SMART DESTINATION APPLICATIONS ACCORDING TO COHEN'S SMART CITY WHEEL: THE EXAMPLE OF İZMİR, TURKEY

Aplicações de Destino Inteligente de acordo com a Roda da Cidade Inteligente de Cohen: O exemplo de Ízmir, Turquia

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ABSTRACT

Since the innovative use of technological systems provides many advantages and convenience to cities, the tendency towards smart applications in cities is increasing. The "smart city" concept, accepted as the new city concept, adopts an innovative and sustainable management style integrated with information and communication technologies in order to find solutions to the problems of cities. By making use of smart city applications, destinations implement smart tourism applications and this provides various conveniences and opportunities to both tourists and tourism stakeholders. In addition, destinations with smart tourism applications provide competitive advantage and increase the quality of tourists' travel experience. İzmir, one of the important destinations of Turkey and visited by many tourists every year, is one of the cities that stand out with its smart city and smart tourism applications. In this context, the aim of the study is to examine the smart city components of İzmir according to Cohen's Smart City Wheel and to determine the studies made to become a smart tourism city based on these applications. In order to achieve this aim, interview technique, one of the qualitative research methods, was used in the research. According to the research findings, the questions directed to the participants regarding smart tourism applications were gathered under 7 themes. These themes were analyzed in the Nvivo 12 package program, including 6 themes (smart mobility, smart living, smart people, smart economy, smart government, smart environment) and smart tourism applications in line with Cohen's smart city dimensions. It is thought that the smart city and smart tourism applications in İzmir will contribute to the residents and tourists visiting the city in terms of easy access, accessibility, sustainability, increasing the quality of life and competitiveness of the destination.

KEYWORDS

Tourism; Smart Tourism; Smart City; Smart Tourism Destination; İzmir, Turkey.

RESUMO

Como o uso inovador de sistemas tecnológicos oferece muitas vantagens e conveniências às cidades, a tendência para aplicações inteligentes nas cidades é crescente. O conceito de "cidade inteligente", aceito como o novo conceito de cidade, adota um estilo de gestão inovador e sustentável integrado às tecnologias de informação e comunicação para encontrar soluções para os problemas das cidades. Ao fazer uso de aplicativos de cidades inteligentes, os destinos implementam aplicativos de turismo inteligente e isso oferece várias conveniências e

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oportunidades para turistas e interessados em turismo. Além disso, destinos com aplicativos de turismo inteligentes oferecem vantagem competitiva e aumentam a qualidade da experiência de viagem dos turistas. İzmir, um dos destinos importantes da Turquia e visitado por muitos turistas todos os anos, é uma das cidades que se destacam com sua cidade inteligente e aplicativos de turismo inteligente. Neste contexto, o objetivo do estudo é examinar os componentes da cidade inteligente de Izmir de acordo com a Roda da Cidade Inteligente de Cohen e determinar os estudos feitos para se tornar uma cidade de turismo inteligente com base nessas aplicações. Para atingir esse objetivo, utilizou-se na pesquisa a técnica de entrevista, um dos métodos de pesquisa qualitativa. De acordo com os resultados da pesquisa, as perguntas direcionadas aos participantes sobre aplicativos de turismo inteligente foram reunidas em 7 temas. Esses temas foram analisados no programa de pacotes Nvivo 12, incluindo 6 temas (mobilidade inteligente, vida inteligente, pessoas inteligentes, economia inteligente, governo inteligente, ambiente inteligente) e aplicativos de turismo inteligente alinhados com as dimensões de cidade inteligente de Cohen. Pensa-se que as aplicações da cidade inteligente e do turismo inteligente em İzmir irão contribuir para os residentes e turistas que visitam a cidade em termos de fácil acesso, acessibilidade, sustentabilidade, aumentando a qualidade de vida e competitividade do destino.

PALAVRAS-CHAVE

Turismo; Turismo Inteligente; Cidade Inteligente; Destino de Turismo Inteligente; İzmir, Turquia.

INTRODUCTION

The emergence of problems such as transportation, accommodation, pollution and security in cities significantly affects the quality of life of the people living in the city. In the face of these problems, the concept of information and communication technologies [ICT] oriented smart city has emerged in order to create more livable, safe, sustainable and efficient cities (Lazaroiu & Roscia, 2012). Smart city applications created by strengthening the technological infrastructure of cities include vital activities such as ensuring sustainable development, efficient use of resources, increasing the quality of life of citizens, and finding solutions to the problems of the people (Vasavada & Padhiyar, 2016). Thus, it is aimed to respond to the needs of individuals quickly and intelligently, to reduce the quality of life, the carbon footprint and the damage to the environment (Buhalis & Amaranggana, 2014).

Information and communication technologies have led to great changes and new developments in the tourism sector and have led to the emergence of numerous opportunities (Savić and Pavlović, 2018, p. 81-82). The phenomenon of smart tourism has found its place in all areas of the industry [intelligent hotel management systems, smart ticket systems, smart remote video monitoring systems, smart tour guide systems, smart travel agency systems, etc.] (Buhalis & Amaranggana, 2014; Guo, Liu & Chai, 2014; Gretzel et al., 2015; Nabben et al., 2016). The

concept of smart tourism comes from smart city and tourism systems that include data flow and information exchange to meet the needs of tourists. Since such flows and exchanges are constantly dependent on communication, external systems [e.g. transportation, healthcare, and payment systems] are interacted with as well as resource sharing for optimization (Yen, Shen, & Hung, 2019). The construction of the smart tourism platform can provide sustainable competitive advantage by improving the processes in the destination. Destination competitive advantage stems from resource equipment, technological infrastructure, managerial activities and resource distribution capabilities that can provide sustainable tourism development (Wang, Li & Li, 2013, p. 60).

Smart tourism destinations are expressed as smart cities that follow innovations and use information and communication technologies to increase the travel experience of tourists (Jasrotia & Gangotia, 2018, p. 53). Smart cities are a multidisciplinary concept that underpins the next level of traditional tourism destinations (Avelar, 2020). Smart tourism destinations become smart tourism destinations when they are supported and strengthened with some other modern technologies in addition to advanced technologies such as the internet of things [IoT], mobile communication, cloud computing and artificial intelligence technologies, which are among the four basic information and communication technologies on which the smart city concept is built (Guo et al., 2014). Smart tourism destinations enable the enrichment of the experiences of tourists by supporting them through various activities such as getting information, comparison, decision making, travel planning, communication and sharing experiences through information technologies (Neuhofer, Buhalis, & Ladkin, 2012, p. 41).

In order to become a smart city and smart tourism destination, many cities around the world are formulating strategies, allocating funds, and progressing their efforts in this direction. In this regard, some Turkish cities conduct numerous research in order to build plans and transfer resources. The province of İzmir is one of these cities. İzmir, as one of Turkey's metropolitan cities, is a popular tourist destination with a significant population and a large number of visitors each year. As a result, the province of İzmir was picked as the study's research region. Few studies on smart city and smart tourism applications for the Izmir destination have been done, according to the literature. In this context, the paper discusses smart tourism applications in the İzmir destination, based on the basic components of Cohen's Smart City Wheel (2012). Because there is no research on this topic, the study is expected to contribute to the field. Data was

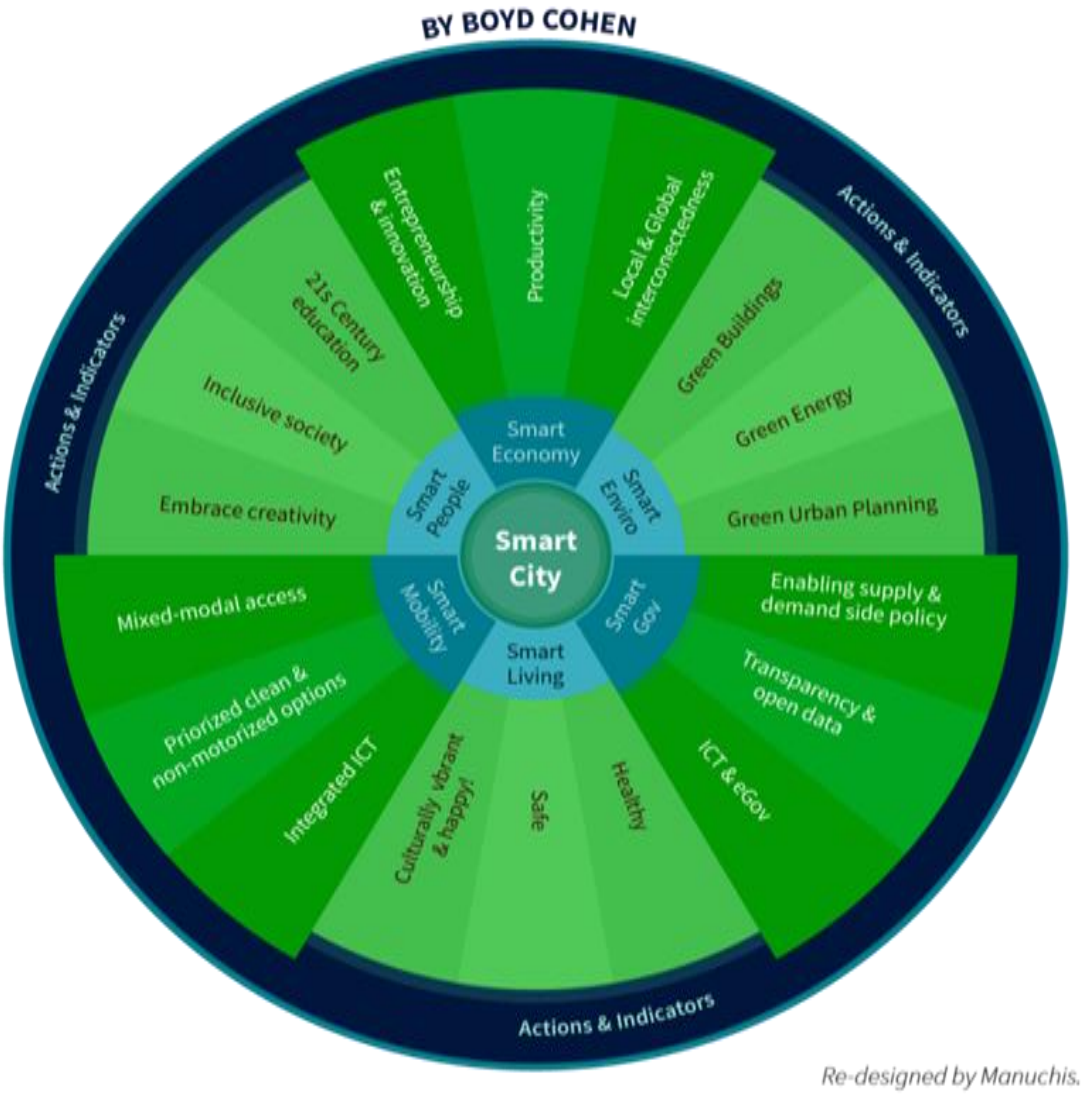
acquired by conducting semi-structured interviews with key agencies and individuals in order to determine the smart tourism applications in the İzmir province. The findings are critical for research into smart city and smart tourist applications. The study is also expected to benefit other destinations that are aiming to become smart tourism destinations.

İzmir Metropolitan Municipality joined the Open and Agile Smart Cities [OASC] community in July 2020 in order to closely follow smart city applications around the world and to implement smart city applications at international standards. OASC, which has 152 members worldwide, offers opportunities to member cities by sharing experience and knowledge among its members (OASC, 2020). The ideas of smart city, smart tourism, and smart tourist destination, as well as smart destination applications, were attempted to be explained in the first phase of the research. In the second part of the study, qualitative research method was used and interview technique was used. İzmir is now a province that conducts numerous studies on smart city applications as a consequence of the research. It creates smart tourism applications by incorporating the smart city's big data capabilities into the tourism industry. It has been determined that studies are carried out at the destination with the smart tourism applications []Visitzmir; İzmir Time Machine; İzmir At My Fingertips] to facilitate the travels of visitors visiting the destination and to boost tourist satisfaction. Because of the study's detection of smart tourism applications, the province of İzmir is crucial in terms of providing ideas to other locations and destination planners.

SMART CITY

Cities become <smart cities> with the ingenious management of natural resources through participatory governance, high quality of life and traditional [transportation] and modern [BIT] communication infrastructure nurturing sustainable economic growth and investing in human and social capital (Caragliu et al., 2009, p.50). Smart cities are formed as a result of the integration of digital infrastructure with physical infrastructure. It is aimed to integrate physical infrastructures and digital infrastructures efficiently and to deliver the obtained data to the end user after analysis. It specifies the basic components of smart cities with the Smart City Wheel developed by Cohen (2012), which is accepted by many researchers. Information about these components is as follows.

Figure 1. Cohen's Smart City Wheel



Source: Cohen, 2012.

Smart Government: is based on a two-way flow of information, ideas and services between the local people and the administration. It focuses on enriching the management's abilities at the point of meeting the needs of the people and solving problems. Smart governments are a component that ensures better quality of life, welfare of citizens, development and economic growth in sustainable ways (Guerra et al., 2017). When the destination components and smart

city dimensions are matched, the smart governance dimension is combined with accessibility, activities and auxiliary services (Della Corte et al., 2017).

Smart Economy: productivity increase, e-commerce, advanced production and supply systems, smart clusters and business ecosystems by using information and communication technologies are evaluated within the scope of this component. The requirements of the smart economy dimension are competitiveness, innovation, entrepreneurship, trademark, efficiency, flexibility, internationalization and transformation ability (Negre & Rosenthal-Sabroux, 2014). When destination components and smart city dimensions are matched, the smart economy dimension is combined with the auxiliary services component (Della Corte et al., 2017).

Smart Mobility: includes integrated transportation systems supported by information and communication technologies. It primarily aims to bring environmentally friendly and inclusive transportation solutions especially for disadvantaged groups. The characteristics of the smart mobility dimension are the feasibility of ICT infrastructure, both local and international transportation, innovation, sustainability and safe public transportation system (Negre & Rosenthal-Sabroux, 2014). When destination components and smart city dimensions are matched, the smart mobility dimension is combined with accessibility (Della Corte et al., 2017).

Smart Environment: renewable energy, smart grids, micro grids, smart meters, advanced air pollution monitoring systems, environmentally friendly buildings and urban planning. The determinants of the smart environment are efficient electricity use, efficient water use, carbon emission reduction strategies, greenhouse gas emissions, energy consumption intensity, green areas, policies including urban sprawl and the proportion of recycled waste (Albino et al., 2015). When the destination components and smart city dimensions are matched, the smart environment dimension is combined with attractions and conveniences (Della Corte et al., 2017).

Smart Living: facilitates people's lives with information and communication technologies and provides a healthier and safer environment for city residents. It includes variables that affect the quality of life such as culture, health, safety, tourism, quality settlement and accommodation. When the destination components and smart city dimensions are matched, the smart life dimension is combined with attractions, conveniences and accommodation facilities (Della Corte et al., 2017).

Smart People: it is aimed to create an inclusive society that encourages productivity and innovation by improving people's ability to use and produce information and communication technologies. When destination components and smart city dimensions are matched, the smart life dimension is combined with assembly (Della Corte et al., 2017).

The components listed above are applications that feed and develop each other, and handling these components in a systematic and holistic manner in the design of smart cities will increase the efficiency in practice. With all its components, smart cities are a chain of transformation and improvement that also affects the social and economic structures and systems of the cities where they are applied with all their technological, structural and systemic solutions. The sectors where this transformation process is felt most intensely are transportation, security, energy management, public administration, education, health and tourism. These sectors can be a solution for the improvement and regulation of social life, which can get efficient results with the implementation of the smart city concept (Yıldız, 2019).

SMART TOURISM

The use of smart technologies in the tourism sector has led to the emergence of the concept of <smart tourism>. Smart tourism consists of the technologies that emerge as a result of the integration of ICT and smart technologies, and especially the adaptation of many applications to touristic services within the framework of the smart city concept (Wang et al., 2016, p. 310). Smart tourism is “a new generation communication technology that combines cloud computing, networking and internet with personal mobile devices (3G etc.) and artificial intelligence” (Li et al., 2016, p. 295). Zhu et al. (2014) defines smart tourism as “an urban tourism platform that integrates tourism resources and information technologies” (p. 553). Tools and equipment used in information and communication technologies provide an efficient environment for the promotion and marketing of tourist destinations, communication, information management and distribution, and increase competitiveness (Gomes et al., 2017).

Smart tourism benefits the tourism and travel industry in three ways. First of all, information about the natural, historical and cultural riches of the city can be provided through ICTs in order to enable tourists to easily access the information they need. Secondly, real-time information of tourists is collected, their movements are monitored and their demands can be analyzed by means of monitoring devices in tourism supply sources. Finally, data can be stored through the

information communication centers to be established, and a connection can be established between the relevant units and the desired information can be shared among the stakeholders in a coordinated manner (Zhu et al., 2014).

Smart tourism development is based on the collection, exchange and processing of data produced in different components of the system, which includes the consumer, tourism establishments and destination as a whole. Therefore, for the realization of smart tourism, various components must be present. These are smart experience, smart business ecosystem and smart tourism destination. The smart experience component focuses on improving tourism experiences through personalization and real-time monitoring through technology (Gretzel et al., 2015). The smart business ecosystem refers to a complex ecosystem that enables and supports the exchange of touristic resources and the co-creation of tourism experiences (Gretzel, 2015). Smart tourism destinations are an extension of the smart city approach. With the intensive use of technology obtained from smart cities, it becomes a smart destination.

Studies on smart tourism have increased especially in recent years (Boes et al., 2016; Li et al., 2017; Sigala, 2018; Jovicic, 2019). Among the topics covered in the studies, smart city and smart tourism technology (Micera et al., 2013; Ronay & Egger, 2013), definition of smart tourism destinations, pioneering studies, framework, necessary technologies and smartness dimensions (Zhang et al., 2012; Wang et al., 2013; Buhalis & Amaranggana, 2014; Boes et al., 2015), the functions of smartphones and applications in tourism, the adaptation of tourists to these technologies, the effects of applications on tourists' decisions, and the contribution of smartphones and applications to travel experiences (Wang et al., 2012; Dickinson et al., 2014; No & Kim, 2014).

Smart Tourism Destination - Destinations that use technology to deliver personalized and existing tourism services to potential visitors in order to increase the competitiveness of the tourism sector and the visitor experience by intensively using the technological infrastructure offered by smart cities are considered <smart> (Xiang, Tussyadiah, Buhalis, 2015; Wang et al., 2016). Smart tourism destination has emerged with the development of smart cities (Buhalis & Amaranggana, 2014). A smart city is defined as a “tourism-oriented and innovative space accessible to all, which is consolidated on a cutting-edge technological infrastructure, which must guarantee sustainable territorial development while facilitating visitor interaction and integration with the environment, increasing the quality of their experience in the destination

and the quality of life of the residents" (Sigalat-Signes et al., 2020, pp. 97-98). The most important difference between these two concepts is that the smart city approach focuses on the citizen, while the smart tourism destination approach includes tourists and passengers (Lamsfus & Alzua-Sorzabal, 2013). A smart tourism destination is an innovative tourism destination built on a state-of-the-art technology infrastructure that is accessible to everyone, ensures the sustainable development of touristic areas, facilitates the interaction and integration of the visitor with the environment (Lopez de Avila, 2015).

Various augmented projects have been initiated to help visitors gain cultural knowledge and experience their travels through smart phones, smart glasses, smart pens and smart phone applications in tourism destinations (Boletsis et al., 2018). Destination management organizations, local organizations and tourism businesses can properly manage their decision-making and action processes based on the data compiled and processed thanks to the technological infrastructure (Mehter Aykın, 2021). Smart destinations increase the travel experience and satisfaction of tourists by effectively integrating the physical areas of destinations into virtual spaces with the presence of smart infrastructure in the travel region (Neuhofer et al., 2012; Zatori et al., 2018; Lee et al., 2018).

In order to implement the concept of smart tourism in smart tourism destinations, first of all, the destination must have smart city technologies or the destination must have the means to support these technologies. Secondly, destinations that are strengthened by smart city and smart tourism should have an environment with a technological infrastructure. It needs to be sensitive to micro- and macro-level uses, to be able to reach tourist/user devices in more than one way (NFC, Bluetooth, Web, etc.), and tourism stakeholders need to benefit from opportunities such as an organic neural network that offers a dynamic communication opportunity. Finally, the destination's smart city technologies / systems enable tourists / users to develop and personalize their tourism experiences, enabling them to be aware of both local and touristic products and services offered by the destination (Ağraş, Yıldız, & Aktürk, 2020, p. 215). Some of the studies on smart tourism destinations in the literature are given in Table 1.

Table 1. Studies of smart tourism destinations

Author/s	Subject
Buhalis & Amaranggana (2014)	Smart Tourism Destinations through exploring tourism applications in destination
Kim, Park, Yun & Yun (2017)	Analyzing travelers' online reviews
Jasrotia & Gangotia (2018)	Smart cities and smart tourism destinations

Shafiee, Ghatari, Hasanzadeh & Jahanyan (2019)	Sustainable smart tourism destinations
Baggio, Micera & Del Chiappa (2020)	Smart tourism development and management
Williams, Rodriguez & Makkonen (2020)	Innovation and smart destinations
Sorokina, Wang, Fyall, Lugosi, Torres & Jung (2022)	Constructing a smart destination by a destination marketing organization perspective.
Bulchand-Gidumal (2022)	Post-COVID-19 recovery of island tourism using a smart tourism destination
Gelter, Fuchs & Lexhagen (2022)	Making sense of smart tourism destinations

Smart Destination Applications - Smart tourism and smart destination concepts and practices combine tourism under a technological roof and provide centralization, as well as cover both tourists and other stakeholders in the destination. It can protect the sustainability in the environmental, social and economic context, ensure competitiveness, create effective resource use, and increase the quality of life of the local people while ensuring the satisfaction of tourists on the one hand (Yüzbaşıoğlu & Karataş, 2021).

Tourism destinations are based on supply and demand, and their success and sustainability depend on the existence and development of critically important factors such as the '6A system' [attraction, accessibility, amenities, available packages, activities, ancillary service] (Buhalis, 2000). While the 6A system aims to create added value for touristic experiences, it simultaneously increases the profits and benefits for the destination (Boes et al., 2015). By applying the concept of smart tourism to these factors and integrating modern technology (smart city concept) into the infrastructure of the destination, it will contribute to both the society / tourists and tourism businesses. Adding the concept of smart to each dimension of the 6A system, Tran et al. (2017) in their approach they call the 6SA model [smart attractions, smart accessibility, smart amenities, smart available packages, smart activities, smart ancillary service] they tried to evaluate smart tourism destinations on the basis of these parameters by intensifying 6 smart criteria with a total of 57 indicators. The tourism applications for smart destinations, which Buhalis and Amarangga (2014) created by adapting the destination components (6A) and Cohen (2012) for smart destinations, are summarized in the table below (Table 2).

Table 2. Tourism Applications in Smart Tourism Destinations

No	Tourism Applications in Smart Tourism Destinations	Utility Function	Destination Components	Smart tourism destinations dimensions

1	Augmented reality (AR) enables visitors to experience digital recreation of tourism sites and time travel.	Interpretation	Attractions	Smart people, Smart mobility
2	Vehicle tracking system provides a real-time information of transport network and could be distributed to end-user devices.	Planning Accessibility	Smart living	Smart mobility
3	Hotel should able in predicting energy demand for building and perform energy audits based on their environment management.	Sustainability	Amenities	Smart environment
4	A multi-languages application that provide range of services such as electronic travel guide which also offer numbers of available packages for tourists.	Guidance	Available packages	Smart people, Smart mobility
5	NFC tags and QR codes to access information about nearby points of interest through mobile devices.	Proximity	Marketing Activities	Smart mobility
6	Tourists are able to register their complaints through a Complaints Management System that supported by various ICT channels such as SMS or mobile applications which could directly route them to appropriate officials.	Feedback	Ancillaries	Smart living

Reference: Buhalis & Amaranggana (2014, p. 559).

İzmir is one of the provinces receiving immigration with its location and employment opportunities. With the increase in population in the city, some problems have occurred and it has become necessary to develop some smart solutions in order to solve these problems. Izmir Metropolitan Municipality joined the Open and Agile Smart Cities [OASC] community in July 2020 in order to closely monitor smart city applications worldwide and to implement smart city applications at international standards (Şenkal, 2022). Izmir Metropolitan Municipality has an open data platform where local people, tourists, businesses and researchers can access data about the city. The data are collected under 10 headings and there are 131 published data sets. For example, data on daily water consumption, dam occupancy rates, and air quality measurement values are included under the environmental heading (İzmir Metropolitan Municipality, 2022). From this point of view, it is aimed to determine the tourism applications carried out on the way to become a smart destination by determining the studies on the smart city components in the province of İzmir.

METHODOLOGY

In the research, qualitative research approach was used to determine the smart city and smart destination tourism applications in İzmir. Qualitative research is an approach to discovering and understanding the meanings that individuals or groups ascribe to a social or human problem.

The research process includes the stages of developing questions and processing steps, collecting data from the participants' own environments, performing inductive data analysis by reaching general themes from specific situations, and interpreting the meaning of the data by the researcher (Creswell, 2017). Although the results obtained in qualitative research are not attributed to the universe, the results obtained are important in terms of providing a perspective on the subject. Qualitative research approach has been preferred because it is suitable for the subject and structure of the study. Interview technique was used to collect data.

The interview technique is a data collection technique in which the participants in the research sample actively explain their knowledge, feelings and thoughts about the research topic and tell their life story. It provides access to unobservable information such as the experiences, different experiences, attitudes, thoughts, intentions, comments, mental perceptions and reactions of the individual about the researched subject (Bengtsson, 2016; Seidman, 2006). Semi-structured interview questions were prepared and interviews were conducted face to face with the participants. Within the scope of the research, data were obtained by conducting interviews with 18 people through a semi-structured interview form. Related questions were asked to the participants and it was tried to get more information about the subject by detailing the question according to the answers.

The answers obtained from the participants were documented in the computer environment. These transcripts were prepared as a document for each participant and questions and answers were processed in the documents. Then the answers were divided into parts and coded. After the coding process, the data were summarized in clusters according to categories. The interview form of the study and the resulting themes, categories and codes were examined by a team of experts and given their final form. Inter-category relations and analytical generalizations were made by inductive method.

Model of the research - In the research, the statistical package program (NVivo), which is preferred in the analysis of qualitative data, was evaluated in terms of use and suggestions were developed for its effective use. In this respect, the study is a descriptive research in the scanning model.

Population and sample - The universe of the research consists of Izmir province destination management representatives. In qualitative research, the researcher should choose the

participants or workplaces [or documents or visual materials] that will help the researcher understand the research problem and research questions in the best way (Creswell, 2017). In this context, in-depth interviews were conducted with 18 representatives of Izmir Metropolitan Municipality tourism unit [office] and Provincial Culture and Tourism Directorate among the Izmir province destination management representatives in the selection of the sample in the research. Such a choice was made because it is a working group that has a good command of policy making and smart destination applications related to smart tourism applications in the destination.

Data analysis - The qualitative analysis program Nvivo 12 was used to classify the data obtained from the interview form used in the research. Nvivo 12 program enables researchers to organize and analyze a wide range of data such as documents, images, audio, video, interviews and social media/internet content (Edhlund & McDougall, 2019). In the study, the answers obtained from the participants were coded, categories were obtained from the codes and themes were created and subjected to content analysis. By examining the data collected through content analysis, concepts and relationships were tried to be explained.

Data collection tool - The interview form developed by the researchers consists of 6 demographic and 8 open-ended questions. While creating the semi-structured interview form, Buhalis and Amaranggana's (2014) studies were used for the basic components of the Smart City Wheel developed by Cohen (2012) and smart tourism applications in the destination. The questions were reviewed by 2 experts and the clarity and validity of all questions were tried to be ensured. According to the feedback from the experts, pre-tests were made and the questions were revised. The interview questions regarding the study are listed: (1) How would you evaluate the transportation possibilities in Izmir as a smart city? (2) Can you make an assessment about the smart life in İzmir within the scope of smart city applications? (3) What are the activities and opportunities for people (society) in the city within the scope of smart city practices? (4) Could you give information about the economic activities and development plans in İzmir as a smart city? (5) What are the governance activities in the city in the context of the smart city? (6) Can you talk about smart environmental applications in the city? (7) Can you give information about smart tourism practices in İzmir as a smart tourism destination?

FINDINGS

The tourism sector, which is heavily affected by the developments in ICT, has changed in many subjects with new trends. With the opportunities offered by technology, destinations can reach large masses by taking more place in the internet environment. With the adoption of smart tourism development all over the world and its development in this direction, destinations become smart and ensure the development of tourism experience (Ataman, 2018). Considering these developments, a holistic presentation of tourism resources for smart tourism applications of the Izmir destination has been designed. These designs, developed with Cohen's Smart City Wheel, are planned for the development of İzmir province tourism nationally and internationally and to provide competitive advantage. In this part of the study, data on the demographic characteristics of the participants in the study and the analysis of the research questions are included.

Table 3. Demographic Data of Participants

	Gender	Age	Educational Status	Employed Institution	Role in the Institution	Professional Time
P1	Male	35	Phd	Provincial Directorate of Culture and Tourism	Tourism Researcher	10 years
P2	Female	50	Phd	Provincial Directorate of Culture and Tourism	Branch Manager	27 years
P3	Female	40	Master	Provincial Directorate of Culture and Tourism	Officer	3 years
P4	Male	43	Bachelor	Provincial Directorate of Culture and Tourism	Translator	5 years
P5	Female	55	Bachelor	Provincial Directorate of Culture and Tourism	Officer	20 years
P6	Male	40	Bachelor	Provincial Directorate of Culture and Tourism	Information Officer	25 years
P7	Male	60	Bachelor	Provincial Directorate of Culture and Tourism	Assistant Manager	35 years
P8	Female	59	Bachelor	Provincial Directorate of Culture and Tourism	Chief	34 years
P9	Female	39	Master	İzmir Metropolitan Municipality	Officer	5 months
P10	Female	32	Phd	İzmir Metropolitan Municipality	Archeologist	1 year
P11	Male	27	Master	İzmir Metropolitan Municipality	Bureau Staff	1 year
P12	Female	29	Bachelor	İzmir Metropolitan Municipality	Tourism Specialist	3 months
P13	Female	33	Bachelor	İzmir Metropolitan Municipality	Bureau Staff	1 year

P14	Male	28	Master	İzmir Metropolitan Municipality	Engineer	2 years
P15	Female	39	Bachelor	İzmir Metropolitan Municipality	Chief	16 years
P16	Male	38	Bachelor	İzmir Metropolitan Municipality	Manager	13 years
P17	Female	27	Bachelor	İzmir Metropolitan Municipality	Bureau Staff	1.5 years
P18	Female	52	Bachelor	Provincial Directorate of Culture and Tourism	Branch Manager	27 years
P19	Female	47	Bachelor	Provincial Directorate of Culture and Tourism	Tourism Researcher	27 years

According to Table 3, 12 of the participants in the study were female and 7 were male. When the age conditions are examined, it is seen that the participants in different age groups from 27 to 60 contributed to the research. Educational status of the participants (12 people) is mostly at undergraduate level. According to the institutions they work for, 10 of the participants work at the Izmir Provincial Directorate of Culture and Tourism, and 9 of them work at the Izmir Metropolitan Municipality. It is seen that the duties of the participants in the institution are in different branches such as branch manager, tourism researcher, civil servant, office staff, translator, archaeologist. When the terms of office are examined, most of them have more than 10 years of experience.

The questions asked to the participants regarding smart destination applications were gathered under 7 themes. These themes were analyzed in the Nvivo 12 package program, including 6 themes (smart mobility, smart living, smart people, smart economy, smart government, smart environment) and smart tourism applications in line with Cohen's smart city dimensions.

Smart Mobility - Smart Mobility is referred to accessibility within the city as well as outside the city and availability of modern transportation systems (Cohen, 2012). 3 sub-codes of the theme named smart mobility have been identified. These subcodes are; mixed-modal Access, priorized clean& non-motorized options, integrated ICT. Some of the statements of the participants on the theme of infrastructure and technology are given below:

> *"İzmir is trying to integrate its existing transportation opportunities in line with technological developments. In particular, the municipality has studies in this direction. He concentrates on'İzmirNet Project and Smart Traffic Systems applications"* (P1).
>
> *"Along with the aspects that are open to development, connections were made in terms of diversity and progress was made"* (P13).

> *"There are multiple models of transportation in Izmir. All villages can be reached with the transfer system. With the IZUM application, information such as road status and parking space can be accessed"* (P9).
>
> *"Izmir's transportation opportunities are diverse and sufficient. In urban transportation, highway, seaway, railway (metro, Izban), as well as bicycle transportation are used"* (P2).
>
> *"It is quite good, you can go everywhere by public transportation"* (P11).

According to the answers given, the participants have a positive perception about the development of transportation opportunities in İzmir. Modes of transportation have been evaluated as integrated with each other and new technological opportunities have been utilized. In addition, the participants who argued that transportation opportunities should increase in parallel with the increasing population and workforce (P17) also made suggestions.

> İzmirNet is an infrastructure service that covers many services. İzmirNet contributes to the environment and economy by using it in many public services such as smart traffic management, MOBESE system, geographic information system, information screens, payment of taxes.
>
> A smart city system was created with the establishment of 621 km fiber internet infrastructure in İzmir. For an environmentally friendly smart city solution, the energy needs of 20 electric buses are met with the panels installed on the roofs of the administration buildings.
>
> A smart traffic system called İzmir Transportation Center (İZUM) has been developed. This system, which can manage traffic for 24 hours, has smart intersections and traffic monitoring cameras. The traffic flow and congestion can be followed by the citizens via the website or mobile application, and the route can be determined accordingly.

Smart Living - Smart Living involves the quality of life which measured in terms of healthy environment, social cohesion, tourist attraction and availability of cultural and educational services (Baudouin, 2012). The smart living theme is collected in 3 sub-codes and these codes are; safe, healthy, culturally vibrant & happy. Some of the responses given by the participants to the living practices in smart cities are as follows:

> *"İzmir is a city sensitive to culture and art in terms of its socio-cultural structure. There are cultural centers, art institutions, museums (archaeological, ethnographic, thematic), theaters and cinemas in the city to meet the needs. In terms of cultural activities, organizations are organized according to the feedback from the citizens"* (P2).
>
> *"Although hospitals and health institutions in the city are developed, quality service is provided"* (P11).

> *"The city is generally safe, but in recent years, security problems have started to occur in some regions due to immigration"* (P3).
>
> *"In line with my observations, it is already a significant destination with its social vitality. In the current situation, it can be said that within the framework of technological integration, cultural and other similar activities are actively shared on various web platforms"* (P1).

According to the participants, smart living practices are observed in various forms and prioritize the popularity and liveliness of the destination. Izmir is one of the important cultural centers of Turkey. Many national and international artistic events, concerts, theaters and exhibitions are organized. İzmir responds to the need in terms of cultural activities, safety and health.

Smart People - Smart People is linked to the qualification level of city's human capital (Cohen, 2012). The sub-codes related to the smart people theme are grouped under 3 themes; education, inclusive society, embrace creativity. The statements given by the participants regarding the smart people practices in the city are given below:

> *"İzmir is a city open to innovations with its many universities and students"* (P8).
>
> *"There are quite a variety of training centers such as public education centers, entrepreneurship centers, and vocational factories"* (P14).
>
> *"Contemporary practices are given importance to raise awareness. The people of İzmir are generally conscious and sensitive to nature and the environment. Activities are carried out to increase the quality of life of the society throughout the city"* (P2).
>
> *"The focus of smart cities is 'people'. In this respect, human-oriented activities and opportunities are offered"* (P18).
>
> *"The use of the Bizİzmir website as an İzmir platform has a wide range of city-oriented content such as public invoices, agricultural hotline, transportation information, etc."* (P16).

According to the answers given, participants are offered digital applications that make daily life easier, transportation, cultural events and other areas to the residents of the city. For example, it was emphasized that the activities of the Bizİzmir website for the community are frequently used. Bizİzmir is an application that can be used online and via mobile applications, making life easier for those living in the city. It is a digital platform that makes it possible to follow all developments in the city, receive news from the municipality, and share ideas and suggestions on important issues. On this platform, pending invoices, artistic activities, İzmir agriculture solidarity line, İzmir city theaters, İzmir academy and many other data can be accessed. In

addition, individuals are provided with a faster and more trouble-free access to training in fields such as education, crafts, sports and hobbies.

Smart Economy - Smart Economy is related to implementation of economic strategies based around digital technology (Cohen, 2012). Responses were collected by the participants in 3 sub-codes of the smart economy theme in İzmir destination. These subcodes are producivity, local and global interconnectedness, entrepreneurship& innovation. Some of the answers given by the participants regarding this theme are as follows:

> *"An effective development planning and strategic plans are being prepared in İzmir local institutions. In partnership with İzmir Development Agency, municipality and chamber of commerce, activities are carried out to reflect these plans into practice"* (P1).
>
> *"I think that resources are used effectively and efficiently. Especially with activities supported by digital transformations, solutions for sustainability are produced"* (P2).
>
> *"Within the scope of the 2020-2024 Strategic Plan, services are provided in the fields of infrastructure, quality of life, economy, democracy, nature, learning by living, culture and art"* (P16).
>
> *"The economic activities of İzmir are planned and managed, especially in the service sector, industry, agriculture and tourism"* (P7).

When the answers given by the participants are examined, the locomotive of the city's economy is industry, trade, agriculture and tourism. Necessary investments are made in this area and it is given importance to its rapid development. The metropolitan municipality is in constant contact with the tradesmen. In addition, it is stated that in the 2020-2024 strategic plan, objectives and targets related to the fields of activity are determined and performance indicators are prepared. Within the scope of these indicators, data flow is provided regularly every year. In line with the vision of "Another Agriculture is Possible", local production is brought to the fore by providing support to farmers and producers. Studies are carried out to support agricultural production, especially in urban rural areas, with the goal of local development.

Smart Governance - Smart Governance relates with aspect of transparency within governance systems through modernization of city administration by supporting data openness and public involvement (Cohen, 2012). When the codes and sub-codes of the data related to the smart government theme are examined, it is seen that they are gathered under 3 themes as ICT& e-

government, transparency & open data, enabling supply & demand side policy. Among the responses given by the participants to this theme:

> *"E-government applications have started to become widespread throughout the city"* (P2).
>
> *"It is very easy to reach institutions, communicate and obtain information online"* (P19).
>
> *"A transparent, democratic and accessible management approach dominates the municipal budget, tenders, council decisions, performance indicators, market prices and many other data on the Bizİzmir platform"* (P16).
>
> *"Free wifi access is provided at certain points in the city, and it is also available in transportation vehicles"* (P14).
>
> *"Metropolitan invests a lot in IT infrastructure"* (P11).

When the answers given by the participants regarding the situation of smart state applications in smart cities are examined, it is emphasized that the metropolitan municipality continues its activities in a transparent and democratic manner. Positive studies are carried out on the IT infrastructure. However, it is quite easy to access data thanks to wifi connections at certain points of the city and in transportation vehicles. It is understood that investments have increased in these areas.

Smart Environment - Smart Environment is related to energy optimization that leads to sustainable management of available resources (Cohen, 2012). For smart environment applications, 3 subcodes were obtained in the context of Cohen's smart city components. This code is divided into sub-themes such as green buildings, green energy, green urban planning. Some of the statements given by the participants about smart environment applications are as follows:

> *"Within the scope of the Green İzmir vision, solar energy panels are installed on the roofs of 4 municipal annex buildings"* (P13).
>
> *"There are trams, subways and green-energy charged buses"* (P7).
>
> *"Green City Action Plan-Sustainable Energy and Climate Plan, Green City Planning are applications in this regard"* (P16).
>
> *"In terms of tourism throughout the province, the number of environmentally friendly, green star accommodation facilities is quite high. There are successful applications to save energy. For example, the use of solar powered lighting systems in park and garden lighting and the widespread use of recycling facilities in İzmir are important developments"* (P2).

When the answers given are examined, it is observed that various applications are made in the city, from green stops to green buildings in İzmir destination. Recycling and climate plan are among the important issues in the city. In addition, green energy vehicles are used in transportation vehicles. Especially in public transportation, electric buses that will not harm the environment are popularized. It is stated that studies that reduce energy consumption and focus on renewable energy sources are carried out in order to reduce greenhouse gas emissions throughout the municipality.

Smart Tourism Applications - According to the answers given by the participants, the website and application of Visitİzmir, the digital tourism infrastructure of the city, was prepared with the tourism stakeholders of İzmir in an environment where tourism is digitalized on a global scale. It is an application that includes photos, videos and information about more than 2,300 historical and touristic points with 13 categories covering 30 districts and is a guide that offers services in various languages. The use of such digital applications in the tourism sector can provide a competitive advantage in both promotion and marketing and in the management of the destination. Some of the answers given by the participants regarding the smart tourism applications carried out in İzmir destination are listed below:

> *"Visitİzmir application is a digital city application"* (P14).
>
> *"Eshot mobile application is the application that provides access to all information about bus transportation in İzmir"* (P3).
>
> *"Official institutions have very rich social media opportunities"* (P8).
>
> *"Applications such as Visitİzmir, Directİzmir, Izmir Time Machine and Izmir At My Fingertips are used"* (P18).

Visitİzmir application contains information about places to see in the city, accommodation opportunities, food and beverage businesses and artistic events to explore the city, and there are transportation routes on up-to-date maps on how to reach them.

> *"Visitİzmir is one of the smart tourism applications in İzmir. In an environment where tourism is digitalized on a global scale, the website and application, which is the city's digital tourism infrastructure, were prepared with the tourism stakeholders of Izmir. From the basket master in Bergama to the luxury hotels in the fountain, from the Yeşilova Tumulus, the first settlement of İzmir dating back 8500 years, to museums and art galleries or lesser-known nature areas, you can reach through Visitİzmir. It is a city guide available in English, Turkish and Russian languages. It was also prepared as a social media platform and promotion medium"* (P16).

"An example can be given to the application with the name "VisitİzmirI", which has a very wide range. You can easily access a lot of information you are looking for in topics such as history, nature, belief, museum and art, and shopping. With its different language options, it is a very useful, easy-to-use, and most importantly, a smart application where tourists can access accurate information" (P13).

Table 4. Smart Tourism Applications in İzmir Province

Tourism Applications in Smart Tourism Destinations	Utility Function	Destination Components	Smart Tourism Destination Dimensions
360° Virtual tour applications [eg Ephesus and Ephesus Museum]	Interpretation	Attractions	Smart people, Smart mobility
IzmirNet, Geographic information system, Traffic Management, IZUM Smart Traffic system [Providing real-time information about the transportation network]	Planning	Transportation, Accessibility	Smart Mobility, Smart living
Environmentally friendly and Green Star Accommodation Operations, Recycling Facilities, Waste water treatment plants, Promoting the use of renewable energy [Smart energy, environmentally friendly energy use]	Sustainability	Facility	Smart Environment
VisitİzmirI application, Directizmir, Izmir Time Machine and Izmir At My Fingertips [Digital tourism and travel guide]	Guidance	Available Packages	Smart People, Smart Mobility
VisitİzmirI application, Directizmir [Information about nearby attractions with mobile device apps]	Close marketing	Touristic activities	Smart Mobility
BizİzmirI [Information and Communication Technologies and Complaint Management system]	Feedback, Security	Auxiliary Services	Smart Living

Source: Authors

In Table 4, smart tourism applications in İzmir destination are discussed. There are virtual tour applications in the ancient city of Ephesus and the Ephesus museum in Izmir. İzmirNet, İZUM Smart traffic systems, geographic information systems can be given as examples for smart transportation and smart life applications. These applications provide convenience in terms of accessibility as they provide up-to-date transportation information for those living in the city and those visiting the city. Recycling facilities, waste treatment facilities, vehicles using renewable energy and environmentally friendly and green star accommodation establishments for the tourism sector can be given as examples of smart environmental practices in İzmir. VisiİzmirI, DirectİzmirI, Izmir Time Machine and Izmir At My Fingertips can be given as examples of applications prepared as a digital travel guide and digital tourism. These applications provide

information to the visitors of the city on many subjects such as touristic businesses, places to visit, transportation information, route planning, culture and art activities in the city. In addition, İzmir Metropolitan Municipality offers transparent, democratic and accessible digital solutions with Bizİzmir application.

> *"Digital applications are widely used in the field of tourism. A mobile application developed by the Provincial Directorate of Culture and Tourism for the use of tourists based on augmented reality technology for the Ephesus archaeological site provides service. The same application is made for the Ephesus Museum. In addition, the 'Izmir at Your Fingertips' project was implemented. Social media platforms [Instagram, Twitter, Facebook, YouTube] are actively used for the promotion of the city. The QR code supported 'Smyrna Legacy' application is used by the visitors to promote the works in the museums. Local governments implement practices such as 'Visitİzmir'"* (P2).
>
> *"Efes augmented reality application is widely used. The buildings in the ancient city are revived with AG, offering a different experience to the visitors"* (P4).

CONCLUSION AND SUGGESTIONS

Smart tourism has emerged as a new approach sensitive to technology, quality and environment as a result of the widespread use of technology in the field of tourism. Destinations using smart tourism applications with the integration of smart city applications provide various advantages to increase tourist satisfaction with the services they offer to tourists in today's competitive environment. In this context, the province of İzmir, which is one of the important destinations of Turkey, is a destination visited by 1,224,634 (2019) (TURSAB, 2020) tourists before the pandemic. In addition, with a population of 4,425,789 according to 2021 data, the province of İzmir (Tüik, 2021) is a province with a population density. For this reason, studies, projects, official website, internet pages [Instagram, Twitter, Facebook, YouTube] and mobile applications related to smart city and smart tourism is being developed in order to both facilitate the life of those living in İzmir and increase the satisfaction level of tourists visiting İzmir.

The new tourist profile is the type of tourist who can access information and communication technologies more easily and use these technologies more actively, make better use of their time and money, and attach more importance to personalization and security in touristic

activities. These changes in the new tourist profile have forced the tourism industry and tourism destinations to adapt to the change. In this context, tourism destinations have started to invest in these technologies in order to reach and attract tourists who use information and communication technologies actively. In the study, it is aimed to determine the smart city and smart tourism applications in İzmir, which is one of the important destinations of Turkey and a member of OASC. The convenience and advantages provided by the smart city and smart tourism applications in İzmir to both the public and the tourists visiting the city are mentioned. In addition, such studies, projects and investments will have advantages such as increasing the number of tourists to the city in terms of tourism, increasing tourist satisfaction and providing competitive advantage.

The aim of the study is to examine the smart city components of İzmir according to Cohen's Smart City Wheel and to determine the activities to become a smart tourism city based on these applications. In this direction, interview technique, one of the qualitative research methods, was used in the research. In the research, the questions asked to the participants about smart tourism applications were collected in 7 themes. These themes were analyzed in the Nvivo 12 package program, including 6 themes [Smart mobility, smart living, smart people, smart economy, smart government, smart environment] and smart tourism applications in line with Cohen's smart city dimensions.

According to the findings obtained in the study, when the answers given to the *Smart Mobility* theme are evaluated, the transportation infrastructure of İzmir is developed and technological opportunities are effectively utilized. Modes of transport are integrated with each other. According to the *Smart Living* theme, the city is sensitive to culture and art in socio-cultural terms. There are cultural centers, art institutions, museums, theaters and cinemas in the city to meet the needs. In all these areas, technological opportunities are utilized as much as possible. According to the *Smart People* theme, emphasis is placed on contemporary educational practices to raise awareness. Activities are carried out to increase the quality of life of the society throughout the city. In these activities, it is ensured that the society takes an active role by allowing the innovative and creative ideas of the society to be put into practice. Within the scope of the *Smart Economy* theme, it is emphasized that resources are used effectively and efficiently. In addition, solutions for sustainability are produced. According to the answers given to the *Smart Government* theme, there is easy access to data in the city and positive studies are carried

out for the informatics infrastructure. In *Smart Environment* applications, green buildings are built throughout the province and green energy consumption is provided especially in public transportation vehicles.

In the study, Visitİzmir application, one of the smart tourism applications in İzmir, is an application that helps those who want to explore the destination. It has been determined that it is an application that includes historical, cultural and touristic places in İzmir, tourism businesses, routes in close distance, transportation information, active road maps as well as cultural and artistic activities in İzmir and up-to-date information. In addition, the mobile use of this application allows tourists to have easy access during their travels and to access up-to-date information about the destination they need. Kaur and Maheshwari (2016) found that mobile applications, which are included in smart tourism applications, provide tourists with access to up-to-date data about touristic destinations without time limit and contribute to the increase of their experience. In this context, the Visitİzmir application is similar to the study of Kaur and Maheshwari (2016) in this respect.

It has been determined that Izmir has made various investments in the smart city concept and especially Izmir Metropolitan Municipality has made serious studies in this direction. According to the results of the interviews, it has been determined that the province of Izmir (Buhalis & Amaranggana, 2014) has a significant amount of smart tourism applications specified in the study. These practices provide the destination with advantages such as sustainability, innovation and value creation, and accessibility. Gelter et al. (2022) examined smart tourism destinations from the perspective of stakeholders with a qualitative research. There is a need to counterbalance the currently dominant focus on technology with softer though more existential values to construct a sustainable path of destination development. In this respect, the results of the research are similar to Gelter et al. (2022).

In the concept of smart tourism, technologies such as NCF, QR, AR, IoT, high-speed wifi, destination-based mobile applications, smart portable devices, smart sensors and cameras can provide tourists and visitors with a richer tourism experience with easier, more active and more up-to-date information. For this reason, it is extremely important for destinations to give importance to information and communication technologies, to make investments and studies in this direction, to increase tourist satisfaction and to provide destination competitive advantage. Although the subject of smart tourism destination is new and up-to-date in the

literature, the lack of sufficient number of studies in this field is among the limitations of the study. In future studies, comparative analyzes can be made with different smart tourism destination applications. In addition, in future studies, the opinions of all stakeholders in the destination can be taken, the attitude of the local people can be evaluated, and the expectations of the tourists coming to the Izmir destination from the smart destination can be investigated. Both the tourism sector and local governments can work on the adaptability of smart tourism destination applications in the world to İzmir destination with a joint study.

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