

Smart Tourism City

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Contributor: Sunyoung Hlee

A smart tourism city is defined as an innovative and sustainable city that achieves economic and social values and enhances the city's competitiveness by collecting, analyzing, visualizing, and modeling real-time big data generated throughout the city and sharing it with all stakeholders of the smart tourism ecosystem. By reviewing the estimation standards proposed by numerous organizations for assessing a smart tourism city, we can identify how a smart tourism city is perceived.

Keywords: smart tourism city ; intra- and inter-regional economic effect

1. Background

Today's tourism cities are facing numerous issues resulting from tourism's vulnerability to unprecedented situations or crises, such as COVID-19. The tourism industry has built resilience in its own way in order to address economic, social, and environmental risks (e.g., terrorism, natural disasters, infection diseases, etc.), despite the inherent characteristics of being vulnerable to the external environment. However, COVID-19 has brought an unprecedented crisis to tourism ^{[1][2]}. Before COVID-19, tourism was used to generate enormous economic effects throughout regions and countries, and was even regarded as a means of poverty alleviation in developing countries ^[3]. However, the economic prosperity that tourism brought has vanished after travel was nearly completely banned subsequent to the pandemic declaration by World Health Organization (WHO).

In this situation, a smart tourism city, a combination of smart tourism and a smart city ^[4], is considered to be a solution for building resilience to address current and future crises, and even be a booster of the enormous economic effects of tourism ^{[1][2][5]}. One possible reason is that numerous economic entities of a smart tourism city are converged, and this convergence can provide a wide range of economic effects to the city and a spillover effect to nearby regions as well ^[6]. Convergence is the common characteristic of smart tourism and a smart city. Numerous platforms and stakeholders converge and form a smart tourism ecosystem ^{[6][7]}. This convergence makes the economic effects of a smart tourism city spread over a wide range, regionally and industrially. Therefore, securing competitiveness as a smart tourism city can be a solution for reopening tourism and the economy.

Thus, it is not surprising that numerous cities have tried to be smart tourism cities. Amsterdam, Singapore, Barcelona, New York City, Copenhagen, and Seoul have been regarded as leading smart tourism cities. Among them, Seoul is implementing an active smart tourism city policy led by the government. The Korean government has recently kicked off a project to provide 4 billion KRW (about USD 3.3 million) to cities for creating a smart tourism city ^[8]. The president of South Korea expedited the establishment of smart tourism infrastructure and highlighted the smart tourism ecosystem as one of the tourism innovation strategies ^[9]. Moreover, Seoul is evaluated as one of the most competitive smart tourism cities with a high level of digital readiness and tour safety, following Singapore, Amsterdam, and New York City ^[10].

2. Smart Tourism City

With the explosive growth of technology, the ways by which global cities are constructed, consumed, and shared have changed and "smartized" ^{[4][11]}. The concept of the smart city has been defined by numerous earlier researchers ^{[12][13][14]}, but the commonly stated attribute of a smart city is that it leads to efficiency improvement, sustainability, eco-friendliness, and improved resident/tourist quality of life/visit through connectivity via information communication technologies (ICTs) ^[4]. At the same time, tourism has been also technologically, economically, and socially developed and smartized with the convergence of ICT and tourism ^{[15][16]}. The concept of smart tourism has put emphasis on achieving a symbiotic relationship between tourists and citizens and creating economic and social value ^{[15][16]}.

The European Union (EU) has annually evaluated the outstanding smart tourism capitals with the following four categories: accessibility, sustainability, digitalization, and cultural heritage and creativity [17]. The Seoul Tourism Organization assessed 12 cities with the following 5 categories: attractiveness, accessibility, digitalization readiness, sustainability, and collaborative partnership [4][10]. These categories reflect that a smart tourism city is one that has (1) enough infrastructure for anyone regardless of age, nationality, or physical ability, (2) balanced economic and social systems for a fair distribution of economic and social benefits to all stakeholders of the smart tourism ecosystem, (3) social efforts for environmental sustainability, (4) strategies for natural and cultural heritage by offering an innovative tourism experience based on information communication technologies (ICTs). Therefore, we can state that a smart tourism city achieves economic, social, cultural, and environmental sustainability based on the convergence of tourism and technologies.

3. Economic Effects of a Smart Tourism City

A smart tourism city can evoke positive economic effects by increasing the economic benefits and reducing costs. In terms of increasing benefits, both tourism and technology, which are the two major fields of a smart tourism city, have already had positive economic effects. Tourism also has a broad effect because it brings numerous opportunities that build or upgrade Social Overhead Capital (SOC), like roads, highways, bridges, airports, and so on [18], which in turn brings widespread economic prosperity to the area around the tourist destination. In addition, technology is regarded as a core solution for overcoming risks resulting from COVID-19 by building tourism resilience [4][5]. For instance, self-service kiosks, Artificial Intelligence (AI) speakers, robot concierges, and so on, can minimize human contact between customers (tourists) and employees [19], which consequently contributes to limiting further spread of COVID-19. Moreover, immersive technologies (e.g., Virtual Reality (VR), Augmented Reality (AR), etc.) can increase prospective travelers' desires and expectations to visit the real destination and enhance the experience by serving as a substitute tourism experience [20]. In addition, residents of a smart tourism city may increase their knowledge management skills by being frequently exposed to technologies [21]. In terms of reducing costs, a smart tourism city offers new ways of managing city resources and tourist flows effectively [22]. A smart tourism city has control over information sources and flow between the various economic entities making up the city, and this power of control gives the city sustainable economic power [23] and productivity by reducing the cost of running the city [21].

In a smart tourism ecosystem, there are numerous stakeholders, and they are connected with each other [24]. In this vein, securing competitiveness as a smart tourism city does not simply result in the economic growth of that city, but also has positive economic ripple effects in other regions [25]. Therefore, this study tried to evaluate the economic effects of a smart tourism city within the city itself and other nearby regions by adopting the inter-regional I–O model.

4. Inter-Regional Input–Output Model

Diverse industries make up the national economy by buying, producing, and selling a variety of goods and services, through which raw or subsidiary materials are used for the production activities of other industries, consumed or invested within the country, or exported overseas [26]. These transaction details are arranged in a matrix called the “I–O table”, which is published periodically; an analysis method that quantitatively grasps the inter-industry relationship by using this table is called the “input–output analysis” [26].

The inter-regional I–O model was originally developed by Isard [27], who noted the importance of considering the inequalities in the geographic distribution of population, income, and resources. Because the inter-regional I–O table consists of transaction information throughout regions and industries [26], it is useful for identifying the economic structure of each region and their inter-regional and inter-industrial relationships. Therefore, it is also the proper method for estimating the economic effects of a smart tourism city, where numerous industries are converged.

In addition, the inter-regional I–O model reduces the risk of overestimating the economic effects by distinguishing between the economic ripple effects leaking to other regions and the effects within the region. Therefore, we can estimate the economic effects of the investment in smart tourism that is occurring within the city itself and in other regions.

Previous studies have adopted the inter-regional I–O model to estimate the economic effect of specific events [28], investments or funds [29][30], and specific industries [31][32] in a specific region and its nearby near regions (see [Table 1](#)). Lee et al. investigated the economic impact of a mega-event (2012 Yeosu Expo in Korea) on the host city (Yeosu) and its nearby regions [28]. Among the economic effects generated from the Expo, approximately 80% impacted the host city, and the other 20% leaked to the other regions. The economic effects of funds or investments, such as an Olympic-related investment [29] and the European Union (EU) structural funds [30], have been evaluated. These studies contributed to providing meaningful implications about the effectiveness of investments and policies. The impacts of numerous

industries, such as convention and exhibition industries [30], on a smart tourism city [21], have been estimated as well. Because these studies estimated the economic impacts of relatively newer or convergence industries, they could provide meaningful implications for deciding future directions.

Table 1. Previous studies applied the I–O model.

Category	Scholar	Purpose
Mega-event	Lee et al. (2017)	Estimation of economic effects of the 2012 Yeosu Expo in Korea on the host city and its nearby regions
Investment or fund	Zhang & Zhao (2007)	Estimation of the economic effects of the 2018 Beijing Olympic-related investments on Beijing, its surrounding areas, and the rest of China
	Pérez et al. (2009)	Estimation of the economic effects of the EU structural funds on Spanish regions
Specific industries	Lee et al. (2013)	Estimation of the economic effects of convention and exhibition business on Daegu (a city in South Korea)
	Lee et al. (2019)	Estimation of the economic effects of tourists' expenditure in smart tourism city Busan (a city in South Korea)

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