Guest Editorial

Development and Trend of Information Technologies in Hospitality and Tourism

1. Introduction

Information and communication technologies (ICTs) allow dynamic communications and information dissemination at low cost and instant time. As such, they have become an indispensable part of people's lives and have brought about radical changes to the hospitality and tourism industry (Buhalis and Law, 2008). The increasing adoption and continuous improvement of ICTs in the service delivery process is no longer an option. It has become a requisite for hospitality and tourism organisations to develop and maintain sustainable competitive advantage (Buhalis, 2000a).

In the pre-Internet era, tourism organisations and destinations relied on analogue, expensive and time consuming processes to communicate with their customers. Information search was a very complicated task (Vogt and Fesenmaier, 1998). Hospitality firms managed their business processes ranging from guest reservations, to check-ins and registrations, which were conducted manually. Without the technological support, collaborations and communications among different departments and across firms have been conducted through telephone and fax, making hotel operations very labor-intensive and inefficient. Distribution to customers was carried out indirectly through intermediaries raising major dependencies on tour operators and travel agencies for all principals (Buhalis, 2000b). The adoption of ICTs in the hospitality and tourism industry came in light in the 1950s when the American Airlines first adopted the computerized reservation systems (CRS). Despite its reliance on human operations, CRS largely reduces heavy manual operations and increases productivity and efficiency of hotel daily operations (Buhalis, 1993). Later on in the 1980s Global Distribution System (GDSs) were launched as travel supermarkets. GDSs connect individual systems of different tourism firms so that travel agencies can book different services via a unified platform. At this stage, the adoption of ICTs largely varied among hospitality and tourism firms, and was mostly limited to large companies due to the high cost and expenses involved. The rapid development of technology enabled hospitality and tourism practitioners to develop their information systems to digitalize management, marketing and operations. In the hotel applications, ICTs can assist hotels in the areas of reservations, guest accounting, room management, telecommunications, safety and security, energy management, and back office. Each individual information system is linked to a central management system via network connection to facilitate both strategic and operational functions (Buhalis, 2003; Sheldon, 1997).

The proliferation of the Internet since its emergence in the 1990s has generated various strategic implications on the hospitality and tourism industry and revolutionized the business landscape of business firm (Buhalis, 1998). The most noteworthy one is the development of websites, which serve as a direct distribution channel for hospitality and tourism managers to reach their customers and conduct online marketing (Law et al., 2014).

Tourism and hospitality products and experiences are intangible in nature (Neuhofer et al., 2015). The Internet allows travelers conveniently access a wide range of information related to the service products

without any time and geographical constraints. This dramatically changed tourists' purchase behaviors, as they can make more informed decisions. The internet also changed how destinations managed and promoted themselves online through Tourism Stakeholder Networks (Mistilis et al., 2014). eCommerce and online shopping were quickly identified as a result of website quality and customer satisfaction towards purchase intentions (Bai, Law & Wen, 2008; Law, Qi & Buhalis, 2010; Qi, Law & Buhalis, 2008). Gradually a new paradigm for tourism and electronic commerce emerged in the marketplace (Cho and Fesenmaier, 2001). Soon the importance of Search Engine Marketing and Search Engine Optimisation for discoverability and distribution channel management became apparent (Paraskevas et al., 2011).

In the 2000s, Social Media revolutionised the Internet and evolved into Web 2.0. Different from Web 1.0 or traditional websites, Web 2.0 enables two-way communication between hospitality firms and customers (Leung et al., 2013). Using social media applications such as Facebook, Twitter, and TripAdvisor, customers have equal opportunities to create and spread information not only to hospitality and tourism firms, but also to other customers. This has largely shifted the power from firms towards customers and forced tourism and hospitality organisations to rethink their engagement with consumers (Xiang and Gretzel, 2010; Fotis et al., 2011). More importantly, social media enabled the development of online consumer-generated reviews, which had direct impacts on online word-of-mouth [WOM] (Yeet al., 2011; Ye et al., 2009; Zhang et al., 2010). Increasingly there is a significant relationship between online consumer reviews and business performance of hotels (Ye et al., 2009; Viglia et al., 2016). Harnessing the "Wisdom of Employees" from Online Reviews is also becoming critical for human resource management (Stamolampros et al., 2019).

Personal computers were subsequently developed into mobile devices, which have become very popular among customers as these devices are more portable and convenient, which are enabled by wireless technology. In response, hospitality and tourism firms frequently incorporate various mobile technologies into their operations. Hotels develop their own mobile applications to allow guests to perform check in, access their rooms, and communicate with service staff. Smart technologies have also been integrated into guest room design, ranging from in-room features to guest amenities. Hotel guests can adjust in-room settings based on their preferences with just a few clicks on a smart device. Currently, hospitality and tourism managers have applied a wide variety of technologies to their daily operations, such as self-service kiosks, robotics, and artificial intelligence. These technologies do not only enhance operational efficiencies and replace labor resources, but also seek to provide seamless customer experiences. At the destination, smart phones and the applications that emerged paved the wave for Social Media Context based Mobile (SoCoMo) Marketing to facilitate personalization and contextualisation of service (Buhalis and Foerste, 2015)

ICT applications in the hospitality and tourism industry have witnessed dramatic growth through smart mobile technologies. The plethora of ICT applications have thus enabled hospitality and tourism firms to reduce costs, enhance productivity, facilitate innovation, and provide customization in the service delivery process. ICTs have played, and will continue to play, a key role in the relationship between firms and consumers. Consumers are no longer passive and they seek various experiences before, during, and even after the consumption of services (Neuhofer et al. 2015). ICT applications in tourism and hospitality further transcend into more customer-centric that focus on the strategic integration of innovative technologies to facilitate co-creation of valuable customer experiences (Buhalis and Leung, 2018). Interestingly leadership, rather than technology, is the most significant driver for innovative technology adoption by tourism and hospitality organizations (Spencer et al., 2012). With smart technologies and more innovative technologies underway, smart hospitality and tourism gradually revolutionise the industry globally (Buhalis and Amaranggana, 2013; Boes et al., 2016). Hospitality and tourism managers will increasingly collect, consolidate, and analyze their consumer data to generate insights about

consumer needs, which turn standardized services into personalized experiences. Interoperable and interchangeable ICT infrastructures will increasingly enable tourism and hospitality business to use interconnected systems to maximise effectiveness and efficiency.

Because of the important role of ICT on the hospitality and tourism development, this special issue called for review papers on the progress of technology in tourism and hospitality in different specific topics to publish a collection of a number of critical review papers.

2. The papers of the special issue

This special issue received very good responses from around the world, and the guest editors are pleased to present a wide range of review papers on progress of ICT in tourism and hospitality. Readers can find review papers on different aspects such as the progress of robotic, virtual and augmented reality, smart tourism, technology acceptance, technology use, and wireless technology in tourism and hospitality. In the following paragraphs, the guest editors provide a brief overview of the papers in this special issue. These contributions provide researchers with very rich information on progress of ICT in tourism and hospitality within two decades.

2.1- Progress on robotics in hospitality and tourism: a review of the literature

The paper by *Stanislav Ivanov, Ulrike Gretzel, Katerina Berezina, Marianna Sigala,* and *Craig Webster* provides a comprehensive review of research on robotics in travel, tourism and hospitality by analysing 131 publications published during 1993-2019. This paper identifies 'Robot', 'Human', 'Robot manufacturer', 'Travel / tourism / hospitality company', 'Servicescape', 'External environment', and 'Education, training and research' as research domains. Moreover, by identifying the research gaps, this paper offers some directions for future research on robotic in tourism and hospitality.

2.2- Progress on Smart Tourism Research

The paper by *Fuad Mehraliyev, Youngjoon Choi,* and *Mehmet Koseoglu* reviews 96 articles published from 1995 to 2017 focusing on smart tourism. Smart tourism has been identified as a popular concept that focuses on sustainability and efficiency through the application of smart technologies. This paper provides identifies the smart tourism research life cycle, collaboration trends, social structure, disciplinary approaches and foundations, categorization of research topics, and methodological approaches, as well as the gaps and suggestions for future research.

2.3- Research Progress on Virtual Reality (VR) and Augmented Reality (AR) in Tourism and Hospitality: A Critical Review of Publications from 2000 to 2018

The paper by *Wei Wei* examines the main developments of virtual reality (VR) and augmented reality (AR) research in hospitality and tourism by reviewing and analysing 60 papers from 2000 to 2018. This paper synthesises the stimuli, dimensions, and consequences of VR/AR-related user behaviour experience, and the progress on the theories and research methodologies, offering a useful background concerning what remains to be achieved. Then, this paper offers some directions for tourism and hospitality research on VR and AR applications.

2.4- Analysing recent Augmented and Virtual Reality developments in Tourism

The paper by *Sérgio Moro, Paulo Rita, Pedro Ramos,* and *Joaquim Esmerado* to analyse recent AR and VR development in tourism adopts a text mining and topic modelling approach to analyse a total of 1,049

articles for VR and 406 for AR. This research shows that most of research using AR is based on mobile technology, and wearable devices still show few publications, a gap that is expected to close in the near future. Moreover, there is a lack of research adopting Big Data/machine learning approaches based on secondary data.

2.5- Progress on Wireless Technologies in Hospitality and Tourism

The paper by *Julio Navio-Marco, Luis Ruiz-Gómez,* and *Claudia Sevilla-Sevilla* reviews the progress of wireless technologies in tourism and hospitality since 2000. Wireless technologies are a set of ICTs involving radio transmission (such us mobile or satellite technologies) that are extensively used in tourism and hospitality but which have not yet been studied comprehensively. This paper opens the field to other technologies (such as Zigbee or Bluetooth), and in particular highlights the large role played by satellite technology in tourism and how this is reflected in the literature. Moreover, this study highlights the importance of wireless technologies in a sensor-based convergence between the physical and digital world.

2.6- A Bibliometric Analysis of Knowledge Development in Smart Tourism Research

The paper by *Abbie-Gayle Johnson,* and *Ioanna Samakovlis* examines the production of smart tourism knowledge thereby revealing the development of the concept through collaborative networks. This paper is useful for academic researchers and industry practitioners to aid their understanding of smart tourism research development identify the underlying context and aid in coherent development of the concept.

2.7- From sci-fi to sci-fact: The state of robotics and AI in the hospitality industry

The paper by *Lisa Cain, John Thomas* and *Miguel Alonso Jr.* reviews the extant hospitality and tourism literature on the state of robotics and artificial intelligence (AI) in the service industry. This research examines and discusses implications for internal and external customer service, legal and ethical issues, and theory. Moreover, this paper highlights the current areas of research on this emerging topic and identify areas for future application and study.

2.8- Progress on Technology Use in Tourism

This paper by *Brad McKenna, Wenjie Cai* and *Shahper Richter* provides a review of key issues which has been discussed in tourism research in relation to technology use. By applying the scheme developed in the IS discipline, this study provides new insights into the development of technology in tourism. In addition, it gives us the opportunity to suggest a research agenda by identifying research gaps and future research collaboration opportunities between these two fields.

2.9- Reviewing the progress on Information and Communication Technology in the restaurant industry

The paper by *Pilar Tejada* and *Pilar Moreno* identifies the progress of research of ICT in the restaurant industry by reviewing the main academic contributions from the area of hospitality and tourism. Given the fact that ICT in the restaurant industry remains a largely unexplored subject, this article can offer a useful tool for researchers who pursue advances in this field, by providing an overview that outlines the main aspects that need further research.

2.10- A Critique of the Progress of eTourism Technology Acceptance Research: Time for a Hike?

The paper by *Shahab Pourfakhimi, Tara Duncan,* and *Willem Coetzee* reviews 74 academic journal articles to evaluate eTourism technology acceptance literature and to illustrate current gaps in the field. This paper highlights that the majority of this research in this field have been conducted within a narrow theoretical scope, and this has led to contemporary theoretical and philosophical advancements in

understanding the psychological, sociological and neuroscientific aspects of consumer behaviour not yet being mirrored in the eTourism technology acceptance research. This paper assists researchers in developing alternative research agendas and diversifying the theoretical foundations of eTourism technology acceptance research.

2.11- Google Trends in tourism and hospitality research: A systematic literature review

The paper by *Gorete Dinis, Zelia Breda, Carlos Costa* and *Osvaldo Pacheco* conducts a review of the literature that used search engine data on tourism and hospitality research, namely Google Insights for Search and Google Trends. Google Trends data use in tourism and hospitality research has increased significantly from 2012 to 2017, mainly for (i) tourism forecasting / nowcasting; (ii) knowing the interest of users' search for tourist attractions or destinations, (iii) showing the relationship between the official tourism statistics and the search volume index of Google Trends, and (iv) estimating the effect of one event in tourism demand. This paper by reviewing the existing literature increases awareness of its potential uses in tourism and hospitality research and facilitates a better understanding of its strengths and weaknesses as a research tool.

2.12- Social Media Analytics in Hospitality and Tourism: A Systematic Literature Review and Future Trends

The paper by *Farshid Mirzaalian* and *Elizabeth Halpenny* reviews the hospitality and tourism studies that have employed social media analytics to collect, examine, summarize and interpret "big data" derived from social media. The study highlights advancements in social media analytics and recommends an expansion of approaches, not only common analytical methods such as text analysis and sentiment analysis, but also infrequently used approaches such as comparative analysis and spatial analysis.

2.13- Progress on the role of ICTs in establishing destination appeal: Implications for smart tourism destination development

The paper by *Ante Mandić* and *Daniela Garbin Praničević* analyses the role of ICTs in establishing destination appeal and reflects on implications for smart tourism destination development. The focus is on identifying and analysing technological solutions, considering six elements shaping tourism destination appeal, namely, attractions, public and private amenities, accessibility, human resources, image and character, and price. This paper provides a number of practical implications for smart destination development and suggestions for future research.

2.14- Progress on Airbnb: A literature review

The paper by *Daniel Guttentag* reviews the extant literature on Airbnb – one of the most significant recent innovations in the tourism sector – in order to assess the research progress that has been accomplished to date. By reviewing 132 peer-reviewed journal articles from various disciplines, this paper provides a concise summary of Airbnb knowledge and suggests some areas for future researches, as well this can assist industry practitioners as they adapt to the recent rapid emergence of Airbnb.

3. Conclusion

Tourism and hospitality areas have been strongly influenced by the rapid development of information technology (IT) in the last few decades (Law et al., 2014). The fast development of the Internet has tremendously revolutionized the tourism and hospitality industries (Buhalis, 2003). Using the Internet, Web 1.0, and then Web 2.0/social media environments have effectively connected the travelers and

tourists around the world from one hand, and the tourism and hospitality businesses from other hand much more than ever before (Buhalis and Law, 2008). The rapid development and adoption of IT in tourism and hospitality industries influenced on the behavior of consumers such as information search, purchase decision, and post-purchase behavior, as well as the suppliers marketing and management approaches (Law et al., 2014).

Smart systems can dynamically interconnect all stakeholders and empower a tourism and hospitality ecosystem to support value cocreation for all. Contextual information and real time services will be driving the future use of cutting edge technology for tourism and hospitality (Buhalis et al, 2015; Buhalis and Leung, 2018, Buhalis and Sinarta, 2019).

Because of the important role of IT on the hospitality and tourism development, several studies have reviewed this role. However, most of previous review papers generally focused on the progress of IT in tourism and hospitality areas, and have not focused on specific topics. Therefore, the current special issue can be consider as a collection of a number of high quality critical review papers on the progress of IT in tourism and hospitality in different specific topics. As such, the special issue aims at two audiences: academics involved in hospitality and tourism research to understand the future agenda for research in this area, and practitioners to figure out the trend of applications of ICT in tourism and hospitality industry. The special issue editors believe that this special issue can shed light on progress and application of ICT in hospitality and tourism, and open new areas for future research and investigation. The guest editors and authors gratefully acknowledge the valuable comments and encouraging support of Cihan Cobanoglu (Editor-in Chief of JHTT) during the preparation of this special issue. The reviewers also deserve the heartfelt recognition of the special issue editors for their remarkable contribution to the quality of this special issue. As usual, they were diligent, meticulous, constructive, and extremely competent.

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