers who use online platform to travel, read other travelers' comments and mostly believe (Milano et al., 2011). As a result, these two factors which are trust and social media are key determinants for the tourists in these days. The tourism industry in any particular country should be aware of this matter and continuously work on the promotional matters to retain the trust of the travelers. Vietnamese tourism industry has good reputation as a travel destination especially for the tourists who have limited budget. For budget tour, Vietnam is a popular destination for the tourists and social media is the key indicator for this.

Challenges and Issues of Using Social Media in Tourism Industry in Vietnam

There might be some unexpected influences (Zeng & Gerritsen, 2014) or negative influences of using social media in tourism industry in Vietnam. Sometimes, people share negative experiences more than positive experience. Through social media they express their feeling about any kind of dissatisfaction. This is not always to warn others but just for self-satisfaction and a kind of virtual revenge. For example, if any hotel can't process the refund due to their strict policy, clients can use social media to make the hotel's impression negative. This is a common practice among the travelers. Sometimes they are very sensitive and they use social media to express their negative feeling. Although in Vietnam, tourists are welcome with all necessary benefits and safety, some travelers still may not be satisfied with some issues and try



Fig. 19.1 Contemporary SNSs at a glance. (Source: Narendra, 2017)

to expose those matters via social media. Another issue is about the privacy of your personal information. Without prior consent, sometimes, tourism industry or some staff members use the e-mail address or telephone numbers for other business purposes which is totally unethical (Hvass & Munar, 2012). Often, people do not even aware of it and they misuse the personal information. In Vietnam, tourists should consider using trusted Apps or websites so that they won't face this kind of problems. (Fig. 19.1)

Another issue in this regard is fraudulence activities using social media in tourism. Fraud detection is a crucial issue for the travelers and it must be done before making any payment. Fraud can cause huge losses (Dong et al., 2018) for the traveler and for the tourism industry as well. In Vietnam, any scammers or fraud should be identified and punished under the law so that the tourists will be attracted and feel safer.

Future of Tourism in Vietnam with the Integration of Technology

The future of tourism in Vietnam is promising with the integration of technology in the tourism industry. Industry 4.0 is an up-to-date revolution in the tourism industry recently that catch scholarly attention. It conveyed key uprisings in the tourism sector (Bilotta et al., 2020). Industry 4.0 motivated the tourists to visit numerous destinations (Lin et al., 2018). Vietnam, at present is not so rich in using industry 4.0, however in the short period of time, the usage of industry 4.0 is expected to be enriched. The popular or widely accepted industry 4.0 adoptions includes Virtual

Reality (VR), Big Data, Robotics Automation system, Augmented Reality (AR), and so on (Liao et al., 2017). E- Customer Relationship Management (E-CRM) in Tourism with the integration of technology is another milestone (Dorcic et al., 2019) in Vietnam tourism sector. Most of the standard business maintain E- Customer Relationship Management (E-CRM) in various ways. Apart from that, they try to be connected with the present and prospective customers by posting images and videos in various social media platforms, sending e-mail, sharing updates information related to tourism and so on.

Implication and Conclusion

The goal of this chapter was to identify the opportunities and threats in the Vietnamese tourism industry due to social media technology usage in the contemporary era. Using recent scholarly literature and the Vietnamese database, the chapter contributes to the existing literature with the analysis of social media technology usage in the Vietnamese tourism industry. The chapter has practical implication for the managers, decision makers, policy-makers in the tourism industry and so on. The chapter sheds the light on tradition tourism and smart tourism industry by discussing various aspects of modern tourism such as industry 4.0 or big data in tourism. In the contemporary universe, at present, tourists' intention to use updated technology in various sectors such as ticketing, hotel booking, tour booking etc. is a common fact. Social media technology-enhanced smart tourism can make the Vietnamese tourism industry more and more attractive among the travellers. Successful implementation of all the aspects of smart technology-based tourism is highly recommended to develop Vietnamese tourism industry. Despite of a few limitations such as real data collection from Vietnamese travellers, this study has significant contribution to the tourism literature.

References

- Alghizzawi, M., Habes, M., & Salloum, S. A. (2019). The relationship between digital media and marketing medical tourism destinations in Jordan: Facebook Perspective. In *International Conference on Advanced Intelligent Systems and Informatics* (pp. 438–448). Springer.
- Arat, T. (2016). The role of social media in tourism. In B. Kaderabkova, J. Holmanova, & J. Rotschedl (Eds.), *Proceedings of International Academic Conferences (No. 3306093)*. International Institute of Social and Economic Sciences.
- AsiaPac Net Media Limited. (2010). *Vietnam digital marketing 2020*. Retrieved from: <https://www.asiapacdigital.com/digital-marketing-insight/vietnam-digital-marketing-2020>. Accessed 26 Mar 2021.
- Balakrishnan, B. K. P. D., Dahnail, M. I., & Yi, W. J. (2014). The impact of social media marketing medium toward purchase intention and brand loyalty among generation Y. *Procedia - Social and Behavioral Sciences*, 148, 177–185.

- Baochinphu. (2019). *Du lịch Việt Nam tăng trưởng thần kỳ, đón 18 triệu lượt khách quốc tế*. Retrieved from: <http://baochinhphu.vn/Du-lich/Du-lich-Viet-Nam-tang-truong-than-ky-don-18-trieu-luot-khach-quoc-te/383674.vgp>. Accessed 2 Feb 2021. (In Vietnamese).
- Bilotta, E., Bertacchini, F., Gabriele, L., Giglio, S., Pantano, P. S., & Romita, T. (2020). Industry 4.0 technologies in tourism education: Nurturing students to think with technology. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 100275.
- Bizzvn. (2020). *Vietnam Digital Marketing Report 2019*. Retrieved from: <https://bizzvn.com/vietnam-digital-marketing-report-2019/1127/>. Accessed 9 Feb 2021.
- Blackshaw, P. & Nazzaro, M. (2004). Consumer-generated media (CGM) 101: Word-of-mouth in the age of the web-fortified consumer. *Nielsen*. Retrieved from: http://www.nielsen-online.com/downloads/us/buzz/nbzm_wp_CGM101.pdf. Accessed 24 Mar 2021.
- Cameron, A., Pham, T. H., Atherton, J., Nguyen, D. H., Nguyen, T. P., Tran, S. T., Nguyen, T. N., Trinh, H. Y., & Hajkowicz, S. (2019). *Vietnam's future digital economy—towards 2030 and 2045*. CSIRO.
- Chu, C-P. (2018). *The influence of social media use and travel motivation on the perceived destination image and travel intention to Taiwan of the Thai people*. Independent Study Manuscript for Master of Arts in Communication Arts. Bangkok University. Retrieved from: http://dspace.bu.ac.th/bitstream/123456789/3163/1/Chun-Pei_Chu.pdf. Accessed 23 Mar 2021.
- Degenhard, J. (2021). *Smartphone users in Vietnam 2025*. Statista. Retrieved from: <https://www.statista.com/forecasts/1145936/smartphone-users-in-vietnam>. Accessed 2 Apr 2021.
- Digital in Asia. (2018). *Vietnam: Digital trends & consumer landscape overview*. Retrieved from: <https://digitalinasia.com/2018/06/18/vietnam-digital-trends-consumer-landscape/>. Accessed 23 Mar 2021.
- Dolan, R., Seo, Y., & Kemper, J. (2019). Complaining practices on social media in tourism: A value co-creation and co-destruction perspective. *Tourism Management*, 73, 35–45.
- Dong, W., Liao, S., & Zhang, Z. (2018). Leveraging financial social media data for corporate fraud detection. *Journal of Management Information Systems*, 35(2), 461–487.
- Dorcic, J., Komsic, J., & Markovic, S. (2019). Mobile technologies and applications towards smart tourism – State of the art. *Tourism Review*, 74(1), 82–103.
- Dwityas, N. A., & Briandana, R. (2017). Social media in travel decision making process. *International Journal of Humanities and Social Science*, 7(7), 291–292.
- Giang, N. (2017). *Có một Thế HỆ trẻ LỚN LÊN cùng Internet (There is a generation of young people growing up with the Internet)*. Zing News. Retrieved from: <https://news.zing.vn/zingnews-post796791.html>. Accessed 22 Mar 2021. (In Vietnamese).
- Giao, H. N. K., Hang, T. D., Son, L. T., Kiem, D., & Vuong, B. N. (2020). Tourists' satisfaction towards Bao Loc City, Vietnam. *Journal of Asian Finance, Economics and Business*, 7(7), 269–277.
- Hua, L. Y., Ramayah, T., Ping, T. A., & Jun-Hwa, C. (2017). Social media as a tool to help select tourism destinations: The case of Malaysia. *Information Systems Management*, 34(3), 265–279.
- Hvass, K. A., & Munar, A. M. (2012). The takeoff of social media in tourism. *Journal of Vacation Marketing*, 18(2), 93–103.
- Jobber, D., & Ellis-Chadwick, F. (2012). *Principles and practice of marketing* (7th ed.). McGraw-Hill Higher Education.
- Johnson, J. (2021). *Global internet penetration 2020*. Statista. Retrieved from: <https://www.statista.com/statistics/209096/share-of-internet-users-in-the-total-world-population-since-2006/>. Accessed 22 Mar 2021.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59–68.
- Karim, Z. (2018). The impact of social media on tourism industry growth in Bangladesh. *International Journal of Economics, Commerce and Management*, VI(8), 463–482.
- Kemp, S. (2021). *Digital 2020: Vietnam*. DATAREPORTAL. Retrieved from: <https://datareportal.com/reports/digital-2020-vietnam?rq=2020+vietnam>. Accessed 26 Mar 2021.

- Koo, C., Shin, S., Kim, K., Kim, C., & Chung, N. (2013). *Smart tourism of the Korea: A case study*. In Pacific Asia Conference on Information Systems (PACIS). Retrieved from: <http://www.pacis-net.org/file/2013/1672.pdf>. Accessed 24 Mar 2021.
- Leung, D., Law, R., Van Hoof, H., & Buhalis, D. (2013). Social media in tourism and hospitality: A literature review. *Journal of Travel & Tourism Marketing*, 30(1–2), 3–22.
- Liao, Y., Deschamps, F., Loures, E. D., & Ramos, L. F. (2017). Past, present and future of industry 4.0 – A systematic literature review and research agenda proposal. *International Journal of Production Research*, 55(12), 3609–3629.
- Lin, D., Lee, C., Lau, H., & Yang, Y. (2018). Strategic response to industry 4.0: An empirical investigation on the Chinese automotive industry. *Industrial Management & Data Systems*, 118(3), 589–605.
- Milano, R., Baggio, R., & Piattelli, R. (2011). The effects of online social media on tourism websites. In R. Law, M. Fuchs, & F. Ricci (Eds.), *Information and communication technologies in tourism 2011* (pp. 471–483). Springer.
- Narendra. (2017). Social media: Influence on the travel industry. *Holiday Simply*. Retrieved from: <https://www.holidaysimply.com/social-media-influence-travel-industry/> Accessed 22 Mar 2021.
- Nezakati, H., Amidi, A., Jusoh, Y. Y., Moghadas, S., Aziz, Y. A., & Sohrabinezhadtalemi, R. (2015). Review of social media potential on knowledge sharing and collaboration in tourism industry. *Procedia-Social and Behavioral Sciences*, 172, 120–125.
- Nguyen, D. N., Nguyen, D. V., Quynh, N. T. N., & Tran, T. C. (2020). The impact of social media on the choice of eating destination for customers in Vietnam. *International Journal of Marketing and Social Policy*, 2(1), 18–27.
- Oyelere, S. S., Paliktzoglou, V., & Suhonen, J. (2016). M-learning in Nigerian higher education: An experimental study with Edmodo. *International Journal of Social Media and Interactive Learning Environments*, 4(1), 43–62.
- Pabel, A., & Prideaux, B. (2016). Social media use in pre-trip planning by tourists visiting a small regional leisure destination. *Journal of Vacation Marketing*, 22(4), 335–348.
- Paris, C. M., Lee, W., & Seery, P. (2010). The role of social media in promoting special events: Acceptance of Facebook ‘events’. In U. Gretzel, R. Law, & M. Fuchs (Eds.), *Information and Communication Technologies in Tourism 2010* (pp. 531–541). Springer.
- Pearce, P. L. (2005). *Tourist behaviour: Themes and conceptual schemes*. Channel View Publications.
- Rasul, T., Zaman, U., & Hoque, M. R. (2020). Examining the pulse of the tourism industry in the Asia-Pacific region: A systematic review of social media. *Tourism and hospitality management*, 26(1), 173–193.
- Rathore, A. K., Joshi, U. C., & Ilavarasan, P. V. (2017). Social media usage for tourism: A case of Rajasthan tourism. *Procedia Computer Science*, 122, 751–758.
- Ravindran, D., Nagamalar, M., & Rani, D. U. (2018). Social media sources (SMS) influence on tourism choice decisions. *Eurasian Journal of Analytical Chemistry*, 13(6b), 177–182.
- Sahoo, S. S., & Mukunda B. G. (2017). *Role of social media in promoting tourism business-A study on tourism promotion in Odisha*. In International Conference People Connect: Networking for Sustainable Development. Retrieved from: <https://www.ijcrt.org/papers/IJCRTICPN042.pdf>. Accessed 26 Mar 2021.
- Singh, S., & Srivastava, P. (2019). Social media for outbound leisure travel: A framework based on technology acceptance model (TAM). *Journal of Tourism Futures*, 5(1), 43–61.
- Sulthana, A. N., & Vasantha, S. (2021). *Mediating role of perceived quality between social media trust and purchase intention*. Materials Today: Proceedings. <https://doi.org/10.1016/j.matpr.2020.11.573>
- Tankovska, H. (2021). Number of social media users 2025. *Statista*. Retrieved from: <https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>. Accessed 26 Mar 2021.

- Tran, V. T., & Hue Do, H. (2016). An impact of social media and online travel information search in Vietnam. *Journal of Tourism Research & Hospitality*, <https://doi.org/10.4172/2324-8807.1000153>.
- Tran, V. T., Phan, N. V. N., Nguyen, T. N., & Do, H. H. (2017). An impact of social media and online travel information search in Vietnam. *Global Review of Research in Tourism, Hospitality and Leisure Management*, 3(1), 414–439.
- Usui, R., Wei, X., & Funck, C. (2018). The power of social media in regional tourism development: A case study from Ōkunoshima island in Hiroshima, Japan. *Current Issues in Tourism*, 21(18), 2052–2056.
- Vietnam National Administration of Tourism. (2020). *International visitors to Viet Nam in December and 12 months of 2019*. Vietnam National Administration of Tourism. Retrieved from: <https://vietnamtourism.gov.vn/english/index.php/statistic/international>. Accessed 2 Apr 2021.
- Vietnamtourism. (2020). *Ứng dụng mạng xã hội trong quảng bá du lịch: Tiện dụng, nhiều lợi ích*. Retrieved from: <https://vietnamtourism.gov.vn/index.php/items/32416>. Accessed 24 Mar 2021. (In Vietnamese).
- Vinh, T. T., Phuong, T. T. K., Nga, V. T. Q., & Nguyen, N. P. (2019). The effect of social media communication on brand equity through Facebook: Evidence from CGV cinemas, Vietnam. *International Journal of Electronic Customer Relationship Management*, 12(2), 143–166.
- World Tourism Organization (UNWTO). (2021). *International tourism highlights (2020th ed.)*. UNWTO.
- World Travel and Tourism Council. (WTTC). (2021). *Economic Impact Reports*. Retrieved from: <https://wtcc.org/Research/Economic-Impact>. Accessed 24 Mar 2021.
- Xiang, Z., & Gretzel, U. (2010). Role of social media in online travel information search. *Tourism Management*, 31(2), 179–188.
- Yang, X., & Wang, D. (2015). The exploration of social media marketing strategies of destination marketing organizations in China. *Journal of China Tourism Research*, 11(2), 166–185.
- Zeng, B., & Gerritsen, R. (2014). What do we know about social media in tourism? A review. *Tourism Management Perspectives*, 10, 27–36.

Chapter 20

Information and Communication Technology Application in the Indian Tourism Industry



Saroop Roy B. R.

Abstract Tourism has established as one of the fastest growing sectors in the world as the business volume of tourism is being surpassed only by the manufacturing sector. In 2019, the travel and tourism industry contributed to approximately 10.3% of the global GDP and generated 330 million jobs. As tourism has become a greater source of income and employment, many countries have increased their investment in the tourism sector and India is no exception. The investment in the sector was not limited only to mere development of physical infrastructure like hotels, airports etc., but also on the development and application of information and communication technology (ICT) to enhance the service quality in this sector. This has resulted in a spontaneous rise of foreign tourist arrivals to India in the millennium from 2.54 million in 2001 to 10.93 million in 2019. Tourism industry witnessed the use of ICT globally in its services since mid of last century. The use of ICT in Tourism has diversified from automated booking systems to providing large source of information to tourists, better and faster service to its customers, improve relationship between distribution channels and enabling promotion and distribution of products directly to its customers. With the growth and development of ICT, the tourism sector capitalised on the use of internet, artificial intelligence and other e-business applications. Tourists have also started depending on the information technology platforms to review the products and make the best choice of their destinations. This paper looks into the application of the ICT in different sectors of tourism industry especially in the Indian context.

Keywords ICT · Augmented reality · Virtual reality · Internet · Artificial intelligence

Saroop Roy B. R. (✉)
Centre for Responsible Tourism, Kerala Institute of Tourism and Travel Studies (KITTS),
Thiruvananthapuram, Kerala, India
e-mail: sarooproym@kittsedu.org

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_20

Introduction

The Information and Communications Technologies (ICT) plays a really important role in tourism, travel and hospitality industry. The developments in ICT has paved way to make changes in the way the travel and tourism industry interacts with its customers. While the ICT facilitates real time access of information from anywhere in the world for their customers, the tourism enterprises are able to reach their targeted customers in no time. The application of ICT in the tourism sector could be seen in different areas like the reservation systems, transportation sector, accommodation sector, enhancement of tourist experience, destination management as well as steps towards implementing sustainable tourism development. The current decade has witnessed development of more novel technologies in ICT and the global tourism industry has in fact capitalized on it to improve their operational efficiencies and to meet the demands of the customers. Many new trends in ICT like Augmented Reality, Virtual Reality, Artificial Intelligence, Internet of Things, Voice Technology, Wi-Fi- Connectivity, Wearable Technology, Mobile Apps, Big Data Analytics, Block Chain Technology have been extensively used now some days in tourism for marketing purposes, operational efficiency as well as to enhance the level of customer satisfaction. The following section looks in detail on the theoretical aspects of ICT and its application in tourism sector with a focus on Indian scenario.

Computer Reservation Systems and Global Distribution Systems

The advent of IT application in travel industry dates back to 1946 with the American Airlines installing the first automated booking system. By the early 1950s, the aviation industry faced difficulties in airline reservations and in 1953, Trans Canada Airlines (TCA) designed a computer based system called ReserVec. This was followed by the development of several other Computer Reservation Systems (CRS) like Semi-Automated Business Research Environment (SABRE) in 1964 (Benckendorff et al., 2014), Delta Automated Travel Account System (DATAS) in 1968 and Apollo Reservation System and Programmed Airline Reservation System (PARS) in 1971 (Roberts, 2013). The airlines did their majority of business through travel agencies and it became difficult for travel agencies to install different CRS in their offices. The world's first multi-airline system, Travicom was created in 1976 at United Kingdom (Sheldon, 1997). Sabre and Apollo also added other airlines to their systems in the same year and leased these to travel agents. At this point, a distinction between Computer Reservation System and Global Distribution System (GDS) happened and the reservation system used by airlines came to be called CRS and that by the travel agents as GDS. Amadeus was established by a European consortium of airlines and Travicom was replaced by Galileo in 1987. This was

followed by the launch of Abacus system by Singapore Airlines and Cathay Pacific Airlines in 1988 (Benckendorff et al., 2014). DATAS and PARS merged together to form Worldspan in 1990. Galileo and Worldspan were acquired by a travel company called Travelport in 2006 and 2007 respectively. While the GDS helps the travel agencies to know the availability of seats in airlines and rooms in hotels, do reservations, get passenger information, access rates and conditions of service, do e-ticketing and inventory management, booking ancillary service, provide information on passenger documents like visa, passports, health, customs, currency, taxes etc., they also require ICT support for their back office systems for helping them in accounting, managing human resources, customer relationship, effective communication as well as for settlement of transactions. Back office systems can be integrated into cross-functional systems known as Enterprise Resource Planning (ERP) like SABRE Red Suite, Travel IntraNet Application (TINA), Abacus Powersuite, which help in productivity by reducing data entry, developing targeted marketing with the help of reporting tools, supporting customer satisfaction, improving supplier relationships and doing trend analysis based on the real-time data.

ICT and Transportation Sector

ICT is widely used by airlines and surface transportation companies. Surface Transport mainly include the Road, Rail and Water Transport system used by the tourists to reach the destination as well as to travel within the destinations.

Airlines mainly depend ICT for wide range of its activities including marketing, distribution, customer service and operations. They use the *Airline Reservation System (ARS)* for getting flight schedules and availability in response to passenger and intermediary requests and providing accurate fares and rules, store passenger information and electronic ticketing, *Decision Support Systems (DSS)* to take decisions on airline activities like Fleet Management, flight scheduling crew scheduling and revenue management, *Marketing and Customer Relations Management System* for direct bookings and operate efficiently customer loyalty programs known as Frequent Flyer Programs, *Departure Control Systems* for check-ins, issuing boarding pass, seat allocation, checked baggage, load control and balance of the aircraft, passenger identification etc. ICT is also used for gate control at the airports, monitor meteorological conditions as well as the aircraft's position relative to other obstacles, providing inflight technologies for traveler safety, entertainment systems, communication facilities, crew support systems, cargo management etc.

In the case of land transport system, the role of ICT comes into play in the implementation of *Intelligent Transport Systems (ITS)*, which connect and manage all land transport systems to detect hazards in the roads and inform drivers in advance, enabling drivers to make better choices on routes, information on availability of parking space, give warnings on road congestions, allowing vehicles to communicate each other and with the infrastructure around etc., *Automated Traffic Management Systems (ATMS)* which manages the smooth flow of road traffic,

Travel Information System (TIS) and *Vehicle Information and Communication System (VICS)* which provide real time information related to traffic congestion, accident locations, parking lots etc. and the *Route Guidance System (RGS)*, which relies on Geographical Information System (GIS) for easy navigation. Now there are electronic tolls which reduces the time to cross a toll and Electronic Road Pricing systems which allows differential pricing at tolls at different time of the day. For example, the National Highway Authority of India (NHAI) has introduced an electronic toll collection system based on radio frequency identification (RFID) technology (Business Standard, n.d.). Rail Transport uses ICT for the online ticketing and reservation systems, signal controls, safety measures, video surveillance, remote monitoring, freight services etc. The water transport system depends on ICT for reservations, Passenger Area Management by which travelers are provided with Wayfinder systems to find way within a big ship, providing entertainment facilities for passengers and in navigation systems.

ICT and Hospitality Sector

The application of ICT in hospitality sector is mainly confined to Front Office, Back Office, Guest related interface and Restaurant & Banquet Management. *Property Management Systems (PMS)* are installed in accommodation units to handle Reservations Management, Opening of Guest Folio, Billing and Room Management, Travel Agent Accounting, Scheduling of Banquet Rooms, Amenity Management which includes sports facilities, spa, gymnasium etc. As part of Guest related interface, ICT support is given for Customer Relations Management, providing Guest Room amenities like Electronic Locking Systems, Entertainment devices, Wi-Fi Connectivity, Guest Services Technology like in-room electronic refreshment centers, smart room service carts etc. Other ICT applications in the accommodation sector includes marketing and promotion through websites, establishing private branch exchanges for communications and Energy Management Systems. The *Restaurant Management System (RMS)* looks into purchase and inventory control of food items, menu and recipe as well as food costing. *Point of Sales (POS) systems* increase the efficiency of food delivery and track and analyze sales.

ICT and Tourist Experience

The application of ICT for tourists include providing information to them, giving better experience through technology interface and in visitor management at the destination. The information can be provided through Visitor Information Centers where digital presentations could be made. Visitors could be provided with better orientation at the destination through technology like Global Positioning System (GPS) and electronic displays instead of normal signage. For managing visitors,

automated ticketing systems could be engaged. ICT also plays the role of ancillary purchases like parking, accommodation, food and beverages, photos etc. with the help of smart cards or wearable devices. Technology can also play a huge role in crowd management as well as ensuring safety and security at the destinations. Most of the destinations have started using Closed-circuit televisions (CCTVs) and Secured Entry Gates as part of security measures.

ICT and Destination Management

Destinations need *Destination Management Systems (DMS)*, a comprehensive electronic database on the facilities of a destination and their customers which could be accessed by various stakeholders of tourism industry. DMS helps to promote destinations through various platforms including websites, digital, call-centers, portals, kiosks and other smart devices and provide visitors with real-time information at several locations. Currently, many travelers are seeking travel information through web-based portals, which provide dynamic packaging to the customers by combining different travel components, bundled and priced in real time, based on the request of the consumer or reservation agent. The web portals give provision for customers to seek air tickets availability and book them online, download mobile applications which include comprehensive mobile destination guide providing general information, facts, attractions, activities, events, festivals etc. Destination Management Organizations (DMOs) can use these web portals as well as other social media platforms for e-marketing.

ICT and Sustainable Tourism

Sustainable Tourism is defined as ‘Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities’ (UNWTO and UNEP, 2005, p-12). The ICT is playing a role in ensuring sustainability in the tourism sector also. On the environmental sustainability part, softwares have been developed to assess the carbon emission due to different activities by tourism activities, which can guide travel companies and tourists in selecting air routes that consume less fuel. Technology has reached a stage that lighter aircrafts are built so that fuel consumption is reduced. Destination Management Systems have been developed so that the sensitive ecological regions as well as heritage sites are protected from overcrowding.

Novel Trends in ICT and Tourism

The nature of tourism has changed with the new trends of ICT development. This has fundamentally changed the way in which how tourists experience travel, destinations promote themselves and the tourism industry rates their success. The last one decade has seen significant changes in the ICT development and its application in tourism and travel sector. The section below details out the various new trends in ICT and its application in tourism, travel and hospitality sector especially in India.

Augmented and Virtual Reality (AR and VR)

Augmented Reality (AR) uses the existing environment and overlays new digital information on top of it in real time. (WhatIs.com, 2016). Virtual Reality (VR) is a man-made environment that is created with software and presented to the user in such a way that the user dangles belief and accepts it as a real environment (WhatIs.com, 2015). There has been an increased use of AR and VR by the tourism industry in the past few years for enhancing the customer experiences as well as marketing and promotional campaigns.

AR has a great potential to augment the tourists' experience with new mobile apps providing useful information, navigation, guides, and translations. Hospitality industry uses AR to create all-around room tours with accommodation details, rates, etc. On the advertisement front, it helps to realize information on a new level by creating 3D animations from printed flyers. With the help of AR, city map could be converted into an interactive guide in multiple languages there by helping the tourists in an unfamiliar destination (Think Mobiles, n.d.). Airlines and hotels have started using VR technology to show travelers the cabins in advance, in order to increase ticket/room booking or ancillary services sales. Google Earth VR helps one fly around the earth to visit any place with large detail. Tourists can enter an environment that recreates a historical scene or building and provide experience that they're in the past. With VR, ancient monuments or buildings that have been heavily worn or even destroyed can be restored to their original state. With travel VR, many tourists will have the opportunity to experience places which are restricted to general public due to sensitivity or fragile nature, whether it's going inside of an ancient tomb, a privately owned area or a preserved natural setting (Omnivirt, 2018).

The Ministry of Tourism's Incredible India app reveals each city's features comprising tourist attractions and events. The app allows one to go through a menu and decide whether to select an experience according to city, genre or events. Users can try their 'Immersive feature' to get a 360° virtual reality view of an attraction before actually visiting the place. While visiting the attraction, one can log onto the application and read the information provided or even listen to it (Iyer, 2019). Kerala Tourism, in its website has added AR 360° videos featuring the scenic beauty and cultural foundations of Kerala (Sheladiya, 2019). These virtual tours can be easily

used on mobile phones, desktop and also through a VR Headset and helps one to prepare for the next trip to Kerala (Kerala Tourism, n.d.). As part of promoting the Muziris Heritage project in Kerala, AugRay with its XR platform created the foundation and 360° VR content for about 10 sites in Muziris such as the ancient seaport and urban centre on the Malabar Coast of Kerala (Sheladiya, 2019). ‘Muziris Virtual Tour Guide,’ an AR mobile app has been developed with features to assist the tourist right from providing travel/accommodation booking to AR street view to guide tourists who visit Muziris. With this app, the visitor gets to know the history of a place, complexities involved in the art or monument and watch the videos and images of the place (Muziris Heritage Project, n.d.). The Karnataka Tourism Department had started a project in 2018 to get a layer of AR for 20 heritage tourism sites in the state. The project budgeted at Rs. 1200 million, which includes technological and physical amenities are being implemented by private entities (Shekhar, 2018). In Gujarat, theme parks are developed with attractions, rides, and experiences based on AR and VR. FlippAR Go, an AR startup fueled by NUMA Accelerate (and Kaapi) based in Bengaluru helps travelers experience a city in augmented reality (FlippAR Go, n.d.). With the help of FlippAR object tagging app, tourists can just scan monuments, buildings and watch its stories come alive, point an object to their smartphone camera and tag them with a message, describing their experiences and further share the same message with their Facebook friends on the app. FlippAR has already tied up with brands like Maxx Fashions, Himalaya, Café Coffee Day, Thompson Reuters etc. (Bhalla, 2016). Delhi-based Augtraveler has developed an AR app to narrate the history of a particular heritage site, its background and importance to visitors. The app, compatible with both Android and Apple phones has a layer of AR that allows users to explore the different nuances of artefacts, the architecture and parts of the monument with interactive elements. In order to ensure the authenticity of the content on the platform, the Augtraveler team has been supported by the Archaeological Survey of India (ASI) to access their content archives and also by the United Nations Educational, Scientific and Cultural Organization’s (UNESCO’s) knowledge partners to tie up with its heritage sites (Kashyaap, 2019).

Artificial Intelligence (AI)

‘Artificial Intelligence is a way of creating a computer, a computer-controlled robot, or a software think intelligently, in the same manner the intelligent humans think’ (Tutorialspoint, n.d.). In India, it is estimated that investments in AI, which was INR 773.64 Bn in 2017 is probably going to increase at a Compound Annual Growth Rate (CAGR) of 33.49% during the 2018–2023 period (Business Wire, 2019). The travel and hospitality industry has started banking on AI on many of its novel technologies and innovations. In India, the contribution of this sector to the AI market is \$92.6 million in market size and 1.4% in market share (Analytics India Magazine & Jigsaw Academy, 2020). This includes platforms that enable ticket booking, hotel reservations, and aggregator apps that helps in online food ordering and delivery

thereby connecting the buyer with the service providers. The major firms in India that utilize AI within the sector include Zomato, Ola, Oyo, Makemytrip, Expedia etc. (Analytics India Magazine & Jigsaw Academy, 2020). Now let us look at the specific applications in which AI is used in the travel tourism and hospitality industry.

Machine Learning

Machine learning is an application of AI that gives systems the capacity to automatically learn and improve from experience without being explicitly programmed (Expert System, n.d.a). The hotel industry as well as airlines are able to make recommendations that help personalized offers on products based on the tourists' past preferences. For this it depends on tourist's data from various functional sources and analyses his/her overall behavior and trends for offering products that suit them. In India, the Taj Group of Hotels acquired the machine learning based Oracle Sales Automation cloud to bring together various aspects of the hotel chain together and now has in depth knowledge of customers to help them serve better. With this, the chain has more customer records than before, and is able to store it in a more effective manner to provide seamless experience to customers (Jayaram, 2018). Similarly, RedBus, the largest online bus ticketing platform in India is depending on machine learning to derive insights of the customer reviews like punctuality, convenience, cleanliness, staff behavior etc. of the buses of various operators registered with them. The Machine Learning model that they developed has helped them to extract dynamic tags for the volume of reviews that they receive every day and give customers a snapshot view of operator's areas of strength and shortcoming. RedBus has also developed an in house Pricing Algo using machine learning by combining multiple signals from the market, both on the demand and supply side, to compute pricing suggestions on a real time basis that helps in improving the operator's average revenue per seat (Jha, 2019).

Chatbot

'A chatbot is software powered by AI that is able to simulate a conversation (or a chat) with a user in natural language through messaging applications, websites, mobile apps or through the telephone' (Expert System, n.d.b). Chatbots are used as mobile travel companions to provide answers to issues like knowing the nearest business lounge, baggage allowance, gate numbers, and how long it takes to the airport (Razzaq, 2018). The Indian companies MakeMyTrip and Goibibo which merged in 2017 have AI powered chatbots named Myra and Gia respectively. It is reported that the customers could book tickets on MakeMyTrip, with their voice using chatbots (Business Line, 2019). AI chatbot "AskDisha" (Digital Interaction to Seek Help Anytime) was launched by the Indian Railway Catering and Tourism Corporation Limited (IRCTC) in 2018 which quickly answers to customer queries,

and provide round-the-clock customer support to provide customer with a stress-free experience (NDTV Profit, 2018). The Indian airline, SpiceJet launched its chatbot “Miss Pepper” via WhatsApp in August 2020 and the passengers can do the web check-in using this (Bose, 2020).

Facial Recognition

Another development of AI, facial recognition helps in scrutiny of travel documents of travelers during embarkation and disembarkation process. AI when combined with blockchain helps in easy identification of customers at airports, immigration, customs, restaurants, and entertainment facilities with a simple facial scan (Saulat, 2018). Adoption of facial-recognition technology at various touch points such as check-in, boarding and passport control at the airports would ease the pressure on existing infrastructure and keep passengers flowing. With the current Covid-19 scenario, keeping in mind the requirement for social distancing and a totally contactless travel experience, facial recognition technology is gaining momentum. Even touchscreen technology is now being snubbed in favor of facial recognition to ensure that passengers need not need to touch anything as they travel.

The Bengaluru airport in July 2019 launched the “paperless biometric technology,” which identifies passengers by their face, there by excluding the need to present boarding passes, passports and other identity documents (Chandran, 2019). The Hyderabad, Delhi and Pune airports also experimented the same with Digi Yatra Program of Government of India (Deccan Chronicle, 2019). The Indian hospitality industry has been using face recognition technology for last few years. The Lemon Tree Premier at New Delhi opted for a face recognition solution called NeoFace developed by the India unit of NEC Corporation to help it deliver a more secure and elevated guest experience in real time (Bagchi, 2015).

Robot

A robot is a machine developed using AI to execute one or more tasks automatically with speed and accuracy. Robotic technology is rapidly gaining in popularity within the travel industry owing to changing consumer habits. Hotels and airports have started using robots for customer service. Many of them can understand and communicate in multiple languages. Robots have already taken up the role of waiters in hotels in India. A 74-seater restaurant, named “Robot”, which serve food to the customers was launched at Mahabalipuram in 2018 year (Moorthy, 2018). The first robotic restaurant in Kerala, ‘Be at Kiwizo’ was opened at Kannur in 2019, where three female robots attend the table as per direction. Apart from waiters, another robot entertains kids by playing games and dance with them (Mathrubhumi, 2019). The restaurant ‘Robo Chef’ located at Bhubaneswar became the first one in eastern India to use robots as waiters in the hotel industry (Business Today, 2019). The Bengaluru city also launched the Robot Restaurant in 2019, which features

Indo – Asian cuisine. The restaurant has a team of six robots and has been designed in such a manner that extra space is provided between the aisles for the robots to navigate (Times Travel, 2019).

Internet of Things (IoT)

The internet has played a big role in the revolution of travel and tourism sector in the last two decades in restructuring its operations and provide personalized guest experience. The concept of Internet of Things (IoT) is by which all digital devices are connected to the internet to make them “smart” (Mistry, 2020). The travel and hospitality industry has benefited from the IoT in many ways especially in enhancing customer experiences and reducing operational costs.

Personalization

The personal needs of guests like room temperature adjustment, control of TV, elevators, and heaters, turn lighting on and off, schedule wake up calls, customize food choice, etc. can be enabled with the help of IoT technology. The hotels can send electronic key cards on guests’ smartphones, allowing them to check-in and check-out, [allows guests to interface with their room’s thermostat or control the TV](#) (Adobe et al., 2016). In India, Le Meridien Goa, Calangute has built an IoT enabled hotel which offers an exceptional experience for guests and mechanisms to reduce energy consumption (Mistry, 2020).

Real-Time Information

Real time information like procedures for flight change, booking connecting flights, providing directions on gates at airports, information on security checks are provided to various smart devices the travelers carry with the help of IoT applications. Customers of EaseMyTrip, an Indian online travel company can track their IndiGo flight status online in order to make them avail complete information about their trip as they have enabled real-time GPS tracking of IndiGo flights. This exclusive facility of EaseMyTrip help the customers manage their travel plans with IndiGo Airlines as all relevant flight information to the customers including live flight status, arrival and departure timings and real-time updates of flights are provided. Customers who have booked their IndiGo Air Tickets from EaseMyTrip and have EMT app in their phones, receive instant push-notifications of any delay in flights, changes in departure gates, estimated takeoff and landing time etc. Similar services are also being offered by Ease MyTrip for Spice Jet, Go Air etc. ([EaseMyTrip.com, n.d.](#)).

Streamlined Operations

The day-to-day operations of airports are streamlined with the help of IoT. The passengers are facilitated to locate their bags through their smartphone. The bags will be able to locate the passengers and send them signals to the travelers' devices. Sensors and RFID tags to the luggage will be beneficial for travelers to locate their bag easily. Delta Airlines became the [first US airline to use RFID baggage tracking](#) in 2016 (Fastuca, n.d.). In India, the GMR led Hyderabad Airport became the first airport to deploy LoRa (Long Range) IoT platform for the Airport Baggage Trolley Project. With this, IoT technology has been enabled for the entire fleet of 3000 baggage trolleys resulting in substantial reduction in the waiting time of passengers for baggage trolleys and ensuring its availability in sufficient number in the real-time (ET CIO.com, 2020). The airport also launched the India's first FASTag Car Park, which enables quick entry and exit from parking spots in 2019. The FASTag solution is based on reloadable electronic RFID tag, which enables automatic deduction of applicable parking charges from a prepaid account while one drives through the car park without stopping for any cash transaction (Somasekhar, 2019). ZestiOT, part of the NASSCOM Deep Tech Club, has developed technology to optimize resources for airport operations. The technology was tested first by Air India at Delhi Airport and later at the Hyderabad and Bengaluru airports. ZestiOT uses IoT and a camera to detect operations from the moment the aircraft lands. For this, the IoT device is installed on every physical, movable asset at the airport - be it catering or the fuel truck and the cameras are installed in front on the aircraft parking stand to capture a lot of operations using AI. The entire operations of the aircraft have been digitized and thus provides visibility to the airport, airline and ground handlers, fuelers, caterers etc. The sensing technology is able to track the aircraft when it is 200 nautical miles away from an airport and thus can build contextual awareness in and around the airport in terms of the aircraft and the traffic movement (Desai, 2021).

Safety and Security

Hotels, railways and airlines implement security mechanisms with the centralized administration of IoT-enabled cameras and sensors. Hotels can even track the supply chain mechanisms with the help of sensors in shipments. The Vande Bharat Express – India's first semi high-speed train – uses a collision-avoidance system comprising sensors and other IoT devices to prevent accidents due to human error or equipment failure between the capital city of New Delhi and Varanasi in Uttar Pradesh (Harigunani, 2021).

Tourist Experience

Tourists will be able to locate and find travel related information on places to visit in nearby locations such as parks, gardens or other sightseeing points they need from their smartphones with the IoT technology. For this, sensors will be installed everywhere in the city to help locating bus stops and parking lots as well as to collect data about the practices of travelers and their reactions to different attractions with a view to optimize tourists' experience. To offer the commuters of Kochi Metro Rail in Kerala, a seamless connected experience, theme based station interiors, distinct color schemes, unique Kochi Metro app, wayfinding & information design, illustrated train livery were designed by Tata Elxsi to reflect the heritage and spirit of Kochi (Tata Elxsi, [n.d.](#)).

Voice Technology

Voice technology is another new development as more and more customers switch from typed-in search to voice interactions. In tourism and hospitality sector, many hotels and airlines have started experimenting with voice-activated devices. The most commonly used voice AI systems are Google Home, with its Google Assistant, Amazon Echo with Alexa, and Apple HomePod with Siri. There also exists assistants on smartphones, including Cortana for Microsoft and Bixby for Samsung (Gonzalo, [2018](#)). Travelers across the world has adopted for voice search as more than 70% of people from China and Turkey utilize it to find their destinations. India comes in third as almost 70% of [Indians](#) bank on voice search for their travels (Fomina, [2020](#)). KFC India has already introduced Alexa skill to allow customers to order food online via the smart speaker (Mehta, [2020](#)). SpiceJet launched 'Pepper', the first bilingual, AI-powered virtual voice assistant in the Indian airline industry in December 2020 enabling faster and more effective customer service in Hindi and English (Business Insider, [2020](#)). Hotel Park Inn by Radisson located at Delhi has modified some of its studio rooms with the help of a smart gadget Amazon Echo Dot powered by Alexa voice assistant so that the guest can do most of the things just by voice commands, marking the use of voice technology in Indian hotel sector. With the voice command, the guests are able to control room lights, turn on/off TV, change TV channels, play music of their interest, change volume level, change TV modes, access Amazon Prime, Google search, WhatsApp Web and YouTube in normal LED TV and avail any room service or avail any other hotel service (Deepanker, [2018](#)).

Wi-Fi Connectivity

Wi-Fi- connectivity has become an important element for communication for the traveler. While travelling, they need to get connected to get details about the destinations, options for stays and food, booking purpose, share their experience through social media. The business tourists want them to be connected to internet wherever they move. All this require uninterrupted Wi-Fi connectivity. Trabug, a Punjab based company from India offers a smartphone or a portable Wi-Fi device powered by a 4G connection on a rental basis, for anyone visiting India. The Pocket Wi-Fi device, which can connect to as many as 5 devices comes with free audio tours, currency exchange services, provides reliable information about places to visit, eat or stay at, access emergency services and information about police, hospitals, embassies, across India, anytime anywhere (Trabug, [n.d.](#)). Vistara became the first Indian airline to offer in-flight Wi-Fi internet on Boeing 787-9 Dreamliners in September 2020 on flights between Indira Gandhi International Airport in Delhi and London Heathrow using the Panasonic Avionics (Financial Express, [2020](#)). The airline also launched the in-flight internet service in domestic flights in India on their A321 neo aircraft in December 2020 (Miller, [2020](#)). Indian telecom companies are already working on VoWiFi and users if allowed by airline service providers can enjoy voice calling on their numbers as well (Srikapardhi, [2020](#)). The Indian airline SpiceJet launched ‘SpicEngage’, a complimentary in-flight entertainment (IFE) system that helps passengers use their own phones and tablets onboard to watch their favorite shows, play games by turning on the Wi-Fi and connect to ‘SPICENGAGE’ (SpiceJet, [2018](#)). SpiceJet has now revamped the same indigenously along with a local startup VuLiv and renamed it as ‘SpiceScreen.’ It uses Android phones, weighing around 200 grams each, to perform the dual role of Wi-Fi servers and content hub and it costs them barely 1% of the cost that they were paying previously to foreign service providers (Mulfati, [2020](#)).

Wearable Technology

Wearable technology is a term used for electronic items that can be worn on the body, either as an accessory or as part of material used in clothing. There are many types of wearable technology but some of the most popular devices are activity trackers and smart watches (Investopedia [n.d.](#)). The travel industry including cruises, airlines, resorts theme parks etc. that has consistent interaction with their customers has benefitted the most out of the technology. Jet Airways became the first airline in India in April 2015 to offer an app for the Apple Watch by which passengers who already have the carrier’s iPhone could synchronize it with their Apple Watch to access features, such as real-time flight status, alerts for upcoming trips and special offers from the airline (Apex, [2015](#)).

Mobile Apps

‘A mobile application is an application software designed to run on a mobile device like a smartphone or tablet computer’ (Techopedia, [n.d.](#)). There has been a huge increase in the number of people using travel apps in their mobile phones. A survey by Travelport Digital revealed that 25 percent of the respondents have at least one mobile travel app installed on their smartphones (TravelBizmonitor.com, [2018](#)). The tourism and travel industry in India is also responding favorably by coming up with new mobile apps. The new app introduced by Bangalore International Airport Limited (BIAL) allows users to urge real-time flight information, navigate with Google Indoor Maps, use one-touch Wi-Fi connect with Android devices, access the Must Try and Must Buy service for F & B and retail, receive notifications based on their location and provide feedback about their experience (Apex, [n.d.](#)).

Redefining Travel with Big Data Analytics

Big Data helps in analyzing the trends of traveler by collecting information from different sources allowing the travel and tourism industry businesses to take appropriate decisions as per the varying customer demand. According to the State of Data in Travel Survey 2017, 65% of travel businesses have a very enthusiastic data analysis team and 75% of those businesses were expecting to increase their data analytics budget that year (Boyd, [2017](#)). The Big Data Analytics help the travel industry business in the following ways:

Personalization

The big data analytics help in providing the tourist’s personalized service based on analyzing the large quantity of personal data on the customer’s behaviors and preferences based on the previous interactions in the social media platforms. This will bring more loyal customers which will directly bring in more sales for the company (Alexsoft, [2018](#)). MayaTM, the flagship product of Crayon Data, one of India’s fastest growing big data companies enables data-led personalization, right across a guest’s journey, from the time of check-in to post check-out. It captures preferences and suggests value based services based on guest profiles by combining internal and external data sets and also has the ability to personalize experiences using behavior and not identity. JW Marriott, Bengaluru spend a lot of time with guests in knowing about their preferences, likes and dislikes to personalize their experience. The hotel gathers information and details about preferences which are updated in the property management system for future use and to improve guest loyalty. Justa Hotels and Resorts uses the captured information of guests in the central databases of their chain to target guests to market and cross-sell their other hotels and thereby

increasing customer loyalty and repeat customers. At Novotel Mumbai Juhu Beach, the kitchen department makes a guest preference list for their own reference and follow it barely. To escalate the personalization experience, the hotel has designated separate chefs to different guests in order to enhance their dining experience (Crayon, 2017).

Improving Pricing Strategy

Big Data analytics can provide a real time view of the current offers tracking, indexing and analyzing competitors' prices. This would help companies to come up with a consistent pricing strategy and track changes in pricing. In addition to this, dynamic analyses can also be used to present a consistent price information. Many global hotel chains likes Marriott International and AccorHotels have data scientists and analysts on their team to develop and deploy pricing models using data about hotels and their competitors. The Country Inn Hotels & Resorts, India, since installing Hotelogix Property Management System is able to analyze client data and efficiently do the pricing for the rooms with occupancy based dynamic pricing in place (Hotelogix, n.d.). The resort has witnessed a 10% increase in revenue after implementing Hotelogix. KAYAK uses analytical models in air travel to ensure that prices displayed on its website are consistent with those on airline sites and also recently introduced flight price forecasting, which predicts whether the price of a particular flight will go up or down in next seven days (Exastax, 2017).

Improving Marketing Strategy

Big Data analytics enable the travel and tourism sector to assess the level of acceptance for a service or a product by potential customers and thereby enabling the company to refine its marketing strategy. This would also help the digital marketers to design the right marketing strategies and also maximize their Return on Interest through personalized marketing messages. The Oberoi group was the first company in hospitality industry in India to adopt the analytical approach in 2012 to engage with their guests. The objective was to design not an individual campaign, but a communication framework built on principles of one customer view, individual as opposed to mass marketing, engage with the guests without interrupting them as well as auto triggered campaigns. This data driven approach had led to an increase of 100% in repeat stays from 15% in 2012 to 30% in 2015 (Analytics India Magazine, 2015). OYO Rooms has used data analytics effectively in the hotel booking and providing services for accommodation segment tapping the mobile users who use the internet and other technological apps to get the best deals and prices. OYO Rooms, which started in May 2013, with one hotel booking had grown to over 8500 hotels and 75,000 rooms spread over well-targeted metros, commercial hubs, small cities, pilgrimage towns and even foreign leisure destinations like Nepal, Malaysia, etc. Their data analytic efforts helped to provide unmatched prices for

luxurious and standard hotel services while setting the standard for in-room customer experience and availability of budget-accommodation in India (Imarticus, 2019).

Ability to Meet Future Needs

By analysing big data, the travel company can analyse the future needs of the prospective travellers. The tourism organisations can know about the prospective customers to different destinations so that resources could be allocated in the most effective way. A cruise liner may be able to decide on the stop over for the trip based on customer preferences while an airline will be able to decide on the frequency flights to a particular destination. The Big data analysis also helps in predicting the availability of tickets in transportation sector. Ixigo, an Indian AI-based travel e-commerce website has launched a PNR prediction feature for train travelers using the power of Big Data. Ixigo is able to show the near accurate probability with which the ticket will confirm for any given train's wait-listed status, so that travelers may decide whether or not to book a wait-listed ticket (Srikanth, 2015).

Block Chain Technology

Blockchain is a technology that publicly stores all transactions between parties that a particular network produces. The technology got its name block chain as each register gets encrypted and grouped into blocks that form a chain. The main characteristics of block chain technology is that the data is decentralized, immutable and secured (Cancelas, 2018). In the tourism sector, many people travel based on the reviews wrote on websites. The reader may not be able to know who wrote this or the accuracy of the post. With the usage of blockchain, the information shown in the network is public and more authentic resulting in increased public trust. Locus Chain Foundation, a Blockchain technology company with headquarters at Singapore, signed a strategic partnership agreement with Let's Fly Free, an internet travel and business enterprise platform primarily based in India to introduce Locus Chain digital currency as a mode of payment within the travel and tourism industry (Gupta, 2019). SpiceJet by partnering with blockchain-based video streaming application provider Mzaalo and Mojo Boxx (formerly VuLiv) has become the first airline to informally adopt blockchain technology for its in-flight entertainment, 'SpiceScreen'. This allows SpiceJet passengers to access over 50,000 hours of Bollywood entertainment from Mzaalo on SpiceScreen, which is powered by just a pair of Mojo Boxx's special Smartphone IFE Box (Preston, 2021).

Conclusion

Tourism is going to be different in the coming years with the development of ICT creating openings in the business in terms of new markets, products and experiences. With India already catching up with these new technological innovations and started offering new innovative products and experiences for the tourists, there is no doubt that it would emerge as the leading tourism destination in Asia. Although India is a country with the world's second largest pool of internet users in the world, yet half the population lacks internet access shows the digital divide in the country. On addressing the issue of digital divide in tourism, it is important that increased investments come in for digital infrastructure in the country, the tourists and businesses develop their ICT skills and use the available online resources and also create opportunities for small enterprises to enhance their ICT skills to place them to compete their tourism products in the global market.

References

- Adobe, Epsilon & Skift. (2016). *How the Internet of Things Will Impact Travel in 2017 and Beyond?* Skift. Retrieved from: <https://skift.com/2016/12/19/how-the-internet-of-things-will-impact-travel-in-2017-and-beyond/>. Accessed 10 Jul 2020.
- Alexsoft. (2018). *How the Hospitality Industry Uses Performance-enhancing Artificial Intelligence and Data Science?* Retrieved from: <https://www.altexsoft.com/blog/datascience/how-the-hospitality-industry-uses-performance-enhancing-artificial-intelligence-and-data-science/>. Accessed 25 Jul 2020.
- Analytics India Magazine. (2015). *Interview – Dilpreet Singh, Head of Analytics at the Oberoi Group*. Retrieved from: <https://analyticsindiamag.com/interview-dilpreet-singh-head-of-analytics-at-the-oberoi-group/>. Accessed 14 Apr 2021.
- Analytics India Magazine & Jigsaw Academy. (2020). *State of Artificial Intelligence in India – 2020*. AIM Research. Retrieved from: <https://analyticsindiamag.com/report-state-of-artificial-intelligence-in-india-2020/>. Accessed 22 Jan 2021.
- Apex. (2015). *Jet Airways becomes first Indian carrier to offer Apple Watch app*. Future Travel Experience. Retrieved from: <https://www.futuretravelexperience.com/2015/12/jet-airways-becomes-first-indian-carrier-to-offer-apple-watch-app/>. Accessed 17 Jul 2020.
- Apex. (n.d.). *On the Ground: Mobile & Wearables*. Future Travel Experience. Retrieved from: <https://www.futuretravelexperience.com/on-the-ground/mobile-wearables/page/2/>. Accessed 19 Jul 2020.
- Bagchi, S. (2015). *How Lemon Tree uses face recognition to bolster security*. Mint. Retrieved from: <https://www.livemint.com/Specials/r8izhPFiNIYiYjW2XG5u7H/How-Lemon-Tree-uses-face-recognition-to-bolster-security.html>. Accessed 23 Jan 2021.
- Benckendorff, P. J., Sheldon, P. J., & Fesenmaier, D. R. (2014). *Tourism information technology*. CABI.
- Bhalla, T. (2016). *Paris-based NUMA accelerator enters India, invests in 9 startups*. Yourstory. Retrieved from: https://yourstory.com/2016/05/numa-accelerator-india?utm_pageloadtype=scroll. Accessed 10 Apr 2021.
- Bose, P. (2020). *SpiceJet Introduces Ms Pepper, An Automated Customer Service Via WhatsApp*. NFA Post. Retrieved from: <https://www.thenfapost.com/2020/08/13/spicejet-introduces-ms-pepper-an-automated-customer-service-via-whatsapp/>. Accessed 11 Apr 2021.

- Boyd, C. (2017). *Big data in the travel industry: How can travel companies do more to collect and use customer data?* ClickZ Marketing Technology Transformation. Retrieved from: <https://www.clickz.com/big-data-in-the-travel-industry-how-can-travel-companies-do-more-to-collect-and-use-customer-data/112872/>. Accessed 15 Jul 2020.
- Business Insider. (2020). *SpiceJet launched “Pepper” AI-powered virtual voice assistant with Nuance Communications*. Retrieved from: <https://www.businessinsider.in/tech/news/spicejet-launched-pepper-ai-powered-virtual-voice-assistant-with-nuance-communications/article-show/79734754.cms>. Accessed 11 Apr 2021.
- Business Line. (2019). *MakeMyTrip deploys AI to make bookings easier*. Retrieved from: <https://www.thehindubusinessline.com/info-tech/makemytrip-deploys-ai-to-make-bookings-easier/article29697353.ece#>. Accessed 15 Jul 2020.
- Business Standard. (n.d.). *What is Electric Vehicle?* Retrieved from: <https://www.business-standard.com/about/what-is-electric-vehicle>. Accessed 7 Nov 2020.
- Business Today. (2019). *Robots serve customers at 1st ‘smart’ restaurant in Odisha*. Retrieved from: <https://www.businesstoday.in/current/economy-politics/robots-serve-customers-at-first-smart-restaurant-in-odisha-bhubaneswar-robo-chef/story/385205.html>. Accessed 8 Feb 2021.
- Business Wire. (2019). *Indian Machine Learning Market Will Be Impacted by the Growth of the Artificial Intelligence Market Which Is Expected to Grow by 33.49% during the Forecast Period, 2018-2023*. ResearchAndMarkets.com. Retrieved from: <https://www.businesswire.com/news/home/20190725005554/en/Indian-Machine-Learning-Market-Will-Be-Impacted-by-the-Growth-of-the-Artificial-Intelligence-Market-Which-Is-Expected-to-Grow-by-33.49-During-the-Forecast-Period-2018-2023---ResearchAndMarkets.com>. Accessed 14 Apr 2021.
- Cancelas, A. (2018). *What We Can Expect from Blockchain in the Tourism Industry*. We are marketing. Retrieved from: <https://www.wearemarketing.com/blog/what-we-can-expect-from-blockchain-in-the-tourism-industry.html#:~:text=Blockchain%20and%20tourism%20have%20the,information%20to%20the%20different%20firms>. Accessed 31 Jul 2020.
- Chandran, R. (2019). *Facial recognition push at India airports raises privacy concerns*. Reuters. Retrieved from: <https://www.reuters.com/article/us-india-privacy-facialrecognition-idUSKC-NIUK115>. Accessed 8 Jan 2021
- Crayon. (2017). *The Personalization Paradox – Indian hospitality rediscovers*. Retrieved from: <https://www.crayondata.com/personalization-paradox-indian-hospitality-rediscovers/>. Accessed 12 Apr 2021.
- Deccan Chronicle. (2019). *Like Hyderabad, & Bengaluru, facial recognition will also come to Pune Airport*. Retrieved from: <https://www.deccanchronicle.com/technology/in-other-news/190919/like-hyderabad-bengaluru-facial-recognition-will-also-come-to-pune.html>. Accessed 12 Mar 2021.
- Deepanker. (2018). *This is How India’s First Voice Activated Smart Hotel Room Takes Hospitality to A New Level*. Techlo Media. Retrieved from: <https://techlomedia.in/2018/01/indias-first-voice-activated-smart-hotel-room-takes-hospitality-new-level-54627/>. Accessed 10 Apr 2021.
- Desai, V. (2021). *How ZestIOT is bringing efficiency to airports with deep tech*. Dataquest. Retrieved from: <https://www.dqindia.com/zestiot-bringing-efficiency-runways-airports-deep-tech/>. Accessed 11 Apr 2021.
- EaseMyTrip.com. (n.d.). *Indigo Flights Live Status*. Retrieved from: <https://www.easemytrip.com/flight-status/indigo-flight-status.html>. Accessed 10 Feb 2021.
- ET CIO.com. (2020). *GMR Hyderabad Intl Airport goes ‘smart’ with India’s first ‘IoT enabled Smart Trolleys’*. Retrieved from: <https://cio.economicstimes.indiatimes.com/news/next-gen-technologies/gmr-hyderabad-intl-airport-goes-smart-with-indias-first-iot-enabled-smart-trolleys/79458426>. Accessed 11 Apr 2021.
- Exastax. (2017). *How big data analytics is transforming the travel industry*. Retrieved from: <https://www.exastax.com/data-analytics/how-big-data-analytics-is-transforming-the-travel-industry/>. Accessed 22 Jul 2020.
- Expert System. (n.d.a). *What is Machine Learning? A definition*. Retrieved from: <https://www.expertsystem.com/machine-learning-definition/>. Accessed 23 Jul 2020.

- Expert System. (n.d.b). *Chatbot: What is Chatbot? Why are Chatbots Important?* Retrieved from: <https://www.expertsystem.com/chatbot/>. Accessed 10 Jul 2020.
- Fastuca, R. (n.d.). *Top 5 Internet of Things Innovations in Corporate Travel*. Locomote. Retrieved from: <https://blog.locomote.com/top-5-internet-of-things-innovations-in-corporate-travel>. Accessed 17 Jul 2020.
- Financial Express. (2020). *Vistara becomes India's first airline to offer in-flight Wi-Fi internet; Check details*. Retrieved from: <https://www.financialexpress.com/lifestyle/travel-tourism/vistara-becomes-indias-first-airline-to-offer-in-flight-wi-fi-internet-check-details/2086245/>. Accessed 11 Apr 2021.
- FlippAR Go. (n.d.). *Hear, hear! Backpackers of the world!* Retrieved from: <https://flipppargo.com/>. Accessed 10 Apr 2021.
- Fomina, D. (2020). *The Era of Voice-Powered Travel Experiences is Upon Us*. Voice UI. Retrieved from: <https://medium.com/voiceui/the-era-of-voice-powered-travel-experiences-is-upon-us-413799505e04>. Accessed 11 Apr 2021.
- Gonzalo, F. (2018). *How Voice Search Will Impact Travel Marketing*. Frederic Gonzalo's Blog. Retrieved from: <http://fredericgonzalo.com/en/2018/02/05/how-voice-search-will-impact--travel-marketing/>. Accessed 15 Jul 2020.
- Gupta, A. (2019). *Hotels check into greener power sources*. EQ International. Retrieved from <https://www.eqmagpro.com/hotels-check-into-greener-power-sources/>. Accessed 19 Nov 2020.
- Hariganani, P. (2021). *India is becoming a hotspot for IoT*. ComputerWeekly.com. Retrieved from: <https://www.computerweekly.com/feature/India-is-becoming-a-hotspot-for-IoT>. Accessed 11 Apr 2021.
- Hotelogix. (n.d.). *Country Inn Hotels & Resorts, India, witnesses 15x Return on Investment since implementing Hotelogix PMS*. Retrieved from: <https://www.hotelogix.com/case-studies/country-inn-hotels-and-resorts-india>. Accessed 14 Apr 2021.
- Imarticus. (2019). *How analytics and data science is helping OYO to enhance customer experience?* Retrieved from: <https://blog.imarticus.org/knowledge-center-analytics-how-analytics--and-data-science-is-helping-oyo-to-enhance-customer-experience/>. Accessed 14 Apr 2021.
- Investopedia. (n.d.). *Wearable Technology*. Retrieved from: <https://www.investopedia.com/terms/w/wearable-technology.asp>. Accessed 20 Jul 2020.
- Iyer, S. (2019). *These walking tour apps help you discover and learn more about city attractions without a guide*. Outlook Traveller. Retrieved from: <https://www.outlookindia.com/outlooktraveller/travelnews/story/69607/audio-tour-apps-to-explore-a-city-solo>. Accessed 10 Apr 2021.
- Jayaram, A. (2018). *How 5-star hotels in India are using tech to improve customer relations*. Business Today. Retrieved from: <https://www.businesstoday.in/technology/news/how-5-star-hotels-in-india-are-using-tech-to-improve-customer-relations/story/280598.html>. Accessed 14 Apr 2021.
- Jha, S. (2019). *Here's how Machine Learning became the ticket to efficiency for redBus*. ETCIO.com. Retrieved from: <https://cio.economicstimes.indiatimes.com/news/strategy-and-management/heres-how-machine-learning-became-the-ticket-to-efficiency-for-redbus/70459411>. Accessed 14 Apr 2021.
- Kashyaap, S. (2019). *Experience India's heritage and history using augmented reality thanks to Augtraveler*. Yourstory. Retrieved from: <https://yourstory.com/2019/01/experience-india-heritage-ar-augtraveler>. Accessed 10 Apr 2021.
- Kerala Tourism. (n.d.). *360° Videos of Kerala*. Keralatourism.org. Retrieved from: <https://www.keralatourism.org/video-gallery/360-virtual-tour/>. Accessed 10 Apr 2021.
- Mathrubhumi. (2019). *Kerala's first robotic restaurant opens in Kannur*. Retrieved from: <https://english.mathrubhumi.com/food/street-food/kerala-s-first-robotic-restaurant-opens-in-kannur-movie-1.3955110>. Accessed 23 Jan 2021.

- Mehta, S. (2020). *How companies are embracing voice tech as their way forward*. Financial Express. Retrieved from: <https://www.financialexpress.com/brandwagon/how-companies-are-embracing-voice-tech-as-their-way-forward/2042439/>. Accessed 11 Apr 2021.
- Miller, S. (2020). *Vistara extends in-flight WiFi service in India*. Paxex.Aero. Retrieved from: <https://paxex.aero/vistara-extends-in-flight-wifi-service-in-india/>. Accessed 11 Apr 2021.
- Mistry, S. (2020). *How Can IoT in Hospitality Industry Grow Your Hotel Business?* eZee Absolute. Retrieved from: <https://www.ezeeabsolute.com/blog/iot-in-hospitality-industry/>. Accessed 18 Jul 2020.
- Moorthy, S. (2018). *At this Chennai restaurant, be served by robots*. Business Line. Retrieved from: <https://www.thehindubusinessline.com/news/variety/at-this-chennai-restaurant-be-served-by-robots/article10009074.ece>. Accessed 18 Jul 2020.
- Mulfati, J. (2020). *VuLiv's Smartphone-Based IFE System Powers SpiceJet's Revamped Offering*. Apex. Retrieved from: <https://apex.aero/articles/vuliv-spicejet-ife/>. Accessed 11 Apr 2021.
- Muziris Heritage Project. (n.d.). *Muziris Virtual Tour Guide*. Retrieved from: <http://www.muziris-heritage.org/muziris-virtual-tour-guide/>. Accessed 10 Apr 2021.
- NDTV Profit. (2018). *IRCTC Launches 'AskDisha' For Customer Support and Engagement*. Retrieved from: <https://www.ndtv.com/business/irctc-indian-railways-launches-askdisha-chatbot-for-customer-support-and-engagement-1932013>. Accessed 18 Jul 2020.
- Omnivirt. (2018). *Travel VR: Explore the world on your couch*. Retrieved from: <https://www.omnivirt.com/blog/top-travel-tourism-virtual-reality-vr-examples/>. Accessed 23 Jul 2020.
- Preston, A. (2021). *SpiceJet uses blockchain to enhance IFE experience*. Inflight. Retrieved from: <https://www.inflight-online.com/spicejet-uses-blockchain-to-enhance-ife-experience/>. Accessed 2 Apr 2021).
- Razzaq, A. (2018). *5 Ways that Machine learning is transforming the Travel Industry*. Marktechpost. Retrieved from: <https://www.marktechpost.com/2018/09/16/5-ways-that-machine-learning-is-transforming-the-travel-industry/>. Accessed 18 Jul 2020.
- Roberts, K. (2013). *Airline Reservation Systems History 101*. Christopherson Business Travel. Retrieved from: <https://www.cbtravel.com/airline-reservation-systems-history-101/>. Accessed 9 Nov 2020.
- Saulat, A. (2018). *Four Ways AI is Re-imagining the Future of Travel*. Mindtree. Retrieved from: <https://www.mindtree.com/blog/four-ways-ai-re-imagining-future-travel>. Accessed 15 Jul 2020.
- Shekhar, D. (2018). *20 heritage tourism sites in Karnataka to get a layer of augmented reality*. The Economic Times Tech. Retrieved from: <https://economictimes.indiatimes.com/technology/20-heritage-tourism-sites-in-karnataka-to-get-a-layer-of-augmented-reality/articleshow/65482413.cms>. Accessed 12 Apr 2021.
- Sheladiya, A. (2019). *Augmented Reality in Tourism*. Linked in. Retrieved from: <https://www.linkedin.com/pulse/augmented-reality-tourism-anandi-sheladiya/>. Accessed 10 Apr 2021.
- Sheldon, P. J. (1997). *Tourism information technology*. CABI Publishing.
- Somasekhar, M. (2019). *GMR Hyderabad International Airport introduces FASTag Car Park facility*. Business Line. Retrieved from: <https://www.thehindubusinessline.com/economy/logistics/gmr-hyderabad-international-airport-introduces-fastag-car-park-facility/article29998409.ece>. Accessed 11 Apr 2021.
- SpiceJet. (2018). *SpiceJet launches its new In-flight Entertainment System 'SpicEngage'*. Media Centre. Retrieved from: <https://www.spicejet.com/PressReleaseNewsPage.aspx?strNews=SpicEngage2018>. Accessed 2 Apr 2021.
- Srikanth, R. P. (2015). *8 innovative examples of Big Data usage in India*. Dataquest. Retrieved from: <https://www.dqindia.com/8-innovative-examples-of-big-data-usage-in-india/8/>. Accessed 2 Apr 2021.
- Srikapardhi. (2020). *An Overview of Wi-Fi on Planes in India: Content, Pricing & Use Case Scenarios*. Aviation scoop. Retrieved from: <https://aviationscoop.com/overview-inflight-connectivity-analysis-india-content-pricing/>. Accessed 13 Jan 2021.

- Tata Elxsi. (n.d.). *Kochi Metro Rail – Designing the end-to-end passenger experience for enhanced travel*. Retrieved from: <https://www.tataelxsi.com/insights/kochi-metro-rail-designing-the--end-to-end-passenger-experience-for-enhanced-travel>. Accessed 3 Apr 2021.
- Techopedia. (n.d.). *Mobile Application*. Retrieved from: <https://www.techopedia.com/definition/2953/mobile-application-mobile-app>. Accessed 16 Jul 2020.
- Think Mobiles. (n.d.). *Augmented Reality in Tourism*. Retrieved from: <https://thinkmobiles.com/blog/augmented-reality-tourism/>. Accessed 14 Jul 2020.
- Times Travel. (2019). *Bengaluru just got its first Robot Restaurant, where robots will be at your service*. Retrieved from: <https://timesofindia.indiatimes.com/travel/eating-out/bengaluru-just-got-its-first-robot-restaurant-where-robots-will-be-at-your-service/as70771831.cms>. Accessed 13 March 2021.
- Trabug. (n.d.). *A Detailed Guide to Public Wi-Fi Networks in India for Foreign Tourists*. Retrieved from: <https://www.trabug.com/blog/a-detailed-guide-to-public-wifi-networks-in-india-for-foreign-tourists/>. Accessed 12 Jan 2021.
- TravelBizmonitor.com. (2018). *Mobile Travel Trends 2018*. Retrieved from: <http://www.travelbiz-monitor.com/Data-Analysis/mobile-travel-trends-2018-35565>. Accessed 16 Jul 2020.
- Tutorialspoint. (n.d.). *Artificial Intelligence–Overview*. Retrieved from: https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_overview.htm. Accessed 15 Jul 2020.
- UNWTO & UNEP. (2005). *Making Tourism More Sustainable - A Guide for Policy Makers* (p. 12). Retrieved from: <https://www.e-unwto.org/doi/epdf/10.18111/9789284408214>. Accessed 17 Nov 2020.
- WhatIs.com. (2015). *Virtual Reality*. Retrieved from: <https://whatis.techtarget.com/definition/virtual-reality>. Accessed 12 Jul 2020.
- WhatIs.com. (2016). *Augmented Reality*. Retrieved from: <https://whatis.techtarget.com/definition/augmented-reality-AR>. Accessed 14 Jul 2020.

Chapter 21

Internet of Things: Designing Digital Eco-Systems for Competitive Tourism Related Micro and Small Enterprises in Pakistan



Sadia Shaikh

Abstract The evolving technological advancements and the advent of the fourth industrial revolution through the influx of the Internet of Things (IoT), has bewildered the business world. The new technologies have brought world markets closer, evading the global geographical borders. In the service sector, the tourism industry, has an immense prospect to further foster through the advanced technological tools such as Artificial Intelligence (AI) integrated with tourism offerings may bring forth enhanced tourism experiences essentially in the arena of authentic heritage tourism in Asia. The times when tourists intend to have wider access to knowledge about the destinations, modern developments in Information Technology and Artificial Intelligence can play a pivotal role in establishing destination knowledge sharing and tourist's information collection protocol. This chapter thus underlines the core areas of integration between information technology and the heritage tourism industry. The contents predominantly emphasize the prominence of the heritage tourism destinations and answers some pressing questions which relate to the need of integration of digitization in heritage destinations and why this combination is perceived to be inevitable. This chapter thus considerably underscores the fusion of technology with the heritage tourism offerings in Asia and how they will emerge as future competitive tourism destinations.

Keywords Industry 4.0 · Internet of Things · Heritage tourism · Tourism SMEs · Digital ecosystems

S. Shaikh (✉)

Faculty of Management Sciences, Hamdard University, Karachi, Pakistan

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_21

Introduction

Industry 4.0: The Refractive Revolution

In recent years, technology has emerged and grown to become immensely popular with deeper effect on global systems by rationalizing human life. The advent of digitization has created a large impact on modern-day lifestyles and the manner we connect, live, work and function. Massive rapid evolvement of technology has not endured its maturity yet nor is in inertia but is in ever-evolving state (O'Leary, 2020). The modern technological trends will further transpire and will lead to transubstantiating the systems in the years to come, which will redefine the communication and subsisting structures.

Disruption of the world marketplace through new commercial enterprise pattern is one of the implications of digitization which additionally influences business competition propensities and consumer markets at large. Technologies which have recently grown and penetrated into the business fields include advent of robotics, augmented reality, the Internet of Things (IoT), Cloud Computing, AI, Block Chain, Big Data and Big Data Analytics, all which are powered through technical convergence and network cyberspace supremacy (Marr, 2018). This radical transition in business processes has emerged as a new generation of industrial revolution, generally called Industry 4.0 or the fourth Industrial Revolution. The core of Industry 4.0 is to merge machine production, information technology and the internet together, to create a strongly connected industrial process tool (Madsen, 2019).

The consequences of the consolidation of network prowess with humanized efforts and simple devices has instigated greater virtual interconnectivity of people, computer systems and human-machine-systems, wherein hierarchies in organizations are regularly dismantled and turning into informal structures, culminating in vertical and horizontal convergence of the hierarchical chain (Paschek et al., 2019). At the brink of this new evolution of the organizational hierarchies, groups within organizations want to be concerned in mapping out digitization standards and find ways to integrate these technologies into their conventional systems (Malik, 2020). Organizations are aggressively making investment plans to capitalize on the technological tools offered by Industry 4.0 to lessen manufacturing charges and continue to be competitive within the marketplace.

With the inception of Industry 4.0 concept, the new business structures have emerged which put emphases on collective organizational systems (Belair-Gagnon & Steinke, 2020). These collaborative systems are termed as Business Ecosystems, where all the stakeholders of a business tend to work in a tightly knitted structure, benefiting each other to grow and prosper. The ecosystem concept renounces the idea of organizational partners working in silos and create a consolidated environment for organizations to channelize their value systems to support each other in order to survive, develop and prosper. I.4 transformations, in this essence, are not only confined to any one unit or element of the business value chain, such as manufacturing or operations, but imply to the whole production and value chain of

business processes. Relatedly, the core of adherence to I.4 and working in business ecosystems extend sustainability benefits to organizations, through which resource efficiency, waste management, lean and green practices can flourish and the competitive advantage for each agent in the value chain process could be maintained (Sharma et al., 2020). The chain of ecosystem is twined through information and communication transference between the value chain agents, that creates the interoperability between the systems, enhances mass production, augments lean practices, spur operational flexibility, product exclusivity and customization prospects for businesses, leading to furtherance in business development and success.

To create faster production processes organizations in order to maintain their competitive advantage need to make strategies built on industry 4.0 tools so as to produce faster, cost effective and quality products so as to beat the market competition. These strategies need to be internet driven and inherently digitally innovative targeted to achieve the sustainable competitive advantage. Industry 4.0 thus transpires to be a catalyst which can resolve the issues related to sustainability adherence, resource insufficiency and subside other global challenges through its propensity to work through its smart integral mechanism (Donner & Steep, 2021). As businesses are heading to sustainable practices and adopting lean marketing and management strategies, industry 4.0 provides them with tools to improve the overall supply chain workflow making the production and process functions more dynamic through automated manufacturing, mass customization, apart from instilling mass production facilities in the organizations.

Artificial Intelligence

Artificial Intelligence (abbreviated as AI) is all about intelligent machines that with advanced built-in programmed systems, perform activities like conversing, reading, observing, recognizing, phenomena, objects, and sentiments like humans. Using complex data algorithms and codes, the artificially built intelligent machines can perform tasks that are onerous and burdensome for humans and execute tasks with greater precision, accuracy, and efficiency. AI is rapidly being engrained in new and existing business systems especially in large organizations and has embarked to be used well everywhere from health services, banking, manufacturing, and sales. The prevalence of AI on smart handy gadgets have made its applicability and use easier for customers.

Internet of Things

The ever-growing impact of digitization and internet in our everyday lives, the emergence of Internet of Things substantiates to bring significant modifications to the tourism industry. The overall system of the IoT include integrated sensors connected to the internet, within different objects like vehicles, handbags, suitcases, buildings, and household items such as chairs, tables, refrigerators, fans, washing

machines and so forth. It would not be unjust to say that the IoT is going to be one of the major innovative reform or a seminal transformative factor in the personalization of customer experience impacting all industries around the world in the next few years.

IoT refers to the concept of computing, which describes the future in which every day physical objects are expected to be linked to the Internet so that other devices can recognize them. The Internet of Things is said to be the next big thing for global businesses which will lead to a massive transformation of the world. The focus of Internet of Things is on machine-to-machine connectivity through cloud computing and the data collection sensor network. The data obtained by the network sensor must be processed and interpreted in real time using a cloud-based program. The Internet of Things thus facilitates the convergence of physical objects with computer-based applications.

IoT is an interactional tool which typically synergizes sensors with different devices. To put simply, IoT use sensors to collect and share the information through remote devices which help gather sensory motions and data to acquire precise information. Peng et al. (2020) proclaim this as “IoT can be defined as an extension of the Internet and other network connections to multiple sensors and devices—or ‘things’-including basic items such as light bulbs, locks, and monitoring machines, and uses higher computing standards to assimilate specific analytical capabilities”.

Similarly, IoT is further defined as a web of physical objects that establishes the embedded object’s ability to link, interact and otherwise exchange data with each other and the external world, this creates a web of network without human interference.

IoT and Business Today

Business systems today are captivated with technological advancements which coerces business enterprises to respond to the innovative developments and meet the ever-changing marketplace demands. Similarly, for all business including micro, medium, large sized as well as those belonging to manufacturing or service industry it is unavoidable to contain these innovations in their operations, beginning with the HR process, the hiring of the right fraction of workers and machines, structuring the supply chain, and the production operations. It has been evidenced that the most intriguing idea, which attracts much of the business attention today, is the IoT.

Justification

Digitization in Micro, and Small Enterprises

Recently, a massive research interest of business researchers has shifted to underpin the challenges surfacing from I.4 and endurance of digital ecosystems in diverse industries. Governments, globally, are more interested to address the issues pertaining to digitalization and techno-businesses realms so as to increase the innovative competence of businesses. The concepts of Horizon 2020, LIFE program (2020–2027) by EU to drive innovation led sustainable growth, Tech USA for technological socio-economic competence, and 2030 Vision to advance I.4 technologies for global goals are all focused on attaining sustainability goals through technological advancements in processes. The global transpiring challenges of resource efficiency and climate issues that world face today bring forth changing dynamics of business and ever-changing customer demands (Hess et al., 2016). All these forces compel global decision makers to support Micro, Small and Medium Enterprise (SME) businesses financially or technically to embrace the technological shift and bring innovation in business arrangements.

Hence, to deal with the new world business challenges, digital business ecosystem brings forth the solution for small businesses to innovate and survive in the dynamic environment. SMEs have higher tendency to adopt changes than the large enterprises due to their flexibility, innovative attitude, entrepreneurial spirit, perseverance, and tenacity (Rauch et al., 2020). Even in previous economic downturns, micro and small enterprises have demonstrated a better endurance to survive than large enterprises which are less risk prone and have a sizable capital at stake. Small size enterprises not only have higher propensity to adapt to the new changes and depict vigorous innovation but also comply with manufacturing variations because of their adaptive approach on remodeling, acclimatization, and modificative behavior to external forces. This adaptability to counteract the increasing competitive coerciveness has provided Micro, Small, and Medium Enterprises (MSMEs), a proactive capacity (Cochran & Rauch, 2020). which implies to better embracing I.4 stipulations. The I.4 technologies thus proffer prolific opportunities to small business to compete and sustain. The shift in business systems brought by technological transformations open a window of prospects for small businesses as they are often capable of implementing technological changes more rapidly than large enterprises as the cost of initiating re-modifications in traditional business infrastructures to employ IT driven structures is less for MSMEs. Many MSMEs and new entrepreneurial start-ups have already deployed Information & Communication Technology (ICT) practices to seize competitive advantage. By incorporating I.4 technologies in production activities with the digital structures, even small production units have emerged as smart production units which can imply large economic contributions.

However, the larger the prospects I.4 indicate for MSMEs, the fact cannot be denied that adoption of digital and I.4 technologies and integrating them into existing business for small business is a challenging task (Hess et al., 2016). Many

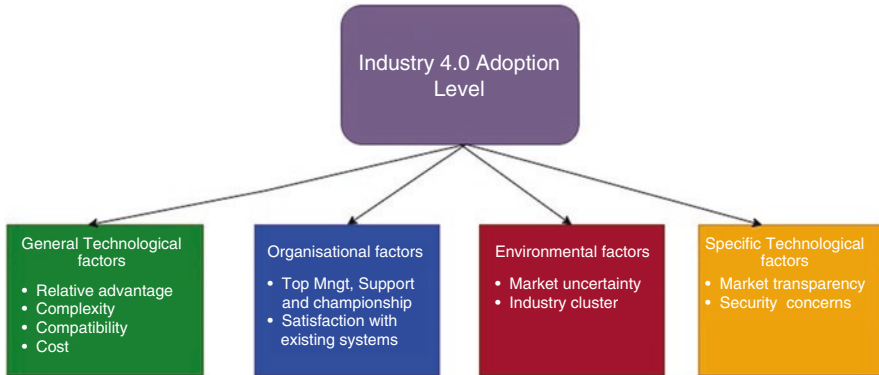


Fig. 21.1 Industry 4.0 adoption model. (Source: Prause, 2019)

research studies attempt to identify the tendency of small businesses for I.4 technologies adoption and proclaim that implementation of these technologies is consistent with the size of the organization i.e., the smaller the size, the more complicated is to embrace the change due to IT in capabilities and operative deficiencies. Along these lines, I.4 readiness for MSMEs and adoption challenges have become the most imperative issue contained in literature today. Figure 21.1 illustrates the framework for i.4 challenges for MSMEs proposed by Martín-Gómez et al. (2019), which accentuates that diverse factors impose barriers towards I.4 adoption in small businesses.

IoT and Manufacturing Industry

The use of IoT led operations are thriving in global businesses today. Organizations are persistently embracing technologies by investing massive amounts. According to an estimated forecast, the number of connected devices in consumer market alone is expected to reach 25 billion by the end of 2020 and even the stream of linked devices will go beyond personal appliances (Gartner, 2015).

The IoT can bring substantial advantages to micro, small, medium, and large manufacturing organizations through the automation of basic tasks such as product control or purchase, incorporation of RFID (Radio Frequency Identification), creation of inventory tags, enabling production process tracking, monitoring and executing tasks such as packaging, map shipment and other logistics channels, control merchandise sale, monitor distribution channels and oversee other organizational operations at cursory pace. To cater the customers, IoT proves to be a salient instrument to provide real time information to the consumers about product availability, its specifications, price comparisons, shipments, and other details. Similarly, IoT also provides automated solutions to the businesses to help avoid the loss of resources during the production processes or loss of goods during distribution and physical sales, and also facilitates to replenish them with least human interface.

Comparably, for financial undertakings, IoT aids to minimize the bookkeeping and accounting tasks. In this regard, pharmaceutical and chemical manufacturing companies can use IoT to control lab environment and monitor temperature for controlled automated experiments. Same could be applied to agriculture production where ground moisture can be tracked to allow automated watering at required intervals. In the post COVID-19 era, where social distancing is essential and human interface is forestalled, diverse industries such as automated patient care and treatments in hospitals, remote learning in schools and colleges, energy saving in organizations through smart lighting and heating systems, programmed repair and cleaning services in automobile industry, sensory motion and real time data capture in driverless transportation in cars and aviation industry, temperature check in restaurants or food industry, expiry or safety check for packaged edible inventory for retail industry, and automated 3D imaging, printing, and production in architecture as well as construction industry are a few avenues where adoption of IoT can provide tremendous benefits. IoT is not only a tool to lead towards mass production or precision in processes but its efficient ability in diverse areas is cardinal aspect to reduce cost and maximize profits.

The modern paradigm based on IoT has a huge effect on various fields such as business, wellness, education, economics, agriculture and other areas and its key purpose is to make lives simpler and comfortable. The application of this new technology in every domain has its benefits and gains. Various organizations, through IoT and connected devices, may be allowed to save energy costs by using smart displays to monitor temperature and lighting. Recently, IoT has immensely benefited the healthcare services which use wearable devices for remote supervision of patient well-being. The industry has also adopted automatic surveillance to alert healthcare professionals about patients' conditions by signaling through remote warning signs such as cardiac attacks, fluctuating blood pressure, and for other emergency treatments.

Aims and Scope

Smart organizations today are relentlessly implementing and deploying IoT in their business processes such as to store, control, analyze and use big data volumes in process automation, customer recognition, inventory monitoring, financial reporting, and other applications to enhance efficiency, procure cost savings, and achieve a competitive advantage. However, the most preeminent feature of IoT is "Customization" in manufacturing. The ability to produce in mass while understanding the need of the customer and producing custom-made according to their needs is a paramount characteristic of IoT which builds its unsurpassed capacities compared to conventional production. Although due to its ability to meet mass production in LE, the vitality of use of IoT in SMEs cannot be denied. The foremost aspect of creating synergy between IoT and SMEs is built upon SMEs capacity to easily adapt new technologies with least cost and efforts.

IoT and Industry 4.0 propose many significant aspects in which adoption of electronically linked processes can have an effect on the business by using robots in the absence of labor, or in inefficient labor output. Similarly, “sensing machines” with sophisticated sensors which detect temperature, sound, friction, movement, power, measurement is rapidly used to monitor the processes and alarm about any malfunction or problem immediately. These sensors may also be used for quality tracking in a far more cost-effective and precise manner. However, the radio frequency identification devices due to its more complex system are generally adopted by large firms. RFIDs are small machine tools that can be inserted into and deposited in products and can monitor or manage performance. The large retailers can benefit from these emerging technologies in various aspects such as for their inventory control, logistics productivity, and to enhance quality management, even most manufacturers had streamlined their procedures with IoT and increased their inventory accuracy. This chapter thus highlights the main aspects of integration of IoT and IoS with the Tourism Related Micro and Small, Enterprises (TRMSEs) which are involved in heritage products and services; and how this consolidation could help businesses in local communities as well as tourism industry to grow.

The fusion of technology with the tourism enterprises is an inevitable phenomenon, which would restructure existing business paradigm and will provide TRMSMEs an apparatus to emerge as future competitive tourism related businesses.

The Global Tourism Industry

Tourism is an emergent industry worldwide, which has witnessed tremendous progress in recent times. Tourism is believed to provide an impetus to the economic progress of developing nations and today it is considered to be the largest industry in the world. International tourism plays a key role in contribution of global economic growth and prosperity. The statistical data disseminated by the world tourism organization (World Tourism Organization, 2019) just before the upheaval of COVID-19 pandemic reveals that approximately 10% of GDP globally is contributed by international tourism worldwide. The international tourist arrivals grew from 25 million in 1950 to over 1.4 billion in 2018 (World Tourism Organization, 2019) which depict the vitality of the industry ad tourists’ interests. However, the data indicated in reports published prior to the global pandemic, which predicted that the international tourist expenditure and international tourist arrivals will further accelerate signifying a rapid emerging tourism industry. If only Asia and Pacific tourism foot flows are examined, the region witnessed the highest growth of 7% in 2018 in terms of international tourist arrivals and also enjoyed a 25% overall market share in the world. According to World Travel and Tourism Council (World Tourism Organization, 2019), direct contribution of tourism to global GDP was recorded as USD 2750.7 billion that make 31.2% of total world GDP, in 2018.

The tourism industry has experienced continued growth and diversification over the decades and promises a positive direct & indirect impact on economic indicators

of the host country. It is considered to be one of the major sources to accelerate the economic wheel responsible to restrain the GDP gap in emerging economies (Tang & Tan, 2015). The latest conception of Restart Tourism by UNWTO (2020), and relevant strategies, bring forth the assuring promise of the industry regrowth and development. Restart tourism accentuates on development of an International Code for the Protection of Tourists during and after the pandemic crises (UNWTO, 2021).

Heritage Tourism in South East Asia and Pakistan

Culture is one of the most significant factors, which attracts tourists to a destination (Roday et al., 2009). The customs, beliefs, lifestyles, religion, festivals, arts, music, dance, architecture all give an insight of the host country's culture to the tourist. Cultural tourism is one the most significant factors to travel Pakistan as the country has a vast and vibrant culture which varies from one region to another, all across the country. The cultural heritage assets in Pakistan date back to more than five millenniums. The region has been a cradle to the world's earliest civilization, the Indus Civilization and the settlements which left their mark as valuable archaeological sites being the tangible cultural heritage. Whereas the customs, traditions, myths, beliefs of the historical era have indulged in modern living patterns of the community and are considered to be the intangible cultural assets, the region possess. Owning an abundant range of cultural heritage resources, out of which UNESCO has listed seven sites in Pakistan as the world heritage sites and several others are in the queue of the tentative list. However, these are several heritage sites in Pakistan reflect the historical remains of different civilizations, temples and religious artifacts from different religions and monuments from historical past. These cultural heritage assets of the region are kept unexploited and need to be conserved for future generations to adhere their historical roots and national identity. Previous studies substantiate the role of heritage & cultural tourism to promote the protection and conservation of the heritage & cultural assets, whereas to promote sustainable growth of tourism industry, the protection and conservation of these assets is essential.

With rapid growth in Tourism worldwide, the future demand for tourism and new destinations could be envisaged. To meet the global challenges, address the socio-economic issues, developing economies have to adopt pro-active approach in order to embrace the future competencies in emerging new industries. However, with rapid growth and progress worldwide, tourism industry in South East Asia particularly in Pakistan has not succeeded as compared to other developed regions around the globe. The reasons to these shortcomings might be due to political, social, economic factors prevalent in the society. The tourism industry in Pakistan has been hit by incessant setbacks, ranging from law-and-order safety issues and the lack of infrastructure and promotion, rendering cultural tourism and the associated livelihood opportunities virtually in shambles (UNESCO, 2013–2020). In order to cater the demand of the prospect tourism market, there exist a dire need to revitalize the

tourism industry in this region, as tourism, particularly for developing economies, can play a fundamental role in achieving economic growth and development (Cortés-Jiménez et al., 2009).

Pakistan is a multicultural and multi-ethnic country where people from various religions, backgrounds, cultures, and ethnicity reside. The historical roots of Pakistan date back to the Indus valley civilization and which continued to blend with the essence of diverse cultures and traditions due to the arrival and settlements of many civilizations from central Asia, Middle East & Europe, throughout the history. Pakistan society comprises of many diverse cultures, linguistics, religions, and ethnicities which have thousands of years of shared history. Approximately more than 15 ethnic & religious groups reside in Pakistan today with their unique lifestyles, traditions, customs, and culture.

Previous research studies on tourism in Pakistan have validated a positive relationship between tourism development and economic progress, in terms of revenue generation and GDP growth of the country (Khalil & Wajeeullah, 2007; Jalil et al., 2013; Anwar, 1994; Khan et al., 2020), but there persists a wide gap in evaluating the cost & benefit analysis of tourism on the host countries. These cost and benefits analyses need to address the direct impact of tourism on three facets of an economy; Economic factors; Social factors; and Culture of an economy.

In a nutshell, the emerging competencies within the tourism industry and the spread of globalization have further stimulated the yearning or the need among people across the world to explore new frontiers ways, and among the custodians of the industry to compete and offer unique tourism products. Every likely destination has been gearing up to compete globally and the industry yields in terms of revenue generation have generally moved upwards adding to progress and economic betterment of populations across the world. This observation presents considerable motivation and rationale for developing countries to advance in the right direction, to stimulate better strategy development for their tourism industry.

Internet of Things and the Tourism Industry

Today, the modern technology has advanced so much that customers with their digital devices are not only connected to hotels, restaurants, to their cars, but also to their baggage and suitcases. There are different chips or devices which are attached to their baggage and the customers can easily locate their baggage anywhere so that there is no room for theft or losing their belongings.

MSME's today face multifarious issues in their business survival and growth. According to Bakar et al. (2020), technological constraints have persisted to rank as the second most compelling issue MSME's face in Asia. The lack of capacity building opportunities to adopt IT in business processes have withheld organizations to join the competitive 4.0 fleet. However, endeavoring the skillset required to integrate IoT is MSMEs systems, will allow them to compete with minimum capital, and preemptively reduce the capital as well as resource risk. MSME's in developed

nations primarily obtain comparative advantage by leveraging on specific target areas including expert craftsmanship, product variety and versatility, and customer centric businesses approach. The advanced customer care support offerings are preliminary extended to customers by understanding their customized demands, through IoT based data gathering. Thus, the alternative to rigid conventional strategies are revolutionized through advanced computer systems, robust internet connections and prudent machines through dynamic trade of data. IoT revolution has interrupted the long prevailing manufacturing procedures, by formulating decentralized structures, run remotely by machines. This has resulted in flexibility of manufacturing, better adaptation to customers' demands, new business trends, and consequently the brings the idea of demographic modifications.

There are various technological evolutions and devices which has changed global socio-economic systems. Due to the integration of rapid technological inventions, technology driven business processes have become an integral part of every industry and travel industry is not an exception.

Mobile Technology

Mobile technology is indeed one of the main features of technology which paves way to the new forms of travel. Cell phones, smartphones, smart watches, tablets, handheld gadgets, have become an integral part customers' daily life. These smart devices in our hands have become our "on the palm" travel guides and easily accessible "at your fingertips" travel agencies which work as location finders, guiding maps, event locators, and much more. The recent data suggests that around 74% of travelers use mobile technology to reserve their travel needs including flight bookings, travel accommodation, boarding, restaurants, pick n drop services, and even in deciding upon a destination choice (Vidal, 2019).

Virtual Assistants

The technology driven Virtual Assistants (VA) have already started playing a vital role in sales and marketing segments in worldwide businesses. Not only the manufacturing sector but the service sector such as tourism has an extensive prospect of customizing customer needs and address their concerns virtually and instantaneously. Virtual Assistants such as Siri, Cortana, or Alexa, Google Assistant and others are all AI devised robots which interact with costumers in a virtual environment to know their queries and meet their tailored needs. For ease customers ask these virtual assistants to know about to recent radio programs, to get weather updates, information on incoming emails, upcoming events, comparing prices of different products or availability of different products and services such as availability of airline tickets or hotel room bookings all are conducted through the help of these virtual assistants. Marketers today extensively use the chatbots assisted technologies through which robot assisted chat bots Play an important in creating

interactive and personalized experiences for the customers. In the hotel industry, many of the hotels today have already adopted virtual assistants so as to guide the customers. This assistance by AI or virtual assistants is preferred by customers as they provide instant and accurate responses without any human interaction. Even the new technology has given AI an advantage of speech impersonification and human language interface through programmed interactions and natural language processing, which makes the conversation between the customers and virtual assistants sound like a humanistic and natural interaction, leaving customers feeling more satisfied. Upon asking any query to the chat bot, which is run by the robots at back end, the queries are responded in real time. Using VAs in varied applications have become a widespread norm for travel and tourism industry service providers.

Augmented and Virtual Reality

Virtual experiences using the Augmented Reality (AR) and Virtual Reality (VR) is getting much attention not only in manufacturing industries but also in travel sector. Many travel related companies are adopting technological innovations to enhance the usability and value of their applications and business products or services. The latest technologies such as IoT has undoubtedly revolutionized the travel application (App) industry. Similarly, the augmented reality option provides with powerful navigation tools for enhanced and augmented reality views of the destination which customers intend to Visit. These powerful tools provide help personalize the travel experiences for individual customers. It has been widely observed that the customers today, due to massive awareness about assorted products and services available in the market and because of their diversified personal preferences, crave personalization and seek for tailor made experiences which meet their personalities, personal choices, and buying preferences.

This prospect opens a wide avenue for travel and tourism industry to leverage on technological advancements so as to gather customers' information and provide tailor-made overall trip experiences based on individual likings, past behaviors, and predilections. The change in the realm of digital transformation has been bought by big data Analytics. The digital data gathering practices have evolved into machine driven technologies which allow marketers to target specific customers and gather relevant information about them. The classified data on consumer behavior collated through different applications not only provide businesses with useful information but also gives the customer knowledge with recommendations for destinations, hotels, and restaurants, and even flights with their timings that may match with their unique lifestyle or preferences. Moreover, the predictive analysis can help travel and tourism companies to forecast the future of the business so as to increase the customers' engagement levels, boost sales and make more informed and accurate decisions. These new technologies are probably responsible to fuel the evolution of digital technology and business ecosystems as they are gaining more popularity in travel and tourism development. As more travel companies are embracing

innovation in their services the future of travel industry can be predicted to become more focused on personalization, simulation, affluence, and response driven orientation.

Tourism Related Micro, and Small Enterprises (TRMSMEs)

Tourism Related Micro, and Small Enterprises (TRMSEs) are a significant contributor to the economy akin to manufacturing SMEs which are considered to be the backbone of emerging economies. The TRMSMEs play a crucial role not only to consolidate the trade and service industry but also to combat certain socio-economic issues such as poverty, unemployment, gender gaps, and drive self-sufficiency in the unemployed youth, women, and other strata of the population.

Embracing creativity, modern technology, innovativeness, latest trends, novel business practices and processes, adaptableness to modernization, novelty, transformations, and inventions all are synonym to the determinants of SMEs' performance and growth today. This was successfully established as described by Mallinguh et al. (2020), that the SMEs today are inclined towards adopting innovative processes and technologies to remain competitive up ahead of Large-scale enterprises and other market competitors. Emerging SMEs use knowledge as a source of success and prosperity. However, within the business context SME's face many challenges and obscurities in contrast to the LE's. Apart from many divergent challenges such as financial support, marketing power, branding and customer orientation that SMEs face in competition to LE's; sustaining innovation and adapting to technological change often remains the prime concern for the small businesses.

The literature pertaining to technology espousal by SMEs strongly suggests that the advocacy of new high-tech advancements in businesses is indispensable in order for businesses to sustain in today's competitive world. Capone et al. (2016), put forward a compelling case study evidence of emerging demand of digitization of SMEs business operations examining the cultural heritage SMEs in Florence, Italy and assessed how digital technologies and ICT in cultural heritage products could reap fruitful benefits for the small businesses. Their research findings demonstrated interesting implications in the SME management perspective and underscore the importance of ICT and digital technology adoption for SMEs related to cultural heritage business as it is considered to revolutionize the conventional business systems and open new business spheres. Seminal case study was conducted by Jeon (2018), to find the impact of innovation adoption by the enterprises in South Korea and how this adoption revitalized and evolved the old business systems in textile SMEs. Hughes (1997) emphasized that the SMEs which implemented product or process innovation in their systems were more successful than those without innovativeness acclimatization. Correspondingly, Rocco and Hodak (2012), asserted that the innovation policy and strategies are the crucial aspects of SMEs to live and survive in competitive business settings. Successful ventures need adherence to high product quality and reinvigoration to the products offered, especially for the

tourism-related business (Rocco & Hodak, 2012), as negligence to this aspect leads to business failures and collapses.

Conclusion

During the past decades, tourism has begun to find much wider recognition as an economic sector with a potential to make contribution towards development in destination areas. Tourism is believed to provide an impetus to the economic progress of developing nations and today it is considered to be largest industry in the world. With huge cultural diversity and beautiful heritage, historical and natural sites, Asia and particularly Pakistan possess a blend of diverse tourism potential. There lies a dire need to exploit the untapped land of Pakistan as a tourist destination. Development of competitive heritage tourism destination can generate substantial economic benefits on economies and local regions. Owing to cultural tourism local traditional jobs are maintained or revived. The activity produces monetary benefits to the locale by bringing about job creations and opportunities for high return businesses, it helps improve the quality of life of the people in the region as they are exposed to favorable environment of the services and tourism products the tourism development begets. It promotes unity through collaborative work, which fosters as people in the community work together to develop a prosperous tourist destination.

Thus, tourism destinations need to manage and promote their cultural and heritage resources by building strong infrastructures based on their unique cultural themes, promote traditional cultural resources, arrange cultural events, and continuously reinvigorate their historical and cultural heritage and market these resources through the Internet of Services (IoS) infrastructure to reach prospect tourists and to provide them with better facilities. As it is evident that the radical change in information technology has not only influenced the supply side of travel and tourism industry but also the demand side where the customer behavior has been altered with new emerging demands, thus the businesses are forced to adopt new marketing and management strategies in the industry. These new strategic structures need to be more flexible so as to address the on-demand, personalized, and customer driven requirements. The digital information systems have reinvented the traditionally structured systems and processes which include tourism service bookings, choosing the best alternatives, and conducting secure online transactions. The web portals are powerful technological tools which significantly impact the tourism service provisions and provide the tourism related businesses with robust competitive advantage. The need of flexibility in business structures has developed new business ecosystems which integrate businesses with customers B2C, businesses with businesses B2B, and customers with customers C2C.

Accustoming to Industry 4.0 and IoT structures in conventional systems is a major challenge for large as well as small enterprises in emerging economies specifically implementing these technologies driven structures into the service sector such as tourism and hospitality industry. Adopting IoT structures for SMEs is also constrained due to less availability of financial as well as insufficiency of adept techno-skilled human resource. With the rapid change in new technological advancements, it is not a question for SMEs to only accept the new innovations, but it is about how they will implement them into their current systems while having limited access to the required resources. Thus, this requires extensive work on developing new technology related business models which may fabricate the new digital business ecosystems. The modern technologies have ascended the initiation of the Cyber Physical System (CPS) which is integrated through information, communication, and digital technologies and bring forth the idea of smart manufacturing and sustainable factories (Yao et al., 2019). Similarly, for the service sector, Cyber Service Systems (CSS) could be considered as the channel to realize the ultimate benefits of digital transformation which can establish digitally driven business ecosystems and create virtual market structures for the stakeholders in the industry.

To sum up, destinations like Pakistan possess many facets of tourism be it the cultural, heritage, leisure, rural or religious tourism, and offer a huge potential of all these aspects of tourism development but unfortunately the deprivation due to unavailability of proper planning and infrastructure lags the progress of these nations. The only solution thus is to exploit the potential through amalgamation of tourism resources with IoS, IoT and other Technological resources, to derive utmost benefits.

References

- Anwar, M. I. (1994). *Tourism in developing countries: A case study of Pakistan*. Doctoral dissertation, University of Strathclyde.
- Bakar, M. F. A., Talukder, M., Quazi, A., & Khan, I. (2020). Adoption of sustainable technology in the Malaysian SMEs sector: Does the role of government matter? *Information*, 11(4), 215.
- Belair-Gagnon, V., & Steinke, A. J. (2020). Capturing digital news innovation research in organizations, 1990–2018. *Journalism Studies*, 21(12), 1724–1743.
- Capone, F., Sartori, A., & Lazzeretti, L. (2016). Small firms and the digitization of cultural heritage the case of Centrica and the Uffizi Gallery. *Udine: Sinergie Annual Conference*, 15, 535–547.
- Cochran, D. S., & Rauch, E. (2020). Sustainable enterprise design 4.0: Addressing Industry 4.0 technologies from the perspective of sustainability. *Procedia Manufacturing*, 51, 1237–1244.
- Cortés-Jiménez, I., Pulina, M., Prunera, C., & Artis, M. (2009). Tourism and exports as a means of growth. *Research Institute of Applied Economics*, 10, 1–28.
- Donner, H., & Steep, M. (2021). Monetizing the IoT revolution. *Sustainability*, 2021(13), 2195.
- Gartner. (2015). *Gartner says a thirty-fold increase in internet-connected physical devices by 2020 will significantly alter how the supply chain operates*. Gartner Press Release. Retrieved from: <https://www.gartner.com/en/newsroom/press-releases/2014-03-24>. Accessed 12 Aug 2021.
- Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2016). Options for formulating a digital transformation strategy. *MIS Quarterly Executive*, 15(2), 123–139.

- Hughes, A. (1997). Finance for SMEs: A UK perspective. *Small Business Economics*, 9(2), 151–168.
- Jalil, A., Mahmood, T., & Idrees, M. (2013). Tourism–growth nexus in Pakistan: Evidence from ARDL bounds tests. *Economic Modelling*, 35, 185–191.
- Jeon, B. K. (2018). *Innovation systems and the revitalization of an old industrial area: The case of the textile industry in Daegu, South Korea*. Doctoral dissertation, UCL (University College London).
- Khan, A., Bibi, S., Lyu, J., Alam, M., Khan, M. M., & Nurunnabi, M. (2020). The quest of tourism and overall well-being: The developing economy of Pakistan. *PSU Research Review*. <https://doi.org/10.1108/PRR-07-2019-0022>
- Khalil, S., Kakar, M. K., & Malik, A. (2007). Role of tourism in economic growth: Empirical evidence from Pakistan economy [with comments]. *The Pakistan Development Review*, 46, 985–995.
- Madsen, D. Ø. (2019). The emergence and rise of Industry 4.0 viewed through the lens of management fashion theory. *Administrative Sciences*, 9(3), 71.
- Malik, S. (2020). Macroeconomic determinants of innovation: Evidence from Asian countries. *Global Business Review*. <https://doi.org/10.1177/0972150919885494>
- Mallinguh, E., Wasike, C., & Zoltan, Z. (2020). Technology acquisition and SMEs performance, the role of innovation, export, and the perception of owner-managers. *Journal of Risk and Financial Management*, 13(11), 258.
- Marr, B. (2018, August). The 4th Industrial Revolution is here—are you ready. *Forbes*. Retrieved from: <https://www.forbes.com/sites/bernardmarr/2018/08/13/the-4th-industrial-revolution-is-here-are-youready>. Accessed 12 Aug 2021.
- Martín-Gómez, A., Aguayo-González, F., & Luque, A. (2019). A holonic framework for managing the sustainable supply chain in emerging economies with smart connected metabolism. *Resources, Conservation and Recycling*, 141, 219–232.
- O’Leary, D. E. (2020). Evolving information systems and technology research issues for COVID-19 and other pandemics. *Journal of Organizational Computing and Electronic Commerce*, 30(1), 1–8.
- Paschek, D., Mocan, A., & Draghici, A. (2019, May). Industry 5.0 – The expected impact of next Industrial Revolution. In *Thriving on future education, industry, business, and society, proceedings of the MakeLearn and TIIM international conference, Piran, Slovenia*, pp. 15–17.
- Peng, S. L., Pal, S., & Huang, L. (2020). *Principles of internet of things (IoT) ecosystem: Insight paradigm*. Springer.
- Prause, M. (2019). Challenges of Industry 4.0 technology adoption for SMEs: The case of Japan. *Sustainability*, 11(20), 5807.
- Rauch, E., Vickery, A. R., Brown, C. A., & Matt, D. T. (2020). SME requirements and guidelines for the design of smart and highly adaptable manufacturing systems. In D. Matt, V. Modrák, & H. Zsifkovits (Eds.), *Industry 4.0 for SMEs* (pp. 39–72). Palgrave Macmillan.
- Rocco, S., & Hodak, M. (2012, May). Design of the hotel tourism product in Croatia—research in the SME sector. In *22nd CROMAR congress “marketing challenges in new economy”*, p. 93.
- Roday, S., Biwal, A., & Joshi, V. (2009). *Tourism operations and management*. Oxford university press.
- Sharma, P. K., Kumar, N., & Park, J. H. (2020). Blockchain technology toward green IoT: Opportunities and challenges. *IEEE Network*, 34(4), 263–269.
- Tang, C. F., & Tan, E. C. (2015). Does tourism effectively stimulate Malaysia’s economic growth? *Tourism Management*, 46, 158–163.
- UNESCO. (2013–2020). *Country programming document*. UNESCO.
- UNWTO. (2020). *AM News, UNWTO Tourism News#19, UNWTO and CNN*. Retrieved from: <https://www.unwto.org/un-tourism-news-19>. Accessed 12 Aug 2021.
- UNWTO. (2021). *AM News, UNWTO Tourism News*. Retrieved from: <https://www.unwto.org/am-newsletter-volume-27-january-2021>. Accessed 12 Aug 2021.

- Vidal, B. (2019). *The new technology and travel revolution*. We Are Marketing. Retrieved from: <https://www.wearemarketing.com/blog/tourism-and-technology-how-tech-isrevolutionizing-travel.html>. Accessed 12 Aug 2021.
- World Tourism Organization. (2019). *UNWTO world tourism barometer and statistical annex*. Retrieved from: <http://www2.unwto.org/publication/unwto-world-tourism-barometer-and-statistical-annex-january-2019>. Accessed 12 Aug 2021.
- Yao, X., Zhou, J., Lin, Y., Li, Y., Yu, H., & Liu, Y. (2019). Smart manufacturing based on cyber-physical systems and beyond. *Journal of Intelligent Manufacturing*, 30(8), 2805–2817.

Chapter 22

Connecting the Connected: How Is Sri Lanka Prepared to Respond to Digital Tourists?



R. S. S. W. Arachchi, J. A. R. C. Sandaruwani, and G. V. H. Dinusha

Abstract Technology and travel joint force reinvent the travel cycle in the twenty-first century. Modern travelers demand immediate assistance, seamless experience and personalized content and services than ever before. Internet, Mobile Technology, Cloud Computing, Artificial Intelligence (AI), Robotics, Augmented Reality (AR), Virtual Reality (VR), Internet of Things (IoT), and Big Data give travelers an unbridled sense of freedom, convenience with the instant access to any information. Further, it personalizes the vacation and provides instant booking and social sharing on digital spaces. This study focusses on how Sri Lanka, as a tourism destination, adapt the technological trends into its supply system. This study focused on four major operators in the tourism industry; hoteliers, restaurateurs, airlines and tour operators. The data were collected based on semi-structured interviews and observations. The study's results and discussion highlight the prevailing technological kick-ups within leading hoteliers, restaurants, airlines, and tour operators in Sri Lanka. Digital transformation and technology adaption across the accommodation sector identified virtual tours, augmented reality content, mobile check-in, self-check-in kiosks, digital concierge, cloud-based Property Management Systems (PMS), smart rooms. Restaurants in Sri Lanka are investing in digital enhancements that appeals to all of the senses of hyper-connected mentality via robot waiters, online food ordering and delivery apps, digital menus with customizing options, self-service mobile apps. Sri Lankan Airline as the only airline operator in the country, is reshaping the flying experience expanding mobile commerce via Sri Lankan Airlines App, e-wallets, security technologies, including robot inspection dog, self-

R. S. S. W. Arachchi (✉) · J. A. R. C. Sandaruwani · G. V. H. Dinusha
Department of Tourism Management, Faculty of Management Studies, Sabaragamuwa
University of Sri Lanka, Belihuloya, Sri Lanka
e-mail: rangana@mgt.sab.ac.lk

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_22

service check-in kiosks, VR entertainment on flights, and in-flight Wi-Fi. Travel agencies adapt technology to streamline their operations, boost operational performances, personalize online tour planning, and multiple digital marketing facets to attract tech-savvy travelers.

Keywords Digital tourists · Revolutionized tourism · Smart tourism · Sri Lanka

Introduction

Current Strategies and the tourism industry's competitiveness are determined by applying modern technology to organizations and destinations. Technology has revolutionised the entire tourism industry to a paradigm shift. The technology applied to the industry has evolved last 40 years from computer reservation systems to a range of modern-day technologies, including Artificial Intelligence (AI) robotics, cashless payments, Augmented Reality (AR), Virtual Reality (VR), big data, internet of things, cloud and so on. Technology innovations bring all-tourism stakeholders together in tourism service ecosystems. As a result, the Smart Tourism concept has emerged mainly focusing on tourism business-led development and co-creation activities to enhance the tourist experience (Buhalis & Amaranggana, 2015). The concept of Smart Tourism is being considered the most crucial challenge for the tourism industry. It is defined as a technological platform that integrates tourist resources and information technologies to offer explicit tourist information and efficient services through mobile terminals (Zhu et al., 2014).

With the implementation of technology and the smart tourism concept, industry and tourists have to face and adopt technology-enhanced tourism experiences. This demand-shift entails transforming the entire tourism ecosystem. These digital applications transformed the behavior of tourists and decision making into a technology demanded experience. Now tourists are using more digital tools to plan and organize the travel experience. Tourists have become more technology savvy, and digitalized and industry is passing a fourth industrial revolution with technological innovations. Thus, tourism industry operators are adopting new business models, products, and services to attract and respond to digital tourists' needs. With the tourism industry's technological revolution, tourism industry operators, including hoteliers, airline operations, and destination management companies, introduce smart travel facilitation and smart destinations. Smart destinations take advantage of smart technology in creating, managing and delivering intelligent touristic services/experiences and are characterized by intensive information sharing and value co-creation (Gretzel et al., 2015). Becoming a smart tourism destination requires leadership, vision, patience, strategic management, continuous evaluation, and change. Perceiving the smart tourism destination as an ecosystem is essential. A vision and a clear set of innovation goals are key facilitators for developing smart tourism destinations as a collective whole (Boes et al., 2016).

This study aims to identify Sri Lanka's preparedness as a smart tourism destination to cater to digital tourists. Further, this study focuses on recognizing the current technological innovations used by the tourism industry operators in Sri Lanka and their challenges. This research provides an insight into the existing technological applications of the tourism industry in Sri Lanka to all the stakeholders and future approaches.

Literature Review

Smart Tourism, Smart Tourism Destination and Digital Tourist

Technologically driven innovations have a significant impact on the tourism industry's development (Hjalager, 2010). Recent information and communication technology (ICT) developments, initiating smartness and smart places have been recognised to cause a paradigm shift within the tourism industry (Buhalis, 2015). Technological applications are modifying how tourist destinations are managed. As a result, the smart city concept and the development of smart tourism destination (STDs) originated (Buhalis & Amaranggana, 2014). The ultimate goal of smart destinations is to increase competitiveness and enhance all stakeholders' quality of life, including residents and tourists (Caragliu et al., 2011; Buhalis & Amaranggana, 2014). It is essential when they are planning and making decisions on the tour. According to Gretzel, Werthner, Koo, and Lamsfus (2015), the Smart Tourism application includes three principles. They are smart information, smart exchange and smart processing. These components create a smart tourism destination by adapting information technology to tourist infrastructure and developing smart business with a digital platform to tourism stakeholders. Further, it changes the tourist behaviour and the experience in society to a technology-based practice. This revolutionised approach allows destinations to substantially improve their effectiveness and competitiveness (Wang & Fesenmaier, 2013).

Technology application's success depends on the tourists' perception of the level of coherence between their expectations, attitudes, and behaviour (Martini et al., 2017). The ability to change tourist behaviour and experience through the application of technology should consider carefully. Smart Tourism provides abundant information of interest to all businesses in the tourism chain: hotels, restaurants, airline's transportation, intermediaries (Mandic & Garbin, 2019). Above all, the use of better-quality data, and especially its customisation, has given rise to the tourist experience (Batat, 2019). In this case, it is vital to maintain an interaction among all the stakeholders. These technical roles at the destinations should enhance the experience of the tourists. It is the most critical aspect to address by the all-tourist stakeholders. All tourism businesses are currently getting ready to cater to digital tourists with their business's reengineering process to provide innovative services. All tourism stakeholders are now networked and interconnected within the ecosystem. Therefore, all the tourism destinations adapt to this context to reward interactions,

co-creating value, heightening visitor satisfaction and engagement of travelers throughout all stages of travel (Xu et al., 2017). Interconnection of the tourism business provides real-time and personal services to the tourists. Future tourists will be quite different from present-day ones, as they gradually become even more individualistic, more time-driven and more demanding of technology (Akehurst, 2009). One scenario is that tourists would delegate several planning tasks to a representative body, thus saving time to focus on other tasks (Buhalis et al., 2019a, b). Hence, it is vital to study whether the tourism business is ready to respond to digital tourists' needs.

The Digitalization of Inbound Travel Agency (ITA) Operation

ICTs allow customer-management relations and supply chain management to be combined into a single source that facilitates various operations – product selection, ordering, fulfilment, tracking, payment, and reporting to be performed with one easy-to-use tool (Bethapudi, 2013, p. 69). Therefore, the contemporary tourism industry is a hybrid industry as it is perfectly combined and blended with information and communication technology (Kazandzhieva & Santana, 2019). The travel and tourism industry continuously change and evolve due to the mergers and insulation with the ICTs (Buhalis, 2003; O'Connor & Murphy, 2004; Buhalis & O'Connor, 2005; Law & Jogaratnam, 2005; Kazandzhieva & Santana, 2019). As explained by Thakran and Verma (2013), Global Distribution System (GDS) era, internet era, SoLoMo (Social + Location + Mobile) era, and hybrid era were respectively being identified as the digital eras of the travel and tourism industry where the tourism industry directed into disintermediation by removing the role of the intermediary. Buhalis (2003) has established three domains of eTourism; business management, information systems and management, and tourism. Conventionally, it is being told that a computer with an internet connection is enough for an ITA's function became rather a big question mark now with that rapid change of the technology and quick adoption of the travelers to those changes. Though E-marketing offers Destination Management Organizations (DMOs) a genuine potential to reach a broader audience than ever before and to do that at a substantially lower cost, the challenge for DMOs is to develop the infrastructure, the skill sets, and the content to exploit the new opportunities through multiple channels (Estêvão et al., 2014).

According to the Sri Lanka Tourism Development Authority (2018, 2019) annual reports, India is the number one source market in terms of the number of arrivals in the last few years, like 2019, 2018. The trend is being continued. Supporting that, Table 22.1 shows that 83% of Indians are relying on technology when they are booking their outbound tour.

However, literature availability is minimal when concerning technological aspects in travel agencies or destination management companies in the Sri Lankan context. Most Micro, Small and Medium Inbound Travel Enterprises (MSMITE), especially around the Colombo district, basically use travel online, [Booking.com](https://www.booking.com),

Table 22.1 Travels booking by Indian outbound traveler

Attribute	Percentage (%)
Social media	43%
Friends and acquainted	1%
Advertisement	16%
Employers	0%
Internet search	40%
Total	100%

Source: Datta (2019)

TripAdvisor, Agoda, Get your guide, Expedia, Bokun, Tour Radar like online platforms to function their operation. In contrast, some transactions and functions were made via make my trip, online banking, B2B/B2C platforms and, through own web sites additionally (Sudasinghe & Dinusha, 2020). Further to Sudasinghe and Dinusha (2020), around 29% of MSMITEs used Android or IOS mobile applications, mainly Facebook, own websites, Instagram, and WhatsApp, to market their products and services. This information supports MSMITE, but big players in the industry should also be investigated.

ICT Integration in the Hospitality Industry

The tech-driven travel, tourism and holidaying paths guide the tourism-related business owners towards innovations in tourism supply. When it narrows down its overview of the hospitality industry, most hospitality businesses engage actively with technologies regardless of their scale (Law et al., 2009). Technologies penetrate at a fast pace. It integrates the hotel operation, reshapes its marketing function, improves total efficiency within the hotel, provides tools for marketing research, support partnership building, enhances customer services, provides strategic opportunities, offers a wide range of distribution & reservation mechanisms online, improves the hotel representation & reservation processes, shifts hotel reservations away from telephone sales & toll-free numbers, enable closer & direct interaction with consumers and partners (Buhalis, 2003).

Technology integrates hotel operation over human interactions, and self-service claims have become the modern era currency. Consequently, travelers expect the same self-service alternatives for their holidaying (The New York Times, 2013). Hoteliers offer self-service hospitality solutions such as room reservations, check-ins and check-outs, and customized payments. Hotels can expedite routine tasks in the front office through automating check-in/check-out with self-check-in/out kiosks or mobile devices (Kim & Qu, 2014). It enhances guest convenience as it eliminates waiting in long check-in lines (Carlin, 2005; Curran et al., 2003; Makarem et al., 2009). Frequent and business travelers highly embrace the technology's

service efficiency compared to leisure travelers who may prefer to choose traditional and friendly encounters with front office staff (Victorino et al., 2005). Therefore, self-check-in technology serves the arriving guests who may be tired or in a hurry or prefer high privacy to check-in to their rooms (Jenner, 2009). Self-service kiosks or mobile check-in/out increase control over the service process, which gives the guests feel more in command of the transaction, increasing their satisfaction (Curran et al., 2003; Griffy-Brown et al., 2008), perception of service quality, confident of the service process (Oyedele & Simpson, 2007).

Now-a-days, travelers' preferred method of hotel room booking is the online method. According to online hotel booking statistics in 2019, 57% of all hotel bookings are made online (WPTravelBooking, 2020). Talón-Ballesteros and González-Serrano (2013) noted that 99% of hotels allow online reservations, yet Walker (2012) noted in 2011 that 76% of online bookings for non-branded hotels came from online travel agencies (OTAs). Just 24% of online bookings came from the hotels' website. Hotel online booking management allows visitors to book their rooms at their convenience, enabling booking or cancelling at any time, enables them to carry out comparisons and gather the qualitative information (room rates, availability, policies) they need (Baltescu, 2015). It allows for speed in transactions, cost advantages and rapid booking confirmations as well. Property Management Systems (PMS) is considered one of the technology cornerstones (Bulchand-Gidumal & Melián-González, 2015) that automated all back and front office operations (Collins & Cobanoglu, 2013; Bilgihan et al., 2014). The PMS is the focal point of information for rate handling, reservations, room allocation and the connection to the web-based booking software (Central Reservation System) and partners in the distribution channels (Global Distribution System). From the visitor perspective, the PMS is inconspicuous for the most part. It stays basic to the operational efficiency of the business (Murphy, 2011). The input obtained from visitors through the Property Management System (PMS) is used to construct an environment explicitly customized. Hotel marketing apps can be designed to automatically deliver exclusive deals, reminders, and in-stay messages based on guest tastes.

Artificial Intelligence (AI) applications are currently drawing more attention in the hospitality industry. Robotic butlers, concierges and luggage handlers have sparked a lot of interest in the mainstream, more for the "surprise", "joy", and "innovation" aspect than for the actual benefits they deliver. These robotic additions to hospitality guest services teams may come to play a valuable role in enhancing the guest experience (Oracle, 2018). Artificial intelligence, combined with automation in rooms, can be programmed to wake-up the guest. AI triggers the automated opening of drapes and turns on the preferred news station, creating a unique and memorable customer experience (Aarthy & Badrinarayanan, 2019). Simultaneously, a room automation system with occupancy sensors helps energy optimization (Cloudbeds, 2015). The advent of new technology impacts restaurant operations, as most firms in the restaurant industry, would be IT-oriented in the production and delivery of goods and services (Oronsky & Chathoth, 2007). The primary technology system used in restaurant operations is the Point-of-Sale System (POS). POS is a network of cashiers and server terminals that handles food and beverage orders,

the transmission of orders to the kitchen and bar, guest-check settlement, timekeeping, and interactive charge posting to guest folios (Collins & Cobanoglu, 2008). POS used in various forms; the handheld/mobile POS terminal and tableside ordering device (Raina, 2017). Mobile POS helps serve guests more quickly, increase guest satisfaction and mobile credit card terminals reduce credit card skimming (Cavusoglu, 2019). Restaurateurs do well by developing mobile apps for their restaurants or, at the very least, optimizing their websites for mobile phones. Alternatively, restaurants use existing apps, like Yelp, to meet their target audience and use feedback or reviews (Cavusoglu, 2019). Restaurateurs adopt advanced technologies in their operations (i.e. self-service kiosks) (Baba et al., 2020), tabletop tablets, AR-enabled live 3D preview of menus (Koui, 2017), AI-enabled robot chefs and servers (Murphy et al., 2019; Paluch & Wirtz 2020; Wirtz et al., 2018).

Technology Application in the Airline Industry

As the travel industry continues to grow and differentiate, airlines have a prominent role to play. Passenger numbers are expanding, with the demand for more integrated services. Every passenger now equipped with a powerful digital device, the opportunities to develop new innovative services to differentiate an airline from its competitors are more significant than ever (Eye for Travel Business Intelligence, 2016). Technology is central to the future of the air transport industry. For the airline industry, specifically, the travel planning and booking experience are done through mobile. They then expect smartphones to be a core part of their travel, easing the process.

Automation in the aviation industry is gaining thrust due to rapid advancements in the fields of robotics. Robots in the terminal are becoming more common. Among some of the most recent examples is self-driving guide robots for luggage transportation at Incheon Airport, AI-powered autonomous robots at Heathrow Terminal enhance passengers' punctuality (Initiatives, 2020). Airlines and airports are adopting and improving inflight experience (entertainments, Wi-Fi, inflight connectivity), chatbot and social media conversations to communicate with passengers, and on the other, to improve operations. It is one of the best passenger experience inventiveness in the Airline category. Also, technological advancements are helping to bring about a much-needed change in the way airlines and airports assist travelers with additional needs. The latest development such as AR (Augmented Reality) and Apps provides the patterns on the various amenity bags available can be scanned to unlock content on the passenger's phone, such as information on how they can ensure they have a relaxing and comfortable flight. Sometimes, these small touches make a difference and let customers know that they are being thought of by the airline (Eye for Travel Business Intelligence, 2016). Japan All Nippon Airways (ANA) introduces personal mobility self-driving electric wheelchairs as part of a far-reaching plan to increase mobility and accessibility options at Tokyo Narita International Airport in 2020 (Future Travel Experience, 2020). This technological advancement improves

customer experience and service expectations at the airport and inside an aircraft. The change from the traditional way of attending customers focusing on minimising costs by outsourcing non-core services, new arrangements of employee and innovative distribution channels indicates structural changes in Airline Industry to cater to smart tourists (Driver, 1999).

Methodology

The study was carried out using various methods. First, a desk review was done to identify the technological innovations and concepts applied in the world's tourism industry using different data sources. Then, an interview checklist was prepared and obtain the relevant information from the top-level officials and the IT experts of the star class hotels and fine dining restaurants and top Destination Management Companies in the Colombo districts. Further, officials of Sri Lanka Airport and Aviation services were interviewed to gather information. More than 15 interviews were conducted till it reaches the maturity level. In addition to interviews, the researchers observed the research sites to see real technological applications. Moreover, the data obtained from secondary data sources such as journals, newspapers, web articles were reviewed thoroughly to develop the discussion.

Data Analysis and Discussion

The Digitalization of Sri Lankan Inbound Tourism

Few inbound travel agents of Sri Lanka are the major arms of the tourism industry in the country. MSMITEs are responsible for significant market share but, per enterprise share is minimal when comparing with per enterprise share of the big players. Due to high revenue, such big players can invest more to implement advanced technological systems for the travel agency operation. Travel Assist, Enigma, OKLO, eEDGEVANTAGE, etc., like operational systems, are installed in such key players with a considerable amount of investment in money and time. Those systems are facilitated with itinerary preparation, suppliers' rates, voucher generation, invoicing, transportation requests, and accounting facilities. In addition to that, report generation is also an essential function of such systems. Integrated Filing Systems (IFS) are adopted to maintain the organization's tour files by limiting access to respective market executives. Such IFSs ensure the sustainability aspect of the organization by prohibiting the usage of sheets. Traditional human resource operations are practiced through the Human Resource Management Systems like mint-hrm, hSenid HRM enterprise, HIVE, Peoples HR. All of those systems were introduced to enhance efficiency and give instant service to the client.

However, all these systems are operating with an internet connection. When the operation is at a peak level, systems seem to be slow, mainly because of the low bandwidth. According to these travel agencies' executives, sometimes they felt that the older manual version is far better than the ongoing systems that trigger operational staff to being angry. This issue can be easily solved if the network providers can continuously provide a better internet connection with better bandwidth and a proper internal maintenance mechanism. Furthermore, automated systems in DMCs are programmed to generate limited descriptions only. It is not flexible enough to cater to ad-hoc changes during the tour due to Standard Operational Procedures (SOP). It is not happening in small travel enterprises as they are servicing a limited number of clients.

Due to the COVID-19 pandemic situation, both small and big players started to cater to the local market, often called domestic tourism. East or west, the customer is the customer, whether he is local or foreign, who can be served through a middleman. This role in Sri Lankan local market was a failure as there were many coordination errors with suppliers and travel agencies. Rates that appeared on hoteliers' websites were cheaper than the rates given to travel agents. As a result, many local tourists booked their accommodation directly from the respective hotelier. VAT issues faced by big DMCs, credit cards and other flash promotions introduced by hoteliers penetrated the conventional tourism system in many cases. That situation is theoretically tally with a *backwards-sloping supply schedule*.¹ On the other hand, as locals are familiar with the country, they may not need to have an agent throughout their entire holiday in the motherland. As local tourism was the only surviving strategy, travel agencies and suppliers should have proper coordination and rate policies, especially at their online presence, to balance the industry by improving the local tourism multiplier in a sustainable framework.

Now, it is high time where the role of the travel agencies is questioned a lot. Many online platforms recently overarch travel agencies and give direct service to the client in taxi, accommodation, etc. Trivago, make-my-trip like online businesses, can challenge the conventional middleman to give a reasonable rate due to the enormous scale. Some travel agencies are merged with such Online Travel Agencies (OTA). OTAs' revenue, compared with the traditional market, is remarkably high. Most of the major players are adapting their social media presence on the internet. For instance, *I am Srilanka* Instagram page promoted water bodies, central highland in Sri Lanka in middle-east clientele. Now, they are operating as a travel agency with a good market share. Further, many major players used to keep both

¹A *backwards-sloping supply schedule* is a unique economic theory application where suppliers are depicting a trend to supply less the market price is high. As noted by Bull (1995), supply will be decreased after a certain point of higher price level due to "tour operators margins are squeezed, and travel and lodging suppliers are not interested in selling to operators, so the supply 'component' dries up" (100). However, the quantity supply reduced to the principal component, the tour operator/travel agency's demand only. Hoteliers' supply curve for direct customers (local tourists as per this study) may remain as a positive slope.

B2B and B2C platforms on their websites to eliminate unnecessary intermediaries. It was proven through the insights of interviewed tour executives as follows.

In inbound business, we can give a reasonable rate because of our scale. However, OTAs, like [booking.com](https://www.booking.com), gives a competitive rate. But they do not have any contact point if something goes wrong. If such a facility is there, it is only given to a limited privileged set of clients. In that case, travel agencies are more reliable and responsible to clients. We are available 24/7. However, in online platforms, they can make instant bookings than us. We can also do the same. What would be lagged in time is the duration we take to exchange emails here and there. It is the time of communication. (Tour Executive 1, the 8th March 2021)

Further, viewing connecting the connected as a whole by concerning the entire destination management component of the Sri Lanka tourism industry is not ready as it is being profoundly limited by the capacity to serve.

Around 70% to 80% of DMCs in Sri Lanka run depending on a tour operator like in the 90s, 20s which is operated by exchanging emails. Some components of the operation were just digitalized like operating systems and booking systems. B2C platforms are there but in very few numbers. We don't have enough bandwidth for that. The other important factor is the web cost, not the initial cost especially the marketing cost of the web. Per annum cost for that is around 36000\$. In that scenario, working with a tour operator is cost-effective. Countries like Sri Lanka, India has to compete with companies like booking holding whose annual marketing cost is said to be endless which is around 4.5 billion dollars in 2019. In that case, we are not ready and capable enough. (CEO 2, the 10th March 2021)

Sri Lankan Hospitality Sector's Technology Adaptation

Technology has become a game-changer in the hospitality industry worldwide. Sri Lanka also stays aligned with that trend. The hospitality industry is leading the charge in adopting smart technologies compared to the other industries in the country. Hotel chains and upscale hotels leverage advanced technology to be innovative, be strategic, win the market competition and ensure world-class service. Small-scale hotels leverage technology for digital presence, online booking as the internet gets more affordable. The city hotels tend to be more outwards in adopting technology than the regional hotels as they cater to time-conscious travelers. The constant demand from tech-savvy guests compels hoteliers to introduce smart devices into traditional guest encounters, thus reshaping Sri Lanka's hospitality market.

Offering fast and free Wi-Fi to guests is now an essential component for hoteliers irrespective of their size and location, as it is a must for today's connected tourists. Hoteliers keep a watchful eye on their hotels' internet bandwidth as the tourists go into an all-out panic if they couldn't connect to the internet. Almost all sampled hotels use Property Management Systems (PMS) to streamline their operations from front-end to back-end. The most popular property management software solution in Sri Lankan hotels is 'Scienter', 'Opera', IDS NEXT, SAP-TMS, and others using emerging brands (i.e. Cheerze, Tauras, OnQ, Zhara, Citrus).

Sri Lankan hotels still focusing on direct channels and building relationships with traditional travel agents to **bolster revenue**. At the same time, they work on boosting the online bookings coming through the official website and Online Travel Agents (OTAs). The most popular OTA sites among Sri Lankan hoteliers are [Booking.com](#), [Hotel.com](#), [Agoda.com](#), [Expedia.com](#), [Trip.com](#), MakeMyTrip, Hotelbeds. Apart from that, 52% engage with GDS integration with brands like Amadeus, Sabre, Galileo, Synxis, HRS. The hotel's social media presence primarily represents a [Facebook page](#), [a Blog](#), [a Twitter account](#), Instagram, [a LinkedIn page](#), and a [Google + hangout](#).

A limited number of hoteliers use self-service technologies such as self-check-in and check-out kiosks, mobile check-in and check-out, e-concierge, vending machines. Hotels use innovative solutions to personalize the service, real-time information and entertainment, better connectivity, and enhanced security. IPTV interface customized welcome, allow guests to view the hotel services, facilities, special offers, keep track of their bills, display information, and interact with service staff from the comfort of their rooms. Most of the chain hoteliers operating in Sri Lanka equip their official websites with 360° VR videography and photography as an innovative option to capture prospective guests' attention and to level-up hotel market reach. These VR-3D tours give the control hand over to prospective guests to virtually check out every nook and corner of the hotel room and public area which could ensure the quality and transparency before making their purchase decisions. One of the sampled hotel chains renowned for its innovative hospitality marketing through introducing 'Aurasma' app powered with Augmented Reality (AR), which seamlessly display virtual content in real-time- videos, animations, audio, and even mini-games via smartphone. The app can scan specially designed printed ads recognizable by the Aurasma logo and display virtual content. It has revolutionized traditional marketing campaigns. Sri Lanka is world-famous for its great hospitality. "Ayubowan!" denotes the blessings of "May you live long", explicit the Sri Lankan great hospitality mixed with warm, welcoming, smiling faces. Tourists revealed that hospitality combined with generous and friendly behavior, excellent care, and eagerness to help become the focal factor for them to visit Sri Lanka. Therefore, the guests may still prefer to have that employee-guest rapport and human touch during their stay rather than getting fully automated service. And some hoteliers also highlighted that they always like to extend their customized service than let it do by the non-sense system. That's what they always follow, as indicated by their value statement. At the same time, Sri Lanka is a country with low labor cost. Therefore, it is not cost-effective for hoteliers to integrate advanced technologies with unaffordable investments like robotics into the operation.

Restaurants integrate digital solutions to make running the business more accessible, faster, more customized and enhance customer convenience and satisfaction. Tech revolutions like online/mobile reservations, ordering, payments have turned into foodservice necessities. Most restaurants use Point-of-Sale (POS) software to streamline the process from food ordering to settlement. Some restaurants from the

sample use advanced technologies like robot waiters to deliver food from the kitchen to the table. That is the only example in Sri Lanka where use robots in the hospitality industry. According to the restaurant owner, a proliferation of robot waiters can handle menu delivery tasks enabling staff to focus more on creative pursuits and restaurant service quality.

Digital Applications in Sri Lankan Airlines

Sri Lankan Airlines is also adopting digital technology to enhance the experience of smart tourists. As a one-world member Airline, it is facilitating customers through the website and individual app for electronic check-in, e-boarding, information and updates on their flights, baggage tracking, choose the seat of travelers' preference. Sri Lankan Airlines app not only allows the tourist to reserve their flights on the go, but it also provides helpful information to fingertips based on wherever they are in the world. Further, this technological application allows the self-service ticketing function for staff and transforming the ticket issuing process into a fully automated digital service with round the clock availability. The process was simplified by providing seat availability and multiple payment options.

Digital transformation and technology adoption to transform processes across the airline have been identified as top priorities. It includes expansion of direct online sales and generation of revenue from new digital businesses; and introduction of more digital payment options to reach new passenger segments by implementing e-wallets, online-mobile commerce and community-based selling to create a digital market place. The latest app, developed by Sri Lankan Airlines called Fly Smiles. It provides various benefits to the members under the Frequent Flyer Programme (FFP). It provides an array of amazing benefits for its members, including convenient travel planning, discounted airfares, upgrades, and limited offer promotions. It is a user-friendly hi-tech solution. Further, Sri Lankan Airlines has begun using the new MATERNA check-in application, which handles its various airline customers in terminal-1 with a single check-in application that can be customized and configured for all airline brands.

Technology is central to the future of the air transport industry. Therefore, Sri Lankan airlines are also focusing on the new technological trends that can be applied to enhance the customer experience. They are currently introducing new technological trends to the airline and airport operations such as robotic technology and Artificial intelligence (AI) for customer handling, inflight Virtual Reality (VR), inflight connectivity, technology adaptation to assist travelers with additional needs etc.

Conclusion

In conclusion, the researchers pointed out the importance of technology and operation system automation, where it can play a vital role in the presence of repetitive, rule-based tasks. Offering on-demand services to the guests via automation doesn't replace the customized extended service traditionally provided by hotel staff but instead satisfies an extra customer service grounded by the conveniences and quickness. The more time the staff saves in the absence of routine tasks, the more time they can spend interacting with their guests and providing more memorable customer service experiences with high-touch guest experiences that cannot be automated. On all scales, the majority of inbound travel agencies in Sri Lanka have digitalized their operation with technological systems to enhance the efficiency of the operational process but the optimal level cannot be achieved due to low technology infrastructure. Sri Lankan DMCs have to compete with giant international B2C platforms that have an endless budget for e-marketing hence many DMCs relying on conventional tour operators supporting basic email communication which is prolonged. In the post-COVID-19 context, many local suppliers relied on their web and social media resources to reach the customer by eliminating the role of the intermediary in which theoretically supports a backward-sloping supply schedule. As such, DMCs in Sri Lanka are at a potential risk to the liquidation of their importance as the conventional middleman especially in domestic tourism and are not capable enough to integrate the latest technology in the world into their operation. In the inbound tourism business too, the strategic position of Sri Lankan DMCs will be more challenging. In the context of Airlines, Sri Lanka is still in the primary stage of digitalization. Sri Lankan airlines should identify the digital transformation adoption to transform processes across the airline. Authorities have to consider the expansion of technology adaptation and generation of revenue from digital businesses creating a digital market place.

References

- Aarthy, C. J., & Badrinarayanan, M. K. (2019). Automation and enhanced service delivery through process improvement in the hospitality industry. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(4), 2842–2848.
- Akehurst, G. (2009). User-generated content: The use of blogs for tourism organisations tourism consumers. *Service Business*, 3(1), 51–61.
- Baba, N., Shahril, A. M., & Hanafiah, M. H. (2020). Self-ordering kiosk usage and post-purchase behaviour in a quick-service restaurant. *Journal of Tourism, Hospitality and Culinary Arts*, 12, 360–376.
- Baltescu, C. A. (2015). The online assessment of tourism services. The hotel market from Brasov County. *Bulletin of the Transilvania University of Brasov. Economic Sciences Series V*, 8(57), 141–148.
- Batat, W. (2019). *Digital luxury. Transforming consumer experiences*. Sage.

- Bethapudi, A. (2013). The role of ICT in the tourism industry. *Journal of Applied Economics and Business*, 1(4), 67–79.
- Bilgihan, A., Okumus, F., Nusair, K., & Bujisic, M. (2014). Online experiences: Flow theory, measuring online customer experience in e-commerce and managerial implications for the lodging industry. *Information Technology & Tourism*, 14(1), 49–71.
- Boes, K., Buhalis, D., & Inversini, A. (2016). Smart tourism destinations: Ecosystems for tourism destination competitiveness. *International Journal of Tourism Cities*, 2(2), 108–124.
- Buhalis, D. (2003). *eTourism: Information technology for strategic tourism management*. Pearson (FT/Prentice Hall).
- Buhalis, D. (2015). *Working definitions of smartness and smart tourism destination*. Retrieved from: <http://buhalis.blogspot.co.uk/2014/12/working-definitions-of-smartness-and.html>. Accessed 4 Jan 2021.
- Buhalis, D., & Amaranggana, A. (2014). Smart tourism destinations. In Z. Xiang & L. Tussyadiah (Eds.), *Information and communication technologies in tourism 2014* (pp. 553–564). Springer.
- Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 377–389). Springer.
- Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019a). Technological disruptions in services: Lessons from tourism and hospitality. *Journal of Service Management*, 30(4), 484–506.
- Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019b). Technological disruptions in services: Lessons from tourism and hospitality. *Journal of Services Management*, 57(8), 1093–1107.
- Buhalis, D., & O'Connor, P. (2005). Information communication technology revolutionising tourism. *Tourism Recreation Research*, 30(3), 7–16.
- Bulchand-Gidumal, J., & Melián-González, S. (2015). *Information Technology (IT) in hotels: A full catalogue*. Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2771059
- Bull, A. (1995). *Economics of travel and tourism*. Longman.
- Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. *Journal of Urban Technology*, 18(2), 65–82.
- Carlin, M. L. (2005). *Self-service takes off*. Retrieved from <https://hospitalitytech.com/secure-file/2517>. Accessed 24 Jan 2021.
- Cavusoglu, M. (2019). An analysis of technology applications in the restaurant industry. *Journal of Hospitality and Tourism Technology*, 10(1), 45–72.
- Cloudbeds. (2015). *How hotels operating costs affect the bottom line*. Retrieved from <https://www.cloudbeds.com/articles/how-hotel-operating-costs-affect-the-bottom-line/>. Accessed 29 Dec 2020.
- Collins, G. R., & Cobanoglu, C. (2008). *Hospitality information technology: Learning how to use it* (7th ed.). Kendall/Hunt Publishing Company.
- Collins, G. R., & Cobanoglu, C. (2013). *Hospitality information technology: Learning how to use it*. Kendall/Hunt Publishing Company.
- Curran, J. M., Meuter, M. L., & Surprenant, C. F. (2003). Intentions to use self-service technologies: A confluence of multiple attitudes. *Journal of Service Research*, 5(3), 209–224.
- Datta, B. (2019). Understanding the booking patterns of Indian outbound travellers. *GeoJournal of Tourism and Geosites*, 24(1), 246–251.
- Driver, J. C. (1999). Developments in airline marketing practice. *Journal of Marketing Practice: Applied Marketing Science*, 5(5), 134–150.
- Estêvão, J. V., Carneiro, M. J., & Teixeira, L. (2014). Destination management systems: Creation of value for visitors of tourism destinations. *International Journal of Technology Management*, 64(1), 64–88.
- Eye for Travel Business Intelligence. (2016). *An eye for travel business intelligence improving the airline experience how technology is changing customer experiences and*

- communications. Retrieved from https://drivaartsdriva.com/files/resources/EfTravel-Relay42-Report_Improving_the_airline_experience_2016.pdf. Accessed 20 Jan 2021.
- Future Travel Experience. (2020). *12 Technology trends for airlines and airports to focus on in 2020*. Retrieved from <https://www.futuretravelexperience.com/2020/01/12-technology-trends-For-airlines-and-airports-to-focus-on-in-2020/>. Accessed 29 Dec 2020.
- Gretzel, U., Werthner, H., Koo, C., & Lamsfus, C. (2015). Conceptual foundations for understanding smart tourism ecosystems. *Computers in Human Behavior*, 50(C), 558–563.
- Griffy-Brown, C., Chun, M. W. S., & Machen, R. (2008). Hilton hotels corporation self-service technology. *Journal of Information Technology Case and Application Research*, 10(2), 37–57.
- Hjalager, A. M. (2010). Progress in tourism management: A review of innovation research in tourism. *Tourism Management*, 31(1), 1–12.
- Jenner, G. (2009). Self-service switch. *Airline Business*, 25(12), 50.
- Kazandzhieva, V., & Santana, H. (2019). E-tourism: Definition, development and conceptual framework. *Tourism: An International Interdisciplinary Journal*, 67(4), 332–350.
- Kim, M., & Qu, H. (2014). Traveller's behavioural intention towards hotel self-service kiosks usage. *International Journal of Contemporary Hospitality Management*, 26(2), 225–245.
- Koui, E. (2017). *Avant l'appétit: An augmented reality interactive menu that elevates the gourmet food experience*. Retrieved from <https://scholarworks.rit.edu/cgi/viewcontent.cgi?article=10770&context=theses>. Accessed 7 Jan 2021.
- Law, R., & Jogaratnam, G. (2005). A study of hotel information technology applications. *International Journal of Contemporary Hospitality Management*, 17(2), 170–180.
- Law, R., Leung, R., & Buhalis, D. (2009). Information technology applications in hospitality and tourism: A review of publications from 2005 to 2007. *Journal of Travel & Tourism Marketing*, 26(5–6), 599–623.
- Makarem, S. C., Mudambi, S. M., & Podoshen, J. S. (2009). Satisfaction in technology-enabled service encounters. *Journal of Services Marketing*, 23(3), 143–144.
- Mandic, A., & Garbin, D. (2019). The impact of ICT on actors involved in smart tourism destination supply chain. *e-Review of Tourism Research*, 16(2/3), 234–243.
- Martini, U., Buffa, F., & Notaro, S. (2017). Community participation natural resource management and the creation of innovative tourism products: Evidence from Italian networks of reserves in the Alps. *Sustainability*, 9(2314), 1–16.
- Murphy, H. C. (2011). An investigation of data management and property management systems in hotels. *Tourism and Hospitality Management*, 17(1), 101–114.
- Murphy, J., Gretzel, U., & Pesonen, J. (2019). Marketing robot services in hospitality and tourism: The role of anthropomorphism. *Journal of Travel & Tourism Marketing*, 36(7), 784–795.
- O'Connor, P., & Murphy, J. (2004). Research on information technology in the hospitality industry. *International Journal of Hospitality Management*, 23(5), 473–484.
- Oracle. (2018). *How artificial intelligence enhances the hotel guest experience*. Retrieved from <https://www.oracle.com/a/ocom/docs/dc/using-ai-enhance-hotel-guest-exp.pdf?elqTrackId=3817dd2d0aa14afca2b1faada14e1ec8&elqaid=77095&elqat=2>. Accessed 14 Jan 2021.
- Oronsky, C. R., & Chathoth, P. K. (2007). An exploratory study examining information technology adoption and implementation in full-service restaurant firms. *International Journal of Hospitality Management*, 26(4), 941–956.
- Oyedele, A., & Simpson, P. M. (2007). An empirical investigation of consumer control factors on the intention to use selected self-service technologies. *International Journal of Service Industry Management*, 18(3), 287–306.
- Paluch, S., & Wirtz, J. (2020). Artificial intelligence and robots in the service encounter. *SMR. Journal of Service Management Research*, 4(1), 3–8.
- Raina, V. K. (2017). NFC payment systems and the new era of transaction processing. In *Mobile communication technology* (pp. 73–96). IGI Global.
- Sri Lanka Tourism Development Authority. (2018). *Annual statistical report*. Sri Lankan Tourism Development Authority.

- Sri Lanka Tourism Development Authority. (2019). *Annual statistical report*. Sri Lankan Tourism Development Authority.
- Sudasinghe, H. D., & Dinusha, G. V. H. (2020). A study on factors influencing E-tourism adaption of the registered micro, small and medium inbound travel enterprises in Colombo District, Sri Lanka. *Unpublished Manuscript*. Belihuloya: Sabaragamuwa University of Sri Lanka.
- Talón-Ballesteros, P., & González-Serrano, L. (2013). Yield revenue management in the hotel sector: An empirical analysis of its application and results in Madrid, Spain. In Á. Matias, P. Nijkamp, & M. Sarmento (Eds.), *Quantitative methods in tourism economics* (pp. 213–231). Physica.
- Thakran, K., & Verma, R. (2013). The emergence of hybrid online distribution channels in travel, tourism and hospitality. *Cornell Hospitality Quarterly*, 54(3), 240–247.
- The New York Times. (2013). *Speedy check-in lets hotel guests bypass front desk*. Retrieved from <https://www.nytimes.com/2013/03/19/business/speedy-check-in-lets-hotel-guests-bypass-front-desk.html>. Accessed 20 Jan 2021.
- Victorino, L., Verma, R., Plaschka, G., & Dev, C. (2005). Service innovation and customer choices in the hospitality industry. *Managing Service Quality*, 15(6), 555–576.
- Walker, T. (2012). *Digital marketing & distribution trends in hospitality – Alberta hospitality, Fall 2012*. Retrieved from <http://www.ahla.ca/wp-content/uploads/2012/12/abhf12.pdf>. Accessed 5 Mar 2021.
- Wang, D., & Fesenmaier, D. R. (2013). “Transforming the travel experience: The use of smart-phones for travel”, *information and communication technologies in tourism 2013* (pp. 58–69). Editorial Springer International Publishing.
- Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave new world: Service robots in the frontline. *Journal of Service Management*, 29(5), 907–931.
- WPTravelBooking. (2020). *Online travel booking statistics & trends 2020*. Retrieved from <https://wptravelbooking.com/online-travel-booking-statistics-trends-2020/>. Accessed 6 Mar 2021.
- Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, 60, 244–256.
- Zhu, W., Zhang, L., & Li, N. (2014). *Challenges, function changing of government and enterprises in Chinese smart tourism*. Beijing Union University.

Chapter 23

Tourism in Bangladesh: The Application of Technologies



Muhammad Khalilur Rahman, Azizul Hassan, and Md. Abdul Jalil

Abstract The contribution of the tourism industry is following a changing pattern in recent years owing to the availability of advanced technologies. The tourism industry was one of the first industries to use information and communication technologies (ICT) almost entirely for business functions. Since then, the development of tourism has been aided by ICT and its success rely heavily on technology. Arguably, ICT encourages this integration and allows tourism goods to be customised to meet the needs of specific individuals. Because of changes in tourist consumer behaviour, the market is becoming more segmented, with each potential consumer belonging to several market segments at the same time. Tourist operators' awareness of these developments and their preparations to respond, or better yet, be proactive are majorly questionable. ICT has brought with it a slew of new challenges and opportunities for business and tourism, and thus posing challenges to the industry and tourism operators, in general. This paper examines the ICT trends that have occurred in the tourism industry followed by the industry's ICT developments and the responses of various players to the challenges that these developments bring in the context of Bangladesh. The study uses secondary data and includes expert opinion to get better insights.

Keywords Tourism · ICT · Technology · Development · Bangladesh

M. K. Rahman (✉)

Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan (UMK),
Kelantan, Malaysia

e-mail: khalilur.r@umk.edu.my

A. Hassan

Tourism Consultants Network, The Tourism Society, London, UK

Md. A. Jalil

Faculty of Arts and Humanities, World University of Bangladesh, Dhaka, Bangladesh

Introduction

The tourism industry has become one of the potential service sectors for generating revenue for the country (Rahman et al., 2018, 2021). Bangladesh is a developing country emphasis on economic policies to promote tourism as a potential source of economic growth (Rana et al., 2020). The tourism industry incorporates many features of information technology such as information richness, mobility and globalization. Law et al. (2014) assumed that information and communication technology (ICT) can contribute a significant role in the tourism and travel industry because they make intensive use of information. ICT is used to depict different electronic devices that are capable of transmitting data in a network. The travel industry has a global connection with tourism providers and communities. Virtual communications empower global travelling to different destinations and carrying friendly culture and habits (Palmer & McCole, 2000). The principles of the tourism industry vary from the micro level to worldwide enterprises, for instance, some are fragmented and others are connected into an oligopoly of worldwide alliances (e.g. airlines).

ICT application in the tourism industry uses digital devices in completing various functions of the organization (Mohanty, 2020). ICT application is playing a significant role in the tourism industry. There is a magnificent advancement of ICT application in Bangladesh, however, it is as yet in the beginning phase in the tourism and travel industry (Patwary et al., 2020). There is a lack of study on ICT application in the tourism industry despite having a good impact on the GPD in Bangladesh. The tourism industry is defined as a system of digital technology and production systems. Technology application can play a significant role in attaining economic development by generating an economy for tourists to travel destinations. The development of ICT application has had a huge business prospect in the tourism industry. Technology application could be a practical approach which tourism industry can use to mitigate tourists' negative impacts.

The application of ICT has a significant role in ensuring ecological tourism development (Wu, 2020). It is enabling a new way of tourism management, improving productivity, emerging new industry and attaining a competitive advantage of tourism services (Adeola & Evans, 2020). The application of technology has created a new paradigm shift in the tourism industry and support for the globalization of the tourism business. ICT application supports an efficient working environment of tourism enterprises because it enables management process and quality work performance of business organizations. The digital technology application has given an advantage of the resources at the disposal of a hotel enterprise (Kumar & Kumar, 2020). The key advantage of digital technology has established a successful association between assorted processes and the network of the supply chain by offering easy access. The competitive advantage of technology application might be accomplished by the travel and tourism industry through internet marketing, effective communication with stakeholders and various tourism marketing strategies.

The application of ICT in the tourism industry transforms at airline industry for hospitality services. ICT application has broadly used in the value-creation process in the tourism sector (Thees et al., 2020). The effective digital technology application has turned out for the success of the travel and tourism industry enterprises because it has convinced their capacity to recognize their contributions, manufacture and transport costs. For instance, e-tourism controls the competitiveness of the organization by exploiting intranets for reorganizing internal process, extranets for transactions with the partners, and the internet for cooperating with stakeholders and customers. Garín-Muñoz et al. (2020) stated that e-tourism contains all business capacities like e-marketing, e-commerce, e-production, e-procurement, e-finance, e-accounting, and e-human resource management for all types of organizations.

The use of ICT application in the tourism and travel industry has created a competitive environment, and it has become a pivotal segment of tourism business development (Razzaq et al., 2021). ICT application plays a crucial role in tourism products and services during booking. Information transforming, and storing is the core activity of all tourism and travel organizations. The travel industry is driven by digital technology application and telecommunications (Stankov & Gretzel, 2021). The entire travel and tourism enterprises such as travel agencies, hotel agencies, tour operators, and rental agencies are driven by information and communication technology. The study aims to explore the role of technology application, importance, critical strategies, opportunities, development and challenges of technology application, and assess the operational implementation of ICT application in evolving tourism industry in Bangladesh.

Roles of Technology Application in Tourism Industry

Digitalization is a prerequisite to ensure business sustainability. Bangladesh is attempting to digitalize in every sector, and this digitalization process is going fast which is assisting each sector to gain profit (Aziz & Naima, 2021). In this phenomenon, the application of ICT is playing a significant role to drive digital technology and the information-driven world. The ICT application plays a significant role in the tourism industry because ICT facilitates a person to access tourism-related information from any place at any time. Thees et al. (2020) indicated that the ICT application might be divided into internal processes in tourism management (e.g. business integrated processes, software and hardware) and external processes (e.g. online review and e-marketing). The integration of ICT application in the travel industry is necessary for the development of the tourism industry. Xiang et al. (2021) indicated that the high velocity of ICT foundation and programming applications in the travel industry is essential for the development of tourism enterprises.

The ICT application can lead to building customer management relations (Singh & Dhankhar, 2020) and supply chain management relationships that encourage an assortment of operations such as ordering, reporting, tracking, payment, and product selection. Technology application can cut expenses by empowering the provider

to be in direct communication with the buyer. Tourism management companies use ICT application to carry out a range of tasks that develop the proficiency of employees in the workplace (Hassan & Sharma, 2020). People can share information about tourism destinations, quality services, environment and social conditions using digital technologies such as Facebook, Twitter, blogs, and WhatsApp. Hotel, resorts and restaurants can communicate directly with their customers by posting links to social medial platforms.

The application of ICT is a wide sort of communication technology that incorporates phone signals, software, data storage, computers, and audio-visual devices that permit data to be accessed, stored, modified and transmitted (Bystrowska et al., 2017). Technology application allows different business organizations to implement their activities and objectives by communicating with partners and managing their information and processes. For example, the ICT application used for communication in a business context incorporates Internet, digital TV, digital radio, computers, 3G/4Gs, social media, Wi-Fi, GPRS, email, mobile applications, game consoles, and virtual the truth. The application of ICT has a transformational effect on the business environment by making a new competitive niche tourism market (Mohanty, 2020). E-commerce and e-business is a crucial method for conducting business using the application of ICT solutions, and e-commerce has become potential for all types of business including tourism and travel industry. E-commerce is capable to facilitate business industries by allowing local business to access the global market. It has created a new opportunity to export goods and services and expanded the operational efficacy within the business organization.

Technology-Driven Revolution in Tourism

The travel and tourism industry is impacted by the business designing experienced because of the technology revolution (Bonfanti et al., 2021). The effective utilization of information technologies is crucial as data is the lifeblood of the tourism industry. The entire system of information technologies is rapidly spreading through the travel industry. Intangible services of tourism cannot be physically inspected at the retail location before buying. Generally, they are purchased before the time of their utilization and away from the location of consumption. Intangible tourism services depend on depictions, given by the tourism and travel trade for their capacity to draw in customers (Shehzad et al., 2019). Accurate information about users' needs is the key to satisfaction of tourism demand. Thus, digital technologies provide the data backbone that influences the travel industry. Ali and Frew (2014) stated that the revolution of digital technologies has significant implications for the tourism management industry, mostly by empowering productive cooperation in the business organization and by offering devices for globalization. The development of supply and demand makes ICT application an imperative partner and accordingly they play a crucial role in travel and tourism marketing, promotion, distribution and coordination (Adeola & Evans, 2020). The redesigning of these process produces a

paradigm shift modifying the structure of tourism marketing. In this way, information technologies significantly affect the tourism industry, since they promote the tourism sector to rethink the way by which it arranges its business, qualities and standards.

The Internet reforms adaptability in customer decision and service delivery process. Consumers are considerably more sophisticated and sensitive because they have experience of service. Therefore, tourists have become demanding, requesting quality products, value for time, and value for money. Tourists' demand depends on electronic media to attain information about destinations, and communication for their necessities (Kumar & Kumar, 2020). The application of ICT can provide benefits for innovative tourism organizations to redesign the tourism products and services to deliver customer needs (Mihajlović, 2012). The application of ICT has become an essential part of the product particularly for the travel and tourism operators who presently expect that certain facilities should be accessible during their trip. The World Wide Web (WWW) and the Internet have reformed the advancement and communication functions of the travel industry (Guo et al., 2014). Booking and purchasing products and services through the Web are convenient for tourists and it is an effective communication mechanism. The greater the capacity, tourist arrival, departures, transactions, reservations, the greater the requirement for technologies to facilitate the processes.

Electronic Travel and Tourism Agencies

The application of technologies has presented significant enhancements in the business organization of travel and tourism agencies. The travel and tourism agencies have accomplished collaborations, efficiencies and cost savings (Rahman, 2019) by coordinating travel agencies' activities such as workforce, tourists' history, ticketing and corresponding with suppliers. The customer relationship management systems can support travel agencies in tacking of their productivity, control and intensity. Frias et al. (2008) indicated that the information and distribution center can assist travel agencies to develop proactive marketing tools to target tourists with particular tourism products and services. The tourism and travel agencies can use digital technology application for customers and suppliers usage.

Electronic Tour Operators and Hospitality Management

Tour operators need continually to communicate with their partners for accommodation, tourism packages and transportation matters. The application of ICT is additionally crucial for the distribution of tour operators' packages (Ma et al., 2003). The introduction of digital technologies including the internet, intranet and extranets as the essential device has numerous advantages for tour operators (Law et al.,

2014). The cooperation, updated information and exchange of timely information is crucial because it permits tour operators to organize actions, solve issues and guarantee that tourist's necessities are connected to all values delivering the tourism product and services. ICT application can play a crucial role for tour operators. It allows tourists to change their tourism package on the web and to form their agenda to extend the trip, change accommodation, dinner plans, and car rentals (Baloglu & Mangaloglu, 2001). Tour operators should focus on information provision, and strategic role of increasing the value of the tourism product, services, and process. Tour operator could along these lines need to assess their core values and recognize market segment of niche tourism for customer satisfaction.

The ICT application has entered in hospitality management for incorporating the hotel operations, improving efficiency, designing marketing function, developing customer services, partnership building, strategic opportunities, and providing devices for tourism marketing research (Werthner et al., 2015). Tourists generally expect ICT facilities including internet access, TV, information ports in the hotel rooms. The majority of the higher categories hotel in Bangladesh is providing these ICT facilities to the customers when they visit a country and stay at a hotel. Digital technologies have improved the hotel reservation process significantly. Booking through the Internet is convenient for tourists who frequent visit to destinations and stay at a hotel as that provides a productive and actual correspondence mechanism. The greater the reservation, arrivals and departure, the greater the requirement for innovations to facilitate the tourism service processes.

Tourism Demand and Application of Technologies

With the demand for quality prerequisites of current tourists, there is required strong ICT for the organization of the increasing traffic. Tourists are seeking high-quality products and services for their money, time and value. Accordingly, tourism destinations and principles need new strategies to serve the demand of the tourist. The utilization of digital technologies in the tourism sector is driven by the tourism demand, and rapid development of new products of tourism, which discourse mini-market segments. The application of ICT can support tourists to get reliable and accurate information and to attempt reservations in a short time. ICT can assist to improve service quality and increase tourists' satisfaction. Tourist satisfaction relies on accurate and comprehensive information about the destination facilities, tourism activities, accessibility and satisfaction.

Destination Management System

A destination management system (DMS) has been used to incorporate the entire travel and tourism supply at the destinations (Ivars-Baidal et al., 2019). DMS's contribution to tourism marketing and strategy is established by its capability to incorporate all partners at the destination and to reach a global market. DMS provides innovative data and facilitates reservation. Destination Integrated Computerized Information Reservation Management Systems (DICIRMS) introduce all scope of necessities and services needed by the travel enterprise and customers for particular destinations (Buhalis & Deimezi, 2004). DICIRMS provide the information structure for integration and business processes between all partners including distributors, consumers, suppliers, and organizations of destination marketing.

Computer Reservation Systems

Computer Reservation Systems (CRSs) satisfy the travelers' need for convenient access to transparent and easy compare information (Buhalis, 1993). CRSs are critical initiators of the electronic age because CRSs formulated a new tourism marketing and distribution system. CRSs cover all assortment of decisions of tourists, leisure services, holiday trip packages, destinations, actual prices and availability of such services. These services provide rapid affirmation and expedient documentation of reservations, permitting adaptability and empowering potential tourists to book scarcely in time (Smith & Rupp, 2004). Experienced tourists are allowed by booking systems and develop their efficiency by making tailor-made product individually. CRSs can help tourism operators to comprehend tourists' needs through survey and marketing research (Kaynama & Black, 2000). CRS is a database that manages the inventory of tourism organizations. Customers and intermediaries can access the inventory and ensure reservations. CRSs have emerged into global distribution systems by integrating the entire range of tourism products and services. All aspects of tourists' activities related to information access, CRSs can provide the framework for offering personalized services.

Tourism Production and Distribution

The effects of information technologies are evident in the tourism production, operation, marketing, and distribution functions of the public and private sectors (Ali & Frew, 2014). The application of ICT can help staff assurance, efficiency, managerial adequacy, the productivity of the tourism industry. Managerial attitude is adapted to the new business environment and take advantage of the rising opportunities. Information and communication technologies have crucial ramifications for the

distribution channel, as they present exceptional and inventive techniques (Leu et al., 2004). Distribution is a crucial component of the marketing mix, which can empower the travel and tourism industry to develop its competitiveness and execution. The advancement of information technologies showed that destinations will be unable to contend successfully unless they were able to improve themselves in the developing electronic distribution channels. Information communication and technologies transformed into an electronic commercial center, where access to data is accomplished (Drosos et al., 2017). There are three major waves of technological development that established ICT in the travel and tourism industry such as Computer Reservations Systems (CRSs), Global Distribution Systems (GDSs) and the Internet.

Challenges and Opportunities of Technology Application in Tourism

The Internet is expected to change the role of travel and tourism services intermediaries. Tourism agencies have been the significant advisors of tourism services and the interface of the business with customers (Buhalis & Licata, 2002). However, to the extent that the Internet enables customers to develop and buy their routes, travel agencies' future gets problematic as Internet transactions are not secured and reliable yet. People who travel rarely to destinations purchase tourism products from traditional travel agencies. Business and frequent travelers use online tourism providers to arrange their travel schedules and buy their tickets. It will rely upon the security of Internet transactions and digital technologies; the dependability and quality of data accessible on the Internet. Buhalis and Law (2008) indicated that tourism agencies have little value for tourism product and services because they initially act as booking offices, and they only manage information and carry out reservations.

ICTs have transformed the modern business environment, which led to new information in the economy. Ali and Frew (2014) stated that ICT is a wide menology indicating numerous correspondence digital technologies such as digital camera, cell phone application, Wi-Fi, Internet, GPS, media, voice, and digital radio, which are creating a new market for tourism business. With the capacity to reach a global audience, the Internet tourism business can increase economic efficiency. Tourist cabins and hotels across the region presently maintain websites advertising their features, dealing with the booking request, and supporting specials to interested customers (Kumar & Kumar, 2020). Small manufacturers of traditional handicrafts are investigating how information and communication technologies can help the marketing and circulation of their products. ICT can create digital marketing to manage the tourism supply chain management. Tourism is a crucial driving force and information-intensive industry as ICT possibly affects the travel and tourism business (Werthner & Klein, 1999). It has given new instrument and empowered new distribution channels for establishing a new business environment. The

application of ICT has facilitated business transaction in the tourism industry by networking with tourism operators, distributors, trading partners, and providing information to customers across the globe. Customers also use the Internet to obtain information about their trip plan. Information is a crucial component in the travel and tourism industry (Aldebert et al., 2011). ICT encompasses all aspects of tourism-related products and services. The application of information and communication technologies has been used for different purposes particularly in the tourism industry across the globe.

Strategies of Technology Application in Tourism

Information and communication technologies influence the strategic management and development of modern business associations. The application of ICT is transforming the best business strategic approach universally (Kumar & Kumar, 2020). ICT transform the strategic position of tourism business organizations by adjusting their effectiveness, diversity, operational expenses and response time (World Tourism Organization, 1999). Digital technologies have stimulated revolutionary changes in the distribution and operation of the travel and tourism industry. Tourism is the re-engineering of the booking process (Joo, 2002), which enable tourisms and industry to save significant time in differentiating, reserving and purchasing tourism products and services. The potential tourists will be able to access the Internet and identify diverse offers to make travel decisions that fit their prerequisites. The tourism industry can shift towards individual travel and dynamic tourism packages for targeting mini-segments. Closer collaboration is needed throughout the travel industry which will develop service and provide a consistent travel experience, while it will empower the travel industry to manage its competitiveness. Briedenhann and Wickens (2004) stated that training and education of human resources are crucial for innovation management of tourism services and thus ICT will empower the tourism industry to improve an understanding of the contemporary development and dream for the future.

Operational and strategic managerial practices are essential to generate profit from the tourism sector. Business process re-engineering enables organizations to attain competitive advantages and overcome long-term threats (Chang & Powell, 1998). The travel industry should understand and use ICT application to serve the target market, increase profitability, improve services, efficiency, and maintain long-term success for tourism marketing. For the success of the tourism industry, tourism destinations will be determined by a mix of creative management, vision, marketing, strategic utilization of digital technologies. Sufficient equipment, training and service are essential for maintaining competitiveness in the long-term tourism business. Tourism agencies should need to transform from booking workplaces to tourism managers and to enhance the tourists' experience (Bassey, 2015). Tourism agencies can offer distinction value by designing quality tourism arrangement which customers will want to pay a premium. Also, tourism agencies can offer cost

value by delivering less expensive tourism products and services. These strategies could lead to dominance in the tourism industry. Global Distribution Systems (GDS) and Computer Reservation Systems (CRS) are also crucial applications which enable interaction between tourism agencies and airlines companies including hotels and vehicle rental firms (Buhalis & Licata, 2002). Destination integrated commuter information reservation management systems and destination management systems can incorporate the management and marketing of the travel industry.

Conclusion

The travel and tourism operators must comprehend the tourism value network. Tourism operators need to know the main players in the tourism industry. Tourism professionals should develop a statistical database and research promoting tourism marketing. Educational organizations can access such research and promote information and communication technologies based knowledge. ICT based knowledge can be supported by technical training and field-based training, research and practical experience. Information technology-related organizations and travel industry players such as tour operators, travel agencies, technology providers, and hotels should have a link and have continuous communication to develop a sustainable tourism industry. The tourism industry can produce necessary data which is the key strategic and significant resources for the tourism business. The application of information and communication technologies can provide new intends to analyze the data for the tourism business. There is needed gradual transition from information systems to reflective knowledge system to promote the tourism industry and help people in the future.

References

- Adeola, O., & Evans, O. (2020). ICT, infrastructure, and tourism development in Africa. *Tourism Economics*, 26(1), 97–114.
- Aldebert, B., Dang, R. J., & Longhi, C. (2011). Innovation in the tourism industry: The case of tourism@. *Tourism Management*, 32(5), 1204–1213.
- Ali, A., & Frew, A. J. (2014). ICT and sustainable tourism development: An innovative perspective. *Journal of Hospitality and Tourism Technology*, 5(1), 2–16.
- Aziz, A., & Naima, U. (2021). Rethinking digital financial inclusion: Evidence from Bangladesh. *Technology in Society*, 64, 1–15.
- Baloglu, S., & Mangaloglu, M. (2001). Tourism destination images of Turkey, Egypt, Greece, and Italy as perceived by US-based tour operators and travel agents. *Tourism Management*, 22(1), 1–9.
- Bassey, B. E. (2015). Transforming the Nigeria tourism industry through tourism entrepreneurial development. *African Journal of Business Management*, 9(15), 569–580.

- Bonfanti, A., Vigolo, V., & Yfantidou, G. (2021). The impact of the Covid-19 pandemic on customer experience design: The hotel managers' perspective. *International Journal of Hospitality Management*, 94, 1–18.
- Briedenhann, J., & Wickens, E. (2004). Tourism routes as a tool for the economic development of rural areas – Vibrant hope or impossible dream? *Tourism Management*, 25(1), 71–79.
- Buhalis, D. (1993). RICIRMS as a strategic tool for small and medium tourism enterprises. *Tourism Management*, 14(5), 366–378.
- Buhalis, D., & Deimezi, O. (2004). E-tourism developments in Greece: Information communication technologies adoption for the strategic management of the Greek tourism industry. *Tourism and Hospitality Research*, 5(2), 103–130.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet – The state of eTourism research. *Tourism Management*, 29(4), 609–623.
- Buhalis, D., & Licata, M. C. (2002). The future eTourism intermediaries. *Tourism Management*, 23(3), 207–220.
- Bystrowska, M., Wigger, K., & Liggett, D. (2017). The use of information and communication technology (ICT) in managing high Arctic tourism sites: A collective action perspective. *Resources*, 6(3), 1–15.
- Chang, L. J., & Powell, P. (1998). Towards a framework for business process re-engineering in small and medium-sized enterprises. *Information Systems Journal*, 8(3), 199–215.
- Drosos, D., Chalikias, M., Skordoulis, M., Kalantonis, P., & Papagrigroriou, A. (2017). The strategic role of information technology in tourism: The case of global distribution systems. In V. Katsoni, A. Upadhy, & A. Stratigea (Eds.), *Tourism, culture and heritage in a smart economy* (pp. 207–219). Springer.
- Frias, D. M., Rodriguez, M. A., & Castañeda, J. A. (2008). Internet vs. travel agencies on pre-visit destination image formation: An information processing view. *Tourism Management*, 29(1), 163–179.
- Garín-Muñoz, T., Perez-Amaral, T., & Lopez, R. (2020). Consumer engagement in e-Tourism: Micro-panel data models for the case of Spain. *Tourism Economics*, 26(6), 853–872.
- Guo, Y., Liu, H., & Chai, Y. (2014). The embedding convergence of smart cities and tourism internet of things in China: An advance perspective. *Advances in Hospitality and Tourism Research*, 2(1), 54–69.
- Hassan, A., & Sharma, A. (2020). *The emerald handbook of ICT in tourism and hospitality*. Emerald Publishing Limited.
- Ivars-Baidal, J. A., Celdrán-Bernabeu, M. A., Mazón, J. N., & Perles-Ivars, Á. F. (2019). Smart destinations and the evolution of ICTs: A new scenario for destination management? *Current Issues in Tourism*, 22(13), 1581–1600.
- Joo, J. (2002). A business model and its development strategies for electronic tourism markets. *Information Systems Management*, 19(3), 58–69.
- Kaynama, S. A., & Black, C. I. (2000). A proposal to assess the service quality of online travel agencies: An exploratory study. *Journal of Professional Services Marketing*, 21(1), 63–88.
- Kumar, N., & Kumar, R. R. (2020). Relationship between ICT and international tourism demand: A study of major tourist destinations. *Tourism Economics*, 26(6), 908–925.
- Law, R., Buhalis, D., & Cobanoglu, C. (2014). Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 26(5), 727–750.
- Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. *Theoretical Models and Processes of Reading*, 5(1), 1570–1613.
- Ma, J. X., Buhalis, D., & Song, H. (2003). ICTs and Internet adoption in China's tourism industry. *International Journal of Information Management*, 23(6), 451–467.

- Mihajlović, I. (2012). The impact of information and communication technology (ICT) as a key factor of tourism development on the role of Croatian travel agencies. *International Journal of Business and Social Science*, 3(24), 151–159.
- Mohanty, P. (2020). ICT and sustainable development: Implications for the tourism industry. In A. Hassan & A. Sharma (Eds.), *The Emerald handbook of ICT in tourism and hospitality* (pp. 259–272). Emerald Publishing Limited.
- Palmer, A., & McCole, P. (2000). The role of electronic commerce in creating virtual tourism destination marketing organisations. *International Journal of Contemporary Hospitality Management*, 12(3), 198–204.
- Patwary, A. K., Chowdury, M. M., Mohamed, A. E., & Azim, M. S. (2020). Dissemination of information and communication technology (ICT) in tourism industry: Pros and cons. *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1(8), 36–42.
- Rahman, M. K. (2019). Medical tourism: Tourists' perceived services and satisfaction lessons from Malaysian hospitals. *Tourism Review*, 74(3), 739–758.
- Rahman, M. K., Sarker, M., & Hassan, A. (2021). Medical tourism: The Islamic perspective. In A. Hassan (Ed.), *Tourism products and Services in Bangladesh: Concept analysis and development suggestions* (pp. 87–99). Springer.
- Rahman, M. K., Zailani, S., & Musa, G. (2018). The perceived role of Islamic medical care practice in hospital: The medical doctor's perspective. *Journal of Islamic Marketing*, 9(1), 2–18.
- Rana, M. S., Rahman, M. K., Islam, M. F., & Hassan, A. (2020). Globalization effects on tourism marketing in Bangladesh. In A. Hassan (Ed.), *Tourism Marketing in Bangladesh: An introduction*. Routledge.
- Razzaq, A., Sharif, A., Ahmad, P., & Jermisittiparsert, K. (2021). Asymmetric role of tourism development and technology innovation on carbon dioxide emission reduction in the Chinese economy: Fresh insights from QARDL approach. *Sustainable Development*, 29(1), 176–193.
- Shehzad, K., Liu, X., Rauf, A., Arif, M., Mazhar, S., Sohail, N., & Amin, W. (2019). Revolutionising tourism development in China: An effective role of ICT and Western Silk Road project. *Asia Pacific Journal of Tourism Research*, 24(9), 965–977.
- Singh, L., & Dhankhar, D. (2020). ICT-based marketing and profitability in tourism and hospitality organizations in Indian scenario. In A. Hassan & A. Sharma (Eds.), *The Emerald handbook of ICT in tourism and hospitality* (pp. 311–330). Emerald Publishing Limited.
- Smith, A. D., & Rupp, W. T. (2004). E-traveling via information technology: An inspection of possible trends. *Services Marketing Quarterly*, 25(4), 71–94.
- Stankov, U., & Gretzel, U. (2021). Digital well-being in the tourism domain: Mapping new roles and responsibilities. *Information Technology & Tourism*. <https://doi.org/10.1007/s40558-021-00197-3>
- Thees, H., Erschbamer, G., & Pechlaner, H. (2020). The application of blockchain in tourism: Use cases in the tourism value system. *European Journal of Tourism Research*, 26, 2602–2602.
- Werthner, H., Alzua-Sorzabal, A., Cantoni, L., Dickinger, A., Gretzel, U., Jannach, D., & Zanker, M. (2015). Future research issues in IT and tourism. *Information Technology & Tourism*, 15(1), 1–15.
- Werthner, H., & Klein, S. (1999). ICT and the changing landscape of global tourism distribution. *Electronic Markets*, 9(4), 256–268.
- World Tourism Organization (WTO). (1999). *Marketing tourism destinations online: Strategies for the information age*. WTO.
- Wu, W. (2020). Analysis of digital tourism, virtual tourism and wisdom tourism. In *The international conference on cyber security intelligence and analytics* (pp. 18–25). Springer.
- Xiang, Z., Stienmetz, J., & Fesenmaier, D. R. (2021). Smart tourism design: Launching the annals of tourism research curated collection on designing tourism places. *Annals of Tourism Research*, 86, 1–20.

Chapter 24

Overcoming Overtourism Through Technology: The Case of Asian Cities



Priyakrushna Mohanty, Nirmalya Nair, and Atul Kumar Sharma

Abstract Overtourism is emerging as a persistent predicament for cities across the world. It (overtourism) is a complex phenomenon that is constituted by several diverse and interlinked factors that affect particular areas of the city. Considered to be one of the threats to the sustainability goal, the problem of overtourism is being addressed by several effective responses such as structural initiatives at the policy level and through the usage of technology. In the recent past, the concept of the smart city is also addressing the overtourism problem in many European cities. However, such examples are rare when it comes to Asian cities which are often touted as the playground for technological innovations. Designed as a descriptive study, this paper attempts to discuss the various facets of technological interventions that are and have the potential to solve the overtourism issues in Asian cities.

Keywords Technology · Overtourism · Asian tourism · Innovations · Asia

Introduction

Urban areas constitute a major portion of both domestic and international tourism in Asia thanks to their cultural, social, visual, and physical features that provide a foundation for tourism destinations (Dixit & Abraham, 2020). However, just like any other tourism destination, many of the Asian urban tourism sites are under serious pressure to manage a broad range of complex issues among which overtourism is emerging as one of the persistent ones (Jamieson & Jamieson, 2019). For many decades, tourism was advocated as an economic and social force (without addressing its unsustainable practices) that focused on quantity and industry rather than on quality and visitors (Camatti et al., 2020). But, in the last few years, the problem of overtourism has grabbed the attention of many academicians and practitioners

P. Mohanty (✉) · N. Nair · A. K. Sharma
Department of Tourism & Travel Management, Jyoti Nivas College Autonomous,
Bengaluru, India

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_24

owing to large scale media and public outrage fueled by the deterioration in the quality of life of the host community and the worsening of visitor experiences (Pasquinelli & Trunfio, 2020). Thus, United Nations World Tourism Organization (UNWTO, 2018, p. 4) defines overtourism as “the impact of tourism on a destination, or parts thereof, that excessively influences the perceived quality of life of citizens and/or quality of visitors experiences in a negative way”.

Considered to be one of the threats to the sustainability goal, the problem of overtourism is being addressed by several effective responses such as structural initiatives at the policy level and through the usage of technology (Gowreesunkar & Seraphin, 2019). The concept of smart city is overridingly addressing the overtourism problem (see Camatti et al., 2020; García Hernández et al., 2019; Gowreesunkar & Seraphin, 2019; Ivars-Baidal et al., 2019; Pasquinelli & Trunfio, 2020). Various new technologies are being designed and created to manage different facets of overtourism (Bourliataux-Lajoie et al., 2019).

Albeit the problems and issues regarding overtourism management have been getting their due attention in the European context through recent academic works of Adie, Falk, and Savioli (2020), Adie and Falk (2020), and Benner (2020). But, in the context of Asia, there has been a paucity of studies when it comes to the planning and management of overtourism problems (Jamieson & Jamieson, 2019). Asian cities which are often touted as the playground for technological innovations enjoy the competitive advantage of the cheap material and labor force required for manufacturing technological tools. Therefore, these digital resources can be used to overcome the overtourism predicament.

Against this backdrop, this paper attempts to study the various facets of technological interventions for solving the overtourism issues in Asian cities which has been facing the wrath of overtourism in the form of traffic congestion, overcrowding, and gentrification of city centers. Another objective of this paper is to find out the driving forces for these technological interventions in Asian cities. Divided into three sections, this paper can be categorized as a descriptive study with a futuristic approach. The first section provides a brief overview of the overtourism tourism problems in Asian cities. The second part of the work deals with the negative impacts of the overtourism problem on urban destinations. The last section of the paper discusses the stark aspects and attributes of technological interventions that are and have the prospect of solving overtourism problems in Asian cities.

Overtourism in Asian Cities: A Rising Concern

Since the 1990s, Asian tourism has emerged as the biggest growth-oriented and dynamic markets (both in terms of inbound and outbound) backed by the unprecedented growth and broadening of its horizons by expanding to new markets, and the creation of unique destinations on offer (Hall & Page, 2016). The region of Asia has

maintained its top position in terms of growth with 348 million (1/4th of worldwide) tourist arrivals in the year 2018 (UNWTO, 2019). With a threefold increase in tourist arrivals between the year 2000 and 2018, Asian tourism is showing signs of exceptional growth. Likewise, similar growth in domestic tourism has been reflected in the Asian region even though clarity in data about the extent and scale growth is still unclear (Singh, 2009). China, the biggest outbound market in the world is also exhibiting incredible growth in terms of international tourism arrivals (UNWTO, 2019). These facts stated above showcases the marvelous future of Asian tourism on all fronts.

However, all these figures have come with a cautionary note. As the number of inbound and domestic tourists rise sharply year after year, destinations (mainly cities) across the region are finding it hard to cope with the rising pressure of overtourism (South China Morning Post, 2019). The situation is much more worrisome in cities which accounts for 55% of the world population and expected to provide shelter to 2.5 billion people by the year 2051. Cities are also the hub of business development, expansion, and innovation that provide job opportunities to many people and so, the population in Asian cities like India and China are expected to grow to 68% of their total population.

Consequently, the problem of overtourism in cities has been vehemently debated many academic and practitioners' forum as a contradiction to the objectives of tourism growth causing imbalances which negatively affects urban landscapes and their social thread (Milano et al., 2019). Phi (2020) in this regard opines that even after being highly discussed, overtourism remains a 'wicked problem' thanks to the lack of clear understanding, inadequate experimentation and definition of the probable solutions. Earlier in the year 2019, World Travel & Tourism Council (WTTC) in collaboration with real estate consulting firm Jones Lang LaSalle (JLL) released a report titled "Destination 2030" that classified fifty cities into five different groups after examining their tourism "readiness". In this report, the category of 'emerging performers' listed 20 cities that are expanding greatly in terms of tourism, but also are under serious pressure due to higher tourist inflow. The majority of those cities like Bangkok, Ho Chi Minh City, Jakarta, New Delhi, and Istanbul belonged to the Asiatic region (WTTC & JLL, 2019).

Against this backdrop, Jamieson and Jamieson (2019) blame the lack of data, poor analytics, inadequate understanding of the diversity in urban areas, inability to estimate limits of growth, and the complexity of urban areas as the fundamental reasons for the rising overtourism problem in Asian cities. de la Calle-Vaquero, García-Hernández, and Mendoza de Miguel (2021) also highlight the problem of growing short-term rentals (STRs) as one of the causes for higher tourist inflow and disruptions in tourism development especially in urban areas that see the highest concentration of tourists across its various attractions. Scholars like Bouchon and Rauscher (2019) view supply sources like low-cost carrier and network hospitality (NH) as the newly introduced factors aggravating the notion of overtourism. In this connection, there are many undesired outcomes associated with overtourism that has been highlighted in the next section.

The Overriding Impacts of Overtourism on Urban Areas

The term Overtourism was first mentioned in an article in the Sydney Morning Herald (2001) that was written to highlight the problems in the management of a destination due to the disturbances caused due to increase in tourist flow. Since then, the problem of overtourism has come a long way becoming a hotly debated topic with implications spread on to economic, socio-cultural and environmental spheres of modern tourism destinations, especially in urban areas. It is a predicament that is often associated with negative outcomes like a breach of carrying capacity, disturbance, crowding, misbehavior, and conflicts between tourists and host communities at the local level (Nilsson, 2020). In the academic literature, overtourism has been majorly regarded as one of the major threats to sustainability.

In its simplest form, the issue of overtourism predominantly discoursed as an environmental challenge. However, the aspect of overcrowding does not only result in environmental problems like noise pollution, sound pollution, lack of proper disposal of the garbage but also destroys the authentic/traditional businesses and infrastructures in the scope of more business-oriented ones (Wall, 2019). A thorough analysis of the tourist movements will often point to the fact that most tourists desire to visit a destination that is more famous and often show a lack of interest to visit a destination that is not well-advertised. This results in unequal distribution of tourists among different urban destinations that results in disturbance in the flow of traffic as well as overcrowding. This also results in uneven distribution of revenue generated and pollution in the urban areas in a sense that areas with a higher concentration of tourists will eventually receive a higher amount of revenue, however will also be more affected by pollution generated from the tourist mobility and resource usage.

Terms like “carrying capacity” and “crowding” have been replaced by “overtourism” to represent the experiences of the negative impact in urban regions (Bouchon & Rauscher, 2019). The rapid and ever-growing tourist flow is threatening the ecology of many tourism destinations around the world through excessive visitations (Milano et al., 2019). One of the examples of overtourism in the Asian context is the problems connected with the beaches in Thailand as illustrated by Hess (2019). Though overcrowding is not a new concept the destinations are at tipping in a fine-scale, it is problem that has the optimum potential to decimate any destination (McKinsey & WTTC, 2017).

“Tourismphobia”, a term used to explain the negative effects of overtourism was defined by Milano (2018) as “a feeling of rejection towards tourism that manifests in the form of assaults to restaurants, businesses and yachts; attacks on tourist buses, bikes damaged in tourist spots, and other acts of vandalism”. Even though there is a great increase in the economy due to tourism, there is still the problem of tourism degrowth that one finds in more than one situation. As put by (García Hernández et al., 2019) this becomes the foundation for many social movements asking for demarketing of the destination. There is a reduction in the quality of service caused due to the local’s rejection of tourists (Żemła, 2020). This is because overtourism

destroys the social, cultural and ecological environment of the locality leading to rejection and antagonistic attitude towards the tourists by civil and local communities.

Urban overtourism also results in the identity crisis of destinations. It attacks the “multifunctionality” of an urban area (Peeters et al., 2021). Instead of using an urban area for its original purposes (such as to provide shelter and employment opportunities to local), it is beautified and shaped into the expectations of tourists (Pasquinelli & Trunfio, 2020). Another way to look at overtourism issue is to focus on the stress on any given destination (and locality) and the social problems arising out of the higher inflow of tourists visiting the destination (Jover & Díaz-Parra, 2020). This stress results in an excessively negative effect on these destinations such as the authenticity of the destination and culture that come under the threat of being influenced by these social factors leading to commercialization of the destination (Capocchi et al., 2019; Jover & Díaz-Parra, 2020). It also causes dissatisfaction among both local people and tourist experience i.e. the quality of the locality and the tourist experience both decrease over a while (Pasquinelli & Trunfio, 2020).

Technology-Driven Interventions for Overtourism Problems in Asian Cities

Though overcrowding is a major issue around the world, it has been found that many solutions can be put into action to overcome the negative impacts of overtourism. Among these solutions, technological interventions have perhaps emerged as the front-runner (Skeli & Schmid, 2019). Technology has changed the perspective of the world on tourism. While mitigating the undesirable outcomes of overtourism, technology also aids in achieving the aim of sustainable growth in tourism development (Buhalis, 2019). In the context of Asia, technology has evolved as a distinguishable force driving the economy of different Asian nations through structural inventions in different sectors (Yoon, 2019). Needless to say, Asian tourism which has continuously showcased the highest growth over the years has adopted a host of technological interventions. It is believed that technology and tourism are in the parallel growth process in Asia and hence, the role of technology in the overall tourism growth in Asia is impeccable. In this section, the technological interventions that have the prospects to solve the overtourism evils in Asia will be briefly discussed.

In all the technological advancements in tourism, perhaps the biggest intervention comes from big data analysis (Zhang, 2018). Big data includes mobile device signals (Wi-Fi, Bluetooth, network signals) *Global Positioning System (GPS)*, Social Media and Search Engines (Trip Advisor, OYO, Airbnb). Big data can be described using parameters like volume, velocity, variation, and resolution (Kitchin, 2017). This data is multifunctional i.e. it can be used to create new and sustainable marketing ideas, management of destination, predict trends among tourists and

detailed statistics (Xu et al., 2020). It also helps gather data on the tourist movements and patterns that can assist in predicting possible future patterns as well (Bauder, 2019; Xu et al., 2020). Big data is also used in Smart tourism to meet the demands of the tourist population (Li et al., 2017).

One of the ideas put forth for using big data is information and communication technologies such as Software Defined Radio (SDR), Open Street Map Data, microservices architecture and Long Range Wide Area Network (LoRaWAN) to map out tourist hotspots. This data can be used to distribute the incoming tourist flow sustainably to various tourist spots with the help of machine algorithms and simple computing of data using mobiles (Brito, 2019). GPS is a commonly used tool that is based on the principle of “radio navigation”. It provides us with real-time geo-location of a tourist that can be stored and analysed by the “GPS receiver” (Shoval & Ahas, 2018). The data gathered from this is used to understand the movement patterns and behaviour of tourists.

Collection of data using mobile signals is being used increasingly to gather data and track individuals (Xu et al., 2020). In his thesis on tourist overcrowding and the use of sensors, Silva (2019) mentions a prototype built to detect the real-time mobility of the tourist. This prototype uses signals sensors that capture the wireless signals emitted by mobiles phones such as Wi-Fi, mobile network and Bluetooth. This device can be used to detect the cluster of people in a destination at any given time by searching the number of smartphones in the given area. This device can also detect the pattern in which the tourist mostly moves. These patterns can be used to put forth alternative destination routes in the path of the crowds. This will be used to disperse the excess crowds and pressure from the hot spots. The only error of this technique is that children will be unaccounted for. People who are carrying their smartphones also become a challenge.

Social media is another important advancement in the world that can help us understand tourist’s patterns and behaviour (Freeman, 2018). An experiment was done by Karayazi, Dane, and Vries (2021) postulate the core reason of attraction and popularity in a region using geo-tagged photographs and try to replicate them in cold spots (less popular or less reviewed) to distribute the traffic equally. This is because Hot spot destinations are at risk of gathering clusters of people in them due to their popularity. This will result in the deterioration of the hot spot which could start the decline of the tourist destination. The tourist traffic focuses on finding the most reviewed destination (hot spots) rather than going to a place with fewer reviews (cold spots) (Bak et al., 2019). The crowds in the destination can be traced by using the geospatial concentration of the geo-tagged destination that the crowds have visited. Under this research, the Density-based spatial clustering of applications with noise (DBSCAN) algorithm helps describe the crowds/clusters using different parameters. One can also spread awareness about these cold spots by making changes in the existing tourist maps (Zhang, 2019). There are two reasons for this; firstly, that most people are mid-centric tourists and secondly because trust the opinion of the people who have been to these places more than that of a celebrity endorsement.

Many Asian countries have recently funded mobile tracing apps due to the COVID-19 pandemic that can be used for crowd controls in destinations. In a paper written by (Lee & Lee, 2020), we come across one such app called Trace Together which has been developed in Singapore. This tracing is done using temporary information (as well as spatial data) and sharing of personal data generation (by the tourist) through mobile phones (Xu et al., 2020). There are usually three types of signals that can be tracked in a mobile; billing data, signalling data and application data. But for the app model, signalling data are used which includes signals that ping off cell phone towers. It utilises base station phone numbers and encrypted mobile phone numbers identifiers to trace a user's location (Wang et al., 2020).

A tourism-related registration database is another method that we can collect data for overtourism (Zhang & Dong, 2021). This includes administration registrations and vehicle registration for tourists to use during their travel. Though the data might not give detailed information of overtourism of the destination, we can examine the overtourism in the locality. Administrative data includes the organisation wise energy usage, international and domestic tourist flows, employment in said organisations and revenue paid. Though this data has great scopes we find it hard to gather such data.

Smart tourism is a new trending topic in the tourism community. The trend is growing in direct relation to technological interventions and innovations (Jeong & Shin, 2020). Technological developments are rapidly improving and entering all areas of tourism. It helps improve the management of a destination and gather data for it. It increases the scope of tourism and brings in social components resulting in tourists gaining the best experience they can. Now one can travel to a distant land with just the click of a button through virtual reality. With the rapid depletion of a destination and its resources due to overtourism, virtual reality becomes the most logical answer to our problems (Bec et al., 2021). Many destinations are getting closed due to hardships in the management of the destinations. To preserve these resources virtual reality and mixed reality are encouraged. It gives these destinations a second chance to preserve their resources. VR offers the tourists great opportunities to travel to places that they usually would not/could not. With the evolution of technology, we come across significance of AR and VR and its application is on a steady growth (Wei, 2019). It is not only used for entertainment and accessibility; it can help in the management of a tourism destination as well. One can use VR to create scenarios or conditions helping in planning, marketing and awareness about a destination. That way any potential tourist can avoid physically travelling to crowded destinations and still manage to experience the destination. Technology has given tourism a chance for sustainable re-birth. Tourism is becoming technology-empowered letting each stage of it improve individually and together. Ambient Intelligence tourism is new and uses a mixture of technologies to make it more interactive and sustainable (Buhalis, 2019).

The greatest advantage associated with most of these technologies is that they are based on open-source resources which are readily available for the general public to use. Additionally, in Asia, these resources are easily available and inexpensive. The

manpower for creating these technologies are also on the rise in countries like India and China (Woetzel & Seong, 2020). Therefore, the future of tech-solutions managing the Asian overtourism problem is not far.

Conclusion

Overtourism is one of the biggest threats that Asian tourism destinations are facing in this era. Especially urban areas, that are always crowded, forget to notice the fact that the huge inflow of tourists results in the overflow of the limiters of a destination. It attacks the identity and multi-functionality of the city. Being focused mostly on the commercial or economic impacts the industry often overlooks sustainability and restrains to acknowledge the harms and threats to the sustainability aspect not only from the environmental but also from the cultural heritage aspect of the destination. This results in the host community refusing to entertain the guests and accumulating tourismphobia. Overcrowding also increases crime rates resulting in negative publicity of the destination.

In this background, technological advancements and innovations help bring out the best solutions for the overtourism problems. It helps in developing and changing the perspectives of people to a direction that can be considered best for the destination without compromising the benefits to the host community of the region. Big data growth analysis plays a major role in the improvement and accounting of crowds in destinations. It is also multi-functional data that not only helps find solutions for overcrowding and increasing sustainability but also helps in promoting alternative destinations to equalize the flow of revenue and traffic. Rerouting of tourists from “major attractions” is the biggest problem that can be solved with the help of analyzing tourist patterns and behavior. These technologies use the crowd mentality of tourists to divert their attention to the cold spots. Smart tourism is a new trend that helps us promote tourism in a region without the problem of travel and crowding.

Asia is emerging as the hub of technological innovations catapulted by the steady progression in the number of tech companies in countries like China and India along with cutting-edge technology development in Japan and South Korea. The number of graduates in the technological fields is also on the rise in the region. However, turning these potentials into reality will require mammoth investments and the willingness of the governments across the different countries in Asia. Regional cooperation and knowledge exchange will also play a key role in achieving these objectives. Beyond these challenges, this chapter encapsulates the huge potential of tech-based innovations in solving the overtourism problems in Asia.

References

- Adie, B. A., & Falk, M. (2020). Residents' perception of cultural heritage in terms of job creation and overtourism in Europe. *Tourism Economics*. <https://doi.org/10.1177/1354816620943688>
- Adie, B. A., Falk, M., & Savioli, M. (2020). Overtourism as a perceived threat to cultural heritage in Europe. *Current Issues in Tourism*, 23(14), 1737–1741.
- Bak, S., Min, C.-K., & Roh, T.-S. (2019). Impacts of UNESCO-listed tangible and intangible heritages on tourism. *Journal of Travel & Tourism Marketing*, 36(8), 917–927.
- Bauder, M. (2019). Engage! A research agenda for Big Data in tourism geography. In D. K. Müller (Ed.), *A research agenda for tourism geographies* (pp. 149–158). Edward Elgar Publishing.
- Bec, A., Moyle, B., Schaffer, V., & Timms, K. (2021). Virtual reality and mixed reality for second chance tourism. *Tourism Management*, 83, 104256.
- Benner, M. (2020). Overcoming overtourism in Europe: Towards an institutional-behavioral research agenda. *Zeitschrift für Wirtschaftsgeographie*, 64(2), 74–87.
- Bouchon, F., & Rauscher, M. (2019). Cities and tourism, a love and hate story; towards a conceptual framework for urban overtourism management. *International Journal of Tourism Cities*, 5(4), 598–619.
- Bourliataux-Lajoinie, S., Dosquet, F., & del Olmo Arriaga, J. L. (2019). The dark side of digital technology to overtourism: The case of Barcelona. *Worldwide Hospitality and Tourism Themes*, 11(5), 582–593.
- Brito, F. (2019). *A smart tourism approach to prevent overcrowding and improve destinations sustainability*. Paper presented at the Ciência 2019 – Encontro com a Ciência e Tecnologia em Portugal, Portugal. Retrieved from: <https://ciencia.iscte-iul.pt/publications/a-smart-tourism-approach-to-prevent-overcrowding-and-improve-destinations-sustainability/60921>. Accessed 2 June 2021.
- Buhalis, D. (2019). Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: A perspective article. *Tourism Review*, 75(1), 267–272.
- Camatti, N., Bertocchi, D., Carić, H., & van der Borg, J. (2020). A digital response system to mitigate overtourism. The case of Dubrovnik. *Journal of Travel & Tourism Marketing*, 37(8–9), 887–901.
- Capocchi, A., Vallone, C., Pierotti, M., & Amaduzzi, A. (2019). Overtourism: A literature review to assess implications and future perspectives. *Sustainability*, 11(12), 3303.
- de la Calle-Vaquero, M., García-Hernández, M., & Mendoza de Miguel, S. J. S. (2021). Urban planning regulations for tourism in the context of overtourism. *Applications in Historic Centres*, 13(1), 70.
- Dixit, S. K., & Abraham, A. (2020). Tourism in cities: Asian perspectives. In S. K. Dixit (Ed.), *Tourism in Asian cities* (pp. 11–31). Routledge.
- Freeman, C. G. (2018). The implications of online connectivity for world heritage in a digital platform society. *Historic Environment*, 30(3), 84–95.
- García Hernández, M., Ivars-Baidal, J., & Mendoza de Miguel, S. (2019). Overtourism in urban destinations: The myth of smart solutions. *Boletín de la Asociación de Geógrafos Españoles*, 83, 1–38.
- Gowreesunkar, V., & Seraphin, H. (2019). Introduction: What smart and sustainable strategies could be used to reduce the impact of overtourism? *Worldwide Hospitality and Tourism Themes*, 11(5), 484–491.
- Hall, C. M., & Page, S. J. (2016). Tourism in Asia: Region and context. In C. M. Hall & S. J. Page (Eds.), *The Routledge handbook of tourism in Asia* (pp. 3–25). Taylor & Francis.
- Hess, J. S. (2019). Thailand: Too popular for its own good. In R. Dodds & R. Butler (Eds.), *Overtourism* (pp. 111–124). De Gruyter Oldenbourg.
- Ivars-Baidal, J., García Hernández, M., & Mendoza de Miguel, S. (2019). Integrating overtourism in the smart tourism cities agenda. *e-Review of Tourism Research (eRTR)*, 17(2), 122–139.

- Jamieson, W., & Jamieson, M. (2019). Overtourism management competencies in Asian urban heritage areas. *International Journal of Tourism Cities*, 5(4), 581–597.
- Jeong, M., & Shin, H. H. (2020). Tourists' experiences with smart tourism technology at smart destinations and their behavior intentions. *Journal of Travel Research*, 59(8), 1464–1477.
- Jover, J., & Díaz-Parra, I. (2020). Who is the city for? Overtourism, lifestyle migration and social sustainability. *Tourism Geographies*, 1–24.
- Karayazi, S. S., Dane, G., & Vries, B. d. (2021). Utilizing urban geospatial data to understand heritage attractiveness in Amsterdam. *ISPRS International Journal of Geo-Information*, 10(4), 198.
- Kitchin, R. (2017). Big data—Hype or revolution. In L. Sloan & A. Quan-Haase (Eds.), *The Sage handbook of social media research methods* (pp. 27–39). Sage.
- Lee, T., & Lee, H. (2020). Tracing surveillance and auto-regulation in Singapore: 'Smart' responses to COVID-19. *Media International Australia*, 177(1), 47–60.
- Li, Y., Hu, C., Huang, C., & Duan, L. (2017). The concept of smart tourism in the context of tourism information services. *Tourism Management*, 58, 293–300.
- McKinsey & WTTC. (2017). *Coping with success: Managing overcrowding in tourism destinations*. Retrieved from: <https://www.mckinsey.com/~media/mckinsey/industries/travel%20logistics%20and%20infrastructure/our%20insights/coping%20with%20success%20managing%20overcrowding%20in%20tourism%20destinations/coping-with-success-managing-overcrowding-in-tourism-destinations.pdf>. Accessed 2 June 2021.
- Milano, C. (2018). Overtourism, social unrest and tourismphobia. A controversial debate. *PASOS: Revista de Turismo y Patrimonio Cultural*, 16(3), 551–564.
- Milano, C., Novelli, M., & Cheer, J. M. (2019). Overtourism and tourismphobia: A journey through four decades of tourism development, planning and local concerns. *Tourism Planning & Development*, 16(4), 353–357.
- Nilsson, J. H. (2020). Conceptualizing and contextualizing overtourism: The dynamics of accelerating urban tourism. *International Journal of Tourism Cities*, 6(4), 657–671.
- Pasquinelli, C., & Trunfio, M. (2020). Reframing urban overtourism through the Smart-City Lens. *Cities*, 102, 102729.
- Peeters, P., Gössling, S., Klijs, J., Milano, C., Novelli, M., Dijkmans, C., Eijgelaar, E., Hartman, S., Heslinga, J., Isaac, R., Mitas, O., Moretti, S., Nawijn, J., Papp, B., & Postma, A. (2021). *Research for TRAN committee-overtourism: Impact and possible policy responses*. Retrieved from: https://researchdata.brighton.ac.uk/id/eprint/1491/IPOL_STU%282018%29629184_EN.pdf. Accessed 1 June 2021.
- Phi, G. T. (2020). Framing overtourism: A critical news media analysis. *Current Issues in Tourism*, 23(17), 2093–2097.
- Shoval, N., & Ahas, R. (2018). The potential of tracking technologies, smartphones and sensors for tourism management and planning of destinations. In C. Cooper, S. Volo, W. C. Gartner, & N. Scot (Eds.), *Applications of theories and concepts to tourism* (pp. 433–442). Sage.
- Silva, R. D. D. (2019). *A tourism overcrowding sensor using multiple radio techniques detection*. Master's dissertation. Iscte – Instituto Universitário de Lisboa, Lisbon.
- Singh, S. (2009). *Domestic tourism in Asia: Diversity and divergence*. Earthscan.
- Skeli, S., & Schmid, M. (2019). *Mitigating overtourism with the help of smart technology solutions – A situation analysis of European city destinations*. Paper presented at the ISCONTOUR 2019 tourism research perspectives: Proceedings of the international student conference in tourism research.
- South China Morning Post. (2019). Overtourism: 20 cities that could be the next to suffer – Will they cope with rise in visitors, or struggle? *South China Morning Post*. Retrieved from <https://www.scmp.com/lifestyle/travel-leisure/article/3015505/overtourism-20-cities-could-be-next-suffer-will-they-cope>. Accessed 1 June 2021.
- UNWTO. (2018). 'Overtourism'? – Understanding and managing urban tourism growth beyond perceptions. Retrieved from: <https://www.e-unwto.org/doi/epdf/10.18111/9789284420070>. Accessed 1 June 2021, p. 4.

- UNWTO. (2019). *Asia tourism trends*. Retrieved from: <https://www.aquae-officiel.fr/wp-content/uploads/2017/11/OMT-Asia-tourism-trends-2019.pdf>. Accessed 1 June 2021.
- Wall, G. (2019). Perspectives on the environment and overtourism. In R. Dodds & R. Butler (Eds.), *Overtourism* (pp. 25–45). De Gruyter Oldenbourg.
- Wang, M., Wang, J., & Song, Y. (2020). *A map matching method for restoring movement routes with cellular signaling data*. Paper presented at the 2020 the 8th international conference on information technology: IoT and smart city.
- Wei, W. (2019). Research progress on virtual reality (VR) and augmented reality (AR) in tourism and hospitality: A critical review of publications from 2000 to 2018. *Journal of Hospitality and Tourism Technology*, 10(4), 539–570.
- Woetzel, J., & Seong, J. (2020, December 24). What is driving Asia's technological rise? *The Japan Times*. Retrieved from: <https://www.japantimes.co.jp/opinion/2020/12/24/commentary/world-commentary/asia-technological-rise/>. Accessed 1 June 2021.
- WTTC & JLL. (2019). *Destination 2030*. Retrieved from: <https://www.wttc.org/publications/2019/destination-2030>. Accessed 1 June 2021.
- Xu, F., Nash, N., & Whitmarsh, L. (2020). Big data or small data? A methodological review of sustainable tourism. *Journal of Sustainable Tourism*, 28(2), 144–163.
- Yoon, D. (2019). R&D innovation strategy for international cooperation of science and technology in Asia. In P. O. D. Pablos (Ed.), *Dynamic perspectives on globalization and sustainable business in Asia* (pp. 1–10). IGI Global.
- Żemła, M. (2020). Reasons and consequences of overtourism in contemporary cities – Knowledge gaps and future research. *Sustainability*, 12(5), 1729.
- Zhang, J. (2018). Big data and tourism geographies – An emerging paradigm for future study? *Tourism Geographies*, 20(5), 899–904.
- Zhang, J., & Dong, L. (2021). Image monitoring and management of hot tourism destination based on data mining technology in big data environment. *Microprocessors and Microsystems*, 80, 103515.
- Zhang, M. (2019). *Use density-based spatial clustering of applications with noise (DBSCAN) algorithm to identify galaxy cluster members*. Retrieved from: <https://iopscience.iop.org/article/10.1088/1755-1315/252/4/042033/pdf>. Accessed 1 June 2021.

Chapter 25

Smart Tourism: Foundations, Developments and Management in Asia



Muhammad Jawad and Munazza Naz

Abstract Smart tourism is a new term that describes how tourist destinations, businesses, and tourists are becoming more reliant on new types of Information and Communications Technology (ICT) that enables enormous volumes of data to be converted into value offers. It's theoretical advancement, on the other hand, is impeded by its lack of definition as a concept. The chapter introduces smart tourism, examines recent developments in the sector, and then sets out the technological and industrial underpinnings for the industry. Following that, there will be a brief discussion of the advantages and disadvantages of smart tourism. The chapter also highlights the essential role of research in driving the development and administration of smart tourism.

Keywords Smart tourism · Technology · Foundation · Development · Management · Asia

Introduction

Sensors, big data, open data, new types of associations, majority of the data offering (e.g., Internet of Things or IoT, RFID, and NFC), the ability to construe furthermore reasons can bring technical, economic, and societal headway. Smartness, as stated by Höjer and Wangel (2015), may be characterized as the ability to link, synchronize, and coordinate the utilization of advances as opposed to distinct innovative unrest accomplishments. Harrison et al. (2010) depicts smart as an illustration for utilizing operational, near-real-time real-world data, coordinating. Also, trading data, applying complex analytics, modeling, optimization, and visualization can aggravate preferred operational choices. Deliberations can also utilize current engineering to enhance asset efficiency, powerful and reasonable government, and

M. Jawad (✉) · M. Naz
Fatima Jinnah Women University, Rawalpindi, Pakistan
e-mail: muhammad.jawad@fjwu.edu.pk

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_25

sustainability. Urban areas are termed as “smart urban communities” that hail physical infrastructure to look into physical, digital, innovative reconciliation (smart house, advanced mobile factory). When connected with technology, multi-functionality as a secondary level of association (smartphone, advanced mobile card, smart TV, and so forth) can be observed and stocked to arrange and enhance all instrumentations. It alludes engineering that urges new sorts of coordinated efforts, esteemed creation for business sectors, better economies for bringing expanded innovation, entrepreneurship, and intensity (smart economy). There have been noteworthy attempts, especially in Asia, to push those smart tourism organization securities. The administrations of China and South Korea considerably contribute in fortifying those specialized foundations that permit advanced mobile tourism (Hwang et al., 2015). A number advanced mobile tourism activities have risen in Europe similarly as an after effect from claiming smart city efforts. Furthermore, advanced mobile visitor destinations quickly got acceptance in the European tourism scenes. However, countries in Europe have advanced mobile end-user applications that energize richer tourism encounters (Lamsfus et al., 2015; Boes et al., 2015a, b).

Smart governance and, on particular, open data, need aid those stress for Australia. Advanced mobile advances would regularly have perceived as hosting revolutionary potential, not recently as far as economics, as well as social and experiential measurements. For truth, “smart” need devolved under a shapeless phrase that is routinely used to Push political objectives Furthermore offer specialized foul results. This is especially genuine inconsistency on account for “smart tourism”, which is every now and again utilized within conjunction with open information activities alternately for apparently insignificant tasks for example, such that pushing free Wi-Fi alternately handling portable applications. These technologies, and also novel information collection, administration, also offering techniques, would vital to begin with steps to smart tourism implementation, yet all the they don’t disguise those whole range about advanced mobile tourism. There may be also an absence of definitional clarity: All that gives the idea should be delightful the greater part of a sudden. Furthermore, In the case of smart tourism, many government and industry-led initiatives lag behind theory. Academic research has primarily concentrated on case studies (e.g., Boes et al., 2015a, b; Bakıcı et al., 2013; Wang et al., 2013) or evaluating specific technical advancements rather than providing theoretical foundations for their advancement and/or critique (e.g., Huang & Chen 2015; Boes et al., 2015a, b). As a result, the goal of this research is to offer data on our current understanding of what smart tourism is and is not. It also lays out the research standards that must be met in order to steer smart tourism’s future progress.

Smart Tourism

The travel industry is “a social, social, and financial marvel affecting individuals’ movement to countries or areas past their ordinary environmental factors for individual or business/proficient purposes”, as indicated by the United Nations World

Tourism Organization (UNWTO). It is anything but amazing to hear “smart” applied to vacationer marvels, given the travel industry’s high data thickness and extensive reliance on data and correspondence innovation (ICTs) (Law et al., 2014; Koo et al., 2015; Werthner & Klein 1999; Benckendorff et al., 2014). Smart the travel industry is a characteristic movement from conventional the travel industry and, all the more as of late, travel industry from various perspectives, in light of the fact that early selection of data and correspondence advances in the travel industry, like worldwide appropriation and focal resale, prepared for industry and buyer development and mechanical direction (Buhalis, 2003; Werthner & Ricci, 2004). The broad utilization of web-based media (Sigala et al., 2012) and a propensity toward executing versatile the travel industry in acknowledgment of the gigantic portability of traveler data and the travel industry clients are energizing this developing pattern (Buhalis & Law, 2008; Wang et al., 2012). Smart the travel industry, then again, addresses a critical advance forward in the development of ICT in the travel industry since it digitalizes the physical and administration parts of the travel industry, accomplishes new degrees of knowledge in the travel industry frameworks (Gretzel, 2011), modifies the business’ texture again, and adjusts the manners by which the travel industry encounters are made, traded, devoured, and shared.

Smart Destinations, on the one hand, are specific smart city situations in which smart city principles are applied to urban or rural regions with visitors in mind in order to improve mobility, resource availability and allocation, sustainability, and quality of life/visits. The smart tourist destination is defined by Lopez de Avila (2015, n.d.) as follows: “An innovative tourist destination built on state-of-the-art technology infrastructure that ensures the sustainable development of tourist areas, accessible to all, that facilitates the visitor’s interaction with and integration into his or her surroundings, improves the quality of the destination’s experience, and improves the quality of life of its residents”.

Smart destinations rely heavily on the integration of ICTs with physical infrastructure. Interactive bus shelters in Barcelona, for example, provide not just tourist information and bus arrival timetables, but also USB ports for charging mobile devices. It also offers bicycles around the city and lets users track their location using a smartphone app, encouraging environmentally friendly commuting (<http://smartcity.bcn.cat/en/bicing.html>). Brisbane has installed over 100 beacons (<http://goo.gl/QidSOC>) that send information via a smartphone app whenever tourists are within a certain radius of a tourist destination. Sensors for crowd control are being tested in the Amsterdam Arena (<http://amsterdamsmartcity.com/>). In Amsterdam, beacons are utilized to allow for the translation of tourist signage into a variety of languages. Seoul invests heavily in providing free Wi-Fi and smart phones to visitors (<http://www.visitseoul.net>), Jeju Island in South Korea recently declared itself a smart tourism hub that will use new technology to distribute content to visitors (<https://youtu.be/d3C7vS-IbAY>), and Taiwan’s Sunmoon Lake tourist bus shuttles provide location-based information. Many of these programs, it is worth noting, are part of larger, coordinated efforts and strategic investments targeted at fostering innovation, quality of life, and sustainability in specific places by leveraging data to enhance physical infrastructure.

As well as coordinating an objective segment, smart the travel industry is a social marvel that creates from the combination of ICTs with the travel industry experience (Hunter et al., 2015). The part on brilliant encounters takes a gander at how personalization, setting mindfulness, and continuous observing may help improve innovation intervened the travel industry encounters (Buhalis & Amaranggana, 2015). Neuhofer et al., (2015) distinguish data total, pervasive systems administration, and constant synchronization as significant drivers of smart guest encounters. The canny guest experience is utilitarian just as charming. Travelers have a significant part in the city's turn of events. They do not simply devour information; they effectively make, comment on, or improve it (for instance, by submitting photographs to Instagram with objective related hashtags or supporting in the planning of bathrooms at places – <http://www.nyrestroom.com/>). To amplify their encounters, brilliant voyagers and their computerized selves (or information bodies) use cell phones to get to data frameworks gave nearby or distantly.

The third component, advanced mobile Business, alludes of the intricate business biological community that empowers those stream about touristic assets and the co-creation of the tourism experience. As stated by Buhalis and Amaranggana (2014), the business part from advanced mobile tourism will be characterized toward rapidly networked stakeholders, digitalization from claiming incredulous benefits of the business activities. Legislatures have developed additional transparent and technology-focused as base of more information providers, heading over phenomenal sums of public-private participation in this advanced mobile business part. As stated by smart tourism, shoppers might generate What's more give acceptable value, and also screen and Along these lines undertake benefits of the business or governance obligations.

The three segments of smart the travel industry are covered by three layers: a smart data layer that gathers information, a brilliant trade layer that grants association, and a smart handling layer that astutely dissects, pictures, coordinates, and uses information (Tu & Liu, 2014). The travel industry that is upheld by an objective's incorporated endeavors to gather and total/outfit information got from actual framework, social associations, government/authoritative sources, and human bodies/minds, just as the utilization of trend setting innovations to change that information into on location encounters and business offers, is known as smart the travel industry.

Technological Advancement and Smart Tourism

The progress of information and communication technology is closely connected to the emergence of smart tourism. While academics and practitioners are unfamiliar with the notion of smart tourism, ICT with the ability to intelligently enhance tourism has long been discussed, produced, and envisioned (Gretzel, 2011). Understanding, learning from experience, collecting and keeping information, and reacting swiftly and efficiently to new situations are all aims of smart ICT (Rudas &

Fodor, 2008). This kind of innovation is basic in a brilliant the travel industry climate since it vows to give vacationers and specialist organizations with more applicable data, better choice help, more noteworthy portability, and, eventually, more agreeable traveler encounters (Gretzel, 2011; Werthner, 2003; Sigala & Chalkiti, 2014). Choice emotionally supportive networks and later recommender frameworks, setting mindful frameworks, independent specialists investigating and mining Web sources, surrounding knowledge, and frameworks that form expanded universes are among the smart advancements that effectively help guests (Fesenmaier et al., 2006; Lamsfus et al., 2014; Venturini & Ricci, 2006).

These frameworks are proposed to help explorers by: (1) expecting client needs dependent on an assortment of components and making suggestions for setting explicit utilization exercises like focal points, feasting, and entertainment; and (2) improving voyagers on location encounters by giving rich data and area based administrations. The expected commitments of smart frameworks to handle computerization, proficiency enhancements, new item advancement, request anticipating, emergency the board, and worth co-creation are drawing in industry interest (Werthner, 2003; Wöber, 2003; Sigala, 2012a, b; Yoo et al., 2015). Notwithstanding the way that these frameworks are heterogeneous, appropriated, and now and then divided, the overall objective of their advancement ought to be open, adaptable, and helpful, giving total self-sufficiency to industry members while additionally supporting the whole traveler experience and all business stages (Staab & Werthner, 2002). In smart the travel industry, innovation is seen as framework as opposed to singular data frameworks, and it is anything but a scope of smart registering advances that coordinate equipment, programming, and organization advances to give ongoing attention to this present reality and progressed investigation to help individuals in settling on better choices about other options, just as activities that will upgrade the travel industry experience (Washburn et al., 2010). Cell phones, specifically, with their plenty of utilizations, have introduced another period of unmatched availability and Internet access (Wang & Xiang, 2012). Thus, an assortment of innovative headways that empower versatile access, like Cloud Computing and End-User Internet Service Systems, are essential to achieving brilliant the travel industry objectives.

Connecting the physical and digital worlds is a major issue in the development of smart tourism. The rising popularity of iBeacon technology in the tourist industry is a first step in this direction, since it allows smart phones to respond to signals from the real world, allowing enabling ambient context recognition (see www.ibeaconinsider.com for an elaboration). However, attaining the IoT, which comprises of interconnected physical and digital infrastructures, will be crucial in the long term for reaching the desired pervasive, “smart” technological environment. Despite the fact that it is currently largely a concept, the IoT has the potential to swiftly become a new reality as a technical infrastructure (Atzori et al., 2010). It is thought to be a fundamental foundation for the services that smart tourism towns will provide (Guo et al., 2014; Perera et al., 2014). The IoT is the ubiquitous presence of a variety of things around us, such as RFID tags, sensors, actuators, mobile devices, and other commodities, that may connect and collaborate to achieve common goals.

These gadgets are connected through the Internet, which overcomes any barrier between the physical and advanced universes. Accordingly, the IoT empowers the improvement of an assortment of stages equipped for sending an assortment of information types by means of participative detecting frameworks (Gutiérrez et al., 2013). Critically, the IoT will introduce a change in assistance conveyance, moving away from the current vision of consistently on administrations, which is normal for the Web period, and toward consistently responsive arranged administrations, which are constructed and formed at run-time to react to a particular need while considering the client's specific situation. Accordingly, the Internet ought to accomplish its hotly anticipated objective of turning into a consistent lattice of customary organizations and arranged things that can be perceived, found, observed, and controlled whenever and from any area not long from now. Substance and administrations will be accessible consistently, permitting new applications and techniques for working, connecting with, engaging, and living to arise (Miorandi et al., 2012).

IoT-driven technologies have far-reaching consequences for tourism growth since travel necessitates mobility across time and space. This "smart" environment will gain the ability to recognize and satisfy the traveler's contextual expectations in a ubiquitous yet non-intrusive manner. In order to deliver location-based services, tourism service providers will be able to track visitors' movements and consumption patterns using sensors installed at tourist sites, for example. Smart watches, for example, are crucial in this respect since they not only gather data through sensors and cameras, but also interact with the network and perhaps the Internet of Things, allowing for high levels of connection without interfering with the user's experience. This sort of technology, which uses a variety of sensors to create a baseline based on each site's carrying capacity, might be used at the management level to limit visitor numbers in certain tourism areas.

Smart gadgets in the climate may send signs to loved ones naturally, advising them regarding what we are doing or have done before, for example, going starting with one region then onto the next or meeting up with comparable contacts. We may think about the IoT from a social point of view as a stage that accumulates and transfers information about "occasions" of individuals and areas to offer data about visits to long range interpersonal communication destinations. Accordingly, smart the travel industry's mechanical part is multi-layered, incorporating omnipresent foundation, more versatile and setting mindful data frameworks, and progressively intricate and dynamic availability that empowers continuous communications with one's actual climate, yet in addition with the local area and society everywhere, which are all straightforwardly or in a roundabout way identified with the media communications industry. Smart the travel industry, obviously, requires the capacity to gather gigantic measures of information, store it, measure it, incorporate it, dissect it, and use it to impact business advancement, activities, and administrations. Numerous advancements assist huge information with creating, and they're regularly referenced with regards to brilliant the travel industry. Other information areas, then again, are seeing a great deal of advancement, with a definitive objective of separating data from tremendous measures of information, which is by and large what is the issue here.

Business and Smart Tourism

The travel industry organizations can utilize ICT apparatuses and applications to (hyper)- robotize, illuminate, and change business capacities and cycles like show-casing, acquirement/inventory network the board, human asset the executives, and client support and the board to become “more brilliant” about how to improve their exhibition and seriousness (Sigala & Marinidis, 2012). The commercial impact of ICT, on the other hand, is not confined to functional consequences. In the tourist sector, information and communication technology (ICT) plays a crucial role in driving institutional and structural market changes. Traditional tourist businesses must rethink their business strategy and how they aim to offer value to customers if they are to survive. According to various definitions, a business model is “the design or architecture of the value generation, delivery, and capture processes” (Teece, 2010, p. 191). Businesses experiment with unique business strategies in order to expand into new markets (Callon & Muniesa, 2005; MacKenzie & Millo, 2003; Pollock & Williams, 2009; Inversini & Masiero, 2014; Storbacka & Nenonen, 2011). Smart tourism, according to Sigala (2015), entails modifying all or some of the five market components listed above: the trade item, market players, market structure, market institutions, and market behaviors.

As indicated by Morabito (2015), working in a major information driven, smart climate essentially affects each of the nine parts of plans of action: Take the accompanying into thought: (1) buyer gatherings, (2) incentives, (3) channels, (4) client associations, (5) revenue sources, (6) indispensable assets, (7) fundamental exercises, (8) key unions, and (9) cost structure. Associations should consolidate the client’s worth creation, the entertainer’s profit thinking, the entertainer’s worth organization, the entertainer’s assets and abilities, and the entertainer’s essential choices while introducing a plan of action (Nenonen & Storbacka, 2010). Genuine smart vacationer business ideas, then again, still cannot seem to arise. In spite of critical government financing, most of smart the travel industry drives are as yet in the arranging stages. While inventive administration models for public administrations in smart urban areas have been proposed in the writing (Anttiroiko et al., 2014), there has been no hypothetical improvement of smart traveler plans of action. Morabito (2015) even recommends that smart the travel industry may require a change by the way we consider plans of action and their essential importance.

Hypothetical underpinnings for the executives moves toward that organizations can use to distinguish, address, and adventure the chances, difficulties, and affordances of smart the travel industry, just as re-characterize their plans of action and look after intensity, can be found in open development, administration predominant rationale (SDL), and administration science writing (Schmidt-Rauch and Schwabe (2014). Open innovation is based on the notion that in order to succeed, a firm must interact with others rather than relying only on its own resources (Dahlander & Gann, 2010; West & Gallagher, 2006). To do so, tourism firms must collaborate with outside partners to identify and share resources for value co-creation.

As per administration science and SDL, esteem co-creation occurs inside bigger help biological systems (Anttiroiko et al., 2014). Regardless of the idea that a practical assistance environment is an essential condition for working with client experience co-creation (Vargo & Lusch, 2014), little is thought about how associations can make and keep up such biological systems. Vargo et al., (2008) and Spohrer et al., (2007) characterize an assistance environment as an unexpectedly seeing and reacting spatial and worldly design of for the most part inexactly associated esteem giving social and monetary entertainers connecting with through establishments and innovation to: (1) work together on help offers; and (2) share administration offers and assets. (3) Work together to make esteem. This lines up with Buhalis and Amaranggana's (2014) idea of progressively organized brilliant the travel industry partners, just as Van Heck and Vervest's (2007) depiction of smart business networks as "fitting and play" situations for catching eminent esteem creation prospects. Organizations may make such powerful associations attributable to online media and web stages that permit them to interface with others and effectively exchange assets. Schmidt-Rauch and Schwabe (2014) stress the significance of portable innovation in the brilliant the travel industry environment, saying that it considers collaboration and a common portrayal of the arrangement space in the field. Major parts in the brilliant the travel industry environment approach material or immaterial assets (e.g., instruments, programming, and data); HR (e.g., abilities, information, and virtual networks); and social assets (e.g., connections) (e.g., relations to accomplices and providers, and organization participation).

In a smart administration biological system, every partner is a player that needs to cooperate with and trade assets with different players to co-make esteem. Travelers, companies, and mediators have been credited names and obligations that are not, at this point adequate in this climate (Vargo & Lusch, 2008). In a smart the travel industry biological system, anyone may turn into a maker, shopper, middle person, or other capacity dependent on assets and connections as opposed to pre-characterized jobs (Gretzel, Sigala, et al., 2015). This incorporates re-examining maker customer connections and setting up new sorts of cooperation in help creation, conveyance, and utilization (Anttiroiko et al., 2014). By contemplating the different partners, such assets moved, and the types of significant worth co-made from these communications, Yoo et al. (2015) stressed TripAdvisor's strategies and strategies for fostering its administration environment. This article stresses on the need of the travel industry firms receiving open data frameworks and plans of action since they permit them to deal with their smart the travel industry biological systems in a unique way and advance "stopping and playing" partners dependent on the assets that should be moved. Members in open business environments can co-make "esteem in-setting" by getting to, blending and coordinating, exchanging, changing, and incorporating assets in an assortment of ways, contingent upon the burning-through situation.

Customers provide the majority of the big data that underlies smart tourism, either directly (through social media) or indirectly (via surveys) (through sensors on mobile or wearable devices). Customers are willing to share data, which is the fundamental basis of smart tourism. Smart tourism firms rely on a plethora of free

information and open technical platforms to transform value offers. Simultaneously, smart tourist information infrastructure may produce new information imbalances that may be economically exploited (Tachizawa et al., 2015). Controlling information sources and flows is unquestionably important to smart tourism's economic success. It is also worth noting that, rather than owning real estate, wealth is increasingly being produced by having access to infrastructure or data. Businesses interested in working in smart tourist settings should consider "value-in-use," which refers to making money by utilizing data, technology, and infrastructure rather than by owning them and going beyond individual transactions (Bick et al., 2012).

Smart service ecosystems, according to Anttiroiko et al. (2014), necessitate new alliances to share risk, circulate knowledge, extend or reformulate value chains/networks, and create a competitive environment in which cost-effective and innovative service (re)configuration is under intense pressure, as well as creating a competitive environment in which cost-effective and innovative service (re)configuration is under intense pressure. Tachizawa et al. (2015) investigate the impact of smart cities on corporate network architectures and governance processes, concluding that the ensuing smart ecosystems are complicated, have high transaction costs, and informal governance will most certainly reign supreme. According to Anttiroiko et al. (2014), the required creative mutuality and collaboration in these systems is more challenging to govern than traditional competitive rivalry. On the other side, increased network complexity may reveal fundamental flaws that enterprises may exploit. In order to build solid foundations for the creation of smart tourism firms, these assumptions must be further explored and validated.

Discussion and Implications

Smart tourism research is limited, with much of it consisting of case studies of current programs. It also has a cheerful, uncritical tone to it, concentrating mostly on the consumer's perspective. The discussion that follows focuses on a few important research areas that must be addressed in order to meet smart tourism goals.

Many brilliant travel industry drives are to a great extent, dependent on information. Therefore, security is a conspicuous issue with regards to the smart travel industry. Sightseers might be executed by area based administrations that they discover truly convenient. In view of the transient idea of cooperation with providers and, accordingly, their applications/benefits, the vacationer business' ability to set up trust is restricted. Due of the tremendous requirement for data, guests might be effortlessly persuaded to surrender their protection (Anuar & Gretzel, 2011). A smart tourist's computerized impression is enormous, regardless of whether an extended get-away or on business, and there are various choices for mining the advanced follows left behind. The alleged "sensor society" (Andrejevic & Burdon, 2015), which is characterized by pervasive, consistently on information gathering, is quickly adding to and profiting brilliant the travel industry. Concerns have been communicated in regards to people being distinguished from tremendous measures

of supposedly mysterious information, programmed information gathering for no evident reason, and observation masked as administration arrangement. Smart travel industry, as indicated by Tallon (2013), presents significant difficulties as far as data administration and surveying the worth of information. As per expansive understanding, all data is very significant to organizations, and reasonable voyagers needing improved travel encounters would readily give it. Information is gathered in a discretionary way, with no thought for capacity, recovery, or data the executives' costs.

While governments have been forced to evaluate what data they have and how it may be used as a result of the adoption of smart city concepts, businesses have not necessarily gone to the same lengths. As a result, information governance and privacy are significant study topics in smart tourism, with specific problems in assessing the value of data and ensuring safety and security in very open and ubiquitous info-structures.

The inordinate dependence on innovation is another aspect of brilliant the travel industry that is quickly being tended to. This has critical ramifications as far as growing the advanced hole for individuals without cell phones and regions that cannot stand to put resources into smart traveler data foundation (Minghetti & Buhalis, 2010). The issue is not just one of cost or availability: current wristwatch deals patterns show that clients are just hesitantly accepting this wearable innovation (Forbes, 2015). At the point when this ICT reliance is researched further, it shows different issues, for example, data over-burden, an absence of good fortune, which is habitually essential for interesting vacationer collaborations, and a developing craving to disengage from innovation while holiday (Gretzel, 2010). While study has been done on how innovation may improve the travel industry encounters, less has been done on the conceivable unfortunate results of exorbitant intervention. There is unmistakably a requirement for more investigation into the mental and wellbeing dangers of being continually barraged with information by setting mindful frameworks, just as customer perspectives toward different parts of smart the travel industry, for example, their eagerness to co-make and appreciate such cycles, and the real components of "significant worth being used".

To harness the potential of vast data for translation into smart tourist services, human and artificial intelligence are necessary, which stresses the problem of human and artificial intelligence. The tourist industry has had difficulty attracting a big number of educated employees. Despite its significant reliance on ICT, it is also known for its lack of innovation (Hjalager, 2002). In the subject of smart tourism, human resource problems are rarely addressed. Smart tourism also paints an image of a utopian future in which many players work in harmony and a self-regulating ecosystem produces long-term value. Furthermore, as previously said, it is unclear whether or not business models can be used in this situation. More organizational and management research, as well as a conceptual and empirical study on smart tourist economics, are needed as a result.

Notwithstanding these reservations, the smart travel industry is a promising situation that will bring about more helpful, protected, energizing, and feasible living spaces for inhabitants and guests the same, more customized and consequently

more significant the travel industry encounters, and surprisingly more freedoms for new administrations, plans of action, and markets to arise because of more adaptable constructions and points of view. Werthner et al. (2015) stress on laying out of numerous levels at which the travel industry and ICT-related examination should make a significant commitment. The smart travel industry should address various holes, going from human-PC interface issues to social elements, market structures, and modern worth chains to affecting approach and administration, to fundamentally advise smart the travel industry drives. To examine the new worth creation potential introduced by the travel industry and change them into viable ICTs, further plan science research is required. A significant number of the mainstays of the arising smart vacationer economy, like Uber or Airbnb, are essential specialized stages that misuse a particular market specialty utilizing current innovation.

These technology-market combinations must be carefully explored and mapped in order to allow for innovative activities. To effectively exploit the various data layers, it is clear that advances in semantic technology and artificial intelligence would be necessary. Given the significance of sustainability, the true costs of smart tourism (such as energy consumption, e-waste, and so on) must be examined. Finally, there have been no studies done to see if educated visitors had a better time.

Conclusion

The purpose of this research was to provide definitional clarity and an explanation of the fundamental assumptions that support the concept of smart tourism. Smart destinations, smart business ecosystems, and smart experiences were identified as the three primary components, which were supported by layers of data generation, processing, and sharing. Smart tourism differs from traditional eTourism not just in terms of technology used, but also in terms of the strategies used to improve at-destination experiences. The study concentrated on the solid practical and theoretical underpinnings of smart city-related conceptualizations, as well as the following focus on public service models, rather than a thorough and systematic analysis of the commercial potential and implications. It also discovered a scarcity of critical literature challenging smart tourism's viability and beneficial experiential, economic, and social consequences. The post provided an incomplete study plan with the objective of exposing the most often ignored gaps in our understanding of the possible advantages and downsides of smart tourism. Tourism development that is smart is already underway. It is a logical result of the tourist industry's increased embrace of technology in many ways. The systematic and widespread organization, sharing, and use of tourist data for value creation, on the other hand, is still in its infancy. Smart tourism ecosystems are tested all over the world (Gretzel, Werthner, et al., 2015). However, due to the industry's complexity, advancing beyond relatively limited platform, technology, or service-specific advances is extremely difficult. Nonetheless, there is a strong technical push toward smart tourism, and many of these smart technologies will very certainly be tried in the tourism sector.

References

- Andrejevic, M., & Burdon, M. (2015). Defining the sensor society. *Television and New Media*, 16(1), 19–36.
- Anttiroiko, A. V., Valkama, P., & Bailey, S. J. (2014). Smart cities in the new service economy: Building platforms for smart services. *AI and Society*, 29(3), 323–334.
- Anuar, F. I., & Gretzel, U. (2011). *Privacy concerns in the context of location based services for tourism*. Retrieved from <https://agriflifecdn.tamu.edu/ertr/files/2013/02/13.pdf>. Accessed 10 June 2021.
- Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. *Computer Networks*, 54(15), 2787–2805.
- Bakıcı, T., Almirall, E., & Wareham, J. (2013). A smart city initiative: The case of Barcelona. *Journal of the Knowledge Economy*, 4(2), 135–148.
- Benckendorff, P., Sheldon, P., & Fesenmaier, D. R. (2014). *Tourism information technology*. CAB International.
- Bick, M., Bruns, K., Sievert, J., & Jacob, F. (2012). Value-in-use of mobile technologies. In A. Back, M. Bick, M. Breunig, K. Pousttchi, & F. Thiesse (Eds.), *MMS 2012* (pp. 56–67). Köllen Druck & Verlag.
- Boes, K., Borde, L., & Egger, R. (2015a). The acceptance of NFC smart posters in tourism. In I. Tussyadiah and A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 435–448). Springer.
- Boes, K., Buhalis, D., & Inversini, A. (2015b). Conceptualising smart tourism destination dimensions. In I. Tussyadiah and A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 391–403). Springer.
- Buhalis, D. (2003). *eTourism: Information technology for strategic tourism management*. Financial Times/Prentice Hall.
- Buhalis, D., & Amaranggana, A. (2014). Smart tourism destinations. In Z. Xiang & I. Tussyadiah (Eds.), *Information and communication technologies in tourism 2014* (pp. 553–564). Springer.
- Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations: Enhancing tourism experience through personalisation of services. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 377–389). Springer.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet – The state of eTourism research. *Tourism Management*, 29(4), 609–623.
- Callon, M., & Muniesa, F. (2005). Economic markets as calculative collective devices. *Organization Studies*, 26(8), 1229–1250.
- Dahlander, L., & Gann, D. M. (2010). How open is innovation? *Research Policy*, 39(6), 699–709.
- Fesenmaier, D., Werthner, H., & Wöber, K. (2006). *Destination recommendation systems: Behavioral foundations and applications*. CAB International.
- Forbes. (2015). *Apple watch sales Aren't looking so hot*. Accessed online. Retrieved from <http://www.forbes.com/sites/aaronilley/2015/07/01/apple-watch-sales-arent-looking-so-hot/>. Accessed 8 June 2021.
- Gretzel, U. (2010). Travel in the network: Redirected gazes, ubiquitous connections and new frontiers. In M. Levina & G. Kien (Eds.), *Post-global network and everyday life* (pp. 41–58). Peter Lang.
- Gretzel, U. (2011). Intelligent systems in tourism: A social science perspective. *Annals of Tourism Research*, 38(3), 757–779.
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electron Markets*, 25, 179–188.
- Gretzel, U., Werthner, H., Koo, C., & Lamsfus, C. (2015). Conceptual foundations for understanding smart tourism ecosystems. *Computers in Human Behavior*, 50, 558–563.

- Guo, Y., Liu, H., & Chai, Y. (2014). The embedding convergence of smart cities and tourism internet of things in China: An advance perspective. *Advances in Hospitality and Tourism Research*, 2(1), 54–69.
- Gutiérrez, V., Galache, J. A., Sánchez, L., Muñoz, L., Hernández-Muñoz, J. M., Fernandes, J., & Presser, M. (2013). SmartSantander: Internet of things research and innovation through citizen participation. In A. Galis & A. Gavras (Eds.), *The future internet* (pp. 173–186). Springer.
- Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). Foundations for smarter cities. *IBM Journal of Research and Development*, 54(4), 1–16.
- Hjalager, A. M. (2002). Repairing innovation defectiveness in tourism. *Tourism Management*, 23(5), 465–474.
- Höjer, M., & Wangel, J. (2015). Smart sustainable cities: Definition and challenges. In L. M. Hilty & B. Aebischer (Eds.), *ICT innovations for sustainability* (pp. 333–349). Springer.
- Huang, C. M., & Chen, S. C. (2015). Smart tourism: Exploring historical, cultural, and delicacy scenic spots using visual-based image search technology. *Applied Mechanics and Materials*, 764, 1265–1269.
- Hunter, W. C., Chung, N., Gretzel, U., & Koo, C. (2015). Constructivist research in smart tourism. *Asia Pacific Journal of Information Systems*, 25(1), 105–120.
- Hwang, J., Park, H. Y., & Hunter, W. C. (2015). Constructivism in smart tourism research: Seoul destination image. *Asia Pacific Journal of Information Systems*, 25(1), 163–178.
- Inversini, A., & Masiero, L. (2014). Selling rooms online: The use of social media and online travel agents. *International Journal of Contemporary Hospitality Management*, 26(2), 272–292.
- Koo, C., Gretzel, U., Hunter, W. C., & Chung, N. (2015). The role of IT in tourism. *Asia Pacific Journal of Information Systems*, 25(1), 99–104.
- Lamsfus, C., Martín, D., Alzua-Sorzabal, A., & Torres-Manzanera, E. (2015). Smart tourism destinations: An extended conception of smart cities focusing on human mobility. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 363–375). Springer.
- Lamsfus, C., Wang, D., Alzua-Sorzabal, A., & Xiang, Z. (2014). Going mobile defining context for on-the-go travelers. *Journal of Travel Research*, 54(6), 691–701.
- Law, R., Buhalis, D., & Cobanoglu, C. (2014). Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 26(5), 727–750.
- Lopez de Avila, A. (2015). *Smart destinations: XXI century tourism*. Presented at the ENTER2015 conference on information and communication technologies in tourism. Lugano. The 4th–6th February, 2015.
- MacKenzie, D., & Millo, Y. (2003). Constructing a market, performing theory: The historical sociology of a financial derivatives exchange. *American Journal of Sociology*, 109, 107–145.
- Minghetti, V., & Buhalis, D. (2010). Digital divide in tourism. *Journal of Travel Research*, 49(3), 267–281.
- Miorandi, D., Sicari, S., De Pellegrini, F., & Chlamtac, I. (2012). Internet of things: Vision, applications and research challenges. *Ad Hoc Networks*, 10(7), 1497–1516.
- Morabito, V. (2015). *Big data and analytics*. Springer.
- Nenonen, S., & Storbacka, K. (2010). Business model design: Conceptualizing networked value co-creation. *International Journal of Quality and Service Sciences*, 2(1), 43–59.
- Neuhofer, B., Buhalis, D., & Ladkin, A. (2015). Smart technologies for personalized experiences: A case study in the hospitality domain. *Electronic Markets*, 25, 243–254.
- Perera, C., Zaslavsky, A., Christen, P., & Georgakopoulos, D. (2014). Sensing as a service model for smart cities supported by internet of things. *Transactions on Emerging Telecommunications Technologies*, 25(1), 81–93.
- Pollock, N., & Williams, R. (2009). The sociology of a market analysis tool: How industry analysts sort vendors and organize markets. *Information and Organization*, 19(2), 129–151.

- Rudas, I. J., & Fodor, J. (2008). Intelligent systems. *International Journal of Computers, Communication & Control*, III(Suppl), 132–138.
- Schmidt-Rauch, S., & Schwabe, G. (2014). Designing for mobile value co-creation – The case of travel counselling. *Electronic Markets*, 24(1), 5–17.
- Sigala, M. (2012a). Social media and crisis management in tourism: Applications and implications for research. *Information Technology and Tourism*, 13(4), 269–283.
- Sigala, M. (2012b). Social networks and customer involvement in New Service Development (NSD): The case of www.mystarbucksidea.com. *International Journal of Contemporary Hospitality Management*, 24(7), 966–990.
- Sigala, M. (2015). From demand elasticity to market plasticity: A market approach for developing revenue management strategies in tourism. *Journal of Travel and Tourism Marketing*, 32(7), 812–834.
- Sigala, M., & Chalkiti, K. (2014). Investigating the exploitation of web 2.0 for knowledge management in the Greek tourism industry: An utilisation–importance analysis. *Computers in Human Behavior*, 30, 800–812.
- Sigala, M., Christou, E., & Gretzel, U. (Eds.). (2012). *Social media in travel, tourism and hospitality: Theory, practice and cases*. Ashgate Publishing, Ltd.
- Sigala, M., & Marinidis, D. (2012). Web map services in tourism: A framework exploring the organisational transformations and implications on business operations and models. *International Journal of Business Information Systems*, 9(4), 415–434.
- Spohrer, J., Maglio, P. P., Bailey, J., & Gruhl, D. (2007). Steps toward a science of service systems. *Computer*, 40(1), 71–77.
- Staab, S., & Werthner, H. (2002). *Intelligent systems for tourism* (pp. 53–55). IEEE Intelligent Systems.
- Storbacka, K., & Nenonen, S. (2011). Scripting markets: From value propositions to market propositions. *Industrial Marketing Management*, 40, 255–266.
- Tachizawa, E. M., Alvarez-Gil, M. J., & Montes-Sancho, M. J. (2015). How “smart cities” will change supply chain management. *Supply Chain Management: An International Journal*, 20(3), 237–248.
- Tallon, P. P. (2013). Corporate governance of big data: Perspectives on value, risk, and cost. *Computer*, 46(6), 32–38.
- Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning*, 43(2/3), 172–194.
- Tu, Q., & Liu, A. (2014). Framework of smart tourism research and related progress in China. In *International conference on management and engineering (CME 2014)* (pp. 140–146). DEStech Publications.
- UNWTO. (2015). *Understanding tourism: Basic glossary*. Retrieved from <http://media.unwto.org/en/content/understanding-tourism-basic-glossary>. Accessed 10 June 2021.
- Van Heck, E., & Vervest, P. (2007). Smart business networks: How the network wins. *Communications of the ACM*, 50(6), 29–37.
- Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: Continuing the evolution. *Journal of the Academy of Marketing Science*, 36(1), 1–10.
- Vargo, S. L., & Lusch, R. F. (2014). Inversions of service-dominant logic. *Marketing Theory*, 14(3), 239–248.
- Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On value and value co-creation: A service systems and service logic perspective. *European Management Journal*, 26(3), 145–152.
- Venturini, A., & Ricci, F. (2006). Applying trip@dvice recommendation technology to www.visit-europe.com. *Frontiers in Artificial Intelligence and Applications*, 141, 607.
- Wang, D., Li, X. R., & Li, Y. (2013). China’s “smart tourism destination” initiative: A taste of the service-dominant logic. *Journal of Destination Marketing and Management*, 2(2), 59–61.
- Wang, D., Park, S., & Fesenmaier, D. (2012). The role of smartphones in mediating the tourism experience. *Journal of Travel Research*, 51(4), 371–387.

- Wang, D., & Xiang, Z. (2012). The new landscape of travel: A comprehensive analysis of smart-phone apps. In M. Fuchs, F. Ricci, & L. Cantoni (Eds.), *Information and communication technologies in tourism 2012* (pp. 308–319). Springer.
- Washburn, D., Sindhu, U., Balaouras, S., Dines, R. A., Hayes, N., & Nelson, L. E. (2010). *Helping CIOs understand “Smart city” initiatives*. Retrieved from http://www.uwforum.org/upload/board/forrester_help_cios_smart_city.pdf. Accessed 9 June 2021.
- Werthner, H. (2003). *Intelligent systems in travel and tourism*. In Proceedings of international joint conference on artificial intelligence (IJCAI 2003). Acapulco. The 9th–15th August, 2003.
- Werthner, H., Alzua-Sorzabal, A., Cantoni, L., Dickinger, A., Gretzel, U., Jannach, D., Neidhardt, J., Pröll, B., Ricci, F., Scaglione, M., Stangl, B., Stock, O., & Zanker, M. (2015). Future research issues in IT and tourism. *Information Technology and Tourism*, 15, 1–15.
- Werthner, H., & Klein, S. (1999). *Information technology and tourism: A challenging relationship*. Springer.
- Werthner, H., & Ricci, F. (2004). E-commerce and tourism. *Communications of the ACM*, 47(12), 101–105.
- West, J., & Gallagher, S. (2006). Challenges of open innovation: The paradox of firm investment in open source software. *R&D Management*, 36(3), 319–331.
- Wöber, K. W. (2003). Information supply in tourism management by marketing decision support systems. *Tourism Management*, 24(3), 241–255.
- Yoo, K.-H., Sigala, M., & Gretzel, U. (2015). Exploring TRIPADVISOR. In R. Egger, I. Gula, & D. Walcher (Eds.), *Open tourism – Open innovation, crowdsourcing and collaborative consumption challenging the tourism industry* (pp. 239–255). Springer.

Chapter 26

Mobile Technology's Role in Tourism of Asia: Patents, Articles, News, and Feedback of Mobile Tour Applications



Muhammad Jawad and Munazza Naz

Abstract The aim of this research is to define mobile technology's status and role in achieving sustainable and smart tourism in Asia, and to examine potential research and policy directions for academia and managers in practise. Several references, such as patents, scholarly journals, and press, and chosen methodologies adapted for the purpose of each study were used in this analysis. Netminer, a social network research software, was used the study to evaluate the relationships between the International Patent Classification (IPC) codes of patents. To evaluate the texts of patents, journal articles, and press, the thesis used the T-LAB software for content analysis. The research used the Leximancer software, which uses relative frequency to evaluate user feedback of mobile applications. We identified different types of data-related technology and mobile technologies for smart city networks and maps in this report. We also found that mobile technology was linked to the climate, sustainability, industry, and consumer themes. Using their feedback, we further examined user perceptions and desires for mobile travel applications. Mobile technology developments are expected to generate creative customer experiences, foster sustainable competitive advantages for tourism destinations and tourism-related vendors, and develop sustainable smart tourism competencies.

Keywords Mobile applications · Smart tourism · Tourism sustainability · Content analysis

For the past three decades, tourism research has been working to define sustainability in the area. Researchers were able to clarify the concept of sustainable tourism and make it deliver positive effects by creating a theoretical foundation and expanding the base of quantitative investigations (Klemm, 1992; Mak & Moncur, 1995; Moscardo & Murphy, 2014; Montaña-Valle, 2016; Camargo & Gretzel, 2017). Furthermore, because mobile technology has become an indispensable commodity

M. Jawad (✉) · M. Naz
Fatima Jinnah Women University, Rawalpindi, Pakistan
e-mail: muhammad.jawad@fjwu.edu.pk

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022

A. Hassan (ed.), *Technology Application in Tourism in Asia*,
https://doi.org/10.1007/978-981-16-5461-9_26

in daily life, its interactions with tourism, as well as its position, are essential themes to examine in this field. This invariably raises the question of how to conceive mobile technology as a progress engine in the context of sustainable tourism, as well as how to establish a theoretical foundation for it. In 2015, Gretzel et al. (2015) and Li et al. (2013) highlighted the importance of mobile technology in tourism and sought to conceive smart tourism (Koo et al., 2017).

In order to create theoretical foundations and guidelines for scientific investigations on smart tourism centered on mobile technology, it is necessary to evaluate tourist priorities and how sustainability in tourism contributed to these goals. As global tourism grew in popularity in the 1960s and 1970s, the idea of tourism sustainability evolved as a regulatory concern to address environmental difficulties and global disparities (Saarinen, 2014) and this theme was mostly centered on the finding of negative tourist effects that exceeded its positives. The negative consequences included inflation, property price rises, a brief inflow of foreigners and the consequent rises in crime rate, and adverse influences on local youngsters. Sustainable development provided moral and ethical goals to stakeholders such as tourists, citizens, and enterprises with the goal of avoiding negative social, cultural, and economic repercussions and optimizing good ones (Wheeller, 1993; Smith, 1997).

During this time, researchers investigated the relationship between tourism destination competitiveness and sustainability (Cucculelli & Goffi, 2016), government interventions, regulations, and partnerships in sustainable tourism development, the development of indicators to evaluate tourism sustainability (Ko, 2005), tourism sustainability measurements (Weber & Taufer, 2016; Huang & Coelho, 2017), and sustainable tourism strategies. However, the importance of technology in sustainable tourism was not mentioned, and it was not a prominent issue of debate. Mobile technology has been a significant predictor of quality of life and market direction since the debut of the iPhone in 2007, which boosted the adoption of smartphones and the implementation of LTE and Wi-Fi communication networks. The use of mobile technology in daily life and business has already surpassed expectations, and tourism is no exception. The importance of information and communication technology (ICT) in tourism has been acknowledged, and the phrase “smart city” has been examined as the most generally used word to define a sustainable city.

New technologies change the framework and procedures of an industry, offering stakeholders with both advantages and hazards (Buhalis & Law, 2008). As a result of mobile technology, we anticipate tourism to develop competitive capabilities and contribute to economic growth. Researchers in the field of tourism should use the fundamental components of tourism, sustainability, and technology to construct a scientific study course and establish a theoretical foundation and conceptualization. As a distinct axis, the infrastructure axis can be expanded to include mobile technologies. According to Gretzel et al. (2015), smart tourism is tourism that collects and consolidates data about locations, provides customers with rich onsite experiences via mobile devices, and produces market value. Physical infrastructure, social linkages, government/organizations, and individual bodies/minds are all possible data sources for these linked campaigns, which are focused on quality and resilience (Gretzel et al., 2015; Koo et al., 2016).

Long-standing issues are intended to be solved by mobile technology. These responsibilities include determining the impact of tourism in a specific and ongoing manner, evaluating mutual interactions between tourists and the environment, tracking and analyzing mutual interactions among other events at the destination, and assisting tourism planning and growth by determining the needs and aspirations of tourists (Moscardo, 2011). Researchers are attempting to construct predictable linkages and reactions between technology, tourists, the industry, communities, and society in order to construct a conceptual structure for smart tourism and widen the study base (Hunter et al., 2015). The endeavor yielded theoretical and conceptual systematization, a comprehensive definition of technology, and market adoption of mobile tourist technology (Kaplanidou & Vogt, 2006). Both of these studies are critical for connecting developing technology, customers, key actors, and industries. However, we still need to take a wide picture of the existing research environment on mobile technology and tourism in both practice and academia at this time.

The goal of this research is to evaluate the role of mobile technology in attaining sustainable and smart tourism from both a technological and a consumer perspective, as well as to give recommendations for future research and technology for academics and practitioners. E-tourism was previously utilized in both academics and practice to explore the interplay between information technology and tourism. We seek to identify partnerships between mobile technology and tourism and to clarify definitions using real field evidence by evaluating the outcomes and discussions on e-tourism, with a specific emphasis on the variability of mobile contexts. This objective invariably leads to three research topics.

1. Are there any mobile applications with a strong focus on tourism value?

The inaugural issue also looks at the similarities and differences between PC-based e-tourism and smartphone tourism.

2. To identify the important factors in tourism-related mobile applications?

The second study question focuses on the significance and conditions surrounding tour stakeholders who utilize mobile devices (for example, visitors).

3. What are the variations in customer views and satisfaction with mobile tourism applications?

The answers to this question will have repercussions for the future of mobile technology.

The second segment consists of three experiments. The first thesis looks at how patent IPC codes are linked to identify historical and present mobile technology. In their literature study, the researchers addressed the topic of mobile technology in tourism, and the realistic patent data sets enhance the studies that are supposed to provide a comprehensive perspective. Patents are viewed as statements of scientific thought that may be gathered into a technology chart to offer a thorough overview of a particular industry (Jeong & Yoon, 2015; Lee et al., 2009).

By studying patent records, academic studies, and press data on mobile technology and tourism, the second thesis employs text mining to investigate contemporary advancements in mobile technology and associated themes. Patents are released after a one- to one-and-a-half-year lag, implying that determining the present state

of technology is difficult. Furthermore, patents emphasize an invention's technical aspect, as well as its rights and uniqueness. As a result, they can't be utilized to figure out how someone uses technology. The patent and the research report are complementary, allowing for a review to reveal additional information. News data may be used to identify user preferences and commercial focuses in the areas of mobile media and tourism (Kim & Kim, 2017).

The third study looks at real-world customer attitudes regarding mobile technology, which is one of the most important elements influencing mobile technology. Customers' opinions, preferences, and pleasure with mobile app providers in the tourist business are investigated in this study. This study aims to add to the existing research in three areas. To begin, this research looks at the present level of mobile technology by integrating field data from a range of sources to enrich existing literature on smart tourism and recommend future research topics. A careful evaluation of patents, scholarly publications, and news coverage reveals any gaps in the research.

Second, whereas past research has focused on one or two mobile tourism innovations, such as consumer views, acceptability, and satisfaction, this study looks at trends that should be debated in academia and are attracting practitioners and customers' attention.

Finally, this study tracks the complicated patterns in user preferences and enjoyment with mobile technology by studying smartphone apps at various times in time. As a result of new technology, consumer behavior will change, and it's critical to follow these changes over time. However, following the changes through surveys and evaluations demands a significant time and financial effort. This study used a different approach, choosing two mobile apps that differed in both chronology and initial startup, and then comparing consumer attitudes (For example, TripAdvisor is a review-based service that started in the PC-based social networking and virtual communities, whereas Google Trips is a service launched relatively recently and started as a mobile-based service.).

Sustainability and Tourism

Sustainability has been argued as a key problem in tourism, but it is difficult to define due to its semantic complexity (Hardy et al., 2002). Although there are various distinct definitions of sustainability, the United Nations Environment Programme (UNEP) and the World Trade Organization (WTO) characterize it as follows:

Tourism that addresses the needs of tourists, the business, the environment, and host communities while taking full account of its existing and potential economic, social, and environmental impacts. (September, 2020)

Depending on the researchers' viewpoint and theoretical grounds, some studies prioritized the physical world, while others focused industry or culture (Lu & Nepal, 2009). The contemporary mobilities model and the quality of life (QoL) are two

competing scientific constructs for tourism that are used to analyze its consequences on the destination region in depth (NMP).

Instead of concentrating on quantitative measures such as income or development, Moscardo et al. (2013) offered a qualitative approach to sustainability by utilizing QoL as a qualitative index to evaluate tourist sustainability. Individual tourists' quality of life, stakeholders from departing/transit/destination communities, and tourism industry workers are all discussed.

In sustainable tourism, the application of QoL allows for a study of a tourist worker's working environment as well as the impact of carbon emissions on the destination. The use of QoL facilitates the application of the analysis to areas that are closely related to tourism. Different forms of capital have an impact on QoL, and some capitals can assist to increase QoL. Moscardo et al. (2013) rebuilt Emery and Flora's (2006) assertion, proposing seven types of capital: economic, natural, developed, social, cultural, human, and political.

Landscape and environmental structures are considered natural capital, whereas financial capital refers to the availability of assets such as earnings and savings. Built capital relates to tangible assets like buildings and transportation networks, whereas social capital relates to the features of social networks (e.g., trust, reciprocity, and cooperation). The traits (e.g., fitness, competence, and talents) of the individuals who make up society are referred to as human capital. Human capital is the traits (e.g., health, knowledge, and abilities) of the individuals who make up the community, while cultural capital is a value held by a human collective.

Finally, political capital is defined as the ability to influence and control political decision-making (Moscardo et al., 2013). The quality of life and capital principles provide a suitable statistical foundation for evaluating the impacts of mobile technology on tourism quality of life. In this sense, mobile technology and sustainable tourism are inextricably interwoven.

Another sustainable tourism system is defined by NMP (Cresswell, 2010). NMP is a type of social movement that emerged as a result of globalization and technology breakthroughs and acts as a foundation for current culture. Rather of being inflexible or constrained, NMP emphasizes adaptability and linkages (Sheller & Urry, 2006). Prior to this, discussions centered on transportation lengths and speeds, as well as physical activity. Recent disputes, on the other hand, have expanded the definition of travel to include virtual, creative, and even social and cultural aspects. In social science, the moving agent is extended beyond people to encompass things, thoughts, and money. The link between mobilities and mobile technologies will tell a lot about how tourism uses mobile technology. Cresswell (2010) proposed the six dimensions of mobility listed below as a way to describe how mobile technology affects tourism. I motive force (or reason for moving/stopping); (ii) velocity (or movement direction); (iii) rhythm (or regularity of movement); (iv) route (or current networks of movement); and (vi) friction (or barriers to movement).

Assuming that tourism sustainability is a reachable and reasonable aim (Schianetz et al., 2007), there will obviously be issues with quantifying and measuring sustainability. The methodology for evaluating sustainability has been thoroughly investigated, and work on constructing a sustainability index is currently underway.

Sustainability is a concern that affects all professions that aspire to achieve it, not simply tourism. It must be seen as confirmation if mobile technology enhances tourist resilience. Quantification of quality of life or well-being, as well as boundary concerns and incorporation valuation concerns, are all key roadblocks to evaluating sustainability. Researchers have sought to construct a range of measuring equipment and measures despite these challenges (Fernández & Rivero, 2009). While the argument in this area is outside the scope of this research, the following models and concepts are notable for the purposes of this study. In addition to the models stated (QoL and capital concept), the DPSIR model (driving forces-pressure-state-impact-responses) from the European Environmental Agency and the system quality concept (which includes a human system and an ecosystem). Schianetz et al. (2007) have offered a number of measures and concepts that may be utilized to improve the methodological background for analyzing the function of mobile technology in tourism. Stress (e.g., water shortages or crime indices), dependability (e.g., vehicle or building energy efficiency), success (e.g., waste created), and early warning are all important indicators, as are environmental management, eco-labeling, and tourism carrying power.

Smart Tourism, Customers, and Technology

Individuals' mobile devices are now serving as multiple touch points for tourist organizations, allowing them to engage with data and statistics in real time. As a result, mobile technology is becoming a key determinant of the type of tourism and the activities of tourist-related businesses.

Smart tourism is being viewed as a phenomenon, and academics are striving to widen its scope (Koo et al., 2016). In terms of information resources, smart tourism is a program that gives information and aid to solo travelers. In the past, while using the terminology of a smart tourism destination (Buhalis & Amaranggana, 2015), some academics and organizations explicitly and/or implicitly referred to smart tourism and stressed clean, renewable, and ethical provisioning of high-quality services (UNWTO), digital networking and civic participation between visitors and destinations, and smart cities.

Smart tourism was initially defined by Gretzel et al. (2015) and Li et al. (2013). Smart tourism, as conceptualized by Gretzel et al. (2015) and Li et al. (2013) is seen as a systematic solution. Li et al. defined smart tourism within the context of China's national setting, which includes the government's policy position on boosting tourism that helps to economic growth indirectly.

This tourism aims to establish a long-term strategic advantage for a location and tourist-related businesses through the use of ubiquitous technology. Gretzel et al. (2015), on the other hand, emphasized the necessity of many institutions in acquiring, collecting, and utilizing new data from digital intelligence sources, such as physical networks, social connections, and government. Gretzel et al. (2015), smart tourism conception is materialized by the notion of the smart tourist environment

(STE). The STE is a tourist infrastructure that uses smart technology to design, manage, and deliver intelligent experiences. The STE consists of a wide group of members, many of whom are devoted to economic and environmental sustainability, as well as a variety of functionalities, such as data gathering, processing, and sharing. Although the two definitions are diverse, they do share certain characteristics, such as an emphasis on mobile devices and the mobile environment, as the phrases “ubiquitous” and “onsite interactions” imply.

A smart city case study (Chatfield & Reddick, 2016) and smart city implementations (Su et al., 2011) are added to the idea. Implementing a recommendation system as well as an intelligent knowledge question system is regarded a required system for attaining smart tourism. Data collection and processing technology, communication technology, geomatics and navigation technology, and app design technology were also included to the crucial smart tourism technology list. According to the definition presented in the preceding paragraphs, smart tourism includes suppliers, consumers, neighbouring participants, and connected structures. These companies connect with one another through the utility characteristics of technology. Technology growth, supplier viewpoint, and consumer perspective have all been used in studies on the usage of information technology in tourism. The service networks of companies and manufacturers may be conceived of as the materialization of technology. As a result, we conduct a comprehensive evaluation of the current literature on smart tourism from two angles: technology and consumer (Law et al., 2014).

Smart Tourism from the Technology Perspective

The importance of information and communication technology (ICT) expanded as the Internet was used as a distribution channel. At the time, the focus of ICT research was on PC-based Internet access and gadgets that took use of this technology, which were sold as part of the e-tourism idea (Xiang et al., 2015). Customers utilized online tools to engage in e-commerce in tourism, increasing the tourist channel and, as a consequence, boosting the competency of tourist firms, similar to e-commerce research. As a result, passenger behavior began to evolve, as did business response patterns, including technology readiness.

As a result, an examination of e-tourism centered on PC-based Internet is critical in understanding the relation between mobile technology and tourism since it considers changes in consumer usage patterns as well as company technological response patterns. Xiang et al. (2015) revealed that most passengers have completely adjusted to travel booking over the Internet using a satisfaction research on consumers' use of the Internet. They claim that for trip planning, social networking sites and video sharing are becoming more popular, while desktop computers are becoming less popular and tablet PCs and GPS are becoming more popular. Mobile technology as a smart tourism facilitator and important ingredient has been classified in a variety of ways. Mobile technology may be classified as data aggregation,

analysis, and optimization technology, or as infrastructure that receives and distributes data, such as a network, a sensor, a chip, and IoT.

Platform services, such as apps, the cloud, and open APIs, may all be classified as platform services. Despite the fact that mobile technology is a broad concept, it can be broken down into four distinct categories. The first category covers technology for data collection, processing, and communication. This category includes search technology, sensors that collect data from visitors' interactions with the environment, and short-range wireless communication technologies like RFID and NFC (Han et al., 2016). Technology is necessary to retrieve and filter data from geotags when users produce information using geotags that include location data.

In addition, technology is necessary to gather user profiles and incorporate other data. Novel data collection, data analysis, data transfer, data sharing, and communication strategies are all examples of data-related technologies (Albusaidi et al., 2016). It is also necessary to develop data analytic tools for tourism. However, tourism research does not go into detail on this. Since attempts have lately been made to assess a destination's picture from the aspect of information quality, data visualization is becoming a focus in this subject. Technology must gather data and information, as well as enable ubiquitous connectivity and real-time synchronization, in order to establish a successful tourism economy. Kim et al. (2017) describe that depending on the entity that creates the data, the technological requirements may differ. Voluntary uploads of local information (including images, reviews, ratings, and advise comments) would, for example, demand distinct methods depending on whether the material is written or visual. You'll need equipment that assures video picture quality as well as networking if you are uploading a lot of video and images. Support for storage is also required.

If content production involves collaboration, services must be usable and convenient to use. Tools for collaboration must also be available. If the information is proprietary or volunteered, there must be a criterion for choosing a source that offers consumers with higher-quality information (Teslya & Ponomarev, 2017). Technology is connected to a number of customer actions in smart tourism.

The second type of technology is the mobile device, which is at the forefront of user interfaces that enable individuals to access data and information. The availability of a single device that is appropriate for a service can determine whether or not the service will be sustainable. The integration of location technology (e.g., GPS) and the development of context-aware data is reflected in a customer's mobile device. Tourists can use mobile devices to enjoy new and imaginative experiences, and consumer or tourism-related firms can manage these experiences (Atzori et al., 2010).

Although the third sort of technology overlaps with the first two, systems that materialize tourism in reality should be considered a separate technology. In tourism, research began with the purpose of improving internal inventory control, then progressed to a computerized reservation system (CRS) to increase commercial transactions and airline bookings. Reservations, recommend systems, intelligent advising systems, tourist information management systems, and tourist risk

assessment systems are all examples of technology (systems) that assist people in making better decisions.

The recommendation system (Felfernig et al., 2006) is the most researched system as a technology if technology is an essential aspect of a system's implementation. Recommendation systems may be divided into three categories. In the first type of system, users may collaborate and rate a product. The third is a knowledge-based recommender system for goods with a high degree of engagement, and the second is a content-based filtering system that proposes genres based on product categories. Information retrieval strategies are used in the second, and detailed product descriptions and limits must be provided in the third. In addition, dialog design, usability difficulties, and flexibility must all be considered while implementing these systems.

External systems include transportation and payment systems, and each distributes optimal data while complying to local constraints. Technology must ensure that optimization is compliant with local laws. Finally, newly evolving technologies incorporate data-related aspects that are implemented as systems. The first issue of mobile technology in tourism that is attracting academic interest is short-range wireless technology, such as Radio frequency identification (RFID) and Near field communication (NFC). The second issue is augmented reality and virtual reality, which both allow for a pre-experience (Pesonen & Horster, 2012).

Sensor technology, which is at the heart of the Internet of Things, will be critical for real-time data collection for big data analytics. Convergence technology and new sorts of information, gadgets, and services, according to smart tourism research, will result in new sorts of commerce and innovation. As Höjer and Wangel (2015) point out, establishing a single technology is insufficient; nevertheless, linking and synchronizing many technologies may contribute more to smart tourism. While it's important to look at how certain mobile technologies effect tourism and consumer involvement, it's also important to look at how convergence technology affects tourism.

Smart Tourism from the Customer Perspective

Academic study on consumer behavior and attitudes is primarily concerned with the adoption of a technology in tourism (e.g., e-tourism) and the satisfaction of customers who use it. In these studies, the dependent variable is also the desire to adopt or contentment. Studies propose and appraise research questions on adoption drivers and components using the technology adoption model (TAM), extended TAM, and unified theory of acceptance and use of technology (UTAUT) theories (Buhalis & Deimezi, 2004).

Furthermore, the adoption point is classified as pre-trip, during-trip, or post-trip in the same study. These researches are mostly concerned with e-tourism web-based services and social media, as well as mobile information systems, which include mobile devices and mobile applications. The existing literature includes research on

the adoption of travel applications, an analysis of user contentment with mobile technology usage, and a review of research on adoption in tourism (Bogicevic et al., 2017). In the MIS literature, the task technology fit (TTF) concept is frequently referenced in relation to client acceptance. TTF is viewed as aligning the capabilities of technology to the demands of the job, and is linked to tool usability, usefulness, and functionality. Finally, it is connected to the use of a certain instrument. Gebauer and Shaw (2004) asserted that the TTF theory allows for demands for simple and highly functional (data processing, information access, communication, and notification) mobile apps for successful mobile e-procurement, while not being directly related to tourism.

In terms of TTF theory and tourism, it is reasonable to believe that in smart tourism, the fit between mobile technology and visitors' tasks is positively related to the desire to use or buy mobile tourist services. With survey-based theories, this paper does not support the hypothesis (e.g., TAM and TTF). The TTF frame of Dishaw and Strong (1999), and Yu and Yu (2010) may be used to derive the following indicators that quantify the fit of mobile technology with visitors' roles in smart tourism. These are: (i) Pre-defines the tour's path and costs; (ii) Pre-defines the objects, relationships, and processes that will be experienced during the tour and are provided as planned during the tour; (iii) Provides personalized data and information optimized for an individual's context; (iv) Enables a fit between the tourism system and the user's life style; and (v) Enables when on the go. Mobile tourism services are likely to be embraced if TTF is high as measured by (i)–(v). As can be shown, TTF theory provides a solid framework for the use of mobile technologies in tourism.

In the tourism sector, the decision-making process may be utilized to investigate client behavior. According to Engel et al. (1990), consumer decision making is a five-stage process: I require (i) identification; (ii) information gathering; (iii) alternative evaluation; (iv) buy decision; and (v) post-buy behavior. To explain tours as the decision-making associated with purchasing particular things and services from the tourist's perspective, a tourist defines a tour as the purchase of airline tickets, hotels, automobile rental services, and tour packages. (i) identifying needs, (ii) tracking or tracing, (iii) evaluation, (iv) booking and payment, and (v) repurchase of tour objects or services are the steps in the decision-making process. When presented with a variety of services, a user who uses intelligent services tries to integrate them into a single service that can be purchased in real time with a single click.

A closer examination of the tourist decision-making process reveals that there will be motivations and desires for a tour prior to the tour, planning for the tour, the decision to tour, selection of tour packages, and real-time decisions such as changing the initial plan based on interactions with the destination's things, environments, and people. During or after the tour, the visitor may express happiness for a product or service, or dissatisfaction through complaints. You can express your happiness or complaints both during and after the tour. Each experience may be described as a linear succession of serial processes, similar to how consumers make decisions in general (Engel et al., 1990). However, some processes, such as planning, making go/no go choices, and making corrections, may overlap or be shuffled. If visitors are

not restricted to certain sites while gathering information, and if the information is customised to be unique to one's particular surroundings, allowing real-time decision making, the experience process becomes more difficult and exhibits a non-linear pattern.

A tourist's experiences are shaped through interactions with a range of items. Tourists can join a tour through a variety of partnerships, and they can develop new ones along the way and/or afterward. Interactions with tourism product and service suppliers, tourist-resident ties with local surroundings and inhabitants, and tourist-tourist relationships with other tourists via review and/or suggestions when planning or during tours are all thought to affect consumer behavior. Academics must analyze how mobile technology will effect consumer behavior via the perspective of relationships. We recommended that the previous sections examine technological trends and customer behavior based on the literature on e-tourism. Park and Gretzel (2007) ranked information quality, ease of use, security/privacy, interaction, accessibility, personalisation, and trust as the top attributes for the success of a tourism-related website. Economic value, pleasure, time savings, mobility, and use context (when no travel card is available, when no cash is available, when in a hurry, when the tourism product must be purchased immediately, when purchasing a tour package requires waiting) are all factors that influence satisfaction with mobile tourism shopping (MTS) according to Kim et al. (2013). We must also examine the impact of mobile technologies on these aspects.

Tourism and Consumer Reviews Online or Through Mobile Applications

Consumer evaluations in mobile applications are studied in two ways in the existing research. The first type of study focuses on the usage of customer reviews as content, with the assumption that the contents of the reviews are used as data for decision-making support systems. How to specify recommendation systems was one of the initial challenges in tourism-related technology. It's critical to understand how recommendation systems use data to produce recommendations. Given the prevalence of the Internet in everyday life, the study aims to build new recommendation algorithms based mostly on online consumer reviews (Phillips et al., 2015).

Studies on online reviews are being developed in accordance with their practical value. Some researchers are looking into how certain aspects of online reviews (e.g., product ranking) affect certain types of consumers (e.g., high-involvement tourists) when making decisions (Fileri & McLeay, 2014), and others are looking into the relationship between hotel satisfaction and the type of hotel (e.g., luxury or budget) and reviews (positive or negative). Since the early 2000s, when TripAdvisor debuted its PC-based web service, consumer review-based online recommendation systems have been around. Three of the most well-known review-based travel services are Uber, Airbnb, and TripAdvisor. TripAdvisor has grabbed the interest of travelers

since its beginnings, and several scholarly attempts have been made to investigate it. One of these research focuses on the gamification funware functionality of the TripAdvisor service (Sigala, 2015). Another study looks at TripAdvisor's online review data from the perspective of hotel attribute importance using a conjoint analysis.

Because mobile Internet usage outnumbers fixed Internet usage, mobile app review research should be promoted as a follow-up to past online review studies. The client composes and accesses reviews on their mobile devices, whether via the mobile web or a mobile app (Chung & Koo, 2015). As a result, it's important to consider the parallels and differences between online assessments of PC-based Internet use and online reviews of mobile apps. Despite the fact that mobile applications allow for hotel room reservations, certain groups continue to engage in PC-centric activity, which defines the behavior of groups with both mobile and fixed Internet connection.

The second set of studies looks at consumer attitudes and behavior through the prism of customer reviews, which may be thought of as a form of social media. Recommendation systems have social networking components built in. This category looks at social media usage utilizing adoption models, focusing on the role of social media in online tourist information and the motivating effect of sharing social media's tourism experience (Munar & Jacobsen, 2014). The importance of social media as a new information source that also incorporates review site functions is becoming increasingly crucial. As a result, it's critical to examine how social media is utilized as a source of tourist information, as well as how consumer social media usage habits are evolving. Furthermore, while access to social media through a computer and the Internet is widespread, advances in mobile technology have enabled access to social media via mobile applications.

While customer evaluations are not directly examined in studies on the construction and user interface of mobile apps, as well as functioning, they are crucial when looking at consumer reviews on mobile applications. As usage patterns shift from stationary PC-based online resources to mobile applications, these studies underline the importance of the mobile app and its design for visitor satisfaction (Palumbo, 2015). The mobile review may be written while the user is on the go; users do not need to switch devices (from mobile to PC and back) to complete the review. These issues must be considered while designing mobile technology.

References

- Albusaidi, H. S., Udipi, P. K., & Dattana, V. (2016). Integrated data analytic tourism dashboard (IDATD). In B. Shukla, S. K. Khatri, & P. K. Kapur (Eds.), *Proceedings of the 2016 5th international conference on reliability, infocom technologies and optimization (trends and future directions) (ICRITO)* (pp. 497–500). Institute of Electrical and Electronics Engineers.
- Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. *Computer Networks*, *54*, 2787–2805.

- Bogicevic, V., Bujisic, M., Bilgihan, A., Yang, W., & Cobanoglu, C. (2017). The impact of traveler-focused airport technology on traveler satisfaction. *Technological Forecasting and Social Change, 123*, 351–361.
- Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 377–389). Springer.
- Buhalis, D., & Deimezi, O. (2004). E-tourism developments in Greece: Information communication technologies adoption for the strategic management of the Greek tourism industry. *Tourism and Hospitality Research, 5*, 103–130.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the internet—the state of etourism research. *Tourism Management, 29*, 609–623.
- Camargo, B. A., & Gretzel, U. (2017). What do tourism students know about sustainability and sustainable tourism? An exploratory study of Latin American students. *Journal of Teaching in Travel & Tourism, 17*, 1–17.
- Chatfield, A. T., & Reddick, C. G. (2016). Smart city implementation through shared vision of social innovation for environmental sustainability: A case study of Kitakyushu, Japan. *Social Science Computer Review, 34*, 757–773.
- Chung, N., & Koo, C. (2015). The use of social media in travel information search. *Telematics and Informatics, 32*, 215–229.
- Cresswell, T. (2010). Towards a politics of mobility. *Environment and Planning D: Society and Space, 28*, 17–31.
- Cucculelli, M., & Goffi, G. (2016). Does sustainability enhance tourism destination competitiveness? Evidence from Italian destinations of excellence. *Journal of Cleaner Production, 111*, 370–382.
- Dishaw, M. T., & Strong, D. M. (1999). Extending the technology acceptance model with task-technology fit constructs. *Information Management, 36*, 9–21.
- Emery, M., & Flora, C. B. (2006). Spiraling-up: Mapping community transformation with community capitals framework. *Community Development: Journal of the Community Development Society, 37*, 19–35.
- Engel, J. F., Blackwell, R. D., & Miniard, P. W. (1990). *Consumer behaviour* (6th ed.). Dryden Press.
- Felfernig, A., Gordea, S., Jannach, D., Teppan, E., & Zanker, M. A. (2006). A short survey of recommendation technologies in travel and tourism. *OGAI Journal, 25*, 17–22.
- Fernández, J. I. P., & Rivero, M. S. (2009). Measuring tourism sustainability: Proposal for a composite index. *Tourism Economics, 15*, 277–296.
- Filieri, R., & McLeay, F. (2014). E-wom and accommodation: An analysis of the factors that influence travelers' adoption of information from online reviews. *Journal of Travel Research, 53*, 44–57.
- Gebauer, J., & Shaw, M. J. (2004). Success factors and impacts of mobile business applications: Results from a mobile e-procurement study. *International Journal of Electronic Commerce, 8*, 19–41.
- Gretzel, U., Werthner, H., Koo, C., & Lamsfus, C. (2015). Conceptual foundations for understanding smart tourism ecosystems. *Computers in Human Behavior, 50*, 558–563.
- Han, H., Park, A., Chung, N., & Lee, K. J. (2016). A near field communication adoption and its impact on expo visitors' behavior. *International Journal of Information Management, 36*, 1328–1339.
- Hardy, A., Beeton, R. J. S., & Pearson, L. (2002). Sustainable tourism: An overview of the concept and its position in relation to conceptualisations of tourism. *Journal of Sustainable Tourism, 10*(6), 475–496.
- Höjer, M., & Wangel, J. (2015). Smarter sustainable cities: Definition and challenges. In L. M. Hilty & B. Aebischer (Eds.), *ICT innovations for sustainability* (pp. 333–349). Springer.

- Huang, Y., & Coelho, V. R. (2017). Sustainability performance assessment focusing on coral reef protection by the tourism industry in the coral triangle region. *Tourism Management*, 59, 510–527.
- Hunter, W. C., Chung, N., Gretzel, U., & Koo, C. (2015). Constructivist research in smart tourism. *Asia Pacific Journal of Information Systems*, 25, 105–120.
- Jeong, Y., & Yoon, B. (2015). Development of patent roadmap based on technology roadmap by analyzing patterns of patent development. *Technovation*, 39, 37–52.
- Kaplanidou, K., & Vogt, C. A. (2006). A structural analysis of destination travel intentions as a function of web site features. *Journal of Travel Research*, 45, 204–216.
- Kim, D., & Kim, S. (2017). Sustainable supply chain based on news articles and sustainability reports: Text mining with leximancer and diction. *Sustainability*, 9, 1008.
- Kim, S.-E., Lee, K. Y., Shin, S. I., & Yang, S.-B. (2013). Effects of tourism information quality in social media on destination image formation: The case of Sina weibo. *Information Management*, 54, 687–702.
- Kim, S., Park, J. H., Lee, D. K., Son, Y. H., Yoon, H., Kim, S., & Yun, H. J. (2017). The impacts of weather on tourist satisfaction and revisit intention: A study of South Korean domestic tourism. *Asia Pacific Journal of Tourism Research*, 22, 895–908.
- Klemm, M. (1992). Sustainable tourism development. *Tourism Management*, 13, 169–180.
- Ko, T. G. (2005). Development of a tourism sustainability assessment procedure: A conceptual approach. *Tourism Management*, 26, 431–445.
- Koo, C., Shin, S., Gretzel, U., Hunter, W. C., & Chung, N. (2016). Conceptualization of smart tourism destination competitiveness. *Asia Pacific Journal of Information Systems*, 26, 561–576.
- Koo, C., Park, J., & Lee, J. N. (2017). Smart tourism: Traveler, business, and organizational perspectives. *Information Management*, 54, 683–686.
- Law, R., Buhalis, D., & Cobanoglu, C. (2014). Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 26, 727–750.
- Lee, S., Yoon, B., Lee, C., & Park, J. (2009). Business planning based on technological capabilities: Patent analysis for technology-driven road mapping. *Technological Forecasting and Social Change*, 76, 769–786.
- Li, H., Ye, Q., & Law, R. (2013). Determinants of customer satisfaction in the hotel industry: An application of online review analysis. *Asia Pacific Journal of Tourism Research*, 18, 784–802.
- Lu, J., & Nepal, S. K. (2009). Sustainable tourism research: An analysis of papers published in the journal of sustainable tourism. *Journal of Sustainable Tourism*, 17(1), 5–16.
- Mak, J., & Moncur, J. E. T. (1995). Sustainable tourism development: Managing Hawaii's "unique" touristic resource—Hanauma Bay. *Journal of Travel Research*, 33, 51–57.
- Montaño-Valle, A. (2016). Sustainability strategy as a source of competitive advantages in the tourism industry. A model for the integration of natural resources. *European Journal of Tourism Research*, 14, 106–109.
- Moscardo, G. (2011). Exploring social representations of tourism planning: Issues for governance. *Journal of Sustainable Tourism*, 19, 423–436.
- Moscardo, G., & Murphy, L. (2014). There is no such thing as sustainable tourism: Re-conceptualizing tourism as a tool for sustainability. *Sustainability*, 6, 2538–2561.
- Moscardo, G., Kononov, E., Murphy, L., & McGehee, N. (2013). Mobilities, community well-being and sustainable tourism. *Journal of Sustainable Tourism*, 21, 532–556.
- Munar, A. M., & Jacobsen, J. K. S. (2014). Motivations for sharing tourism experiences through social media. *Tourism Management*, 43, 46–54.
- Palumbo, F. (2015). Developing a new service for the digital traveler satisfaction: The smart tourist app. *International Journal of Digital Accounting Research*, 15, 33–67.
- Park, Y. A., & Gretzel, U. (2007). Success factors for destination marketing web sites: A qualitative meta-analysis. *Journal of Travel Research*, 46(1), 46–63.
- Pesonen, J., & Horster, E. (2012). Near field communication technology in tourism. *Tourism Management Perspectives*, 4, 11–18.

- Phillips, P., Zigan, K., Santos Silva, M. M., & Schegg, R. (2015). The interactive effects of online reviews on the determinants of Swiss hotel performance: A neural network analysis. *Tourism Management, 50*, 130–141.
- Saarinen, J. (2014). Critical sustainability: Setting the limits to growth and responsibility in tourism. *Sustainability, 6*, 1–17.
- Schianetz, K., Kavanagh, L., & Lockington, D. (2007). Concepts and tools for comprehensive sustainability assessments for tourism destinations: A comparative review. *Journal of Sustainable Tourism, 15*, 369–389.
- Sheller, M., & Urry, J. (2006). The new mobilities paradigm. *Environment and Planning A, 2006*(38), 207–226.
- Sigala, M. (2015). The application and impact of gamification funware on trip planning and experiences: The case of tripadvisor's funware. *Electronic Markets: The International Journal on Networked Business, 25*, 189–209.
- Smith, D. M. (1997). Geography and ethics: A moral turn? *Progress in Human Geography, 21*, 583–590.
- Su, K., Li, J., & Fu, H. (2011). Smart city and the applications. In *Proceedings of the 2011 international conference on electronics, communications and control (ICECC), 9–11 September 2011, Ningbo* (pp. 1028–1031). IEEE.
- Teslya, N., & Ponomarev, A. (2017). Smart tourism destination support scenario based on human-computer cloud. In T. Tyutina & S. Balandin (Eds.), *Proceedings of the 2016 19th conference of Open Innovations Association (FRUCT)* (pp. 242–247). IEEE Computer Society.
- United Nations Environment Programme (UNEP) and the World Trade Organization (WTO), September, 2020
- Weber, F., & Taufer, B. (2016). Assessing the sustainability of tourism products-as simple as it gets. *International Journal of Sustainable Development and Planning, 11*, 325–333.
- Wheeller, B. (1993). Sustaining the ego. *Journal of Sustainable Tourism, 1*, 121–129.
- Xiang, Z., Wang, D., O'Leary, J. T., & Fesenmaier, D. R. (2015). Adapting to the internet. *Journal of Travel Research, 54*, 511–527.
- Yu, T.-K., & Yu, T.-Y. (2010). Modelling the factors that affect individuals' utilisation of online learning systems: An empirical study combining the task technology fit model with the theory of planned behaviour. *British Journal of Educational Technology, 41*, 1003–1017.

Part IV
Technology Application in Tourism in Asia:
Future Research Directions

Chapter 27

Technology Applications in the Asian Tourism Industry in Future



Aysen Ercan İştin, Gamze Eryılmaz, and Meral Üzülmöz

Abstract Technological developments affecting the lifestyles of all people are important in terms of ensuring the sustainability of businesses in the tourism industry, gaining competitive advantage, increasing the quality of service, creating a positive image, and meeting the needs and demands of tourists fully. The increasing prevalence of social media in the tourism industry; rapid advances in automation through robotics, machine learning, and artificial intelligence; new technologies such as the use of bitcoin and blockchain technology, and the use of virtual reality technology and other smart tourism technologies can offer tourists the opportunity to provide highly customized products and experiences. For this reason, tourism businesses need to analyze the innovations in information and communication technologies in tourism effectively and efficiently and develop technology-oriented tourism policies. In addition, tourism businesses should focus on anticipating what new technological opportunities may arise in the future and be prepared for the future to cope with the challenges of technology innovation. In this context, it was examined that the technological applications used in the tourism industry today in this chapter. Then, it was also examined that the expected developments in the technology usage in the future and what kind of applications may arise depending on these developments. In addition, it was discussed that the COVID-19 outbreak affecting the whole world might bring what kind of new technological applications to the tourism industry. Finally, within the scope of the study, it was presented recommendations to the businesses in the tourism industry.

A. E. İştin (✉)

School of Tourism and Hotel Management, Department of Gastronomy and Culinary Arts, University of Şırnak, Şırnak, Turkey

G. Eryılmaz

Faculty of Tourism, University of Iskenderun Technical, İskenderun, Turkey

M. Üzülmöz

Department of Gastronomy and Culinary Arts, Osmaniye Korkut Ata University, Osmaniye, Turkey

Keywords Technology · Technological applications · Smart tourism technologies · The tourism industry

Introduction

Technology is a revolution for tourism. It can be said that technology creates an important competitive power and strategy for the areas serving in the tourism industry with the increasing efficiency of technology in tourism (Buhalis & Law, 2008; Buhalis, 2020). However, this situation must be continuous for the dynamic and innovative tourism industry in the future. Therefore, considering that digitalization is among the most important changes in a rapidly developing world (Zsarnoczky, 2018), it is important to the integration of the tourism industry with technology.

Considering the tourism industry's technology development process, it can be clearly seen what kind of an adaptation process it is involved in. Unused military aircraft began to be used in air transport with the use of the first computers at the end of the 1940s after the war. These developments have paved the way for the slow movement of the tourism industry. The increase in the number of passengers in the 1950s pushed airlines to provide more efficient service. This situation has also made it mandatory to use powerful and versatile reservation systems. In the first stage, main system computers using paper-based reservation (manual) systems and related notifications started to be seen in computerized reservation systems (CRS) of airlines with the establishment of SABRE Travel Network, Hotel Management Systems, Travel Agency, and Tour Operator Systems and Destination Management Systems (DDMSs), one of the leading travel technology providers in the world between 1960 and 1990. It is seen that most of the investments made regarding the information system investments are made in Global Distribution Systems (GDSs) (Buhalis, 1993, 2020; Buhalis et al., 2011; Mistilis et al., 2014). With developments in this direction, information systems (capacity management, operational efficiency, and productivity; inventory control, reservations, and sales; income and expense management; marketing research and planning; customer relationship management and personalized service) have made significant progress (Buhalis, 2000, 2020; Sigala, 2003; Buhalis & Crofts, 2013; Benckendorff et al., 2019). The E-tourism era started with the development of the internet network between 1990 and 2005. The infrastructure of this period was formed with the development of Web 1.0 through websites and e-commerce. Google as a search engine and Yahoo as a web portal revolutionized the search for information online (Pan & Fesenmaier, 2006; Buhalis, 2020). Another development has been in Application Service Providers (ASPs), which incorporate key functions through network resources. In the 10-year period, including 2005–2015, blogs that facilitate interaction and enable multiple contributions and the development of other social media platforms started with the Web 2.0 era. This situation has led to the formation of an individual or multiple interactions in the online environment where the producer and the consumer communicate

mutually (Buhalis & Law, 2008; Buhalis, 2020). Thus, developing technology has made distribution channels actively used, in which direct communication and transactions between the producer and the consumer are provided, and many new intermediaries have emerged. All these developments have enabled tourism service providers to express themselves better online for their consumers, thanks to TripAdvisor, [Booking.com](https://www.booking.com), and similar vacation destination search sites (Buhalis, 2020).

Web 3.0 era has started to be active for 2015 and beyond. As of this period, it can be said that smart technologies that bring different changes in the tourism industry as in many industries and reality applications are being used actively. These technologies can be listed as smartphones, mobile devices, portable computers, and applications utilized by these devices. This advance in technology has changed the way people communicate and interact and has become a mediator for the touristic experience. In fact, this has led to the emergence of the concept of smart tourism (smartness refers to the interconnection and interoperability of integrated technologies) (Kim & Law, 2015; Buhalis & Amaranggana, 2015; Buhalis, 2020). In the next process for 2020 and the future, it can be said that tourism has gained / will gain a different dimension with a more advanced technology infrastructure based on smart technologies. As of 2020, there are many technology applications currently used in tourism. These can be listed as mobile applications, reality applications, information technologies, and smart tourism technology applications. With these technologies for the future, many other technological possibilities such as fifth-generation mobile network (5G), artificial intelligence, gamification, machine learning, advanced analytical capabilities may be determinants of the position of tourism in the digital age (Buhalis, 2020).

Another event/phenomenon that can add a different dimension to technological developments that may occur in tourism businesses is the COVID-19 outbreak. According to Parisotto and Elsheikhi (2020: 15), the tourism industry is among the industries most affected by the COVID-19 process. The COVID-19, which emerged in the city of Wuhan in China in December 2019 and affected the world, had significant negative effects restricting social life after it was declared as an epidemic by the World Health Organization. The COVID-19 is still effective as a process in which activities in the tourism industry come to a halt, as in many industries. It is high predictions that the high risk and fear that arise due to the Coronavirus outbreak will cause changes in the consumption of tourist goods and services and destination choices; and tourists will turn to the destinations or tourism businesses that take more effective measures such as social distance, hygiene and cleanliness, certification and alternative tourism types. Therefore, it is vital that tourism businesses integrate their technological applications in accordance with pandemic policies because it is necessary to use various advanced technologies to overcome various problems related to the epidemic.

The aim of this chapter is to examine the developments in technology applications to be used in the tourism industry in the future, and what kinds of applications will emerge depending on these developments. At the same time, it was aimed to examine that The Coronavirus Outbreak can bring new technological applications

to the tourism industry. In terms of the currency of the subject examined in the department, it is thought that taking into account the returns of the global outbreak is important in order to see the progress towards the future more clearly. Finally, it was aimed to provide suggestions to the businesses serving in the tourism industry within the scope of the study, depending on the purpose of the department.

Technological Applications in the Tourism Industry

Today, it is one of the prerequisites for tourism destinations and businesses affected by the technological revolution to adopt innovative methods regarding technological developments and thus increase their competitiveness. Tourism enterprises being aware of this situation, commonly use mobile applications, information technologies, and reality applications. Under this title, these applications are detailed with examples in the tourism industry.

Mobile Applications

Applications that involve the installation and use of the application that is directly related to the subject to be processed through a website or via internet-based devices that provide mobile communication can be defined as mobile applications. Mobile phones (These are devices that provide wireless communication, can be carried easily, have a wide coverage area), PDA (Pocket computers - names and addresses can be stored and it used as a notebook by using the Internet and e-mail), smartphones (high-tech devices with a combination of cell phones and PDA features), tablet (they are personalized, easily portable computers with touch screen), laptops (Portable computers consisting of the screen and keyboard sections), Pocket computers and GPS that enable communication (It is a technological tool that sends the coded information regularly through a satellite network, thus measuring the distance between the satellites and providing the opportunity to determine a specific location on the earth) can be defined as technological tools that provide mobile communication (Sürücü & Bayram, 2016).

Some applications can be installed on the devices mentioned above for those who travel within the tourism industry and want to have a holiday. These applications provide a great convenience for the user to choose a holiday destination, determine the transportation vehicle or travel route, choose the accommodation and quickly benefit from more opportunities. For example, first-time visitors to a destination can determine their route by installing applications such as “City Maps 2Go”, “Map.me or Googlemap” thanks to the GPS feature on their devices. With applications installed on devices such as “XE Currency” or “Exchange Rate”, which are international currency conversion applications for foreign tourists, it can be

calculated exchange differences at airports; moreover, made payments easily in places such as restaurants and hotels.

“Hotel Tonight” which lists the last-minute offers of famous hotels for sudden travels, is another application that can be used. When it comes to unplanned travels, it can provide solutions to instant travel and accommodation needs. “Rome2rio” can be defined as another application that guides users on how to get somewhere by plane, train, bus, ship, or car on their overseas trips. Thanks to this application, a list can be accessed about how long the route will be reached, the timetable, and ticket prices. “Google Trips” and “TripAdvisor” are apps that are often used for vacation and travel plans. Thanks to these applications, users can get information about places such as museums, historical places, shopping venues, hotels, restaurants, entertainment venues, cafes. At the same time, thanks to these applications, it can also utilize facilities such as reservations and reasonable price options for hotels, restaurants, and airline tickets. Another application that can be exemplified is the “AroundMe” application. Thanks to this application, it can be seen as a list of all places according to location, such as the nearest pharmacy, bank, petrol station, hospital, hotel, restaurant, supermarket when there is an emergency in the host country or city (Gulal, 2019).

Information Technologies

Information technology (IT) refers to the acquisition, processing, storage, and dissemination of textual, audio, pictorial, and digital information through a microelectronic-based computer and telecommunications combination (Jadhav & Mundhe, 2011). Information technologies basically include computers, operating systems, application software, communication equipment, and multimedia technologies. Within this scope, there are two prominent technology groups. These are communication and computer technologies. Communication and computer technology are two interdependent technologies as well as having different functions. While the function of establishing communication and transcending geographical boundaries is possible with communication technologies, active processes such as improving the process, being dynamic, and employees doing their jobs more effectively can be done thanks to computer technologies. Alternatives such as telephone, fax, cellular networks, and the Internet constitute communication technologies. Software used for storing, processing, and retrieving data via computer hardware and related equipment includes computer technologies (Townsend et al., 2001; Benli & Kızım, 2002).

There are applications that are actively used in the tourism industry under the name of information technologies. Global distribution systems, barcode, data matrix, Radio Frequency Identification (RFID) Technology, Near Field Communication (NFC) Technology, and Bluetooth are some of them.

Global Distribution Systems

Global distribution systems are reservation systems formed by the combination of different reservation systems (airline companies, tour operators, hotels, car rental companies, etc.) based on computerized reservation systems (Yüksek, 2013). Reservation systems are systems that are connected to the system aiming to access information via computers that provide reservations and simultaneous confirmation services for businesses (Ünivar, 2014). While these systems provide the opportunity to perform electronic distribution to sales offices and sales partners, they are a database that manages the stocks of tourism enterprises (Kurgun et al., 2007). Tourism businesses have started to take place in global distribution systems with the introduction of reservation and information management systems such as electronic sales points, electronic tickets and etc., depending on internet technology. In this way, tourism enterprises can now use one or more central reservation systems in order to distribute products/services and to be included in the systems in different countries of the world (Yüksek, 2013) because these distribution systems support the infrastructures of many airlines, travel companies and companies that sell online (tickets, rooms) such as agencies and tour operators. In addition, it also offers tour operators the opportunity to book outgoing tours and provide infrastructure. The most important systems in the tourism industry that dominate the global distribution market are AMADEUS (A technology partner selected by travel industry service providers, travel agents, and travelers who buy their travel online), GALILEO (It specializes in travel agencies and travel services distribution. It provides reservation support to United airlines. It serves more like a distributor.), SABER (it has the ability to reach every travel reservation, no matter how it is made or where in the world it is made) and WORLDSPAN (Its services are provided to the business itself, not to the distribution partners or to the airline companies owned by the company. It uses distributors to do this. It is compatible with other operating systems) (Karataş, 2021).

Barcode

It is one of the information coding technologies. It is also known as line code. It consists of black bars and white spaces (Akyanı, 1994). The linear barcode type, which consists of vertical and different thickness lines, is the most frequently used today (Örücü, 2013). In the tourism industry, it can be used for hotel room fees or food services, as well as effectively in the process of supplying food products to food and beverage or accommodation businesses. Thanks to the barcode, businesses can have all kinds of information about the product, from the soil where the product is grown to the farmer who grows the product. Product quantity and stock information can be provided easily (Cebeci, 2006).

Data Matrix (Quik Response/QR)

It can be expressed as a more advanced form of barcode technology. QR codes are defined as 2D barcodes that can store a certain number of numeric characters (7089), alphanumeric characters (4296), binary bytes (2953), and Japanese Kanji / Kana symbols (1817 characters) or a combination of these (Law & So, 2010). Therefore, it can contain more data than barcodes. At the same time, the data in it can be stored offline. The information in the QR code can be easily recognized, and access to information is provided by taking images with smartphone cameras via mobile phones and the Internet thanks to specially installed software (Şimşek & Cinnioğlu, 2020). In today's restaurants, in order to see the menu and to give the order directly and quickly without waiter service, there can be tablets and menus with a QR code (Şimşek & Kızıldemir, 2019). The data matrix application is included as explanatory information in both tourism destinations and signboards. As soon as the tourist receives the data matrix image via his smartphone, he can quickly access the relevant information. In hotel businesses, on the other hand, thanks to the data matrix, the user can easily get information about the activities of the hotel or access to which food type in which area (Şimşek & Cinnioğlu, 2020).

Radio Frequency Identification (RFID) Technology

It is an automatic identification technology that collects information about a person or object and transfers it to information systems without a person. The technology consists of an RFID tag and an RFID reader connected to the computer system (Özoğul & Baran, 2018). The RFID tag, which can be active/passive/semi-active, forms the part that collects real and simultaneous data and then transmits this data via radio waves. The tag usually consists of two parts. The content of the tag includes a microchip and antenna (Srinivasan & Kumar, 2013). The circuits in the microchip in the tag are activated by radio waves. Microchip devices (modulates) the waves into segments and sends them back to the reader via the antenna. Afterward, the information sent to the reader is converted into a digital form and monitored (Maraşlı & Çıbuk, 2015). RFID technology can be used in hotel businesses, restaurants, airline operations, theme parks, entertainment events, and cruise ships. For example, RFID technology can be used in many areas, from determining the product cost and tracking product-stock, from the work time of housekeeping employees to material tracking in hotel businesses. Other examples are applications such as speeding up the guest's check-in process, eliminating the need to use money or credit cards within the hotel thanks to cashless payment systems, or warning the guest when the guest's room door is open. It can be used by airline companies to track baggage that is delivered to the wrong flight or is involved. It can be said that RFID applications are used in many areas, such as the ability of parents to track their children, to determine the location of the child when children are lost In theme parks; to allow participants to shop quickly and securely in entertainment activities and to track how

much they spend; to determine the location of cruise passengers onboard the cruise ships (Özoğul & Baran, 2018).

Near Field Communication (NFC) Technology

NFC is a subset of RFID technology. In addition to being an intuitive device, it is a type of radio frequency identification (RFID) technology that provides simple and reliable communication and wireless connection at short distances. NFC operating at 13.56 MHz and providing data transfer at 424 Kbits per second operates in two modes that are active and passive. Communication is achieved when two NFC-compatible devices are brought close to each other (up to 4 cm) (Medaglia et al., 2011). In this context, it can be said that NFC technology is used especially in contactless transactions. For example, data/information on smart mobile phones, contactless debit/credit cards, and other contactless smart cards can be transmitted using near field communication technology during contactless payment transactions in hotels, restaurants, travel businesses, parking lots, railways, or airline terminal sales points. In this process, payment transactions are made via credit card or bank payment networks. With these uses, NFC technology is used for membership cards given to the user in order to benefit from the loyalty programs implemented by tourism enterprises. On the other hand, NFC application is used to open room doors in hotels and to take advantage of virtual tickets in transportation and ski centers (such as ropeway use) thanks to mobile technology (Egger, 2013).

Bluetooth: It is one of the wireless communication technologies used for smart devices. They are radio transmitters that broadcast small energy-based radio signals periodically and are inexpensive and power-efficient (Oh et al., 2019). Bluetooth is defined as an alternative technology in terms of tracking user movements in tourism activities in closed areas, sharing the content developed by users, correct positioning, and data transfer (Jankowski et al., 2010). For example, it can be monitored tourists' visits to historical and touristic places, their entrance and exit to the hotel business via Bluetooth. In this way, it can be examined the time spent by the tourists at their destination and the distribution of their attractions and accessed data related to travel purposes. In addition, it can be obtained important data to guide the planning of visits in the touristic area, and it is possible to determine the time interval that the touristic activities will do (Esen & Türkay, 2017).

Reality Applications

These applications, which are also referred to as reality technologies, are defined as an artificial environment where the real environment is transformed into a simulation by combining real and unreal concepts. It has two prominent applications, namely virtual reality (VR) and augmented reality (AR) (İçten & Güngör, 2017). VR means that a user who has entered 3D games on technological devices is connected to that virtual world and is disconnected from the real dimension. AR does

not completely cut off the user's connection with the real world. AR can be defined as the applicability of images to real-world objects and the simultaneous perception of the real and digital world (Ferhat, 2016). The applications offered as a combination of both technologies are expressed as mixed reality. For example, thanks to AR technology, information about the book arts and calligraphy collection exhibited in the Istanbul Sakıp Sabancı Museum can be presented to the museum visitors (Thanks to VR technology, visitors to the museum can easily and quickly access interactive applications on iPad).

While VR can be experienced with special wearable devices (gloves, glasses, or headgear), this technology can also be used directly through smart devices (such as phones, iPad) or applications on the devices. Thanks to these devices, nature trips can be made, playgrounds can be visited, high areas can be climbed, and many places can not be visited, or 3D games can be played. At the same time, thanks to Google's virtual reality channel (Google Spotlight Stories, comprehensive collections of 360-degree recordings and 360-degree videos), virtual tours can be made to a touristic area. It may be sufficient for the users to direct the mouse on the computer, touch the location on the iPad or phone.

AR includes a technology where real and virtual objects interact with each other. In other words, it refers to a real environment where digital media products are used instead of real world objects (Günel & Arabacıoğlu, 2019). AR can be experienced (being in and experiencing reality through devices) through wearable or reality-reflecting devices. AR can be used as a technology that presents the alive image and the reality of the visible size of 3D developed with the camera in smartphones (Demirezen, 2019).

These reality applications can be used by visiting the website of the touristic areas (3D virtual tour, 360-degree recordings, and comprehensive collections of 360-degree videos). It is also possible to be visited directly to tourist places/areas such as a museum and an archaeological site (for example, the Turkey Topkapi Palace Museum, Anatolian Civilizations Museum, and the Hatay Archeology Museum).

It can be said that these technologies are widely used in travel businesses (for example, In Basel, Dublin, and Tuscany Region, AR Tourist Guide can translate users in languages such as English, German, French, Spanish, Italian, etc. Again, thanks to AR technology, areas such as accommodation, food and beverage, and culture can be monitored 360 degrees. Even information about these areas can be obtained) museums, hotel businesses (for example, Marriott Hotels, in cooperation with Samsung offer their guests the opportunity to visit China, Rwanda, and Chile in a virtual environment thanks to VR technology), entertainment centers (for example, at Futuroscope Theme Park in France, futuristic animals have reflected in the real environment thanks to AR technology), food and beverage and transportation (Eryılmaz & Aydın, 2020).

Will That Kinds of Technological Applications Be Possible in the Tourism Industry in the Future?

The change and development of information technology and communication networks have been showing themselves more intensely in the tourism industry, especially in recent years, and information technology is effective in all stages of tourists such as reservation, transportation, and accommodation from before to after the holiday (Kozak et al., 2018: 201). Zsarnoczky (2018) states that with the change of technology, the touristic experiences of the visitors will vary greatly. In this context, it is stated that technologies such as robot hotels, augmented reality, artificial intelligence, cloud computing, big data, chatbots, gamification, and 3D printing will be used at higher rates in the future, especially with the development of data technology (Buhalis, 2020: 269; Law et al., 2019: 287). From this point of view, technological applications such as smart tourism technology applications, robot hotels, artificial intelligence (concierge), chatbots, big data, cloud computing, gamification, and 3D printing are included under this title. In addition, the specified technological applications are discussed with examples in the context of the enterprises (accommodation businesses, travel agencies, food and beverage businesses, tour operators, and transportation businesses) under the tourism industry.

Smart Tourism Technology Applications

Smart tourism applications are an application that includes touristic activities supported by information technologies and smart technology. Smart tourism technology is expressed as a tourism system that focuses on the creation, presentation, and management of smart tourist experiences and utilizes smart technology (Gretzel et al., 2015: 180). In this context, it can be said that the factors such as collecting and processing data on which tourism is concentrated and creating data exchange are the basic functions that should be in smart tourism applications. Guo (2014) states that the technological dimension of smart tourism is supported by applications such as the Internet of Things and mobile communication. Similarly, Park et al. (2016) state that the Internet and smartphone applications shaped by information technologies facilitate the application of smart tourism technology. Koo et al. (2017) emphasize that the Internet and smartphone applications are important because they enable smart tourism technologies to be portable. Therefore, it can be said that smart tourism technology applications are realized with applications such as the Internet of things, mobile communication, and wearable technology. Thanks to the Internet of Things, touristic activities are connected with each other, and customers can get more personalized services with wearable device technology. And also, smarter connections can be established between visitors and the hotel through mobile communication.

Control information of all sensors and devices that can be used in hotels and buildings will be gathered in a single-center via the Internet of things. This will enable efficient use of energy, increase security, and meet the requests and needs of visitors in real-time. Wireless sensors to be used in hotels will allow all information (such as temperature, weather, humidity, fire alarms, etc.) to be collected and monitored on a smartphone or computer (Ercañ & Kutay, 2016: 603). Jin et al. (2014) also state that the Internet of Things technology enables the collection of important internal and external data such as reaching the tourist's location, obtaining information such as weather, road conditions, and airport traffic. Güney (2020) also states that applications such as smart hotel rooms, smart airports, smart wristbands, and smart suitcases can be given as examples of the Internet of objects applied in the tourism industry. Cho et al. (2013) state that it is possible to automatically turn off a device that is not used or consuming electricity, and this will allow the hotel to save energy by detecting the activities of the device in a hotel. Gökalp and Eren (2016) state that wearable technologies also offer personalized services to customers. In addition, Gökalp and Eren (2016) state that a child who uses RFID-enabled wrists in hotels can be able to follow his position with his mobile phone both from the camera's images and the wristband on his arm in the crowded playground. Both the Internet of things and wearable technologies are also supported by mobile communication.

Therefore, it can be stated that the use of customized and wearable technological applications in the tourism industry will be inevitable in the coming years to reduce the waiting time of the guest, to monitor their location and activities because these technologies are applications that can affect the general impression and tourists' satisfaction.

Robot Hotels

Robots are defined as electro-mechanical devices that can perform pre-programmed tasks. Thanks to various sensors that direct them, they fulfill their tasks. Robots are also defined as devices that perceive and interpret their environment thanks to sensors and act according to the decisions taken as a result. In addition, robots are devices that operate or stop motion organs as action (Ivanov & Webster, 2020: 1067). In another definition, robots are programmable mechanisms that are determined by their ability to perform the intended tasks without human intervention and operated with a degree of autonomy (Lukanova & Ilieva, 2019: 172). Ivanov and Webster (2017a) state that robots are subjected to two different classifications as industrial and service robots according to the intended applications.

Murphy et al. (2017) state that robots are divided into three categories: industrial robots, professional service robots, and personal service robots. In this context, it is stated that the robots used in hotels are service robots. These robots are designed to achieve practical goals such as supporting people with physical and social interactions and providing information to them (Tung & Law, 2017: 2500). Although robots are not widely used today, they are used by hotel businesses for different

purposes in different areas. Alexis (2017) states that robots in hotels are used to carry out various functions such as carrying luggage and providing guidance services as well as interacting with passengers. For example, the first robot hotel is Henn-na Hotel is a hotel that opened in Japan's Nagasaki Prefecture in 2015. A total of 80 robots, including arm robots carrying luggage, transporters, female robots, dinosaur robots at the reception desk, desktop robots for indoor customer service, and cleaners, serve in the hotel. The robot in the cloakroom has an electric handle that automatically stores the luggage. The female and dinosaur robot serve in the reception (main building). Guests use the touch panel next to the reception robot to advance the menu. The acceptance robot performs actions according to the button pressed by the visitor. The carrier robot carries the items/bags to the room after the visitor's procedures are completed at the reception. Cleaning robots are mostly used in common facilities such as corridors and lobbies (Osawa et al., 2017: 219). These functions reveal that the Henn-na hotel is a fully automated hotel and that almost all department work is carried out by robots.

Another example of robot hotels is the Flyzoo Hotel that Alibaba Group Holding wants to make the first unmanned hotel of the future in Hangzhou in Shanghai towards the end of 2018 (Zhong et al., 2020: 3). The hotel was built with 290 rooms using futuristic technology provided by Alibaba's online travel platform called Fliggy. In the hotel restaurant, capsule-shaped robots deliver the food that guests order with the FlyZoo application, while a large robotic arm in the bar can mix more than 20 different types of cocktails, and in-room robotics can give guests their towels. In addition, robots can handle guests' water requests and other room service requests and concierge tasks. In addition, apart from robots, there are many different high-tech applications in the FlyZoo hotel, and therefore it is considered the hotel of the future (Cadell, 2019; Carson, 2020).

Although there are examples of robot hotel applications in the world, it turns out that the examples of hotels that offer fully robotized service in a hotel are limited. Especially with the developing technology, it is stated that there will be a significant decrease in labor costs with the spread of robot workers in different departments of the hotels, and the efficiency and sales will increase in hotel activities (Ivanov & Webster, 2017b: 2). Osawa et al. (2017) state that since robots can be operated at midnight, common areas in the hotel can be cleaned not only during check-out but also at night, and this will increase the quality of service. In addition, an important function that hotel robots can perform is data collection. In the process of interacting with guests, robots can collect various information about guest preferences, guest satisfaction, guests' purchasing patterns, and other behaviors. These are factors that can help hoteliers collect valuable information and use it to design a highly personalized service, thereby increasing the number of loyal customers (Lukanova & Ilieva, 2019: 174). Robots are considered to be an important tool in the tourism industry in the transformation into the digitalization process. The advantages of robots show that robots will be preferred more widely in hotels in the future.

Artificial Intelligence (Concierge)

Artificial intelligence is described as one of the most important systemic inventions that make up today's technological revolution. It is most generally defined as a computer acting like a human (Sterne, 2017: 9). Artificial intelligence can also be expressed as systems that can copy human mental abilities such as learning, problem-solving, speaking, and strategic thinking (Mata et al., 2018: 43). Therefore, artificial intelligence that learns to solve problems is considered a technology that focuses on defining features (Fernandez, 2019: 8). Artificial intelligence is divided into three categories as artificial narrow intelligence, artificial general intelligence, and artificial superintelligence. Artificial narrow intelligence is designed to perform only certain tasks such as face recognition, voice recognition, internet searches. Artificial general intelligence is the system that can perform complex cognitive tasks that human beings can achieve. Artificial superintelligence, on the other hand, is a system that can develop abilities superior to human intelligence, such as creativity and wisdom (Pennachin & Goertzel, 2007: 1). In the tourism industry, artificial narrow intelligence and artificial general intelligence applications are generally encountered. In particular, it is seen that the usage areas of artificial intelligence technologies have increased even more with the developing technology and R&D studies. Usage areas of artificial intelligence technologies in general; (1) systems that act and think like humans, (2) expert systems (3) natural language processing, (4) robots, (5) image processing, and (6) machine learning (Adalı, 2017). Tsaih and Hsu (2018) state that it is possible to provide uninterrupted instantaneous services in tourism 24 hours a day, 7 days a week, using the natural language processing functions of artificial intelligence. In addition, they state that artificial intelligence applications such as voice customer assistants used to provide these services come to the fore. Zsarnoczky (2018) states that artificial intelligence enables reservations to be made in relation to personal preferences and aims to make travel organizations perfect according to the wishes of traveling individuals. West et al. (2018) state that artificial intelligence applications not only provide more consistent and timely services but also provide a higher service quality compared to human employees with advanced data collection capabilities, high processing speeds, and accurate personalization features. As can be seen, there are various artificial intelligence applications in the tourism industry. Savaş (2018) states that one of the artificial intelligence applications effective in the tourism industry is robotic concierge.

Similarly, Russell and Norvig (2010) state that the robotic concierge at the hotel entrances brought by artificial intelligence is one of the most important tools in creating personalized preferences for guests. Ivanov and Webster (2017b) states that hotels use AI applications to quickly perform traditional tasks such as concierge, check-in / check-out, room service, bartending, chat, and virtual voice assistance. For example, Hilton Worldwide is working with Connie, a concierge robot powered by Watson AI from IBM. This robot makes consultancy guests and advises them on local attractions or activities for tourists to do. The compact Connie locates at the hotel's reception desk, learns to interact with visitors and provide them with a

personalized experience. She can also access WayBlazer's travel information to ensure customers get the answers they need (Savaş, 2018).

Another example is the robot named SARA located in Singapore. This robot is a robotic concierge that provides tourists with information about local attractions. SARA locates a tourist using a GPS integrated module. It can provide real-time assistance and reroute (Niculescu et al., 2014; Tung & Law, 2017). In addition, a concierge robot named Mario at the Marriott in Belgium, Pepper at the Mandarin Oriental Hotel in Las Vegas, and ChiHira Kanae in Japanese hotels can be given as examples of robots serving in hotels (Lukanova & Ilieva, 2019).

Apart from hotel businesses, concierge robots also work in restaurant businesses. For example, Pizza Hut uses concierge robots in its new concept in Shanghai. These robots greet the guests with a smiling face and accompany them by showing their tables. In addition, concierge robots work effectively at airports. For example, robots advise passengers traveling at Seoul Incheon Airport in South Korea to the boarding gates. The robot named "Hitachi", which started to serve in Tokyo international airport of Japan, supports passengers in finding airline companies, shops, and restaurants within the airport and can direct the passengers. A robot guide provides service to visitors at the Deutsches Museum in Bonn, Germany. The robot called "Rhino" interactively informs the visitors about the artifacts in the museum and can transfer images by connecting to different parts of the world via the Internet (İbiş, 2019). Therefore, concierge robots help guests to check-in, provide information about hotel services, local attractions, dining facilities, weather forecasts. Artificially smart concierge robots expand their knowledge by learning new things after each interaction with guests and help guests obtain more complete and more accurate information (Lukanova & Ilieva, 2019). It can be stated that the effectiveness of artificial intelligence applications will increase with technology in the near future and will create radical innovations in the tourism industry. In particular, businesses that process and analyze data with artificial intelligence and combine machine learning with the outputs of this data will be able to be a leader in the industry by expanding the use of artificial intelligence in the tourism industry.

Chatbots

Chatbots, known as virtual agents, instant messaging bots, and chatter entities, are computer programs that can respond to text or spoken commands and questions and provide advice instead of a staff member. Chatbots powered by artificial intelligence is becoming an important customer service channel. Support smart bots can interact with customers on any channel, from websites to mobile applications and from desktop to social media (Kasinathan et al., 2020: 3). For example, the most popular version of the first chatbot developed under the name ELIZA for automatic communication is a consultancy and personal assistance application. ELIZA's main areas of use are customer service, decision-making support, state-of-the-art payment systems, and online communities. In addition, it is possible to perform transactions such as making reservations, ordering, room temperature, or lighting

adjustment with this application (Jain et al., 2018: 896; Akgül, 2019: 150). In the tourism industry, chatbots are an extremely important technological application for guests who love automatic communication, want to provide fast access to information, and do not want to waste time by contacting an employee and waiting for an answer. The application of chatbots can be made via various customer service channels (for example, on a touchscreen placed in the hotel lobby) as a mobile application or on a tablet that guests receive upon arrival.

Thanks to the chatbot technology, guests can discover information about the brand. This application allows the chatbot to recognize the messaging style of the guests and respond to their needs and personal preferences in the best way providing information about the hotel and its nearby attractions and restaurants, weather, flight schedule (Um et al., 2020; 1–2; Lukanova & Ilieva, 2019: 15–16). One of the most important advantages of chatbots is that they help improve the guest experience when communicating with the hotel. Chatbots can be used 24/7 and can serve guests of different nationalities as a multilingual application. This also contributes to reducing the workload of the staff. As the guest communicates with the chatbot during their stay at the hotel, it can help collect and examine behavioral trends of the hotel and thus improve its services. This also helps to ensure brand loyalty (Dickinson et al., 2014).

Yıldız and Davutoğlu (2020) state that chatbots have an important role in reducing costs, positioning them as a new sales channel, and increasing sales in the tourism industry. In addition, Yıldız and Davutoğlu (2020) state that, according to the results of research conducted by Google, approximately 3/1 of the travelers use chatbots for flight, hotel, destination research, and reservation issues. However, it is stated that chatbots have some disadvantages that may arise from the first stage of their use in the hospitality industry. It is stated that chatbots do not always meet the expectations of the guests. In addition, it is often stated that automatic response to a more complex request can have a negative effect. Therefore, guests should take into account that they need to make simple and precise requests in order to get the maximum benefit from chatbots. Chatbots for the hotel industry are still a relatively new technology and are mostly implemented by large hotel companies such as Novotel, Marriott, Holiday Inn, and Hyatt. Independent and smaller hotels still operate with human-provided instant messaging systems, which are a more affordable alternative financially (Lukanova & Ilieva, 2019: 15). It is seen that chatbots are used in museums as well as large hotel enterprises. In this context, chatbot “Max” in Heinz Nixdorf Museums Forum in Germany and chatbot “Object Phone” in Cooper Hewitt Museum in New York can be given as examples (Lasek & Jessa, 2013; 147–148). Chatbots in museums guide visitors by providing information as virtual museum guides. Although there are examples of applications of chatbots in tourism enterprises, it is also revealed that they are not widely used due to their cost. For this reason, it is predicted that this practice will become widespread in the coming years in tourism enterprises that will realize the advantages of chatbot applications.

Big Data

Big data is a concept used to define large amounts of data sets that cannot be analyzed and managed with traditional data processing objects (Ohlhorst, 2013: 19). In the tourism industry, the concept of big data is considered as one of the effective ways to make customer relationship management data analytical (Kudyba & Kwatinetz, 2014: 3). Big data provides the opportunity to analyze the users' economic, social and psychological digital traces in a versatile way. In this way, data of different sizes can be obtained simultaneously from many different places and samples, and also, data analysis is performed at low costs. At the same time, big data is used as an important planning tool in revealing the personal profiles of users and their changing habits and tendencies over time (Esen & Türkay, 2017: 106). Big data consists of many sources such as social media broadcasts, internet statistics, blogs, climate sensors, information from sensors, phone records obtained from GSM operators. Therefore, the processing of data collected from different sources such as social media posts, blogs on the Internet, videos, and photographs exceeds the capacity of traditional analysis methods. However, these various data need to be processed in order to make them meaningful (Demirtaş & Argan, 2015: 11). Advanced analysis techniques such as text analysis, machine learning, and data mining are used for data processing.

Tourism enterprises should manage the data they obtain well to improve service quality, create a better marketing strategy, increase efficiency and maximize profitability in today's conditions. In hotel businesses, big data analysis provides advantages such as improving customer experiences through personalization, improving marketing strategies, and providing cost and capacity optimization (Gupta et al., 2017: 477–478). Apolinski (2014) states that both hotel businesses and travel businesses can understand the basic needs of their customers by using big data analytics. He states that accommodation businesses provide products that meet their customers' expectations by analyzing the scattered data obtained from many sources. In addition, he states that travel companies make fast and reliable online reservations thanks to big data analysis and try to increase customer satisfaction by taking advantage of personal travel experiences. For example, a big data analysis system called d-LAB has been developed in Barcelona in order to ensure the interaction of the locals with tourists and to allow them to travel comfortably with a high standard, uninterrupted and wide transportation network. With this system, it is aimed to produce various visitor profiles, to prevent unwanted densities by determining visitor density maps, and to provide the correct service by revealing the travel flow diagrams of tourists (Esen & Türkay, 2017: 93–94). As it can be understood, big data analytics saves time and costs for tourism businesses and increases their efficiency. Considering that the costs of technological applications are still too high for the tourism business causes the enterprises to be reluctant to invest in new technologies. However, in today's conditions, it should be a priority to provide a competitive advantage and present products that meet customer demands and expectations by analyzing unstructured data and developing a marketing strategy (Avcı, 2015: 706).

Therefore, big data will become more important in tourism businesses in the coming years.

Cloud Computing

Cloud computing means that companies provide the applications and data storage they access from internet-based sources instead of protecting them on computers or servers of companies (Kelly & McGowen, 2010: 240). Armbrust et al. (2010) refer to cloud computing as service applications offered over the Internet and hardware and software services provided by data centers. Cloud computing consists of a server, data center, storage, and application resources on the Internet (Holtsnider & Jaffe, 2009: 210). Cloud computing technology has five basic features: self-procurement of resources, providing wide network access, sharing resources, fast flexibility, and measurable service. These features not only make cloud computing affordable, secure, easy to use, and repair but also contribute to the prominence of cloud computing compared to other computing models (Imhanwa et al., 2015: 8). Anderson and Rainie (2010) also state that most individuals will use the software applications by accessing online and shared cloud computing instead of their own personal computers or primary tools because of the five basic features of cloud computing technology. Özbilgin (2016) states that businesses using cloud computing technologies primarily gain a competitive advantage, that they reduce their hardware and software costs, and maximize business continuity and productivity thanks to cloud computing technologies.

Cloud computing also provides many advantages to tourism businesses. Tourism enterprises can scale the cloud computing infrastructure according to their storage needs and increase or decrease their area according to their business volume. It offers a wide variety of software possibilities for the travel industry, eliminating the need to develop new applications for niche market applications. These include applications such as basic booking arrangements, file sharing, travel, flight, and accommodation planning. Cloud computing is a technology that enables tourists to access websites, shared applications, and reservation systems from anywhere in the world and at any time of the day as long as they have internet access (Mastorakis et al., 2015: 17–18). It is seen that there are different cloud computing application areas in tourism and travel businesses. For example, in hotel businesses in front office applications (reservation system, check-in / check-out operations, hosted guest information management), administrative office applications (purchasing, accounting, and inventory module), guest-oriented interface applications (call recording system, energy management system, cloud computing technologies are used in assistant guest services) and restaurant and banquet management (menu management system and beverage control system) (Yazıcı & Ayazlar, 2019: 74). In addition, cloud computing shows itself in applications in hotel businesses such as access to rooms without a key, free payment possibilities, managing the resources of the hotel room as heat, light, mini bar and finding suitable hotels with rich search alternatives offered with an advanced interface, identification of the smartphone

with the near field communication feature and the use of the phone as a room key, etc. (Tekin, 2019: 133). In particular, it is seen that cloud computing technologies are used by some international travel and tourism businesses such as Thomas Cook, InterContinental Hotels Group, Lufthansa, London Gatwick Airport, and Tourism Ireland (Mastorakis et al., 2015: 18). Especially for cloud computing in the tourism industry, security concerns and connection problems cause many businesses to stay away from this technology. However, it can be stated that its use will increase in the coming years, considering the benefits it provides to tourism enterprises.

Gamification

Gamification is considered a new multidisciplinary research area, and it is predicted to be a popular future trend for the tourism industry (Xu et al., 2017: 245). Gamification is defined as a method that stimulates creativity, helps to develop new communication skills, time management, and teamwork, increases productivity and performance, and also increases the level of satisfaction and motivation of employees (Zica et al., 2017: 20). Burke (2014) states that gamification is a method that interacts digitally, and this means that players interact with computers, smartphones, wearable monitors, or other digital devices. The term gamification is also defined as the use of game design elements and game thinking in a non-game context, and it is stated that many applications for smartphones or tablets offer gamified systems (Bartoli et al., 2018: 1). Nelson (2012) states that smartphones, tablets, and cheaper technologies play a major role in the emergence of the concept of gamification, and technological developments facilitate gamification applications. Buckley and Doyle (2016) state that gamification offers individuals the opportunity to learn and gain experience by making mistakes. He also states that gamification fulfills various purposes, such as motivating individuals by making them aware that failure is not the end. In addition, Baiturova and Alagöz (2007) state that gamification is used to increase the loyalty of internal and external customers, to change the behavior of the new generation especially close to digital environments, and to increase brand awareness of businesses.

Gamification consists of three elements. These are dynamics, mechanics, and components. Dynamics generally include constraints in game design, emotions, progression structure, and storytelling technique. Mechanics refer to struggle, competition, cooperation, feedback, sourcing, rewards, chance, and winning conditions. Components include achievement, score, badge, level, and virtual products (Altuntaş & Karaarslan, 2016: 436–438). One of the most well-known examples of gamification is the Foursquare application. This application includes elements such as notifying places visited, commenting on these places, and sharing these comments using the basic elements of gamification. Badges can be obtained in different categories with the increase in frequency and repetition of the place notification (Bitirim Okmeydan, 2018: 4573).

In the tourism industry, it is seen that there are gamification applications in both hotel and transportation businesses and food and beverage businesses. For example,

Air Canada implements gamified loyalty programs to collect points by awarding rewards on every flight. Similarly, American Airlines and Turkish Airlines (QR Flags Challenge) are among the airlines that offer gamification applications. As a hotel business, Marriott My Hotel has a gamification application that aims to recruit new staff for vacant positions (Xu et al., 2013: 532; 2017: 253; Sever et al., 2015: 196). Gamification is an application currently used by the tourism industry. However, considering that gamification applications strengthen the emotional bond between customers and the business, it is expected that the importance of this application will increase in the coming years in service-oriented industries such as tourism.

3D Printing

3D printing is a technology that attracts attention from both businesses and consumers due to its innovation and some advantages. 3D printing is defined as a technological application that enables the layered creation of a structure with a direct 3D computer drawing using computer-controlled additive manufacturing techniques without human intervention (Izdebska, 2016: 33). Crampton (2017) states that an object or model must first be created in a 3D drawing or CAD (computer-aided design) program in order to manufacture an item with a 3D printer. Sun et al. (2015) state that 3D printers have many advantages due to some features such as not requiring special equipment during production, reducing labor, affecting the quality properties of the product like color, shape, and aroma, and easily adjusting the raw material content used when necessary when compared to traditional production. Due to these advantages, it is seen that 3D printer technology is used in many fields such as construction, food and automotive industry, education, medicine, industrial and architectural design.

One of the most important of these areas is tourism enterprises. Ersöz (2013) states that developing technology will bring along some innovations, such as reaching the required product simultaneously with 3D printers in hotel rooms. He also states that anything desired (such as a new dress, shoes, or even a computer) can be produced in real-time with 3D printers to be found in every hotel room in the future. Zsarnoczky (2018) states that the use of 3D printers is more common, especially in the food industry. In this context, in the concept of 3D food printing, popular sweets and flavors are synthesized with a layered printing technology using various pre-mixed powders, flavors, stabilizers, and oils stored in the printer's "toners". In addition, cookies, meat and seafood, chocolate, pasta, pizza, and melted cheese, and sauces are among the food products produced with a 3D food printer (Hao et al., 2010; Lipton et al., 2010; Sun et al., 2015). Güneş et al. (2018) state that robots are generally used in the production and service of these foods. Food Ink, which is the first 3D printer restaurant in the world, opened in London in 2016, and the smart sushi restaurant named "Sushi Singularity Tokyo" in Tokyo in 2020 can be given as examples for businesses that produce food with 3D printing (Yıldız & Davutoğlu, 2020: 307–308).

Zsarnoczky (2018) states that 3D printers can be widely used in robot hotels that provide services with robots, such as Hen-na Hotel. It is stated that the development of 3D printers contributed to the personalization of foods and personalized designs, the adjustment of nutrients according to the nutritional needs of the person, the creation of new food textures, longer shelf life of foods, and increased efficiency in supply chains (Izdebska, 2016: 36). Therefore, it can be said that 3D printing technology is a promising technology for the tourism and food industry. The use of 3D printing can support both the food industry as well as accommodation and tourism businesses in similar ways, as it can increase cost-effectiveness, efficiency, and sustainability. It is predicted that the dynamics of applied technological applications such as 3D printing will be reached in the next 30 years, which are unimaginable today in other fields, including tourism.

Apart from the technologies described above, it can be said that drones will be one of the important technological applications that will be widely used in the tourism industry in the future. It is among other predictions that drones in tourism can be “big data” collectors and that drones can be used to collect real-time data. Also, drones will be able to enhance digital marketing by taking stunning photos of travel destinations.

Impact of the COVID-19 Outbreak on the Use of Technological Applications in the Tourism Industry

The COVID-19 outbreak, which emerged in Wuhan, China, in December 2019, caused significant changes in human life with travel restrictions and border closures, isolation, and quarantine policies applied to intervene in COVID-19. According to the data of the World Health Organization, the number of coronavirus cases in the world has exceeded 88 million as of January 12, 2021. The number of people who died due to the coronavirus has approached two million as of the same date (World Health Organization, 2021). While the COVID-19 epidemic continues to affect the world, travel restrictions, which are the main measures taken by countries to prevent the spread of the virus, also affect the tourism industry. It is stated that no events in history affect travel as much as the coronavirus in the report published by UNWTO on travel restrictions originating from COVID-19, which provides information on the current status of these restrictions (UNWTO, 2021a). In addition, the COVID-19 outbreak caused between 850 million and 1.1 billion international tourist loss, 910 billion (USD) to 1.2 trillion (USD) lost revenue in export revenues from tourism and 100 to 120 million jobs to be at risk (UNWTO, 2021b). Hence, millions of people missed the chance to explore different places, cultures, and traditions due to the COVID-19 outbreak. At the same time, unfortunately, the significant positive effects of tourism such as creating employment, contributing to the economic development of countries, supporting other industries and businesses could not materialize for 2020.

Economic recession, travel restrictions, reduction of airline capacity, health and safety measures, including social distance rules, have brought the mobility of the travel industry to the point of almost exhaustion due to the COVID-19 outbreak, which is one of the biggest challenges facing the travel industry. It does not seem easy to predict a timeline for when the industry, which has not faced a disaster like the COVID-19 outbreak, will recover under epidemic conditions. According to the scenarios prepared for the effects of the epidemic, it is stated that global tourism will recover until 2023–2024, but in this recovery, it will not see the 2019 level in terms of tourism expenditures before 2023 (TURSAB, 2020). After all these disasters, people's tendency to travel safely and desire to participate in tourism activities will take time. Of course, after the COVID-19 pandemic is completely over, people will participate in tourism activities again, but when making their choices, they will prefer destinations or tourism businesses that take the highest level of precautions against epidemics. In particular, people will use these preferences in favor of tourism businesses that take health measures more with digital technologies that minimize contact.

Digitalization is an important revolution that completely changes the traditional understanding of vacation. Applications such as social media, virtual reality, augmented reality, big data, cloud computing, robots, and 360-degree videos are technologies that change tourists' expectations and show that traditional travels are coming to an end. Therefore, changing and increasing tourist expectations force destinations or tourism businesses to produce as different and continuous content as possible. In particular, the COVID-19 pandemic, which affects the whole world, causes tourism businesses to have to enrich these contents using contactless technologies. This situation shows that digitalization is now a global necessity. For this reason, tourism businesses should adapt to these innovations as soon as possible instead of fighting with digitalization innovations.

People will tend to prefer destinations or tourism businesses that are integrated with new technologies that will minimize the risk of getting sick in order to make their holidays safer and healthier due to the Covid 19 outbreak. This will highlight the necessity of contactless technologies in the travel and tourism industry. For this reason, tourism enterprises should immediately implement technological applications providing physical distance that will enable tourists to feel safe in the context of ensuring sustainability.

Tourism businesses will invest more in robotic technologies as one of the ways to maintain physical distance between tourists and employees. For example, it can be predicted that robots used to regularly clean common areas of hotel businesses, food and beverage businesses, airports, and other tourism-related facilities, meet guests, and guide and direct them will be compulsory in many tourism businesses serving almost the world. In addition to these, robots will be used more frequently as a means of delivering food to guest rooms in-room service services to prevent many people from gathering in hotel restaurants (Adim et al., 2020: 21). Similarly, robots will be one of the few alternatives that will be more widely used to perform check-in and check-out processes to reduce the physical distance between tourists and employees and thus the risk of disease transmission. With recognition

technology such as face recognition and fingerprint recognition, the use of applications for making contactless tourists check-in and check-out transactions without the need for a receptionist will increase in tourism enterprises. In addition, robots or automatic portable vehicles that can carry the luggage of tourists to their rooms will be used more widely in hotel enterprises. Thus, problems related to the COVID-19 pandemic in service quality can be prevented, and customer safety and satisfaction will be ensured.

In addition to using robots as a means of delivering meals to guests in food and beverage establishments, the use of environmentally friendly disposable plates, forks, and knives, which can be recycled with the help of technological developments, will become widespread. In addition to arranging customer areas suitable for physical distance, customer areas will be disinfected every half hour by means of robots or drones. Tourists will be able to pay for accounts without using cash or credit cards by using recognition technology in food and beverage establishments or hotel restaurants.

Internet of Things technology will be able to be used in almost any tourism business. Thanks to the Internet of Things, tourists will be able to control lights, air conditioning, and many other devices that can be used in hotel rooms with a single device (either the tourist's own phone or a portable device offered by the hotel).

Artificial intelligence chatbots will be used more, and thus, customer satisfaction can be obtained by obtaining information by chat bots to meet customer expectations in order to learn Tourists' requests, expectations, and complaints. With the effect of the pandemic, gaming applications that offer the opportunity to explore the natural beauty and other tourism products of tourism destinations digitally will be among the alternative tourism activities that tourists can prefer to experience the destinations they are curious about by reaching the feeling of actually being there with virtual reality glasses, 360-degree videos and augmented reality technology.

In summary, due to the fear and anxiety caused by the COVID-19 pandemic in people, participation in tourism activities will mostly occur in destinations that adapt to virtual applications and non-contact technological applications. People will prefer the less popular destinations with fewer crowds, shorter distances to them, and the highest precautions for the COVID-19 outbreak. In addition, they will make their vacations shorter and mostly as individual trips.

Conclusion and Recommendations

The revolutionary developments in the Internet and its subsequent information and communication technologies make a remarkable change in the tourism industry as in all other industries. In this context, the period of these developments and changes in information and communication technologies have taken the first steps in creating a digital society by bringing global competition and cooperation with it. These changes and developments in the digital society and digital technologies have also affected the production technologies and shaped them, and an industrial

transformation has been experienced over time. This transformation, defining as Industry 4.0 today, has shaped the production technologies and has been effective in the economic activities of the countries. Digital transformation in the tourism industry is important for both tourists and businesses. In this context, while tourism enterprises want to increase their operating efficiency with digital transformation elements, to increase their preference by tourists who adapt rapidly to digitalization and to provide faster and more reliable services to tourists; tourist wants to realize their experiences in the most reliable and fastest way. The tourist, who adapts to technological changes and developments, can obtain information about the destination he/she intends to travel from internet-based sites (such as social media, blogs, official websites). In addition, tourists can buy tickets or make reservations online with the ease of using the Internet without contacting travel agencies. Therefore, today's tourists increase their digital usage areas and realize their travel movements.

Despite the advantages of technological developments, some tourism service providers may be reluctant to implement technological innovations due to the fear of losing human relationships, the need to acquire new skills, and the cost of technological applications, which have long been the basis of hospitality. However, tourism businesses need to invest in new generation technologies for smart tourism. In this context, the fact that tourism enterprises offering the technology that tourists can demand increases the preference rates. Applications that respond to personalized requests and expectations in tourism enterprises are among the factors that ensure customer satisfaction. Especially the time savings and storage of information provided by information and communication technologies, which started with digital transformation, are important factors for businesses in the tourism industry. For this reason, it seems inevitable for tourism enterprises to adapt to an advanced technology infrastructure based on smart technologies in the future.

Mobile applications, reality applications, smart tourism applications, and information and communication technologies are used by many tourism companies as applications that contribute to providing personalized services to tourists and to managing customer relations in a good way. In addition, although it seems that technological applications such as robot hotels, artificial intelligence (concierge), chatbots, big data, cloud computing, gamification, and 3D printing are not used in all service processes of the tourism industry, it is predicted that the use of these technologies will increase further in the future and will create radical innovations in the tourism industry. With these technologies, tourism operations will make a superior effort to meet the demands and needs of tourists at the highest level. Businesses will speed up their production processes, reduce the use of resources and contribute to sustainability in this respect. The COVID-19 process will also bring some technological changes in the tourism industry. In particular, the fear and anxiety created by COVID-19 in individuals will enable the tourism industry to adapt to more virtual applications and non-contact technological applications.

Some suggestions can be offered in terms of technological innovations and developments for all enterprises in the tourism industry. In the tourism industry, the development of new generation technology-based applications that can be actively used in industry 4.0 projects should be provided. In addition, when evaluating the

technological applications currently used in tourism enterprises, the effects of technology on tourists, personnel, and businesses should be taken into account. Harmonizing the personnel with technology and providing the necessary training to the personnel in this regard will firstly increase the motivation and job performance of the employee, and then it will allow the enterprise to provide positive outputs on many different issues. The use of digital technology will be possible by integrating this technology into all appropriate departments. At the same time, widespread use in waste management, storage areas, laundry, and open buffets may also benefit the enterprises in question in resource management, increasing the usage areas of technological applications in hotels and food and beverage businesses in the coming years. Therefore, considering that the competition between businesses will increase even more over time and that not every tourism business will be successful in the industry, the tourism businesses of the future should benefit from technological applications as much as possible in order to combine existing resources with new opportunity areas and follow technological innovations in order to ensure business continuity. The fact that tourists expect the digital accessibility and convenience they have in their daily lives to be in the tourism businesses they receive services will make digital transformation inevitable in these businesses (Gulal 2019).

References

- Adalı, E. (2017). Artificial intelligence. *ITU Foundation Journal*, 75, 8–13.
- Adim, C. V., Amadi, S. F. S., & Konya, K. T. (2020). Technological innovation of hotel services: A COVID-19 strategic response. *British Journal of Economics, Finance and Management Sciences*, 17(2), 19–23.
- Akgül, S. Ö. (2019). Tourism 4.0 and artificial intelligence applications. In M. Sezgin, S. Ö. Akgül, & A. Atar (Eds.), *Tourism 4.0 (digital transformation)* (pp. 141–158). Detay Publishing.
- Akyani, E. (1994). Barcode technology and barcode production techniques. *Journal of Marmara Communication*, 7, 145–151.
- Alexis, P. (2017). R-tourism: Introducing the potential impact of robotics and service automation in tourism. *Ovidius University Annals, Series Economic Sciences*, 17(1), 211–216.
- Altuntaş, B., & Karaarslan, M. H. (2016). Investigation of the selected marketing cases in Turkey within the concept of gamification. *Mehmet Akif Ersoy University Journal of Social Sciences Institute*, 8(17), 433–447.
- Anderson, J. Q., & Rainie, H. (2010). *The future of cloud computing*. Pew Internet & American Life Project.
- Apolinski, L. (2014). Questions around big data. *HITEC 2014 special report*.
- Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, 53(4), 50–58.
- Avcı, E. (2015). *Big Data: A new opportunity for tourism businesses*. 1st international Turkish world tourism symposium. Kastamonu, 19–21 November, pp. 706–715.
- Baiturova, K., & Alagöz, S. B. (2007). Gamification as a tool that influences customer loyalty. *KMÜ Journal of Social and Economy Studies*, 19(33), 134–143.
- Bartoli, E., Elmi, B., Pascuzzi, D., & Smorti, A. (2018). Gamification in tourism. *Psychol Behavioral Science International Journal*, 8(3), 1–2.

- Benckendorff, P., Xiang, Z., & Sheldon, P. J. (2019). *Tourism information technology* (3rd ed.). CABI.
- Benli, T., & Kızılgın, Y. (2002). A field study on the importance of using information technology in hospitality businesses: The case of Muğla Province. *Legislation Journal*, 5(52), 3–15.
- Bitirim Okmeydan, S. (2018). Marketing came to “game”: gamification approach and examples in marketing. *Journal of Social and Humanities Sciences Research*, 5(31), 4750–4768.
- Buckley, P., & Doyle, E. (2016). Gamification and student motivation. *Interactive Learning Environments*, 24(6), 1162–1175.
- Buhalis, D. (1993). Regional integrated computer information reservation management systems (RICIRMS) as a strategic tool for the small and medium tourism businesses. *Tourism Management*, 14(5), 366–378.
- Buhalis, D. (2000). Information technology in tourism: Past, present and future. *Tourism Recreation Research*, 25(1), 41–58.
- Buhalis, D. (2020). Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: A perspective article. *Tourism Review*, 75(1), 267–272.
- Buhalis, D., & Amaranggana, A. (2015). *Smart tourism destinations enhancing tourism experience through personalisation of services*. In I. Tussyadiah & A. Inversini (eds.), *Information and communication technologies in tourism 2015* (pp. 377–389). Springer.
- Buhalis, D., & Crotts, J. (2013). *Global alliances in tourism and hospitality management*. Routledge.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the internet-the state of eTourism research. *Tourism Management*, 29(4), 609–623.
- Buhalis, D., Leung, D., & Law, R. (2011). eTourism: Critical information and communication technologies for tourism destinations. In Y. Wang & A. Pizam (Eds.), *Destination marketing and management: Theories and applications* (pp. 205–224). CABI.
- Burke, B. (2014). *Gartner redefines gamification*. Gartner. Retrieved from http://blogs.gartner.com/brian_burke/2014/04/04/gartner-redefines-gamification/. Accessed 2 Jan 2021.
- Cadell, C. (2019). *Alibaba's futuristic hotel*. Reuters. Retrieved from <https://www.reuters.com/article/us-alibaba-hotels-robots-idUSKCN1PG21W>. Accessed 5 Jan 2021.
- Carson, D. (2020). *FlyZoo Hotel: The hotel of the future or just more technology hype?* Hotel Technology News. Retrieved from: <https://hoteltechnologynews.com/2019/03/flyzoo-hotel-the-hotel-of-the-future-or-just-more-technology-hype/>. Accessed 5 Jan 2021.
- Cebeci, Z. (2006). *Information technologies in food traceability*. National agriculture convention, pp. 15–17.
- Cho, W.-T., Lai, Y.-X., Lai, C.-F. & Huang, Y.-M. (2013). Appliance-aware activity recognition mechanism for IoT energy management system. *The Computer Journal*, 56(8), 1020-1033.
- Crampton. (2017). *3D printing*. Retrieved from <https://turbofuture.com/consumer-electronics/3D-Printers-For-Food-Technology-and-Applications>. Accessed 5 Jan 2021.
- Demirezen, B. (2019). A literature review on the availability of augmented reality and virtual reality technology in the tourism sector. *International Journal of Global Tourism Research*, 3(1), 1–26.
- Demirtaş, B., & Argan, M. (2015). Big data and change in marketing: A theoretical approach. *Journal of Marketing and Marketing Research*, 15, 1–21.
- Dickinson, J. E., Ghali, K., Cherrett, T., Speed, C., Davies, N., & Norgate, S. (2014). Tourism and the smartphone app: Capabilities, emerging practice and scope in the travel domain. *Current Issues in Tourism*, 17(1), 84–101.
- Egger, R. (2013). The impact of near field communication on tourism. *Journal of Hospitality and Tourism Technology*, 4(2), 119–133.
- Ercan, T., & Kutay, M. (2016). Internet of things (IoT) applications in industry. *AKÜ FEMÜBİD*, 16, 599–607.

- Ersöz, M. (2013). *Tourism industry in the future*. Turizm&yatirim. Retrieved from <http://www.turizmyatirimdergisi.com.tr/haber-detay-622-gelecekte-turizm-sektorunu-neler-bekliyor.html>. Accessed 19 Dec 2020.
- Eryılmaz, G., & Aydın, R. (2020). The place of virtual reality and augmented reality technologies in tourism applications and marketing. *IRTAD-International Rural Tourism and Development Journal*, 4(2), 9–25.
- Esen, M. F., & Türkay, B. (2017). Big data applications in tourism industries. *Journal of Tourism and Gastronomy Studies*, 5(4), 92–115.
- Ferhat, S. (2016). Reality of the digital world, virtuality of the real world virtual reality as a digital media product. *TRT Academy*, 1(2), 724–746.
- Fernandez, R. O. (2019). *Artificial intelligence in the business of tourism: A market strategy in the UK travel distribution*. Master thesis. University of East London School of Business and Law.
- Gökalp, E., & Eren, E. (2016). Application of smart technology in tourism and hospitality sector. In V. Tecim, Ç. Tarhan, & C. Aydın (Eds.), *Smart technology & smart management* (pp. 278–287). Gülermat Publishing.
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Elektron Markets*, 25, 179–188.
- Günel, Z., & Arabacıoğlu, B. C. (2019). A current view of the use of augmented reality (AR) in space design education in the light of potentials and restrictions. *Art and Design Journal*, 23, 151–177.
- Güneş, E., Bayram, Ş. B., Özkan, M., & Nizamlioğlu, H. F. (2018). Gastronomy four zero (4.0). *International Journal of Environmental Pollution and Environmental Modelling*, 1(3), 77–84.
- Güney, B. (2020). *IoT and tourism sector*. Retrieved from: <http://www.buketguney.com/?p=215>. Accessed 13 Oct 2021.
- Guo, Y., Liu, H., & Chai, Y. (2014). The embedding convergence of smart cities and tourism internet of things in China: An advance perspective. *Advances in Hospitality and Tourism Research (AHTR)*, 2(1), 54–69.
- Gulal, S. (2019). *20 mobile apps that will make your travel easier*. Turizm Gunlugu. Retrieved from: <https://www.turizmgunlugu.com/2019/01/05/en-iyi-20-seyahat-uygulamasi/>. Accessed 14 Jan 2021.
- Gupta, K., Gauba, T., & Jain, S. (2017). Big data in hospitality industry: A survey. *International Research Journal of Engineering and Technology*, 4(11), 476–479.
- Hao, L., Mellor, S., Seaman, O., Henderson, J., Sewell, N., & Sloan, M. (2010). Material characterisation and process development for chocolate additive layer manufacturing. *Virtual and Physical Prototyping*, 5(2), 57–64.
- Holtznider, B., & Jaffe, B. D. (2009). *IT manager handbook: The business edition*. Morgan Kaufmann.
- İbiş, S. (2019). Robotics in the tourism industry. *Journal of Turkish Tourism Research*, 3(3), 403–420.
- İçten, T., & Güngör, B. A. L. (2017). Examination of recent developments and applications on augmented reality. *Gazi University Journal of Science Part C: Design and Technology*, 5(2), 111–136.
- Imhanwa, S., Greenhill, A., & Owraq, A. (2015). Relevance of cloud computing: A case for UK small and medium sized tourism firms. *GSTF Journal on Computing*, 4(3), 7–12.
- Ivanov, S., & Webster, C. (2017a). *The robot as a consumer: A research agenda*. Paper presented at the “Marketing: Experience and perspectives” conference, 29–30 June 2017, University of Economics-Varna, Bulgaria.
- Ivanov, S., & Webster, C. (2017b). *Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies – A cost-benefit analysis*. International scientific conference “contemporary tourism-traditions and innovations”, 19–21 October 2017, Sofia University.
- Ivanov, S., & Webster, C. (2020). Robots in tourism: A research agenda for tourism economics. *Tourism Economics*, 26(7), 1065–1085.

- Izdebska, J. (2016). 3D food printing-facts and future. *Agro Food Industry Hi Tech*, 27(2), 33–37.
- Jadhav, V. S., & Mundhe, S. D. (2011). Information technology in tourism. *International Journal of Computer Science and Information Technologies*, 2(6), 2822–2825.
- Jain, M., Kumar, P., Kota, R., & Patel, S. N. (2018). Evaluating and informing the design of chatbots. In *Proceedings of the 2018 designing interactive systems conference*. Hong Kong, China, pp. 895–906.
- Jankowski, P., Andrienko, N., Andrienko, G., & Kisilevich, S. (2010). Discovering landmark preferences and movement patterns from photo postings. *Transactions in GIS*, 14(6), 833–852.
- Jin, J., Gubbi, J., Marusic, S., & Palaniswami, M. (2014). An information framework for creating a smart city through internet of things. *IEEE Internet Things Journal*, 1(2), 112–121.
- Karataş, K. (2021). *Global distribution systems in the tourism sector*. Retrieved from <https://kemalkaratas.tr.gg/>. Accessed 14 Jan 2021.
- Kasinathan, V., Abd Wahab, M. H., Idrus, S. Z. S., Mustapha, A., & Yuen, K. Z. (2020). Aira chatbot for travel: Case study of AirAsia. *Journal of Physics: Conference Series*, 1529, 1–9.
- Kelly, M., & McGowen, J. (2010). *Busn (book only)*. Cengage Learning.
- Kim, H. H., & Law, R. (2015). Smartphones in tourism and hospitality marketing: A literature review. *Journal of Travel & Tourism Marketing*, 32(6), 692–711.
- Koo, C., Park, J., & Lee, J. (2017). Smart tourism: Traveler, business, and organizational perspectives. *Information and Management*, 54(6), 683–686.
- Kozak, N., Kozak, M. A., & Kozak, M. (2018). *General tourism*. Detay Publishing.
- Kudyba, S., & Kwatinetz, M. (2014). Introduction to the Big Data Era. In S. Kudyba (Ed.), *Big Data, mining, and analytics: Components of strategic decision making* (pp. 1–15). CRC Press.
- Kurgun, A., Kurgun, H., & Güripek, E. (2007). The strategic role of the global distribution system (GDS) in tourism marketing. *Dokuz Eylul University The Journal of Graduate School of Social Sciences*, 9(1), 262–274.
- Lasek, M., & Jessa, S. (2013). Chatbots for customer service on hotels' websites. *Information Systems in Management*, 2(2), 146–158.
- Law, C., & So, S. (2010). QR codes in education. *Journal of Educational Technology Development and Exchange*, 3(1), 85–100.
- Law, R., Sun, S., & Chan, I. C. C. (2019). Hotel technology: A perspective article. *Tourism Review*, 75(1), 286–289.
- Lipton, J., Arnold, D., Nigl, F., Lopez, N., Cohen, D., Norén, N., & Lipson, H. (2010). *Mutli-material food printing with complex internal structure suitable for conventional post-processing*. 21st annual international solid freeform fabrication symposium – An additive manufacturing conference, SFF 2010, Austin, TX, USA.
- Lukanova, G., & Ilieva, G. (2019). Robots, artificial intelligence, and service automation in hotels. In S. Ivanov & C. Webster (Eds.), *Robots, artificial intelligence and service automation in travel, tourism and hospitality* (pp. 157–183). Emerald Publishing Limited.
- Maraşlı, F., & Çıbuk, M. (2015). RFID technology and usage areas. *Bülent Ecevit University Journal of Science*, 4(2), 249–275.
- Mastorakis, G., Trihas, N., Mavromoustakis, C. X., Perakakis, E., & Kopanakis, I. (2015). A cloud computing model for efficient marketing planning in tourism. In *Marketing and consumer behavior: Concepts, methodologies, tools, and applications* (pp. 940–955). IGI Global.
- Mata, J., Miguel, I., Duran, R. J., Merayo, N., Singh, S. K., Jukan, A., & Chamania, M. (2018). Artificial intelligence (AI) methods in optical networks: A comprehensive survey. *Optical Switching and Networking*, 28, 43–57.
- Medaglia, C. M., Moroni, A., Sposato, S., Ceipidor, U. B., & De Rosa, Y. (2011). Design and evaluation of SIMpliLife, an NFC platform to ease day-to-day actions of people's life. *Journal of Computer Technology and Application*, 2(6), 424–431.
- Mistilis, N., Buhalis, D., & Gretzel, U. (2014). eDestination marketing of the future: The perspective of an Australian tourism stakeholder network. *Journal Travel Research*, 53(6), 1–13.

- Murphy, J., Hofacker, C., & Gretzel, U. (2017). Dawning of the age of robots in hospitality and tourism: Challenges for teaching and research. *European Journal of Tourism Research*, 15, 104–111.
- Nelson, M. J. (2012, October). Soviet and American precursors to the gamification of work. In *Proceeding of the 16th international academic MindTrek conference* (pp. 23–26). ACM. <https://doi.org/10.1145/2393132.2393138>
- Niculescu, A. I., Banchs, R. E., Jiang, R., Kim, S., Yeo, K. H., & Niswar, A. (2014). SARA-Singapore's automated responsive assistant for the touristic domain. In *INTERSPEECH 15th Annual Conference of the International Speech Communication Association* (pp. 2138–2139). Singapore: the 14th–18th September, 2014.
- Oh, C. J., Jwa, E. K., & Jwa, J. W. (2019). Development of smart tourism app using Bluetooth low energy beacons. *International Journal of Recent Technology and Engineering (IJRTE)*, 7(6), 1276–1280.
- Ohlhorst, F. (2013). *Big data analytics: Turning big data into big money*. Wiley.
- Örücü, A. İ. (2013). DataMatrix technology as a tax payment tool. *Finance Journal*, 164, 259–267.
- Osawa, H., Ema, A., Hattori, H., Akiya, N., Kanzaki, N., Kubo, A., Koyama, T., & Ichise, R. (2017). Analysis of robot hotel: Reconstruction of works with robots. In *26th IEEE international symposium on robot and human interactive communication (RO-MAN)*. (pp. 219–223). IEEE.
- Özbilgin, İ. G., Arslan, Y., & Ünver, M. (2016). Data migration to cloud computing. In V. Tecim, Ç. Tarhan, & C. Aydın (Eds.), *Smart technology & smart management*. Gülermat Publishing.
- Özoğul, G., & Baran, G. G. (2018). Overview of radio frequency identification (RFID) technology applications in tourism industry. *BMIJ*, 6(3), 461–468.
- Pan, B., & Fesenmaier, D. R. (2006). Online information search: Vacation planning process. *Annals of Tourism Research*, 33(3), 809–832.
- Parisotto, A., & Elsheikhi, A. (2020). *COVID-19, jobs and the future of work in the LDCs: A (disheartening) preliminary account*. International Labour Organization. Retrieved from: https://www.ilo.org/wcmsp5/groups/public/%2D%2D-ed_emp/documents/publication/wcms_764268.pdf. Accessed 9 Jan 2021.
- Park, J. H., Lee, C., Yoo, C., & Nam, Y. (2016). An analysis of the utilization of Facebook by local Korean governments for tourism development and the network of smart tourism ecosystem. *International Journal of Information Management*, 36(6), 1320–1327.
- Pennachin, C., & Goertzel, B. (2007). Contemporary approaches to artificial general intelligence. In B. Goertzel & C. Pennachin (Eds.), *Artificial general intelligence* (pp. 1–30). Springer.
- Russell, S., & Norvig, P. (2010). *Artificial intelligence a modern approach* (3rd ed.). Prentice Hall.
- Savaş, G. (2018). *Artificial intelligence in the tourism industry*. <http://www.tuyed.org.tr/turizm-sektorune-5-yapay-zeka-uygulamasi/>. 5 Jan 2020.
- Sever, N. S., Sever, G. N., & Kuhzady, S. (2015). The evaluation of potentials of gamification in tourism marketing communication. *International Journal of Academic Research in Business and Social Sciences*, 5(10), 188–202.
- Sigala, M. (2003). The information and communication technologies productivity impact on the UK hotel sector. *International Journal of Operations & Production Management*, 23(10), 1224–1245.
- Şimşek, E., & Cinnioğlu, H. (2020). The quick response code usage of hotels in smart tourism destinations: A research on Istanbul smart Beyoğlu. *International Journal of Management Economics and Business*, 16(3), 675–690.
- Şimşek, E., & Kızıldemir, Ö. (2019). *Use of data matrix in restaurants: A study on Beyoğlu*. 20th national – 4th international tourism congress proceedings book, 16–19 October, Eskişehir, pp. 874–880.
- Srinivasan, S., & Kumar, R. (2013). An electronics tourist assistance system with voice using RFID technology. *IJSR – International Journal of Scientific Research*, 2(5), 171–173.
- Sterne, J. (2017). *Artificial intelligence for marketing. Practical applications*. Wiley.
- Sun, J., Zhou, W., Huang, D., Fuh, J. Y. H., & Hong, G. S. (2015). An overview of 3D printing technologies for food fabrication. *Food Bioprocess Technology*, 8, 1605–1615.

- Sürtücü, Ö., & Bayram, A. (2016). Mobile marketing and use of mobile technologies in tourism. *The Journal of International Social Research*, 9(42), 2024–2032.
- Tekin, Z. (2019). The relationship between management systems and business success based on web/cloud-based technologies in hotel businesses. *Journal of International Management and Social Researches*, 6(11), 130–137.
- Townsend, A. M., Demarie, S. M., & Hendrickson, A. R. (2001). Information technology, unions, and the new organization: Challenges and opportunities for union survival. *Journal of Labor Research*, 22(2), 275–286.
- Tsaih, R. H., & Hsu, C. C. (2018). Artificial intelligence in smart tourism: A conceptual framework. In *Proceedings of the 18th international conference on electronic business* (pp. 124–133). ICEB.
- Tung, V. W. S., & Law, R. (2017). The potential for tourism and hospitality experience research in human-robot interactions. *International Journal of Contemporary Hospitality Management*, 29(10), 2498–2513.
- TURSAB. (2020). *Covid-19 Sürecinde Türkiye ve Dünya Turizmi Değerlendirmesi*. Retrieved from <https://tursab.org.tr/apps//Files/Content/6ad52b35-1dd2-41c2-9f1c-c24cc19e7a63.pdf>. Accessed 13 Jan 2021.
- Um, T., Kim, T., & Chung, N. (2020). How does an intelligence chatbot affect customers compared with self-service technology for sustainable services? *Sustainability*, 12(12), 1–21.
- Ünütvar, Ş. (2014). Use of information communication technologies in the tourism sector. *Selçuk Journal of Selçuk University Social Sciences Vocational School*, 10(1–2), 597–618.
- UNWTO. (2021a). *Tightened travel restrictions underline current challenges for tourism*. Retrieved from: <https://www.unwto.org/news/tightened-travel-restrictions-underline-current--challenges-for-tourism>. Accessed 13 Jan 2021.
- UNWTO. (2021b). *UNWTO tourism data dashboard*. Retrieved from: <https://www.unwto.org/unwto-tourism-dashboard>. Accessed 13 Jan 2021.
- West, A., Clifford, J., & Atkinson, D. (2018). “Alexa, build me a brand” an investigation into the impact of artificial intelligence on branding. *The Business and Management Review*, 9(3), 321–330.
- World Health Organization. (2021). *Weekly epidemiological update – 12 January 2021*. Retrieved from: <https://www.who.int/publications/m/item/weekly-epidemiological-update%2D%2D12-january-2021>. Accessed 13 Jan 2021.
- Xu, F., Weber, J., & Buhalis, D. (2013). Gamification in tourism. In Z. Xiang & I. Tussyadiah (Eds.), *Information and communication technologies in tourism 2014 proceedings eBook* (pp. 525–537). Springer.
- Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, 60, 244–256.
- Yazıcı, S., & Ayazlar, G. (2019). Cloud computing and tourism 4.0. In A. Kahraman & K. Sayın (Eds.), *Digital tourism: The new future of the industry* (pp. 61–80). Springer.
- Yıldız, E., & Davutoğlu, N. A. (2020). ON the road from tourism 4.0 to gastronomy 4.0: Restaurants and management of the future. *The Journal of Academic Social Science*, 8(109), 301–318.
- Yüksek, G. (2013). The role of information technologies in travel businesses and an example of global distribution systems: AMADEUS. *AJIT-e: Online Academic Journal of Information Technology*, 4(12), 17–28.
- Zhong, L., Yang, L., Rong, J., & Li, X. (2020). A complexity analysis of user interaction with hotel robots. *Complexity*, <https://doi.org/10.1155/2020/4537152>
- Zica, M., Riurean, S., Ionica, A., & Leba, M. (2017). Gamification in tourism mobile application development. *International Journal of Tourism*, 2, 20–23.
- Zsamoczky, M. (2018). The digital future of the tourism & hospitality industry. *Boston Hospitality Review*, 6, 1–9.

Index

A

Agenda 2030, 102
Analyses, vii, viii, x, xii, xiv, xvii, 6–26, 38, 58, 64, 72, 84, 92, 135, 167, 171–173, 203, 204, 206, 209–212, 215, 222, 229, 231, 232, 259, 271, 295–307, 322, 329, 334, 340–342, 358, 360, 374–379, 398, 399, 402, 417, 427, 430, 432, 434, 456
Application in tourism, 20, 25, 26, 38–48, 54–64, 110, 168, 184, 256, 328, 332, 385–386, 390, 391
Applications, v–viii, x–xviii, 3–27, 37–48, 53–65, 72, 73, 76, 83, 86, 87, 89, 91, 104, 105, 109–123, 127–142, 151–153, 157, 158, 160, 167, 168, 179, 184, 202, 203, 207, 208, 211, 212, 214, 219–236, 241–252, 256, 267–279, 284–289, 292, 295–307, 311–322, 327–343, 352, 355, 360, 368, 369, 372–375, 378, 383–392, 400, 401, 408, 412, 413, 415, 423–434, 441–464
Artificial intelligence (AI), vi, vii, ix, x, xii, xv, xvii, 4, 5, 8, 23, 39, 40, 43, 47, 57, 58, 72, 74, 76, 89, 99–102, 105, 110, 114, 115, 118, 123, 135, 148–153, 159, 160, 204, 207, 208, 221, 227, 229–232, 248–252, 256, 258, 260, 264, 328, 333–338, 350, 351, 359, 360, 368, 372, 378, 416, 417, 443, 450, 453–454, 462, 463
Asia, v–xi, xiii, xv, xvii, 13, 37–48, 53–65, 70–73, 75, 77, 78, 81–92, 109–123, 153, 158, 159, 166, 173, 193, 204, 242,

268, 287–289, 313, 315, 319, 343, 356–358, 362, 395, 396, 399, 401, 402, 407–417, 423–434

Augmented reality (AR), x, xii, xv, xvi, 4, 5, 8, 21, 23, 39, 42, 43, 57, 73, 74, 76, 86, 89, 148, 157–158, 160, 196, 221, 224–229, 232, 322, 328, 332–333, 350, 360, 368, 373, 377, 401, 431, 448–450, 461, 462

B

Bangladesh, xvi, 38, 40, 46, 47, 286, 313, 383–392
Big data, xii, xvi, 5, 8, 23, 39, 72, 85, 86, 92, 99, 110, 114–116, 122, 123, 201–215, 221, 231–232, 256, 258–260, 262, 264, 296, 322, 328, 340–342, 350, 355, 360, 368, 399, 400, 402, 407, 414, 431, 450, 456–457, 460, 461, 463

C

Content analysis, xvii, 18, 203, 204
Cooperation, xiv, 44, 61, 62, 119, 210, 215, 251, 305–307, 386, 388, 402, 414, 415, 427, 449, 458, 462
Coronavirus disease-19 (COVID-19), vi, vii, x, xiv, xviii, 38, 39, 42, 47, 74, 85, 106, 110, 117, 121–123, 129, 135, 142, 184, 188, 189, 197, 205, 220, 242, 258, 269, 284, 288, 289, 295–307, 335, 355, 356, 375, 401, 443, 460–463

Course building, 202, 214, 215
 Customer experiences, 4, 24, 27, 56, 99, 116,
 129, 135, 149, 158, 220, 221, 269, 296,
 332, 336, 342, 352, 372, 374, 378, 456

D

Data protection, 136–139
 Developments, ix–xviii, 6, 39, 40, 43, 45–47,
 54–57, 71, 73, 75–78, 82–86, 89–92,
 98–100, 116, 118, 121, 123, 131, 133,
 137, 148, 149, 151, 155, 156, 158, 159,
 166–168, 170–174, 176–179, 184, 190,
 202, 213, 215, 220–224, 227, 231–233,
 235, 249–252, 256, 258, 260, 261, 268,
 274, 276–277, 279, 284, 292, 296, 297,
 303, 304, 307, 312–316, 318–320, 328,
 332, 335, 338, 343, 351, 352, 357, 358,
 360, 362, 363, 368–370, 373, 384–386,
 388, 390, 391, 397, 399, 401, 402,
 407–417, 424, 427, 430, 442–444, 450,
 458, 460, 462, 463
 Digital, 4, 38, 55, 72, 82, 102, 115, 128, 147,
 167, 185, 187, 195–197, 199, 203, 221,
 284, 305, 314, 330, 353, 368, 384, 396,
 408, 428, 443
 Digital ecosystems, 353
 Digital tourists, xv, 367–379
 Domestic tourists, xiv, 191, 242, 301, 302,
 305, 307, 397, 401
 Dubai, ix, 41, 97–106, 110–112, 114, 115,
 117, 119, 120

E

E-commerce, 122, 174, 315, 342, 385, 386,
 429, 442
 E-marketing, v, 128–132, 141, 331, 370,
 379, 385
 Entity recognition, xiv, 297
 Ethical views, 139
 E-tourism, viii, 16, 21, 23, 24, 90, 167, 196,
 229, 256, 268, 385, 425, 429, 431,
 433, 442
 Expert interviews, 204, 205, 207

F

Facility management, xii, 242, 252
 Foundations, viii, xvii, 6, 16, 187, 202, 204,
 206, 227, 231, 290, 314, 332, 333, 342,
 385, 395, 398, 407–417, 423, 424, 427

H

Heritage tourism, xv, 189, 333,
 357–358, 362
 Hong Kong, xiii, 13, 39, 45, 47, 48,
 242, 256–264
 Hospitality, vi, vii, ix–xiii, 3–27, 55–57, 61,
 72, 98–100, 104, 106, 109–123,
 127–142, 147–150, 152, 153, 155–160,
 167, 168, 171, 173, 185, 195–198,
 201–215, 227, 248, 256, 258–262, 264,
 268, 284, 307, 315, 317, 328, 330,
 332–336, 338, 341, 363, 371–373,
 376–378, 385, 387–388,
 397, 455, 463
 Hospitality curriculum for Bachelor
 program, 201–215
 Hotel industry, x, xii, 16, 74, 134, 135, 138,
 139, 147–160, 197, 205, 208, 210,
 250–252, 287, 334, 335, 360, 455

I

ICT economy, 82
 Industry, 4, 5, 38, 54, 69, 85, 86, 104, 110,
 128, 147, 166, 184, 204, 220, 248, 256,
 268, 303, 312, 328, 355, 368, 384, 402,
 408, 424, 442
 Industry 4.0, 85, 86, 91, 232, 312, 321, 322,
 350–352, 356, 362, 463
 Information and communication technology
 (ICT), ix, xi, xiii, xv–xvii, 4, 5, 8, 21,
 23, 57, 73, 74, 76, 81–92, 98, 102, 103,
 118, 119, 166–168, 172–174, 176, 178,
 179, 185, 186, 228–230, 235, 268, 269,
 273, 274, 276, 327–343, 353, 361,
 369–373, 384–392, 409, 410, 413, 416,
 424, 429
 Information technology (IT), 12, 48, 54, 85,
 118, 174, 190, 192, 208, 220, 256, 270,
 271, 350, 362, 369, 384, 425, 443
 Innovations, vii–x, xiii, xvi–xviii, 4, 5, 15, 16,
 21, 23, 25–27, 48, 54, 58, 69–78,
 82–92, 103, 105, 114, 115, 122, 138,
 139, 142, 147, 148, 155, 156, 158, 159,
 184, 189, 204, 220, 224, 229, 258, 273,
 278, 293, 305, 307, 312, 314, 317, 318,
 333, 343, 352, 353, 360, 361, 363, 368,
 369, 371, 372, 374, 388, 391, 396, 397,
 401, 402, 408–411, 413, 414, 416, 417,
 426, 431, 454, 459, 461, 463, 464
 Intention to travel,
 297, 299–301

- Internet, v, ix, x, xii, xv, 4, 5, 15, 21, 23, 25, 38, 39, 47, 59, 71, 73–75, 85, 88–92, 99, 100, 103, 104, 113–118, 122, 129, 138, 140, 148, 155–156, 158, 160, 166, 167, 172–174, 176–178, 184–186, 189, 220, 221, 223, 227, 229, 232, 234, 256, 257, 261, 268, 270, 272, 274, 312–316, 318, 319, 328, 336–339, 341–343, 349–363, 368, 370, 371, 375, 376, 384–388, 390, 391, 407, 411, 412, 429, 431, 433, 434, 442, 444–447, 450, 451, 453, 454, 456, 457, 462, 463
- Internet of Things (IoT), 4, 73, 85, 99, 138, 148, 185, 221, 256, 336, 350, 407, 430
- Iran, xi, 38, 167, 184, 187, 189
- K**
- Kazakhstan, xi, 165–179
- M**
- Malaysia, xiii, xiv, 13, 14, 39–41, 45–47, 136, 158, 186, 283–293, 313, 341
- Managements, ix, xii, xiii, xvii, 7, 8, 13–15, 22, 24, 25, 27, 43, 46, 47, 54–58, 72, 82, 85–87, 91, 92, 98, 100, 103, 104, 115, 129, 134, 135, 141, 148, 153, 155, 157, 160, 168, 186, 189, 193, 194, 202–204, 207–212, 214, 220, 222, 223, 226, 227, 229–231, 233–234, 243, 246–252, 260, 269, 273, 274, 284, 318, 322, 328–331, 340, 341, 351, 356, 361, 362, 368, 370, 372, 374, 376, 384–392, 396, 398, 399, 401, 407–417, 428, 430, 442, 446, 450, 456–458, 464
- Mapping analysis, viii, 53–65
- Middle East, 110–123, 187, 190, 192, 358, 375
- Mobile applications, x, 5, 72, 74, 100, 105, 119, 122, 127–142, 148, 150, 151, 173, 257, 268, 269, 271, 273, 274, 314, 331, 340, 371, 386, 425, 431, 433–434, 443–445, 454, 455, 463
- M-tourism, xiii, 267–279
- O**
- Okinawa, xii, 242–252
- Overtourism, xvi, xvii, 395–402
- P**
- Privacy, 27, 39, 47, 135–141, 321, 372, 416, 433
- Promotional strategies, 208
- Property management systems (PMS), xvi, 204, 209–215, 247, 251, 252, 330, 372, 376
- R**
- Revolutionized tourism, 4, 55
- Robochat, 40, 74, 89, 100, 115, 148, 151, 152, 159, 160, 334, 359, 373, 450–460, 462
- S**
- Service quality, xiii, xv, 131–134, 141, 372, 378, 388, 453, 456, 462
- Smart tourism, xii, xiv, xvii, 5, 16, 21–24, 27, 73, 91, 118–121, 227, 229–231, 234–235, 312, 322, 368–370, 400–402, 407–417, 424–426, 428–433, 443, 450–460, 463
- Smart tourism technologies, 235, 429, 443, 450–460
- Social media, vi, x, xiv, xvii, 4, 5, 8, 16, 21, 23, 25, 27, 45, 56, 74, 83, 87–89, 91, 92, 99, 118, 139, 142, 150, 151, 193, 203, 204, 235, 270–272, 274, 275, 278, 285, 287, 296, 297, 306, 311–322, 331, 339, 340, 371, 373, 375, 377, 379, 386, 399, 400, 414, 431, 434, 442, 454, 456, 461, 463
- Sri Lanka, xv, xvi, 367–382
- “3S” technology, 222–223
- Sustainable tourism, xiii, 13, 24, 27, 39, 45, 73, 233, 267–279, 303, 304, 313, 328, 331, 392, 423, 424, 427
- T**
- Technological applications, viii, xiii, xviii, 45, 58, 70, 221–227, 232–235, 369, 374, 378, 443–464
- Technologies, v–xviii, 3–27, 37–48, 53–65, 69–78, 82–92, 97–106, 109–123, 128–135, 148–153, 155–160, 165–179, 184, 201–215, 219–236, 241–252, 256–264, 268–274, 276, 277, 284, 285, 290, 292, 293, 296, 311–322, 328–333, 335–339, 342, 350, 353–356, 358–363, 368–374, 376–379, 383–392, 395–402, 408, 409, 411, 412, 415, 417, 423–434, 441–464

- Technologies innovations, 90
- Technology adoption, 5, 6, 38, 46, 48, 59, 72, 73, 98, 105, 361, 378
- Technology innovation, 83, 90, 159, 293, 368
- Text mining, xiv, 10, 20, 89, 212, 297, 425
- Thailand, xiii, 14, 41, 45, 46, 72, 73, 159, 167, 267–279, 287, 313, 398
- Thai tourism, 274, 275
- Tourism, 4, 5, 38, 54, 69, 70, 82, 98, 110, 128, 148, 166, 202, 220, 242, 256, 268, 296, 312, 338, 356, 368, 384, 395, 408, 423, 442
- Tourism applications, 58, 61, 229, 230, 369, 425, 450, 463
- Tourism industries, v, vii–ix, xi–xviii, 4, 5, 9, 15, 24–27, 38, 40, 42, 45–48, 54, 55, 57, 58, 69–73, 75, 77, 90, 115–118, 122, 156, 166, 167, 172, 173, 184, 185, 187, 188, 190, 193, 194, 196, 198, 202, 219–236, 241–252, 256–264, 268, 269, 272, 274–276, 278, 279, 284, 287, 288, 290, 292, 296, 304, 306, 307, 311–322, 327–343, 351, 356–362, 368–370, 374, 376, 384–387, 389–392, 427, 441–464
- Tourism marketing, 14, 16, 82, 87–90, 185, 288, 384, 386–389, 391, 392
- Tourism SMEs, 361–362
- Tourism sustainability, 78, 424, 427
- Trends, vii–x, xvi, 6, 38, 45, 56, 64, 70, 72, 75, 87, 89, 115, 119, 131, 136, 141, 147–160, 166, 168, 170, 173, 191, 208, 214, 231, 276, 297, 299, 305, 312, 313, 317, 328, 329, 332–342, 350, 359, 361, 370, 375, 376, 378, 399, 401, 402, 410, 426, 433, 455, 458
- U**
- United Arab Emirates (UAE), ix, 98–100, 102–104, 110–112, 114, 117, 121, 122, 186
- UN SDG 17, 129
- V**
- Value perception, 203
- Vietnam, xv, 38, 287, 312–322
- Vietnamese tourism, xiv, 311–322
- Virtual reality (VR), vii, x, xii–xvii, 4, 5, 8, 15, 21, 24, 27, 39, 41–43, 73, 74, 76, 86, 89, 99, 118, 119, 148, 157–158, 160, 189, 196, 221, 222, 224–229, 232, 284–290, 292, 293, 321–322, 328, 332–333, 360–361, 368, 377, 378, 401, 431, 448, 449, 461, 462
- Virtual tourism experience, xiii, 283–293