

An Evaluation on Smart Tourism*

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Tourism is a sector directly and indirectly linked to technological developments for the cause of increasing customer satisfaction, providing competitive advantage, and protecting the environment. It seems that technology has been used in tourism industry to adopt innovations in information and communication technologies. In this direction, smart tourism concept has emerged in recent years as a new approach based on technology and environment. Although there are various definitions in the literature, it is seen that a common definition of the smart tourism concept does not exist yet. The purpose of this research, which is a literature review, is to contribute to the creation of a common definition in the literature by examining different definitions in the literature. In this context, the literature on the concept of smart tourism has been searched and the common aspects mentioned. Information and communication technologies and smart destination concepts are seen as the foreground in the descriptions and explanations made for smart tourism. It can be observed that mobile applications, smartphones, social media, and the Internet are highlighted when environmentalism is ignored in smart tourism definitions, which are evaluated within the scope of information and communication technologies. According to the definition made by the World Tourism Organization, environmental awareness must be included in the definition of smart tourism.

Keywords: smart tourism, smart destinations, smart city, sustainable environment

Introduction

Technological innovations are on the ground of new approaches and innovative business models in the tourism industry. Computerized Reservation Systems (CRS) created in the 1970s, Global Distribution Systems (GDS) emerging at the end of the 1980s, the introduction of the Internet in the 1990s, and the mobile technologies in the 2000s are among the most important technological innovations (Werther, Koo, Gretzel, & Lamsfus, 2015). In recent years, advances in information and communication technologies have caused radical and unexpected changes in societies. Especially, since the emergence of the Internet of Things (IOT), travel and tourism have been most commonly transformed sectors (Chiappa & Baggio, 2015). It can be said that this transformation facilitates the collection and storage of information about tourists in terms of tourism stakeholders. For example, chips embedded in tourists' tickets allow tour operators to track their locations and

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buying behaviors (Buhalis & Amaranggana, 2014).

Technological developments affect tourism development in terms of sustainability as well as the storage of data about tourists. Technological sustainable development in tourism is considered in two dimensions. The first is the development of products with technologies that provide effective resource management in all the sub-sectors (transportation, accommodation facilities, etc.) that form tourism. The second is developments in information technologies that facilitate information sharing on a global scale (Şanlıöz-Özgen, 2016). The effectiveness and importance of the concepts, like Cloud Computing, Internet of Things, data mining, and artificial neural networks, which are the basis for storing and analyzing large data, are increasing day by day. Cloud Computing and the Internet of Things are at the forefront of these concepts, which are also called large data technologies (Çiğdem & Seyrek, 2015). These technologies can affect the buying process of individuals more and more every day. It is unthinkable that the human-focused tourism sector ignores developments and practices in information technology.

Smart Tourism

Smart tourism has been dealt with in three ways on the basis of sustainability at international conferences organized by the United Nations World Tourism Organization (UNWTO, 2017). The World Tourism Organization first defined smart tourism as the clean, green, ethical, and high quality of service in every level of service. In the second approach in 2015, the concept appears to be explained by including information and communication technologies and the concept of intelligent destination¹. In 2017, it is stated that the concept considered as smart destinations constitutes the future of tourism development. Smart destinations have been defined as intelligent, sustainable, and competitive tourism destinations using data-linked resources, such as geo-referenced data, large data, and the Internet of Things, where all stakeholders are involved².

Smart tourism includes smart tourism experiences that enable tourists to communicate and interact more closely with local residents, local businesses, local government, and tourist attractions in cities. However, smart tourism refers to a new smart tourism economy with new sources, new players, and new exchange models (Gretzel, Zhong, & Koo, 2016). Wang (2014) dealt with the concept of smart tourism together with all the components of the tourism industry. In this context, smart tourism functions are described in the cycle of smart service, smart guide, smart shopping guide, payment settings, service line, and smart destination management. Within the specified cycle, smart tourism functions include transactions, such as online or credit card payment, traffic flow, weather information, and registration of tourist movements.

Chiappa and Baggio (2015) emphasized that the necessity to combination of real and virtual components is not new, but that digital business ecosystems have been conducted at tourism-related studies in recent years. Guo, Liu, and Chai (2014) pointed out that smart tourism is shaped by the Internet of Things, mobile communication, Cloud Computing, and artificial intelligence technologies. In a similar approach, smart tourism elements have been identified as Cloud Computing, Internet of Things, mobile communication, and artificial intelligence technologies (Wang, Li, Zhen, & Zhang, 2016), while another study has indicated that information

¹ World Summit On Sustainable Tourism + 20. Available online: https://www.skal.org/sites/default/files/media/Public/Web/PDFs/ 1015_peterclaesen_english.pdf (accessed on 2 April 2017).

² 1st UNWTO World Conference on Smart Destinations, Murcia, 15-17 February, 2017. Available online: http://sdt.unwto.org/sm artdestinations (accessed on 3 April 2017).

and communication technologies alone are not sufficient to describe the smart concept. In this context, smart tourism is explained by the importance of sustainable competitive advantange in tourism destinations, as well as the harmony between knowledgeable people and interconnected and cooperating technological systems (Boes, Buhalis, & Inversini, 2016).

Along with the approaches mentioned, there are also some studies explaining smart tourism by limiting it to Internet, social media, and smart phone applications (Wang et al., 2016; Brandt, Bendler, & Neumann, 2017; Park, Lee, Yoo, & Nam, 2016; Chung, Tyan, & Han, 2016; Kladou & Mavragani, 2015; Huang, Goo, Nam, & Yoo, 2017; H. C. Kim & Y. S. Kim, 2016; Tussyadiah & Zach, 2012; Noone, McGuire, & Rohlfs, 2011). Another noteworthy aspect of the studies is necessity to make smart tourism technologies portable. Internet and smartphone applications are important because they provide this mobility (Zacarias, Cuapa, Ita, & Torres, 2015; Koo, Shin, K. Kim, C. Kim, & Chung, 2013). The smart tourism ecosystem is defined by Gretzel, Werthner, Koo, and Lamsfus (2015) as a tourism system characterized by intensive knowledge sharing and value creation, utilizing smart technology in creating, managing and delivering intelligent tourist services/experiences, as well as evaluations on technological developments (Gretzel, Werthner, Koo, & Lamsfus, 2015).

Although there are various definitions of smart tourism in the literature, there is no commonly accepted definition for the concept and it is stated that the concept can be used incorrectly (Gretzel, Sigala, Xiang, & Koo, 2015; Yoo, Goo, Huang, Nam, & Woo, 2016; Li, Hu, Huang, & Duan, 2017). For example, smart tourism can be confused with e-tourism because information and communication technologies, information systems, and social media concepts in smart tourism are also important for e-tourism.

With the development of information and communication technologies, e-tourism has emerged as a result of integration of global distribution and central reservation systems in tourism with web-based technologies. E-tourism has improved due to widespread use of social media and tendency towards mobile tourism. Smart tourism is seen as the last stage in the development of information and communication technologies that include an ecosystem that is physical and includes experiences of destinations, businesses, and individuals as well as state. In this respect, smart tourism is mainly distinguished from e-tourism by the integration of information and communication technologies with the physical infrastructure. Other main differences that distinguish smart tourism from e-tourism are: sphere, core technology, travel stage, lifeblood, paradigm, structure, and exchange (Gretzel et al., 2015). The differences between e-tourism and smart tourism are shown in Table 1.

Dijjerences Deiween E-tourism und Smart Tourism		
	E-tourism	Smart tourism
Sphere	Digital	Bridging digital and physical
Core technology	Websites	Sensors and smartphones
Travel phase	Pre- and post- travel	During trip
Lifeblood	Information	Big data
Paradigm	Interactivity	Technology-mediated co-creation
Structure	Value chain/intermediaries	Ecosystem
Exchange	B2B, B2C, C2C	Public-private-consumer collaboration

Differences Between E-tourism and Smart Tourism

Table 1

Source: Gretzel, Sigala, Xiang, and Koo (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179-188.

On the light of information given in Table 1, there is a business and customer-based transformation for e-tourism while it is seen that state is included this transformation in smart tourism. In addition to this stituation, it seems that the smart tourism process contains not only pre-travel and post-travel stages, but also during the travel stage, like e-tourism (Gretzel et al., 2015; Yoo et al., 2016). Huang, Goo, Nam, and Yoo (2016) evaluated this process as pre-trip search, booking, payment, and providing desired access and facilitating connection through the use of smartphones, Internet, and other technologies during vacation (Huang et al., 2017), while Buhalis and Amaranggana (2014) dealt smart tourism process with three stages as before, during, and after the vacation. While arragments are being planned for tourists by gathering information from user profiles in the pre-vacation period, tourists discover the destination with real-time information access during the vacation and feedback is received directly from the tourists by personalized services. The post-vacation process allows tourists to take a holistic view of the tourism experience through feedback system, and at the same time, allows stakeholders to make an evaluation for the future through feedback.

It is seen that studies in the literature emphasize the concept of smart destination with the improvements in information and communication technologies. Smart tourism seems to be used to express smart destinations, which are a special part of smart cities. In this context, studies are being carried out to improve the quality of life of the local people, and at the same time, to increase the quality of visit by tourists by applying smart city policies and infrastructure system to urban or rural areas.

Smart City

Concepts such as "digital cities", "virtual cities", "information cities", and "cyber cities" have come to the forefront together with information societies in the 1960s, 1970s, and 1980s (Angelidou, 2014). Smart city concept has been developed to make cities, that consume more than 75% of the world's energy and produce 80% of the greenhouse gas emissions, more technological, interconnected, sustainable, comfortable, attractive, and reliable (Lazaroiu & Roscia, 2012). According to another approach, the purpose of the development of a smart city concept is to enhance the people's quality of life by providing advanced and innovative services supported by ICT systems (Piro, Cianci, Grieco, Boggia, & Camarda, 2014). For instance, a recommending application that shows shops near to user on the mobile phone would be useful for newly opened or recent stores to reach potential customers and to advetise new products. In addition, all shoping options would be available quickly and easily through only one application for the users (Boukhechba et al., 2017).

European Commission describes the smart city concept as a model in which six characteristics of smart economy, smart people, smart governance, smart mobility, smart environment, and smart living³. The model is shown in Table 2 together with its subcomponents. According to the information in Table 2, although tourism is located under the head of intelligent life as tourist attraction; tourism is related to the other five, as it is a sector linked to issues, such as transportation, environment, and competition.

Buhalis and Amaranggana (2014), who evaluated smart tourism under smart city components, combine smart people, smart mobility, and smart environmental categories with smart tourism concepts (Buhalis & Amaranggana, 2014). Furthermore, P. Liu and Y. Liu (2016) explained smart tourism based on the Internet of Things, Cloud Computing, mobile communication, and artificial intelligence technologies. Guo et al. (2014) had considered smart tourism as an important and applicable part of smart city formation.

³ Centre of Regional Science (SRF), Vienna University of Technology in October 2007.

AN EVALUATION ON SMART TOURISM

Factors of a Smart City

Smart economy (competitiveness)	Smart people (social and human capital)	
Innovative spirit	Level of qualification	
• Entrepreneurship	Affinity to life long learning	
 Economic image and trademarks 	 Social and ethnic plurality 	
Productivity	• Flexibility	
Flexibility of labour market	Creativity	
International embeddedness	Cosmopolitanism/Openmindedness	
Ability to transform	Participation in public life	
Smart governance (participation)	Smart mobility (Transport and ICT)	
Participation in decision-making	Local accessibility	
Public and social services	• (Inter-)national accessibility	
Transparent governance	Availability of ICT-infrastructure	
 Political strategies and perspectives 	Sustainable, innovative, and safe transport systems	
Smart environment (natural resources)	Smart living (quality of life)	
Attractivity of natural conditions	Cultural facilities	
Pollution	Health conditions	
Environmental protection	Individual safety	
Sustainable resource management	Housing quality	
	Education facilities	
	Touristic attractivity	
	Social cohesion	

Source: Centre of Regional Science (SRF), Vienna University of Technology in October 2007.

Smart Tourism Destination

Gretzel, Sigala, Xiang, and Koo (2015) considered smart tourism destination as a component of smart tourism. While smart experience and smart business are being other components; data processing, exchange and accumulation have been evaluated as smart tourism layers. The concept focuses on management, stakeholders, tourist experience, and competition issues, when information and communication technologies, information systems, and social media are considered important mechanisms (Chiappa & Baggio, 2015). In this respect, the purpose of the smart destination is to increase competition and to increase the quality of life of all stakeholders, including local people and tourists (Buhalis & Amaranggana, 2014; Gretzel et al., 2016; Boes et al., 2016; Caragliu, Bo, & Nijkamp, 2011).

Buhalis and Amaranggana (2014) and Wang, X. Li, and Y. Li (2013) examined smart tourism destinations in three ICT categories: Cloud Computing, the Internet of Things, and the End User Internet Service System (Buhalis & Amaranggana, 2014). Cloud Computing is designed to reach to reliable network platforms and data warehouses on a specific network. Cloud Computing increases information sharing that is the basis of smart tourism destinations. The Internet of Things is that everything is connected to each other via the Internet without time, space, and entity limitation. Internet of Things has emerged from the idea that Radio-Frequency Identification (RFID) tags, sensors, actuators, mobile phones, etc. objects or entities have been widely available to interact with each other through special addressing programs and to achieve common goal by environmental cooperation (Atzori, Iera, & Morabito, 2010). H. C. Kim and Y. S. Kim (2016), evaluating smartphones as the basic formation of this component, exemplified the fact that energy consumption can be controlled by a smart energometer based on the Internet of Things and thus enable energy saving.

The third component of smart tourism destinations, the End User Internet Service System, comprises

number of applications at various levels based by the combination of Cloud Computing and the Internet of Things. Byun, Kim, Ko, and Byun (2017) emphasized the importance of the Internet of Things among these components for the smart tourism concept (Byun, Kim, Ko, & Byun, 2017; Nitti, Pilloni, Giusto, & Popescu, 2017) considered the Internet of Things as the most basic element of smart tourism within the smart city (Nitti, Pilloni, Giusto, & Popescu, 2017). Huang, Goo, Nam, and Yoo (2016) examined smart tourism technologies by considering all types of online tourism applications and information sources, such as online travel agencies, personal blogs, social media, smartphone applications, government and business web sites, and so on. In this respect, smart tourism technologies have a significant impact on the overall travel experience. In a similar study evaluating online tourism applications, emphasizes the quality of information, the reliability of source, interaction and importance of accessibility in smart tourism technologies (Yoo et al., 2016).

Environmental Consciousness

The tourism sector can affect negatively the ecological system and living areas by increasing energy and water consumption and creating liquid and solid wastes. Sustainable development and environmentally conscious approaches have also led to differentiation in tourist preferences especially in the 1980s (Tanrıverdi, 2016; Güneş, 2011). Sensitivities to the ecosystem's protection have increased and eco-friendly behavior and practices have begun to increase. Especially, after the 2008 global economic crisis, environmentally friendly tourism has gained importance (Güneş, 2011). Different applications for more efficient and rational use of existing resources have begun to be widespread at local and global dimensions. The spread of environmental practices is ensured in favour of various certifications and incentives. In this context, international certifications, such as Green Globe and Green Key, and national certifications, such as green stars provide environmentally friendly participation of enterprises and informed consumers about environmentally sensitive companies.

Along with the developments in information and communication technologies, environmentally sensitive tourists can easily reach information about the environmental values of holiday destinations and service providers. In this direction, tourism enterprises increase the number of high environmentally conscious tourists by environmentally friendly practices and then meet the needs and demands of this environmentally friendly population (Ayaş, 2007). The adverse impacts of tourism on the environment can be reduced by technological developments, environmental policies and measures taken by management (Buckley, 2012). It is very important that environmental awareness and sensitivity education should become widespread among managers and employees in tourism industry. Information technology is also known to help control environmental resources and reduce energy consumption (Gössling, 2017). In this context, the use of sensors and light sinks, the use of minimum energy-consuming machines, the use of timed and remote-controlled heating, cooling, and irrigation systems are examples of the contribution to the sustainable environment of information technology. Today, information technology is indispensable in ensuring environmental awareness.

Conclusion

In this study, the various definitions and contents of smart tourism concept are examined in detail and the common expressions in the definitions are emphasized. In the definitions and descriptions in the literature, information and communication technologies and smart destination concepts have come to the forefront. Mobile applications, smartphones, social media, and the Internet are used in the definition of smart tourism

which is evaluated within the scope of information and communication technologies. For this reason, meaning of smart tourism is confused with e-tourism. In the definitions, it is seen that information technologies are focused, but environmental problems in cities and destinations are overlooked. Considering that the environment has turned into a serious problem in the society and the green practices towards the sustainable environment are spreading, it has come to the conclusion that environmental awareness should be included in the definitions of smart tourism, smart city, and smart destination in accordance with the definition of World Tourism Organization.

In this context, it is inevitable that the stakeholders as primarily the components of the destination, are smart technology-friendly. It can be said that smart destinations may actualize by applying and spreading of the above mentioned smart applications in enterprises especially to tourism enterprises. On the one hand, businesses in the destination are encouraged to be technology and environmentally friendly; on the other hand, the public and non-governmental organizations in the destination must also take priority in applying smart technology applications and encouraging conservation of waste in order to protect the environment, use of renewable energy. There is no doubt that educated and dynamic workforce has an important influence on the emergence and maintenance of smart destinations. For this reason, it is very important to raise the awareness of employee in the frame of total quality understanding.

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