Smart Tourism Cities and Sustainability

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As the tourism sector is suffering the disastrous impact of COVID19, new prospects will naturally emerge; this paper explores the potential of technology and IT platforms for the industry, specifically focus is on smart technologies that are changing consumer experiences and generating creative tourism business models. Smart tourism facilitates new ways of managing tourist flows, offering better tourist services, new advertising models and new collaborative ventures that build on cloud services and open data to innovate beyond the boundaries of traditional industry. The main aim of this review article is to examine and analyze the characteristics of smart tourism cities and the potential place of sustainability as a tool for the effective management of environmental systems and urban society. The subordinate questions are: What mutual ties may exist between the characteristics of smart cities and smart tourism? In addition, what is the place of sustainability in smart tourism cities and how can smart tourism cities use "smartness" technologies for better environmental and social management of tourism in the city? The article makes use of secondary research methodology and is based on an analysis of diverse studies on issues of smart cities, smart tourism, and sustainability in smart tourism cities. What emerges is that the concept and models of smart cities fits well with the idea and framework of smart tourism. They overlap and complement each other. The sustainability factor constitutes a central element in the essence of smart city tourism. Several important challenges can apparently be met through the use of smart technologies and applications for both better management of tourism space through smart city tourism and for monitoring and managing environmental elements.

Keywords: *urban tourism; innovation; smart cities; smart tourism; sustainable tourism; Covid 19.*

INTRODUCTION

Information and communication technologies (ICTs) are important and significant elements for the changing society of today. The smart tourism agenda is developing in parallel with smart cities. In both cases, emphasis is on smart technologies that change consumer experiences and generate creative business models. Cloud

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computing, big data, mobile apps, location-based services, geo-tag services, beacon technology, virtual reality, augmented reality, and SNSs (Social Networking Services) are all cutting-edge examples of smart technologies for enhancing tourism experiences and services (Wang et al., 2012). Expanding tourism demand, which might reach 1.8 billion international tourist trips in 2030, in addition to 10 to 12 billion trips in domestic movement (UNWTO, 2017), is generating a considerable ecological impact. There are distinct similarities between tourism trends and the growth of the world's population with its increasing concentration in urban environments: by 2050, 66% of the planet's inhabitants are expected to live in urban areas. Approaches to this urban management challenge emerge largely through the smart city perspective, which sets a clear precedent for smart tourism destinations (STDs) (Perles and Ivars, 2018).

The main objective of the article is to examine and analyze the characteristics of smart tourism cities and the potential place of sustainability in city tourism as a tool for the effective management of environmental and social systems in the city. The subordinate questions are: What mutual ties exist between smart cities and smart tourism? What is the place of sustainability in smart tourism cities and how can smart tourism cities use "smart" technologies for better environmental and social management of tourism in the city? Secondary research methodology is employed and is based on the analysis of existing studies on smart cities, smart tourism and sustainability in smart tourism cities.

The first part of the article relates to the connection between the development of urban tourism with its varied complex challenges, and integration of the idea of smart cities. The article then defines and analyzes issues connected to smart tourism and smart cities, as well as elements connected to sustainability and its potential for ensuring balanced management of tourism activity in the city. The conclusion discusses the ramifications of the findings for planning and developing smart tourism in smart cities. They also address new challenges facing contemporary tourism, such as those caused of late by the COVID 19 pandemic. This research is of significant importance, in light of the many challenges facing tourism cities worldwide. These cities have to cope with major problems resulting from the intensive growth of tourism movement with its potential to disrupt the fine balance between tourism, society and environment in urban areas.

URBAN TOURISM AND SMART CITIES

Urban tourism is distinguishable from other forms of tourism by the many different purposes tourists have for visiting the cities other than leisure. These include business, conferences, shopping, and visiting friends and relatives (Edwards et al., 2008). The nature of urban tourism is determined not only by the characteristics of the tourism product, but also by the city's economy and population size (Shoval,

2006). The phenomenon of urban tourism has grown in importance since the 1980s. Increase in disposable income, non-work time and consumption preferences have created a demand for new forms of holidays (Hall & Williams, 2008), such as visiting prominent city destinations. City tourists seek distraction from their daily routine in the form of attractions that can offer them entertainment, special experiences of local history and culture (Fainstein & Judd, 1999). In a globalizing world, destinations can no longer bank on their traditional visitors or ignore growing competitive pressures. As a result, both well-established and emerging tourist destinations must manifest innovation in order to increase their attractiveness (Halkier et al., 2014). The competitive tourism market is characterized by high turbulence and rapid changes. To compete effectively, tourism firms must be highly innovative in offering new high-quality products that meet customer demand (Alsos et al., 2014). As a result, tourism policy increasingly focuses on the promotion of innovation (OECD, 2006) and it is within this process that the agenda of smart cities holds a significant place.

The term 'smart' today generally denotes technologically-embedded services and products. In many cases, ICTs (Information Communication Technologies) lie at the actual core of the smart city concept (Nam and Pardo, 2011; Su et al., 2011; Boes, et al., 2015). Smart cities are described as urban areas in which a wide range of electronic and digital applications operate in the communities; information technology helps to transform life and work within a region; and ICTs and people work together to enhance innovation, learning, and the production of knowledge (often with university involvement) (Komninos, 2002). Cities can be defined as smart "when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance" (Caragliu et al., 2011, 70).

ICTs alone do not determine the success of smart cities. Equally important are innovation, creativity, human capital, and the ability to accentuate the attractiveness of products and services. Nam and Pardo (2011) emphasize the importance of a knowledgeable workforce, collaborative spaces, innovation, and social capital. A smart city can be perceived as a holistic linked system where people, both visitors and citizens, constitute the most important aspect (Kanter and Litow, 2009). The smart city concept does not stand on its own, and encompasses a variety of industries, including the tourism industry (Guo et al., 2014). Over the two last decades the term 'smart cities' has been discussed largely as a potential way to improve the lives of urban inhabitants (Albino et al., 2015). Art and media have been identified as elements of smart regeneration in many cities (Florida, 2005); cities like New York, London, Paris, Amsterdam and Tokyo rank high in smart cities indices (IESE, 2019). The city of Reykjavik (Iceland), which ranked fifth in the IESE index, as highly attractive to IT (information technology) companies, is also emerging as an urban tourism phenomenon.

SMART TOURISM CITIES

Smart tourism facilitates new ways to manage tourist flows, improves tourist services, creates new advertising models and new collaborative ventures that build on cloud services and opens data to innovate beyond traditional industry boundaries (Gretzel et al., 2016). Smart tourism also refers to smart destinations (Buhalis and Amaranggana, 2014), which are special variants on smart cities. They are urban or rural areas that apply smart city principles and infrastructure, and harness big data not only from residents but also from tourists in their efforts to support mobility (Hannam, 2019), resource availability and allocation, sustainability, and quality of life/visits. In addition, smart tourism involves smart tourism experiences, which provide tourists with better communication and interactions in cities, allowing them to establish closer relationships not only with residents but also with local businesses, local government, and city attractions. In addition, smart tourism refers to a new smart tourism economy with new resources, players and exchange models and it might support city development and services.

The synthesis between smart cities and smart tourism makes sense given the shared high needs for infrastructure and the high concentration of other resources and users (Gretzel et al., 2016). Many tourism cities offer free Wi-Fi and easily identifiable tourism precincts. The variety of tourism experiences available within relatively small areas further contributes to the viability of smart tourism initiatives in cities. Cities can serve as testbeds for smart tourism efforts before rolling them out on a larger scale. City tourism itself is experiencing unprecedented highs and growth potential (UNWTO, 2012). With shorter and more frequent trips becoming more popular, cities emerge as optimal destinations offering compelling experiences to increasingly sophisticated and demanding travelers seeking to satisfy a wide variety of needs. Support for smart tourism comes from travelers and from the industry, as well as from destination marketing organizations (DMOs) that seek to fulfill important roles of coordination, facilitation and governance within smart tourism ecosystems (Oates, 2016). Actually, it is not farfetched to postulate that smart tourism re-empowers the DMOs in terms of structuring and marketing/branding the smart city tourism experience (Gretzel et al., 2016).

Cacho et al.'s (2016) analysis of a unique case study of a mobile tourist guide supporting a smart city initiative in Brazil adds a Latin American perspective and explores the design of a specific mobile app within a larger smart city initiative. It illustrates the business intelligence infrastructure and tourism information system needed not only to provide such a tool but also to take advantage of it in terms of eliciting market intelligence and managing city resources effectively. It also illustrates the interdisciplinary nature of smart city tourism development and research, as it integrates computer science, social sciences, engineering and the planning needed to drive smart city tourism projects forward.

Gretzel et al. (2015) describe three components of smart tourism: smart destination, smart experience and smart business. Smart cities (the smart destination)

provide mobility, resource allocation and sustainable quality of life to their residents, and further facilitate tourism with integrated smart surroundings, thus enhancing the experience of visitors (smart experience) (Lee et al., 2020). Smart business refers to the complex business ecosystem of dynamically interconnected stakeholders and the exchange and co-creation of touristic resources. These three components interrelate with three additional layers of data-related factors: layer of smart information data collection; layer of smart exchange to aid interconnectivity, and a layer of smart processing, analysis, visualization, integration and intelligent use of data. The essential components of smart tourism are: transportation, accommodation, gastronomy, attraction and auxiliary services. The smart tourism experience is based on a concrete smart business ecosystem at a destination that operates through data sharing among stakeholders. This refined model reflects the more nuanced and individual smart travel experience and eliminates certain potential data factors, such as 'available package,' and adds others, such as 'gastronomy' (see Figure 1).

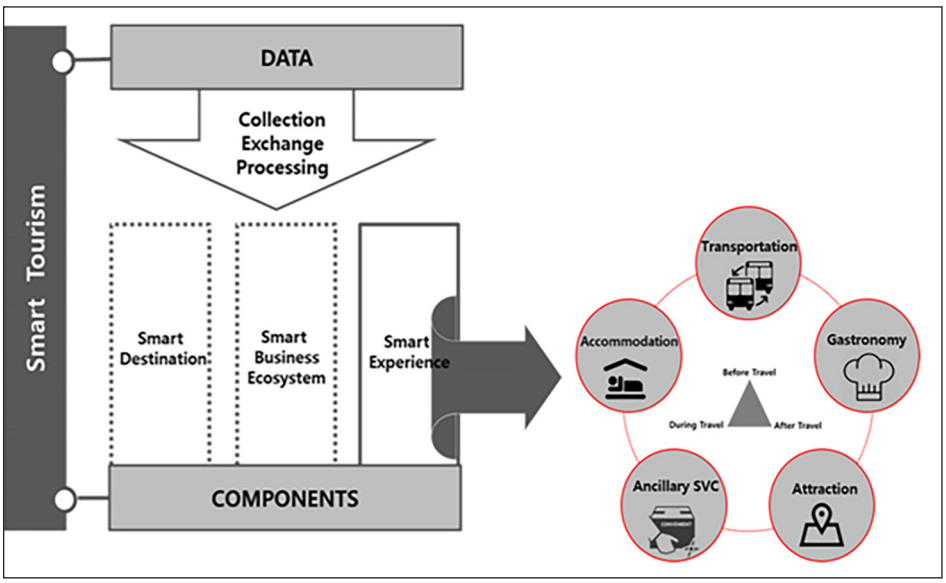

Figure 1: Components of smart tourism
Source: Lee et al., 2020

Smart tourism destinations can act as ecosystems that can increase touristic competitiveness, provide important conceptual foundations for exploring the smart city concept and challenge the notion of "smartness" (Gretzel et al., 2016). The distinction between hard smartness (infrastructure) and soft smartness (people and institutional factors) is important. Based on European case studies, smartness is seen to

emerge from innovation that relies on the interplay of people, ICTs and city leadership and translates into the delivery of smart services. Smart tourism destinations build on these smart services in order to provide attractions, accessibility, amenities, packages, activities and auxiliary tourism services, paying significant attention to sustainable tourism development.

THE PLACE OF SUSTAINABILITY IN SMART TOURISM CITIES

The idea of smart urban tourism is expressed through information management infrastructure and smart technologies. These assist by providing more effective management of tourism activity in the urban space, optimizing resource utilization. The result can include savings in economic and environmental costs (e.g., lower expenses for energy, transportation and storage and reduced environmental pollution) and reducing the problems of overcrowding in the city (by both locals and tourists).

The sustainability paradigm (Edwards, 2005) has become prevalent since its appearance in the 1980s report of the World Commission on Environment and Development. The report promoted a concept of development designed to meet current social, environmental, and economic needs without compromising the ability of future generations to meet those same needs (Goodland, 1995). The notion of sustainable tourism stems directly from this conceptual framework, delineating four dimensions: environmental, social, cultural and economic. Similarly, tourism can generate benefits for the community, the destinations and the visitors; the interdependencies between tourism and the environment should be managed, so the former does not harm the latter, impair future availability or generate unacceptable impacts. Tourism development should respect the size, nature and characteristics of the destination; it should establish a harmonious balance between the needs of the visitor, the place and the resident community; all of the agents involved should respect these principles – the tourism industry, governments and the environmental agencies (Wight, 2002).

While sustainable tourism has been described as tourism that is managed according to the principles of sustainable development (Butler, 1999), studies mention the concept as an important tool for keeping the balance between tourism development (as an economic sector), society and environment (Liu, 2003).

Tourism growth constitutes a potential cause of environmental damage and socio-cultural problems (Goffi et al., 2019). These are attributable to too many tourists, disturbance of residents' routine life, and ultimately the desire to exclude tourists (Lee et al., 2020). The combination of budget flights and home-sharing sites has contributed significantly to over-tourism. Budget airlines enable more people to reach tourism destinations and home-sharing sites like Airbnb, provide accommodations in the midst of local communities so that tourists can experience local life in communities, sometimes at the cost of disrupting that life. Over-tourism may

have different forms in different cities, but ultimately, the same challenges emerge: alienated local residents, degraded tourist experience, overloaded infrastructure, and damaged nature sites (McKinsey and Company, 2017).

Major tourism cities like Barcelona and Venice are suffering dramatically from the impact of over-tourism on residential life and local infrastructures. The commercialization of Airbnb is directly affecting the local real-estate market, raising house prices and consequently increasing cost of living for local residents. The demand for apartments from visitors means local people are pushed out. The Barcelona municipality, recognizing that the city was facing a severe over-tourism problem, used data aggregates based on cutting-edge technology to develop an apartment rental-detection program, a novel solution designed to fight illegal tourist apartment rentals. This user-friendly platform provides information to residents and visitors and increases the quality of life for both parties. Lee et al. note that smart tourism cities need to develop inclusive sustainable tourism through accessibility. ICT solutions, such as beacons, which add intelligence to the identification and location of nearby objects, could be developed into inclusive devices in this regard (Lee et al., 2020). Off peak tourism is an additional strategy to disperse tourism loads, utilizing ICT and "smart" technology to expand the tourism year (Ivars-Baidal et al., 2019). The smart city concept incorporates improved sustainability through the greater efficiency provided by the use of new technologies and higher volumes of information for management (Giffinger et al., 2007; Komninos, 2015), generally within new governance processes (Caragliu et al., 2011).

The connection between smartness and sustainability are expressed on two complementary levels: the destination strategy and the application of technologies for more efficient environmental management. These two levels combine with a new governance framework, create a new approach for managing STD- Smart Tourism Destinations. This is a systemic three-tier approach (see Figure 2): strategic-relational, instrumental and applied (Ivars-Baidel et al., 2019). The strategic-relational level depends on robust governance establishing a sustainable territorial-tourism model shared by the local community. This model provides the basis for developing smart solutions adapted to the needs of the destination. These, in turn, are supported by technology and information systems. The STD must adopt sustainable tourism growth or even more radical alternatives, such as evolving towards steady state or de-growth situations.

Several elements of smartness and sustainability benefit from the synergetic approach where, monitoring systems, real-time management, public-private cooperation, and open innovation are fused together (Perles-Ribes and Ivars-Baidel, 2018). STD's are based on innovative technological infrastructure enabling tourists to communicate and interact with their environment, with diverse stakeholders, through user-friendly platforms in a connected city. A smart tourism city would not only solve urban problems and provide citizens with a better living environment (Wang et al., 2012), but would also enable visitors to explore new destinations and indulge

in local products and services at the right time since real time availability and infrastructure are controlled (Lee el al., 2020).

Developing STD's is a multi-faceted process involving several components: smart preparation, smart guests, smart travelers, smart use of technology. "Smart traveler" refers to key phases of the tourists' mobility: getting there, getting around and departing, using data to deploy travel. "Smart technology use" refers to tourists' abilities to manage their time and reduce their impacts. Using online live streams of notices regarding peak visiting times at sites, mobile guides and access to services, can reduce frustration for the tourists themselves and for locals.

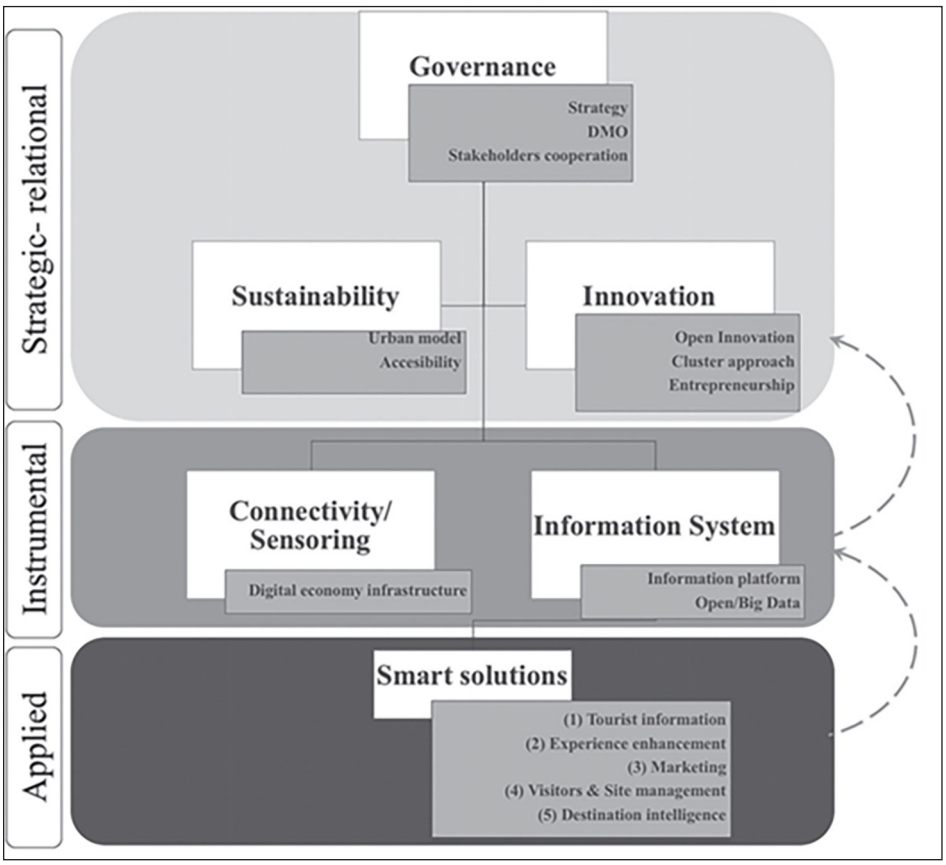

Figure 2: Systemic Smart Tourism Destination model
Source: Ivars et al., 2017

In order to disseminate these processes, municipalities, residents and tourism companies must work together closely and share data gathered and available on technological infrastructure (Pearce, 2018). A few cities, including Vancouver, Hamburg

and Copenhagen, have transformed themselves into STD's where inclusivity is part of sustainable development. These initiatives have made the cities more accessible to visitors, enhance their inhabitants' quality of life and are attracting more varied tourists (Lee el al., 2020).

CONCLUSIONS

The concepts and models of smart cities overlap and are mutually complementary with the idea and framework of smart tourism. The sustainability factor constitutes an important element of smart urban tourism. Technology, ICT applications and better monitoring can help to meet a number of important challenges. These include optimal management of the tourism space through smart tourism in order to help prevent over-tourism, and to monitor environmental parameters such as air and water pollution. During the Covid 19 period of 2020, the use of smart urban tourism applications can also serve as an effective tool for managing crowds (as well as maintaining physical social distancing to prevent infection). Sensors can be used to measure body temperature at the entrance to tourism sites. Maximizing the use of smart technologies such as robots at airports and other public places will provide more effective management of visitor movement, reduce crowding and enhance medical and security control.

It is important to note that smart urban tourism is a central component of the tourism experience at these destinations and contributes greatly to the quality of service and the experience. Smart urban tourism, can also control overcrowding and urban stress. These are of special significance for the younger Y and Z generations, born into a digital environment and for whom this is a part of their life style. They expect smartness, they prefer travel tech and are more aware of the environment. Sustainable management of services and experience are becoming accepted standards.

One can argue that smart urban tourism is transforming from a futuristic vision to a real and abiding need. This includes sustainable tourism management, which encourages a balance between the use of environmental and social resources, and the movement of tourist visitors in a city. In this way, online digital experiences in contemporary urban tourism can provide responses to the problems of tourism overcrowding in the 21st century.

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