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Trends, Development and Issues in Tourism Information System

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ABSTRACT. *Tourism is an essential sector in national economics, and it constantly boosted by information technology development. From the 1970s to the 2000s, tourism information system experiences three stage with the development of information and communication technology: The first stage is in 1970s. Computer Reservation System is invented, which is stimulated from the development of database and network and improves the reservation effectiveness. Then in the 1980s, the Global Distribution System was created to connect every part of tourism worldwide, which is aided from the network's development. In the 1990s, the internet emerges. Varying tourism service can be booked online. Currently, with the smart personal device and Big data technology are widely adopted, the tourism enters the smart age. Smart tourism that empowered by the Internet of thing(IoT), Smartphones, Cloud computing and big data now fully reconcile the travel experience and re-explain the travel experience. IT plays a vital central role in the travel industry. However, the development of smart tourism also have some challenges need to be resolved, such as the information governance, data privacy, internet security and the extremely technology dependence.*

KEYWORDS: *Tourism information system, Smart tourism, Big data, Machine learning, Business intelligence, Iot*

1. Introduction

Tourism can be seen as the commercial sectors in which business functions almost exclusively use information and communication technology (ICT) that have permanently boost the development of tourism. Since the 1970s, the development of tourism products and services have been converging to promoted by information technology (IT) and tourism. Tourism has become a complex system that integrates the Computer Reservation System (CRS), the Global Distribution System (GDS), the Internet, and Big Data analytics technology from the 1970s to 2010s. Smart tourism that empowered by the Internet of thing(IoT), Smartphones, Cloud computing and big data now fully reconcile the travel experience and re-explain the travel experience(Wang, Xiang, & Fesenmaier, 2016). IT plays a vital central role in the travel industry. However, the development of smart tourism also have some challenges need to be resolved, such as the information governance, data privacy, internet security and the information technology dependence.

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The rest of this report is organised as follow: Section two describes the history and trends of information system in tourism. Then section three introduce the development of tourism information system. Section four presents the issue of information system in tourism. Finally, conclusion and reference are followed.

2. History and Trends of Tourism Information System

The information system in tourism experiences three stages from the 1970s to 1990s: CRSs, GDSs and the Internet tourism (Pease & Rowe, 2005).

2.1 Computer Reservations Systems

Networks and database are matured from the 1970s, the technology development and business need foster CRSs, which are considered as the critical initiators of the Information age of tourism. A CRS consists of a central database and some remote terminal. The database manages the inventory of the tourism firm while the terminals in remote sales offices and external partners access the centre inventory, which gives intermediaries and customers the ability to book and confirm their reservations. The increasing growth of both demand and supply make the CRS quickly adopted in worldwide (Buhalis & Law, 2008).

CRSs increase tourism enterprise's control of the distribution and promotion of the tourism inventory. Moreover, they integrate all the business function and therefore can increase the tourism company's profits and competitive edges. The information in CRSs also can be mind to show the demand patterns of customers and thus provide aid in making business and marketing strategy to improve the margin and decrease the operation and communication cost (Pease & Rowe, 2005).

2.2 Global Distribution Systems

With the horizontal and vertical expanding, CRS has evaluated to Global Distribution Systems (GDSs). Compared to CRSs, GDSs not only cover other airline company on other countries, they also cover every products and service that the tour will need when travelling, such as motel booking, attraction tickets reservation, local guide and recreational vehicle(RV) rentals (Buhalis & Law, 2008) (Buhalis, 1998).

Because the GDSs satisfy and increase customer's leisure needs, allowing them booking of theatre tickets, vacation packages and tour destinations, therefore small and medium size company are emerged into leisure market to satisfy customer's need. Moreover, the GDSs will help them provide diversified services to a broader market, thereby reducing their market saturation.

By linking consumer demand to travel supply, GDS enable global customer and intermediary to distribute and manage their reservations effectively. As a result, tremendous synergies have been achieved, and the drivers of globalisation have pushed the development of GDS and vice versa. Eventually, GDS should aim to

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increase the satisfaction of every part involved in tourism(including consumers, travel agencies and shareholders), produce quality goods and maximise partners profits (Buhalis, 1998).

2.3 Online Tourism

Since the 1990s, the World Wide Web (WWW) has developed as the most important filed of the Internet. It allows users to enjoy varying service and products, like online shopping, online learning, e-banking, video meeting. The tourism also is dramatically impacted by the WWW.

Firstly, the internet, especially the social media (Twitter, Facebook, Weibo), become the primary source when customer want to purchase and plan their travel(Law, Buhalis, & Cobanoglu, 2014). The comments from Friend, even cyber partner, in social media significantly impact user's choice. Secondly, the usability and personal experience of websites also will improve user's willing of buying. Therefore, travel agents have the impetus to improve their website's usability and give users more control to customise their products. Moreover, the service provider also emphasis the smooth communicating with customers not only when users using service but also after the service due to their comments will impact other's user's choice. Notably, the online review website (like Yelp, DianPing) enlarge the user's opinion by aggregate the comments of customers.

On the other hand, from the tourism company's view, WWW become an informant marketing field, which encourages tourism companies to provide more creativity and personal service and marketing strategy.

3. Development of Tourism Information System

With the big data era coming, the machine learning and artificial intelligence technology have quickly developed, the tourism also enters the smart age.

3.1 Smart Tourism

Smart tourism is a new movement to boost the development of tourism through current emerged technology, such as Machine learning, Deep learning, Big Data, Internet of Things (IoT), RFID, and NFC etc. Commonly, through developing ICT abilities, smart tourism aims to improve information management and governance, promote the innovation of tourism service and products, improve the traveler tour experience, and, eventually, enhance and keep the competitiveness edge of tourism firms (Hunter, Chung, Gretzel, & Koo, 2015; Hunter et al., 2015; Koo, Gretzel, Hunter, & Chung, 2015). Tourism is an essential section in many countries, and for some county, it even is the primary income source. Thus, for building a sustainable developing of tourism and promoting the image in tourist, Many countries consider smart tourism as the potential developing direction in future. Therefore, it mainly

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selected as a strategic tool by many country and organisation. For example, the European Commission (2015) has considered collect and mining the travel and commute data is an important task to improve citizen's mobility and city transportation and that should put under the framework of smart city as a long-term development strategy. Another example is China have put smart tourism as an essential part of a country policy of updating the tourism industry and improving economic development with the help of information technology (CNTA, 2015; Guo, Liu, & Chai, 2014).

The innovation of smart tourism is sourced from the recent significant development of information technology, especially the technology about Big Data store, analysis and computing, which provide new possibilities to mine information and create value. With those developing of technology, more smart search, varying smartphone apps providing virtual tour guide and trip plan, online travel distribution platform, and numerous tourism-related social media are incredible grow, which make tourist make decisions more convenient and smart. Also, the development of the internet of thing makes many RFID tags and different sensor embedded in the physical environment and connect with us through mobile smartphones. Therefore, it seems to build a more hopeful view that smart tourism will bring the tourism dramatic innovation and development (Atzori, Iera, & Morabito, 2010; Taafe, J, 2014).

Besides the governments are keen to develop smart tourism, researchers also think smart tourism is high potential research direction. Buhalis and Amaranggna(2015) research by providing personalised service, the smart tourism destinations will enhance tourist experience. Bringing intelligence to a destination requires dynamic linking of stakeholders through a technology platform on which information about travel activities can be exchanged immediately. Instant messaging also create an extensive data set called big data that can be used to reveal patterns and trends through computational analysis. Smart travel destinations should make the most of big data by providing the right services at the right time to suit their preferences. Smart travel destinations can potentially enhance the travel experience by providing a more personalised product and service to meet the unique needs and preferences of each visitor because understanding the traveller's needs, wishes and wishes are increasingly vital to the competitiveness of the destination. Another research illustrates the concept and theoretical basis of smart tourism. It shows that due to the ubiquitous presence and impact of the Internet and mobile devices, new business models, new behavioural patterns and new issues related to image management and marketing of tourist destinations are emerging. It describes the constructivist paradigm and related research methods to explain how smart tourism is a form of soft power (Hunter et al., 2015). Moreover, a research provides media-induced tourism research analysis video sharing social media-induced music-induced tourism. The industry's influence includes Korean pop music and South Korean inbound tourism. The study found that consuming Korean pop music footage on YouTube is an essential predictor of South Korean inbound traffic (Oh, Ahn, & Baek, 2015). The fourth article provides a comparative analysis of the official travel websites of the SAARC (South Asian Association for Regional

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Cooperation) countries. Evaluate their performance from the perspective of promoting culinary heritage on the World Wide Web. This study reflects the relative advantages and disadvantages of SAARC tourism websites in promoting food tourism and proposes remedial measures to promote food tourism promotion through the website (Ashish & Shelley, 2015). The fifth article builds on the constructivist paradigm of tourism research and provides an image of Seoul's online destination. Empirical case study, Korea. This article explores the connection between traditional destination image projections and online destination images through print media. It also explores the relevance of specific forms of destination images by using the Q method to identify the perspective of the residents. The study calls for the more thoughtful development of the destination image in the context of smart tourism (Hwang, Park, & Hunter, 2015).

From above research, it can be found that the big data analysing method is quite helping on smart analysing every stage of tourism, including quick promotion delivery, customer buying pattern discovery, smart products and service management and so on. It trends is increasing the small and medium tourism enterprise service capability to provide personal service and products to the customer and at the same time satisfy customer’s increasing demanding.

4. Issues of Tourism Information System

Even smart tourism has many advantages, it still have some significant problems. First one is the data privacy and information governance (Tallon, 2013) Currently, all the information on tourism is considered valuable to the business and can be collected freely. However, the storage, management and analysis of Big data isn't a trivial task, and it is hard to burden for small enterprises. Due to the importance of smart tourism and the close relationship smart city, the government maybe take the responsibility to plan and manage what data is essential and valuable. Therefore, in search of smart tourism, a significant area is information governance and privacy, particularly the issues related to defining the value of information and considering the law issue of capture data from persons.

Another increasingly noticed issue is the sheer technological dependence. A tourist attraction cannot build an active smart travel experience for the tourist who does not have a specific smart device, for example, smartphone and smartwatch (Minghetti & Buhalis, 2010). However, the obstacle is not only the ability to acquire or afford. Sometimes, customers are simply unwilling to adopt, for example, smartwatch (Forbes, 2015). Besides, this ICT dependence unveils other issues, such as information overload. Sometimes, people want to evade technology when on vacation (Gretzel, 2010). Although research has conducted on how to enhance travel experience by technology, there are few researches about how to control the interfere of technology and still provide enough smart experience.

5. Summarey

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Tourism is an essential sector in national economics, and it permanently boosts by ICT's development. Since the 1970s, the database and intranet's development foster the CRS. With the network technology's development and the business need, the Global Distribution System generated at the 1980s that significantly improve the communication effectiveness. Then, from the 1990s, the development of the internet, particular WWW dramatical change tourism industry. Varying tourism service and products are put online. The internet connects customer, tourism provider and other third-party service providers closely. More small and medium truism enterprise can provide flexible and personal service to tourist. Then, the smart personal devices and Big data related technology become mature and widely adopt. The concept of smart tourism begins to shape. Smart tourism that empowered by the Internet of thing(IoT), Smartphones, Cloud computing and big data now fully reconcile the travel experience and re-explain the travel experience. IT plays a vital central role in the travel industry. However, the development of smart tourism also have some challenges need to be resolved, such as the information governance, data privacy, internet security and the extremely technology dependence.

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