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Virtual Recreation Applications Analyzing Digital Tourism from the Perspective of Smart Cities

Dijital Turizmde Sanal Rekreasyon Uygulamalarının Akıllı Şehirler Perspektifinden Analizi

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Abstract: The rapid development of technology in recent years has enabled the widespread use of virtual reality and augmented reality concepts in the tourism sector. These technological innovations are leading to a significant transformation in tourism and recreational activities. In this context, the aim of this study is to determine the scope of the digital recreation concept created using virtual reality and augmented reality infrastructure and to examine virtual recreation applications in digital tourism through smart cities. In line with this aim, virtual recreation applications carried out in smart cities in Turkey have been analyzed. Virtual reality and augmented reality can be effectively used in the tourism sector, particularly in the recreation field. These technological innovations enable tourists to explore destinations before travel, experience different things during travel, and revive their memories after travel. Additionally, virtual recreation activities are considered an important leisure activity that offers social and psychological benefits for tourism. However, it has been found that the current smart city applications do not yet provide sufficient application for virtual recreation activities. Existing smart city applications in Turkey provide an important opportunity for accelerating digitalization in the tourism sector. In this context, deductions have been made on virtual recreation activities concerning the basic features of smart city applications. As a result, virtual reality and augmented reality technologies have a significant impact on the tourism sector. Virtual recreation applications in digital tourism through smart cities can play an important role in accelerating digitalization in the tourism sector. Therefore, effective use of these technologies by stakeholders in the tourism sector and integration of smart city applications into the digitalization process of the tourism sector are crucial.

Structured Abstract: Virtual reality technology has become increasingly prevalent in various industries, including tourism and recreation. The use of virtual reality can provide users with a realistic and immersive experience that simulates a real-world environment. The adoption of smart technologies such as the Internet of Things, big data, and artificial intelligence is creating intelligent experiences, and smart tourism supports and facilitates innovations related to technology implementation and the development of smart travel experiences. Smart tourism technology experience significantly relates to travel experience satisfaction. Virtual recreation activities are a novel concept in leisure time management, representing an extension of virtual tourism. They

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have the potential to contribute to the development of urban tourism and add a new dimension to the tourism industry when promoted as smart city applications. By leveraging advanced technologies such as virtual reality and augmented reality, virtual recreation activities can create highly engaging and immersive experiences for users, allowing them to explore and interact with virtual environments in unprecedented ways. This can help attract a wider range of visitors and enhance their satisfaction with the tourism offerings in urban areas. As cities continue to invest in smart city technologies and infrastructure, the potential for virtual recreation activities to become a key component of urban tourism is likely to grow. A study conducted in Turkey aimed to examine the status of virtual recreation activities and smart city applications in the scope of digital tourism.

The concept of smart cities has emerged as a solution to ensure high quality of life and sustainability in urban areas by using modern technology. Smart city solutions can not only create livable and sustainable cities but also contribute to economic development by offering new products, services, and business models. On the other hand, digital tourism is a new concept that allows individuals to experience tourism virtually without leaving their place of residence. The use of new-generation reality technologies enables individuals to access tourism experiences that were previously inaccessible due to time and financial constraints. Similarly, digital recreation, which is defined as any leisure activity undertaken voluntarily during free time, is introducing revolutionary changes to the travel and tourism industry. The continuous evolution and expansion of next-generation reality technologies have opened up new possibilities for digital recreation, offering exciting and innovative ways for individuals to engage in leisure activities and experience tourism virtually.

This conceptual research aims to analyze virtual recreation applications in digital tourism from the perspective of smart cities, specifically focusing on existing national applications in Turkey. Document analysis was used as the data collection technique, which is a qualitative research method that involves interpreting sources related to the targeted situation. The research universe is composed of national applications related to "digital tourism" and "virtual recreation." The purpose of the study is to analyze virtual recreation applications in smart cities from the perspective of digital tourism. To accomplish this, tables were used to examine virtual recreation applications in various sub-themes, such as those used in museums, cultural sites, and municipal websites. The findings of the research contain recommendations that could be useful to researchers, local governments, and representatives of the tourism industry in the fields of digital tourism and smart cities. Therefore, the study was designed to contribute to the more efficient design and implementation of projects that combine digital tourism and smart cities. The article discusses the digital recreation applications implemented in Turkey, particularly in museums and cultural heritage areas. Several museums in Turkey have rich content in terms of digital recreation applications, providing visitors with an immersive experience of ancient times. Similarly, cultural sites like Göbeklitepe and the Roman Baths also use digital recreations to help visitors understand the lifestyle and culture of ancient times. Local governments in Turkey have also started using digital means to promote cultural sites and tourist destinations, but they have not made sufficient progress in this field compared to other countries.

Digital recreation applications used in museums have become popular during the pandemic, allowing visitors to virtually tour museums. Large museums like the Topkapı Palace Museum and smaller ones like the Zeugma Mosaic Museum offer such applications. Virtual recreation applications used in cultural sites are particularly useful for historical areas. For those who cannot physically visit important historical sites, these applications provide an opportunity to get a closer look and explore the areas. The virtual recreation applications provided by municipalities generally consist of services such as photo galleries, promotional materials, and tourism information for people with disabilities. These applications are useful for municipalities to introduce their cities to tourists and highlight their cultural heritage. Digital recreation applications are an important tool to preserve and promote cultural heritage, making it possible for more people to reach historical sites and for our cultural heritage to be discovered by wider audiences.

In conclusion, digital recreation applications are an important tool to preserve and promote our cultural heritage. These applications make it possible for more people to reach historical sites and for our cultural heritage to be discovered by wider audiences. According to the article, the elements that virtual recreation applications analyzing from the perspective of the smart cities concept should contain are as follows:

- Integration with other smart city applications: Virtual recreation applications should be integrated with other smart city applications, such as transportation, energy management, and waste management systems, to create a seamless and comprehensive experience for users.

- Interactive and immersive experiences: Virtual recreation applications should provide interactive and immersive experiences for users, allowing them to explore cultural heritage sites and museums in a more engaging and educational way.
- Accessibility: Virtual recreation applications should be accessible to all users, regardless of their physical abilities or limitations, by providing features such as audio descriptions and closed captions.
- Personalization: Virtual recreation applications should offer personalized experiences for users, allowing them to tailor their exploration of cultural heritage sites and museums according to their interests and preferences.
- Real-time data and analytics: Virtual recreation applications should provide real-time data and analytics to measure user engagement and preferences, enabling continuous improvement and optimization of the applications.
- Security and privacy: Virtual recreation applications should ensure the security and privacy of user data and information, adhering to relevant laws and regulations to protect user rights.

This study focuses on the impact of smart city technologies and new-generation technologies on the tourism sector in Turkey. It was found that municipalities offer more recreational activities for promotion through their websites, mainly in the form of photographs and promotional materials. However, efforts to use new-generation reality technologies in digital recreation are increasing. Collaborations with celebrities and the use of storytelling techniques are important in increasing the attractiveness of tourism destinations. It is suggested that research should be conducted to examine the impact of smart city technologies on sustainability, tourism revenues, and tourist experience. Additionally, studies can be conducted on personalized digital recreation activities, the use of next-generation reality technologies, the sustainability of digital recreation activities, and the use of storytelling techniques in promoting tourism destinations. Such research can help develop effective strategies for the use of digital technologies in the tourism sector and the adoption of sustainable tourism practices.

Keywords: Digital Tourism, Digital Recreation, Virtual reality, Augmented reality, Smart Cities.

Öz: Son yıllarda teknolojinin hızlı gelişimi, turizm sektöründe sanal gerçeklik ve artırılmış gerçeklik kavramlarının yaygın olarak kullanılmasına olanak sağlamaktadır. Bu teknolojik yenilikler, turizm ve rekreasyon faaliyetlerinde önemli bir dönüşüme yol açmaktadır. Bu bağlamda, bu çalışmanın amacı, sanal gerçeklik ve artırılmış gerçeklik alt yapısı kullanarak oluşturulan dijital rekreasyon kavramının kapsamını belirlemek ve akıllı kentler üzerinden dijital turizmde sanal rekreasyon uygulamalarını incelemektir. Bu amaç doğrultusunda, Türkiye'deki akıllı kentlerde gerçekleştirilen sanal rekreasyon uygulamaları analiz edilmiştir. Sanal gerçeklik ve artırılmış gerçeklik, turizm sektöründe özellikle rekreasyon alanında etkili bir şekilde kullanılabilmektedir. Bu teknolojik yenilikler, turistlerin seyahat öncesinde destinasyonları keşfetmelerine, seyahat sırasında farklı deneyimler yaşamalarına ve seyahat sonrasında ise hatıralarını canlandırmalarına olanak sağlamaktadır. Ayrıca, sanal rekreasyon faaliyetleri turizm açısından sosyal ve psikolojik faydalar sunan önemli bir boş zaman aktivitesi olarak değerlendirilmektedir. Ancak, mevcut akıllı kent uygulamalarının sanal rekreasyon faaliyetleri konusunda henüz yeterli düzeyde uygulama sunmadığı tespit edilmiştir. Türkiye'deki mevcut akıllı kent uygulamaları, turizm sektöründe dijitalleşmenin hızlandırılması için önemli bir fırsat sunmaktadır. Bu kapsamda, akıllı kent uygulamalarının temel özellikleri hakkında sanal rekreasyon faaliyetleri konusunda çıkarımlar yapılmıştır. Sonuç olarak, sanal gerçeklik ve artırılmış gerçeklik teknolojileri, turizm sektöründe önemli bir etki yaratmaktadır. Akıllı kentler üzerinden dijital turizmde sanal rekreasyon uygulamaları, turizm sektöründeki dijitalleşmenin hızlandırılmasında önemli bir rol oynayabilir. Bu nedenle, turizm sektöründeki paydaşlar tarafından bu teknolojilerin etkili bir şekilde kullanılması ve akıllı kent uygulamalarının turizm sektöründe dijitalleşme sürecine dahil edilmesi önem arz etmektedir.

Anahtar Kelimeler: Dijital Turizm, Sanal Rekreasyon, Sanal gerçeklik, Artırılmış gerçeklik, Akıllı Kentler.

Introduction

Recently, the rapid advancement of the internet and technology has led to the emergence of virtual reality applications, which have been employed in various industries such as healthcare, military and pilot training, architecture, education, and also in the tourism and recreation sector (Aylan & Aylan, 2020). Virtual reality is a cutting-edge technology that serves as an interface between human beings and computer-generated environments, enabling the simulation of human actions and behaviors in a natural setting, including visual, auditory, and motor interactions (Hurhadi et al., 2018). Simply put, virtual reality systems allow users to engage with computer-generated content through an immersive and interactive experience, creating a simulated environment (Baran, 2023b) that closely resembles the physical world and incorporates multiple sensory feedback modalities (Bahar, 2014). Through the use of advanced simulation and rendering techniques, virtual reality technology can generate a highly realistic and interactive environment, enabling users to feel fully present and engaged with digital content as if they were physically there (Sharif et al., 2020). Computers facilitate the generation of a three-dimensional environment that enables users to become physically engaged and participate in a simulated reality that replicates real-world scenarios. Advanced virtual reality systems now use infrared motion sensors to accurately track user movements and provide more realistic responses. These systems are often paired with head-mounted displays that use stereoscopic vision to provide users with a lifelike sense of depth and spatial awareness. Together, these technologies create a highly immersive and interactive virtual environment that can be used in various applications such as gaming, education, healthcare, and more (Greengard, 2019). As technology continues to evolve, it is likely that virtual reality systems will become even more sophisticated and widely adopted, further transforming the way we experience and interact with digital content (Racz & Zilizi, 2019).

The emergence of smart technologies, including virtual reality, big data, the Internet of Things, and artificial intelligence, has paved the way for the development of intelligent experiences in the tourism industry. Smart tourism, as a new ecosystem, promotes technological advancements and facilitates the implementation of smart travel experiences (Femenia-Serra & Neuhofer, 2018). An example of such an experience is the virtual museum, which provides users with virtual tours and entertainment accessible from the comfort of their homes. A virtual tour is an immersive technology that allows users to be placed within the virtual image, thereby enhancing situational awareness and offering advanced features for displaying, capturing, and analyzing virtual data (Osman et al., 2009). Comprising a series of static images or videos, a virtual tour replicates an existing location and may incorporate various multimedia elements such as music, narration, text, and sound effects (Zheng et al., 2018).

Virtual reality applications have led to changes and transformations in tourism and recreational activities (Aylan & Aylan, 2020). Recent technological developments have changed the way people experience physical and virtual environments (Flavian et al., 2019), and service experience or customer experience has become a popular topic (Anita & Wijaya, 2021). Customers now prefer to consume services and seek experiences rather than purchasing goods or products. Therefore, it is very important to identify, evaluate and respond to customer needs and preferences in order to improve the service experience. As a result, customers experience significantly different experiences from normal services by using smart services. The adoption of smart technologies in the tourism industry has resulted in the provision of smart services, which in turn has led to the emergence of smart experiences. These experiences involve the utilization of cognitive, emotional, and behavioral elements of smart technology to interact with customers, ultimately leading to their satisfaction with their travel experience (Roy et al., 2017; Pai et al., 2020).

Digital tourism, which has gained a new dimension in the form of smart city applications, is increasingly shaping itself as the concept of virtual recreation according to people's entertainment

perception, thanks to the influence of the evolving technological infrastructure. Virtual recreation activities, which are considered as a new concept in leisure time management and an extension of virtual tourism, are believed to contribute to the development of urban tourism and add a new dimension to tourism when promoted as smart city applications.

The study was designed to examine the status of virtual recreation activities and smart city applications in the scope of digital tourism in Turkey. For this purpose, a literature review was conducted on the concepts of smart city, digital tourism, and virtual recreation. Subsequently, smart city applications in Turkey were examined, and the virtual recreation activities offered for tourism purposes by cities that have implemented virtual recreation activity applications were identified.

Conceptual Framework

The advancement of technology has led to the emergence of various digital solutions in different industries, including tourism and recreation. Among these digital solutions, smart city applications have been developed to create sustainable and livable urban areas, while digital tourism and recreation have enabled individuals to experience virtual travel and leisure activities from their own environments. This paper aims to explore the conceptual framework of these three topics, highlighting their key characteristics and potential benefits.

Smart city

Smart city applications have emerged as a new set of values that encompass all models developed over time to ensure high quality of life and sustainability in urban areas (Eremia, Toma, & Sanduleac, 2017). On the other hand, the smart city is a transformation process that not only includes technological solutions for components such as the economy, environment, and people but also has the capacity to affect many sectors within the city (Deloitte, 2016). The smart city model may be needed not only to create livable and sustainable cities but also to develop economically. With the correct direction and effective use of modern technology, smart city solutions can be offered for new products, services, and business models, leading to both the conservation of natural resources and the economic development of the city (United Nations, 2017).

Digital Tourism

Tourism is a fundamental concept that originally referred to leisure, but has evolved into an important industry that can be pursued for various reasons (Toskay, 1989). In today's conditions, the traditional definition of a tourist is changing, and a definition is emerging that does not require the tourist to leave their place of residence. Through new generation reality technologies, tourism experiences that cannot be realized due to time and financial constraints are becoming accessible through digital tourism technologies (Baran, 2021). In the new definition of tourism, the starting point is "setting out" from the real world, and after experiencing a tour in the virtual world, the individual "returns" to their physical world. Compared to physical travel, virtual travel experiences can be considered more of a mental activity. Therefore, the definition of virtual tourism can be defined as the collection of virtual visits and related activities that individuals undertake mentally to "virtual spaces" for a certain period of time, paying an economic cost, from their real environment (Kozak & Özerkoğlu, 2018).

Digital Recreation

The emerging next-generation reality technologies, which are constantly evolving and utilized in various fields, are introducing revolutionary changes to the travel and tourism industry (Howell & Hadwick, 2017). Recreation is defined as any kind of leisure activity that is undertaken voluntarily and not mandatory during free time (Baran, 2023a). Recreational activities are activities that individuals engage in to make the most of their free time and require motivation (Torkildsen, 2005). It can be observed that virtual museum tours are the most common digital recreational

activities (Pourmoradian et al., 2021). In addition, virtual tours to natural environments such as caves, waterfalls, canyons, mountains, and cultural sites such as ancient cities, churches, and mosques are also known to exist. The diversity of virtual tours continues to expand to include various digital recreational activities such as cycling, hiking, yoga, and more.

Methodology

The initial stage of this conceptual research is expressed as "Virtual Recreation Applications Analyzing in Digital Tourism from the Perspective of Smart Cities." In this study, which is designed to examine current national applications of virtual recreation from the perspective of smart cities in Turkey, the aim is to analyze national applications. Document analysis was used as the data collection technique for the research. Document analysis is a qualitative research method that involves interpreting sources related to the targeted situation (Glesne, 2013). In this context, the universe of the research consists of national applications prepared for "digital tourism" and "virtual recreation." The aim of the study is to analyze virtual recreation applications in digital tourism from the perspective of smart cities. Within this framework, virtual recreation applications were analyzed with the help of tables. Sub-themes such as virtual recreation applications used in museums, cultural areas, and on municipalities' websites were examined. The findings obtained from the research contain recommendations that can be useful for researchers working in the field of digital tourism and smart cities, local governments, and representatives of the tourism industry. Therefore, the research is designed to contribute to the more efficient design and implementation of projects that combine digital tourism and smart cities. This study does not require ethical committee approval. The article has been prepared in accordance with research and publication ethics.

Findings

Firstly, when looking at the digital recreation applications implemented in Turkey, within the framework of research conducted on the internet, applications that can be evaluated as virtual recreation activities for museums and cultural heritage areas are shown in Table 1 and in Table 2.

Table 1: Virtual Recreation Applications Used in Museums

Museum Name	City
Anatolian Civilizations Museum	Ankara
Hatay Archeology Museum	Hatay
Topkapi Palace Museum	Istanbul
Sakip Sabanci Museum	Istanbul
Zeugma Mosaic Museum	Gaziantep

When the museums in Turkey included in Table 1 are examined, it appears that they have rich content in terms of digital recreation applications. Archeological museums such as the Museum of Anatolian Civilizations and the Hatay Archeology Museum offer their visitors the rich archeological heritage with digital recreations. These digital recreations provide visitors with a surreal experience, bringing the lifestyle of ancient times to life. Topkapı Palace Museum and Sakıp Sabancı Museum are museums that display Turkey's cultural richness. In these museums, art works located in palaces and museums are presented to visitors with digital recreations. In this way, visitors can see the real dimensions and details of the art works better and understand their historical stories better. The Zeugma Mosaic Museum is a museum where mosaics from the Roman period are displayed. In this museum, the details and colors of the mosaics are digitally reproduced, offering visitors a surreal experience. The digital recreations of these museums create an environment where culture, history, and art are integrated, offering visitors an interactive experience. Therefore, digital

recreation applications make the time visitors spend in museums in Turkey more enjoyable and educational.

Table 2: Virtual Recreation Applications Used in Cultural Sites

Cultural Site Name	City
Miniatürk	İstanbul
Roman Baths	Ankara
Göbeklitepe	Şanlıurfa
Galata Tower	İstanbul
History Comes Alive in 3D Project	Bergama

When the recreation practices used in cultural areas in Turkey are examined in Table 2, it can be seen that they have rich content in terms of digital recreation applications. Miniatürk is a miniature park located in Istanbul. In this park, important structures and tourist attractions from various places in Turkey and the world are exhibited in miniature form. These miniatures are combined with digital recreations to offer visitors a surreal experience. The Roman Baths is an ancient bath located in Ankara. With digital recreations, this bath brings to life the lifestyle of ancient times for visitors, allowing them to better understand how the bath was used and the bathing culture of ancient times. Göbeklitepe is a world heritage site and an ancient temple complex located in Şanlıurfa. Through digital recreations made in this area, visitors can better understand how life was lived here in ancient times and how the temples were used. The Galata Tower is a historical structure located in Istanbul. Through digital recreations, the tower offers visitors a historical experience, allowing them to better understand the view from the tower and its historical story. The 3D Animation of History Project includes the digital recreation of a historical area located in Bergama. This project brings to life how life was lived in Bergama during ancient times and how historical structures were used for visitors. These digital recreation applications in cultural areas create an environment where culture, history, and art come together, offering visitors an interactive experience. Therefore, digital recreation applications make the time visitors spend in cultural areas in Turkey more enjoyable and educational.

Tablo 3: Virtual Recreation Applications Used in Municipalities' Websites

Presented Virtual Recreation Application	City
Photo Gallery	Adana
Photo Gallery	Ankara
Photo Gallery, Tourism Information for the Disabled	Antalya
Photo Gallery,	Aydın
Photo Gallery, Promotional Material, Tourism Information for the Disabled	Balikesir
Photo Gallery, Promotional Material	Bursa
Photo Gallery, Promotional Material	Denizli
Photo Gallery, Tourism Information for the Disabled	Diyarbakir
Tourism Information for the Disabled	Erzurum
Promotional Material, Tourism Information for the Disabled	Eskisehir
Photo Gallery, Promotional Material	Hatay
Photo Gallery, Promotional Material, Tourism Information for the Disabled	Istanbul
Photo Gallery, Promotional Material	Izmir
Photo Gallery, Promotional Material	Kahramanmaras

Photo Gallery, Promotional Material	Kayseri
Photo Gallery, Promotional Material	Kocaeli
Photo Gallery, Promotional Material	Konya
Photo Gallery, Promotional Material	Malatya
Photo Gallery	Manisa
Photo Gallery	Mardin
Photo Gallery, Tourism Information for the Disabled	Mersin
Photo Gallery	Mugla
Photo Gallery, Promotional Material	Ordu
Photo Gallery, Promotional Material	Sakarya
Photo Gallery, Promotional Material	Samsun
Photo Gallery, Promotional Material	Sanliurfa
Photo Gallery	Tekirdag
Photo Gallery, Promotional Material	Trabzon

Table 3 presents the virtual recreation applications offered on the websites of municipalities in Turkey. These applications generally include photo galleries, promotional materials, and tourism information for the disabled. Among the listed municipalities are major cities such as Istanbul, Ankara, Izmir, Antalya, and Bursa. This table shows that local governments in Turkey have started using digital means to promote cultural sites and tourist destinations. However, the inclusion of only simple applications such as photo galleries in the table indicates that Turkey has not yet made sufficient progress in this field compared to digital recreation applications in other countries.

The available data provide a general idea about the digital recreation applications used by museums, cultural sites, and municipalities in Turkey. These applications enable visitors to virtually explore the locations and get a closer understanding of our cultural heritage. Virtual recreation applications used in museums have become particularly popular during the pandemic and allowed museum visitors to virtually tour museums. Large museums such as Topkapı Palace Museum, Museum of Anatolian Civilizations, and Sakıp Sabancı Museum, as well as smaller ones like the Zeugma Mosaic Museum, also offer such applications. Virtual recreation applications used in cultural sites are especially useful for historical areas. For those who cannot physically visit important historical sites such as Göbeklitepe, these applications provide an opportunity to get a closer look and explore the areas. The virtual recreation applications provided by municipalities generally consist of services such as photo galleries, promotional materials, and tourism information for people with disabilities. These applications are very useful for municipalities to introduce their cities to tourists and highlight their cultural heritage. In conclusion, digital recreation applications are an important tool to preserve and promote our cultural heritage. Through these applications, it is possible for more people to reach historical sites and for our cultural heritage to be discovered by wider audiences.

Conclusion

The changes brought by smart cities and new generation technologies to the tourism sector are a rapidly developing trend that is of great importance. It is expected that this trend will continue to increase in the future. On the other hand, when recreational activities are evaluated in terms of tourism, they stand out as important activities that contribute to the individual's socialization, increase their perception level and success, and help develop their communication skills. The comprehensive development of the individual facilitates their involvement in all areas of social life and makes it easier for them to go beyond the boundaries of their own world. The ease of accessibility of developing technology has positively affected recreational activities in tourism, allowing the tourism industry to quickly become acquainted with the virtual world. This has also increased the efforts of countries that want a larger share of the tourism industry to integrate technology systems

into their tourism activities. With the emergence and rapid adoption of smart city technologies, the tourism industry has the potential to leverage these advancements to create more attractive and efficient travel experiences. Smart cities can offer a range of benefits, including enhanced mobility, connectivity, and sustainability. For example, smart transportation systems can provide real-time data on traffic patterns and public transit schedules, allowing travelers to navigate unfamiliar cities more easily and efficiently. Smart hotels can provide guests with personalized recommendations and experiences based on their preferences and past behavior. Moreover, smart cities can help improve environmental sustainability by reducing energy consumption and waste, and promoting eco-friendly practices. By incorporating smart city technologies into their offerings, tourism businesses can provide travelers with more seamless and enjoyable experiences, and differentiate themselves from competitors. Moreover, the use of smart technologies can help tourism businesses to better understand and respond to the needs and preferences of their customers, leading to higher levels of customer satisfaction and loyalty. Therefore, the tourism industry has the potential to benefit greatly from the advantages offered by smart city technologies, making it a more attractive and promising sector for investment and growth. However, sufficient resources and cooperation are required for the development and implementation of these technologies. At this point, it is possible for municipalities, tourism directorates, and the private sector to maximize the potential of the tourism industry by collaborating.

In this study, which was designed to reveal the extent of virtual recreational activities in smart cities in Turkey, it was determined that municipalities offer more recreational activities for promotion through their websites. These activities were mainly seen in the form of photographs, promotional materials, and tourism opportunities offered to disabled individuals. On the other hand, it was found that recreational activities for tourism in Turkey are mostly designed for museums and cultural areas. Although there are not many applications in this regard, it can be evaluated that efforts to use new generation reality technologies in digital recreation are increasing. This situation is an indicator that it will increase in proportion to the economic development of countries and their openness to innovations sociologically.

In relation to the topic, planning well-anticipated advertising activities that incorporate new generation technologies is important in increasing the city's image. Within the framework of smart city applications, municipalities need to implement attractive applications through not only their own websites but also new generation reality technologies that they will install in the city's tourist information points. It is known that collaborations with celebrities are striking elements in increasing the attractiveness of tourism destinations today. In this regard, it is also important to present platforms created using new-generation reality technologies and to organize promotional activities targeting individuals with access to this technology who fit the tourist profile.

Taking all of these generalizations into consideration, it can be evaluated that the widespread implementation of digital tourism applications would be a significant step toward tourism development in Turkey, particularly considering the limited provision of digital recreational activities for museums and cultural sites in the country. Smart cities, which offer a new dimension to tourism activities, can progress and advance in terms of promotion and sustainable tourism practices. Furthermore, while some municipalities' tourism activities for people with disabilities are considered as crucial examples of digital recreation, they could become more appealing destinations by taking their features to the next level and offering exciting small experiences for disabled and elderly tourists. Additionally, some municipalities' digital recreational activities, which are solely focused on photo and promotional materials, could become much more attractive destinations if they are brought to life through new-generation virtual reality technologies.

On the other hand, storytelling is a very important promotional material that can be used in new-generation reality technologies (Baran, 2022). Turkey is a land of fairy tales and legends. Using

this feature and providing environments where stories can be experienced almost like reality through the opportunities offered by digital technologies is considered a much more important development as a contribution to the promotion of the destination at both national and international levels.

It is important that future research should focus on case studies that aim to increase the number of applications at the city level. In particular, sample applications to be carried out by municipalities and tourism provincial culture directorates appear to be crucial in paving the way for such developments in our country. Furthermore, some suggested research topics that could be undertaken academically are as follows;

- A study can be conducted to determine the profiles of tourists in cities and provide personalized digital recreation activities based on their interests.
- A study can be conducted to examine the effects of smart city technologies on the tourism industry, addressing the impacts of smart city applications on the sustainability of tourism activities, tourism revenues, and tourist experience.
- A study can be conducted on the use of next-generation reality technologies in promoting tourism destinations, examining the impact of tourists experiencing destinations using these technologies, their interest levels, and the impact of these technologies on tourism destinations.
- A study can be conducted on the sustainability of digital recreation activities, addressing factors such as the environmental impacts of digital recreation activities, consumption, and mobility patterns of tourists who engage in these activities.
- A study can be conducted on the use of storytelling techniques in promoting tourism destinations. This study can address the impact of storytelling techniques on how tourists experience destinations, how tourists perceive these techniques, and which methods can be used to enhance the impact of stories.

Conducting such research can help develop more effective strategies for the use of digital technologies in the tourism sector and the adoption of sustainable tourism practices.

In summary, the incorporation of innovative technologies and smart city applications in the tourism sector is vital for achieving sustainable tourism. To enhance the attractiveness of their destinations, municipalities can utilize reality technologies, collaborate with celebrities, employ storytelling, and provide digital recreation activities. Moreover, offering tailored experiences for disabled and elderly individuals can further enhance the appeal of tourism activities. Future academic studies in this field can help measure the influence of new-generation technologies on the tourism industry, thereby contributing to the advancement of sustainable tourism.

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    1. First author %50

    2. Second author %50

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