

Analysis of Smart Tourism Development in Azerbaijan

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Abstract— “Smart tourism” is one of the latest trends in the tourism sector based on smart technologies. The aim of the research is to analyze the main factors for the development of “Smart tourism” in Azerbaijan. Three factors - technology, human capital, and innovation were considered for the analysis. The “Smart city” approach is the basis of smart concepts for tourism. For this reason, in order to realize “Smart tourism” applications in a tourism destination, it is necessary to develop “Smart city” infrastructure for that city first. Therefore, it would be a correct approach to evaluate “Smart city” and “Smart tourism” applications as integrated with each other, enhancing and enriching the quality of life of the local people in that city, and enriching the experiences of those who temporarily visit that city, supported by advanced internet technologies. We considered a “Smart city” opportunity in the Sheki Zagatala region of Azerbaijan.

Keywords—“Smart city”, “smart tourism”, information technologies, modernization, urban planning

I. INTRODUCTION

Tourism is an important economic driver for the economies of the country. The energy supply, vital for the tourism industry, is still dominated by oil products in Azerbaijan which leads to ecology problems

The use of renewable energy technologies (RET), information and communication technologies (ICT) can boost the competitiveness of the tourism sector significantly the country. In addition to economic benefits derived from reduced energy costs, a transition to RET and ICT can reinforce sustainable tourism marketing strategies, increasing tourist arrivals and allowing for higher room rates.

The rapid development of information and ICT has created numerous opportunities for the tourism sector. The last decade is characterized by the rapid growth of high technologies, electronics, and instrumentation, which have found their wide application in all sectors of our daily life. The use of such technologies in urban planning, including tourism, has led to the creation of "smart tourism" and “green energy”, which are new approaches.

At present, modernization, informatization, and internationalization bring opportunities for traditional tourism, at the same time “smart tourism” is developing [1]. “Smart tourism” satisfies the needs of tourists, allows tourists to feel convenient, and leads to the modernization of tourist complexes [2]. Of course, the rapid development of science and technology, and the application of the internet, take an important place in the development of tourism, including intellectual tourism.

Today tourism vigorously develops, but there are problems in this area. Therefore many scientists study the problems and engage in solutions to these problems in tourism. On the other hand, the development problems of smart tourism are at the center of the attention of many scientific centers, and specialists. They search the ways of smart tourism development and investigate innovation in tourism [3-7].

The authors of [3] show the importance of analyzing information from social networks to develop "smart tourism". Their models could be used as input data for the creation of "smart urban tourism".

The authors [4] conducted an analysis of urban attractiveness taking into account the

residential population and demand for international tourism. They revealed a balance between environment, population, tourists, and visitor numbers. Although their study analyzes the development of tourism in complex with the city's attractions, but real data is not given.

The authors in the work [5] combine the information on initiatives and works from the documents of public tourism planning. They defined that a growing number of destinations require the generation of knowledge useful for managing tourism. Although their research has practical significance, but it has no connection with the transformation and upgrading of tourism.

The main characteristics of smart tourism development were studied in the work [6]. It is possible to use these results in planning the further development of smart tourism and in the application of tourism innovation policies. These results have only certain reference value for the modernization of traditional tourism and the long-term and sustainable development of "smart tourism", but the authors have not widely analyzed the development of "smart tourism".

The paper [7] deeply analyzed the problems connected with the development of the tourism industry today and providing information technology for tourists during travel.

The purpose of our study is to analyze the literature data on "smart tourism" and its applications in the planning of urban development of tourist complexes. In the work, the literature data were studied in detail, various definitions of "smart tourism" were identified, and the concept of "smart hotel" was considered. It is determined that in "smart tourism", which is assessed in the framework of information and communication technologies, the main place is occupied by mobile applications, smartphones social networks, and the internet.

We think that new advances in technology will change tourism planning and that this will subsequently help cities work towards implementing sustainable urban planning practices.

II. "SMART CITY", "SMART TOURISM"

"Smart city" is an urban planning concept for integrating a variety of information and ICT, including Internet of Things (IT) systems for managing urban infrastructure: transport, education, healthcare, housing and communal services, security, etc. The goal of creating a "smart city" is to improve the resident's life using urban informatics technology to improve service efficiency and meet the needs of residents (fig.1) [8].

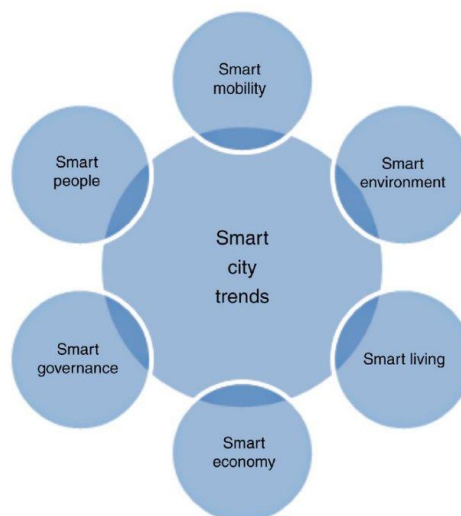


Fig.1 Trends of smart cities [9]

ICT allows the city government to contact communities and the infrastructure of the city, monitor processes in the city, develop the city, and find ways can improve the quality of life. The use of sensors integrated in real time, the accumulated data from urban residents and devices is processed and analyzed. The collected information is the key to solving problems of inefficiency.

It was used ICT to improve the quality, productivity, and interactivity of city services, consumption of resource consumption and reduce costs, and improve communication between city dwellers and the state. The application of smart city technology is being developed to improve the management of city flows and respond quickly to complex challenges. Therefore, a "smart city" is more prepared to solve problems than with a simple "operational" relationship with its citizens. However, the term itself remains obscure in its specificity, and hence is subject to many interpretations and discussions.

The global smart cities market size consisted of 1,090.64 billion USD in 2021. It is expected to expand at a compound annual growth rate of 24.2% from 2022 to 2030 [10]. The major growth drivers are increasing urbanization, the need for efficient management of resource utilization, public safety concerns, and growing demand for an environment with efficient energy utilization (fig.2). The market growth is explained by the increase in the use of nanotechnology, artificial intelligence, machine learning, cloud computing, intelligence of things, cognitive computing, big data analytics, and open data.

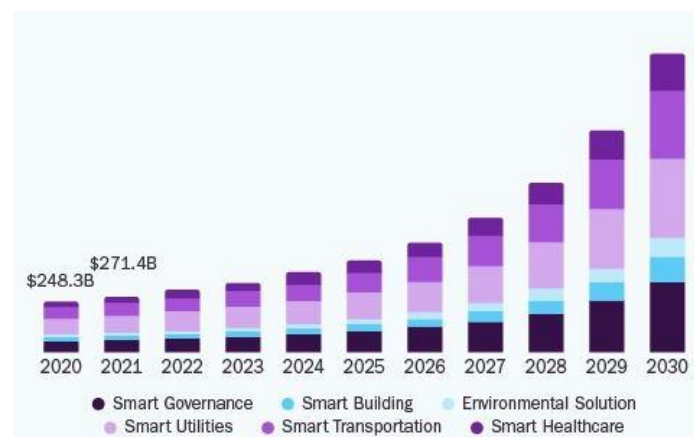


Fig.2 US smart cities market size, 2020-2030

Technological innovations are on the ground of new approaches and innovative business models also in the tourism. The tourism industry, which has a great place in the development of countries, is experiencing significant changes with the developing technology, like all other sectors. One of the latest concepts related to tourism brought with technological innovations and developments is the concept of "smart tourism". Unlike the "smart city", "smart tourism" focuses not only on the local people, but also on the tourist experiences, and the life of the local people, as well as the life of the tourists, their mobility, ease of access to resources, and sustainability, are also important. "Smart city" and "smart tourism" are two strictly connected concepts in the framework of technological component.

Smart cities have overlapping and interacting concerns, including tourism. The aspects shown in fig.1 are only an example of the many different aspects. For example, big data, artificial intelligence, and intellectual technology can be used to improve transportation efficiency, health services, sustainability, and tourist experience (fig.3) [11].

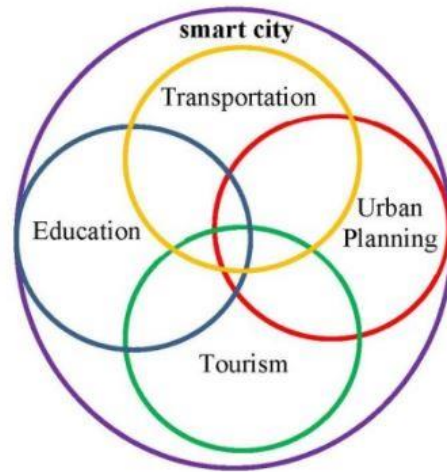


Fig.3 Aspects of the smart city that are relevant to tourism

We can understand it as clean, green, ethical and quality at all levels of the service. “Smart tourism” is tourism where technology is applied and preference is given to the number and maybe to the quality of apps available for the tourist use of the city. Today, “smart tourism” technologies are given priority as the tool in the tourism planning processes of destinations, projects for smart airports, smart hotels, and smart transportation systems are on the agenda and are being implemented states that smart destinations as places and “smart tourism” are closely related concepts. Therefore, the “smart destination” has a meaning that includes regions with touristic attractions where smart tourism technologies are used effectively. It is seen that the “smart tourism destination” is considered as a concept that emerged together with the concepts of “smart tourism” and “smart city” in the related literature.

It is seen that the “smart tourism” has emerged as a new approach sensitive to technology, quality and environment and finally the widespread use of technology in the field of tourism.

Integrating smart technologies into tourism destinations is a process that requires takes place stakeholders in a technological platform that allows instant information sharing between people involved in tourism activities. This platform consists of tools that have multiple connection points, support and facilitate the creation of instant tourist experiences, and increase the tourism resources at the micro and macro level. The main motivation in the creation of “smart tourism destinations” is to make the most of technology to increase tourist experiences and resource management efficiency in order to maximize consumer satisfaction and destination competitiveness along with sustainability.

III. “SMART CITY” CONCEPT IN AZERBAIJAN

"Smart city" are area where various electronic and digital methods and sensors are used to collect data. The information gained from the collected data is directed toward the efficient use of assets and resources. This concept includes the internet, artificial intelligence, blockchain, etc. technologies. Certain components are formed based on these technologies. For example, the electrification and collection of electricity and water consumption in specified places can be shown. The population can see their utility history and make payments using certain software.

The difference between the "smart city" from other cities is the electrification of the entire infrastructure and the creation of a large database. On the data set, the efficiency of spending and life of the population is increased throughout the city.

"Smart city" and "smart village" technologies have the power to improve the health and well-being of citizens while providing new ways for economic development. The application

of cloud-based technologies in regenerating areas accelerates the recovery process of the region and makes the region interesting for techno-investors.

In addition, the relevant state institutions gain the opportunity to carry out optimization work based on the information gathered in the entire database. All these applications of electronification are also valid for the field of medicine and transport. In addition, it is possible to monitor pollution in the city area on an electronic map through wireless sensor networks for air monitoring in environmental protection.

On the "smart village" platform, it is possible to observe the implementation of sustainable development goals in remote areas through technology. Through this model, governments aim to increase the efficiency and safety of public services, reduce financial costs, and ensure transparency and good governance (fig.4).

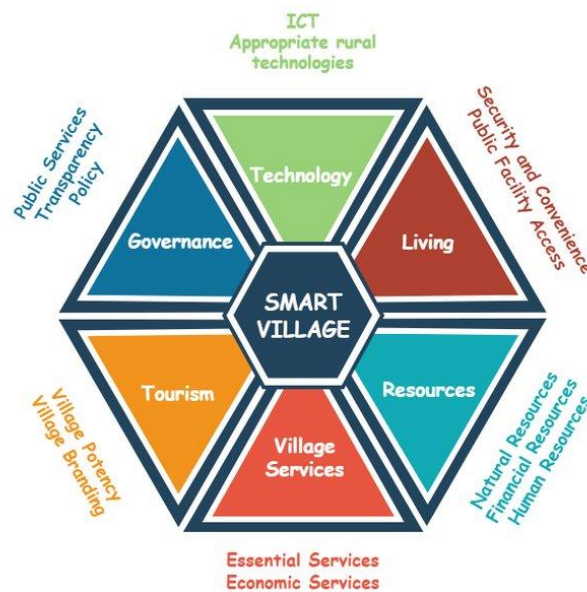


Fig.4 Proposed "Smart village" Model [12]

"Smart village" projects are implemented in different countries of the world. One of this project's main objectives is to prevent people's flow from rural to urban areas. The second goal of the "smart village" project is to create an opportunity for people to earn money in the village. The third point is that rural residents should have access to public services, just like every citizen of the country.

The "Smart village" concept was realized with the support of "Vodafone" in Turkey, the "Village Kazakhstan" project in Kazakhstan, the "Smart Village" project in Rwanda, the "Autonomous Smart Village" project in Ukraine, and the "Smart Village" project in Germany have been implemented and the smart trade and logistics have been implemented in these places, smart energy methods are used.

The "Smart city" and "Smart village" projects are among the main priorities of sustainable development in increasing the quality, safety, and efficiency of services provided in the cities and villages of Azerbaijan, applying information technologies in their provision, as well as ensuring the effective use and management of existing resources for those services. With the implementation of this project in cities and villages of Karabakh region of Azerbaijan, freed from occupation, the foundation is created for the transition of the works to be provided there to the next stage of development.

The creation of "smart cities" in the modern world can also eliminate many problems

caused by globalization and the 4th industrial revolution. Also, making cities more sustainable, inclusive, and safe is one of the Sustainable Development Goals of the United Nations.

For the first time, world leaders seriously discussed the concept of a "smart city" at the 2019 G20 Summit in Osaka. During the same discussion, the participants announced the establishment of the alliance for identifying the necessary global framework that would unite the existing enterprises and organizations working on the creation of such facilities.

The Smart City project launched in Azerbaijan in 2017. Azerbaijan has developed the Development Concept "Azerbaijan - 2020: a look into the future" and a strategic direction for the development of telecommunications and information technologies.

Thus, the "Public Wi-Fi" project already launched in the capital of Azerbaijan was the beginning stage of the implementation of the "smart city". In subsequent stages, such components as "smart transport", "smart port", "smart trade", etc. were implemented. "Smart cities" and green energy are the focus of the National Priorities of the Azerbaijan Republic.

In order, effectively use information technology and renewable energy potential the "State Program on the use of alternative and renewable energy sources, information technology in the Republic of Azerbaijan" was adopted in 2004. Concept №5 of the document "Azerbaijan 2030: National Priorities for Socio-Economic Development" (clean environment, "green growth" country and "smart village") approved by the Decree of the President of the Azerbaijan Republic dated February 2, 2021, in the direction of climate change and its fight against, the application of renewable energy in all sectors of the economy based on the principles of green energy space and smart city in the country is also reflected. The mentioned National Priorities are also of special importance in the realization of the commitments arising from the UN "Transformation of our World: Agenda for Sustainable Development until 2030."

The mentioned concept of "smart city", "smart village" and "green energy" will, first of all, respond to global challenges in the world. Especially, the Karabakh region has become a center of interest for technological investments, and it will also serve as an experiment for the application of smart urban-rural technologies in other regions of the republic, such as the Sheki Zagatala region. This region is a well-known region of Azerbaijan because of its tourism abilities [13-18]. Every year the number of tourists visiting the Sheki-Zagatala region of Azerbaijan is growing. This region is rich in ancient natural, historical, and cultural tourism potential. Various types of tourism are developing because of the expansion of the areas serving tourism in the region (accommodation, food, transport, excursions). Statistics and marketing research of recent years give grounds to assert that every year more foreign guests wish to spend their holidays in the Sheki-Zagatala region and get to know the region. The use of "smart city" and "green energy" concepts in this region is considered very perspective and will lead to the development of tourism potential in this region.

In order to make the "smart city" concept a reality in the region, it is necessary firstly to learn sustainable international experience, then extensive use of ICT for application and promotion.

By implementing "smart city" solutions, we can impact various quality of life indicators including health, safety, time, quality of environmental, convenience, social connection, citizen participation, workplaces and living expenses.

The information technology will allow to improve the distribution of energy in the region, facilitate the collection of waste, reduce traffic congestion, and improve air quality (fig.5). For example, the installation of smart bins that automatically send information to waste management companies and have a pre-planned schedule for removal when necessary can turn the region into a waste-free recycling center in Azerbaijan.



Fig.5 Elements of a "Smart village" have already been installed as examples in the village of Aghali in Zangilan, the Karabakh region of Azerbaijan, April 26, 2021

From the point of saving water resources that is important for the economy of the country as a whole, the smart city concept to be realized in the liberated territories will play a significant role in reducing water consumption. Such smart technologies as intelligent irrigation systems and water leakage, water quality and consumption monitoring can save between 25-80 liters of water consumption per person in a day.

Cloud technology applications can facilitate not only human lives but also territorial management. For better decision-making, increasing the quality of their work and life, local government structures, municipalities, private enterprises, and citizens may use these applications to receive, analyze, and manage information in a real-time manner.

As 5 cities applying smart-city solutions the most, Singapore, London, Amsterdam, Hong-Kong, and New York are also the world's main tourism centers. It means that smart city technologies may lead to new opportunities for developing tour

IV. CONCLUSION

In order to realize "smart tourism" applications in a tourism destination, it is required to develop "smart city" infrastructure for that city first. It is a correct approach to evaluate "smart city" and "smart tourism" applications as integrated with each other, enhancing and enriching the lives of the local people in that city, and enriching the experiences of those who temporarily visit that city, supported by advanced internet technologies. We can consider "Smart tourism" consisting of the following factors: accessible city guides, accessible tours, accessible citizens engagement, accessible tourist information offices, accessible city routes, accessible infrastructure, diversity and accessibility. It was considered a "Smart city" opportunity of the Sheki Zagatala region of Azerbaijan.

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