Features of The Application of Technologies of The Digital Economy in Tourism (Tourism 4.0)

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Abstract. **The article considers various features of the process of modernization of the internal processes of tourism representatives. The author presents the categories of innovative technologies used in this industry: technologies. According to the author, for smart (digital) tourism, enterprises must take appropriate measures, namely, make the necessary investments, allocate a budget, create funding and organize the necessary training of human resources. Technological transformation through smart tourism has the potential not only to increase the number of tourists coming to the country, but also to increase tourism revenues, as well as the share of tourism revenues in gross domestic product.**
Keywords: *digital economy, tourism industry, hotel business, digital economy technologies, digital economy of tourism, innovative technologies in tourism.*

1. INTRODUCTION

At the current stage of development of modern society, it is no longer possible to ignore or deny the growing influence of digital technologies every year on absolutely all spheres of public life in any part of the Earth. In our country, this trend is reflected in the state policy aimed at the digitalization of socially significant internal processes.

The strategic innovative development of certain sectors of the Russian economy is rapidly gaining momentum every year, however, the overall lag of our state from the leading countries at the moment remains and, according to experts, is 5-8 years [2]. In this regard, any modern high-quality scientific research on various problems of the process of transition to a digital economy is relevant and practically significant.

The tourism sector is also no exception to the trend described above. Various internal business processes of a dynamically developing tourism business need to be modernized against the backdrop of global innovative metamorphoses, which means that they need scientific and theoretical support.

In the modern world, tourism has become an integral part of the lives of many people. Smart tourism technologies are a combination of various methods and tools that contribute to the sustainable development of tourism and improve the quality of the tourism product. They are based on innovative approaches in the field of information technology, energy, transport, etc. For smart (digital) tourism, enterprises must take appropriate measures, namely, make the necessary investments, allocate a budget, create funding and organize the necessary training of human resources. Technological transformation through smart tourism has the potential not only to increase the number of tourists coming to the country, but also to increase tourism revenue, as well as the share of tourism revenue in gross domestic product (GDP). Therefore, it is necessary to understand that only innovation and digital technologies can ensure growth in an increasingly competitive environment. Investing in smart tourism is becoming a must in order to meet the expectations of today's tourists and stay at the forefront of the market. The future of tourism is in digitalization, innovation and modern technologies, which is why today it is necessary to start building it for the future prosperity of the tourism sector and the economy as a whole. Keywords: digital age, smart tourism, digitalization, tourism 4.0, GDP, innovations, new generation technologies, digital transformation, service sector, business, VR technologies

The modern digital age is the beginning of a new era called "Industry 4.0", which includes the desire to make industry more efficient by harnessing the power of the computer world. The new generation of technologies brought about by Industry 4.0 has had a transformative impact on many industries around the world.

2. LITERATURE REVIEW

This topic is relevant, because. tourism 4.0 is a new era in the development of tourism, which is based on the use of advanced technologies and digital solutions to improve the experience of travelers. Version 4.0 marks the evolution of the tourism industry to be more modern, integrated and sustainable.

At different times, such domestic specialists as Dzhandzhugazova E.A., Ovcharenko N.P., Kostenko K.I., Pavlenko I.G., Churakova A.A., Ryndina S.V., Kulikova S.V., Mikhailova K.D., Larionov V.A., Komarov G.A., Ovsyankina E.V. and others. However, the author of the study noted the existing gap in modern scientific research in the described area using the example of a narrow segment - the hotel business, which also determines the high degree of relevance of the study.

When covering theoretical issues, the works of domestic and foreign scientists devoted to the disclosure of the issues of "smart tourism", promotion and strategic management in the tourism business were used. When studying models and approaches to the management and regulation of tourism, information from the works of L.E. Kalinina., E.A. Dzhandzhugazova and A.D. Chudnovsky. As part of the study of the development of Internet technologies as a means of promotion, the works of A. Kuskov, N. A. Melnikova, N. K. Moiseeva, N. V. Miforov, A. M. Vetitnev were studied. Platov A.V., Petrash E.V., Silaeva A. A. [13], Chernikova L.I.[14], Slepneva T.A., Shalneva M.S., Faizova G.R.[15].

3. ANALYSIS AND RESULTS

The practical significance lies in the fact that one of the main aspects of tourism 4.0 is the use of artificial intelligence and big data to provide personalized services to travelers. With the help of machine learning algorithms and big data analytics, companies can offer customized recommendations for places to visit, hotels, restaurants and other attractions based on the preferences and interests of each traveler.

As mentioned above, the hospitality and tourism industry is largely influenced by the global global trend towards the digitalization of various processes. The key factor influencing the process of introducing various digital technologies into the tourism industry is the high speed of the dynamics of this segment, as well as the high speed of changes in the needs and demands of consumers [4, p. 239].

Digital economy technologies that can be effectively implemented in various internal processes of the hotel business can be divided into three categories:
1. Technologies to attract new customers;
2. Technologies to retain existing customers;
3. Technologies for improving the efficiency of internal business processes [1].

Thus, a rapidly developing technology for attracting new customers in the hotel business is the introduction of digital marketing, which is a special type of communication with potential customers, carried out through digital technologies. It should be noted that digital marketing, despite its name, goes beyond Internet marketing and affects the consumer both online and offline (for example, through the use of QR codes with links to hotel services).

As digital marketing channels that can be used by representatives of the hotel business, we can distinguish:
1. Websites;
2. Interactive screens;
3. Social networks;
4. Digital TV;
5. Mobile applications;
6. Offline representation;
7. Games^1^e consoles;
8. Self-service terminals;
9. Digital Art and more [5].

Some digital marketing tools are also used by hoteliers to retain existing customers. The most effective tool in achieving this goal is email newsletters, which are aimed at informing and maintaining interest in hotel services on the part of the guest after his eviction. According to experts, such a communication channel brings hotels more than 50% of the income from the total sales of services.

The most popular technology that can be used to improve the efficiency of the hotel's internal business processes is the use of a PMS system [3].

PMS-system is a special kind of automated management system, which is aimed at reducing the costs of the hotel by reducing the share of "manual" labor of its staff. At the time of the appearance of such systems, their functionality

was limited to the functions of the reception staff: the PMS system was focused on performing such tasks as booking rooms, distributing rooms between customers, registering the fact of arrival and departure of guests from rooms, as well as maintaining the process of paying by the client for his stay In a hotel. The PMS system has replaced spreadsheets that have existed for quite a long time, which were filled in manually by hotel employees.

However, today PMS systems have greatly expanded their functionality and are currently an integrated operations system that allows hotel management to automate absolutely all internal business processes.

One of the major benefits of property management systems in the hotel industry is the opportunity to integrate them with the rest of the software toolkit in place and third-party products. More importantly, such tools can completely replace some software you might be using, thus reducing the number of licenses you pay for without compromising on the quality of services provided.
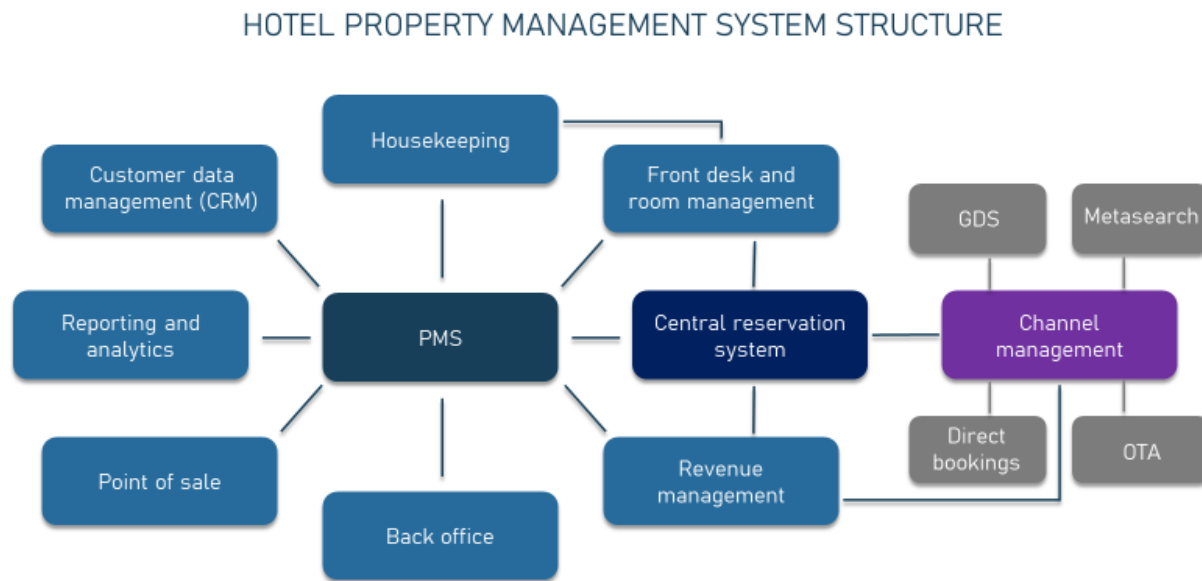

Fig1. Hotel Property Management Systems (PMS): Products and Features [16]

For example, integrating PMS and CRM systems (content management function) leads to consolidating your customer data from various sources, improving the experience for all the parties involved. This leads to better outcomes for customers, more personalized services, reduction in errors and duplicate data, and other essential performance improvements.

However, CRMs are by far not the only software with which hotel property management systems can be integrated. Think about billing, personnel management, analytics, online booking aggregators, and reimbursement tools. All of these can be integrated (and some replaced by) a hotel PMS through clean API connectors.

Most importantly, travel APIs connectivity and integration ensure interoperability, scalability, and fault tolerance of property management systems used in hotels, as every module can be replaced or scaled separately, should the need arise.

However, not all of the benefits mentioned above come with all the hotel property management systems on the market. As we mentioned, some tools are geared toward small hotel chains, while others aim at large resorts and offer quite a more robust functionality as well as customization services. Let's take a look at how various types of PMS in hotels helped hoteliers around the globe improve their operational efficiency.

Fig.2. PMS and CRM integration [17]

It should also be noted the trend of transferring all used innovative technologies from "desktop" to "cloud", as the increasing functionality of programs entails an increase in the required volume and size of servers, which does not always allow the efficient use of these technologies.

One of the main aspects of tourism 4.0 is the use of artificial intelligence and big data to provide personalized services to travelers. With the help of machine learning algorithms and big data analytics, companies can offer customized recommendations for places to visit, hotels, restaurants and other attractions based on the preferences and interests of each traveler.

Another important aspect of tourism 4.0 is the use of virtual and augmented reality to create a unique and immersive travel experience. With the help of VR technology, tourists can travel electronically and visit places they might not be able to access in real life. From visiting ancient ruins to diving in coral reefs, virtual reality allows travelers to experience the beauty and diversity of the world without being physically present.

One of the key components of smart tourism technologies is the use of information systems and online resources. They allow tourists to access up-to-date and reliable information about various attractions, routes, services and events. Thanks to this, tourists can effectively plan their trips, choosing the most interesting and optimal options.

Fig.3.Hotel Property Management Systems: Core Features and Benefits [18]

Digitalization in tourism, which is one of the most important income-generating industries in all countries of the world, is largely influenced by this process. Essentially, the digital transformation in tourism is affecting travel companies, stakeholders and the market, and is also creating the profiles of a new generation of tourists.

In the digital world, global borders are disappearing. As a result of digitalization, people have begun to make extensive use of the Internet and mobile devices at every stage of their lives. In fact, tourists are learning about the places they will go, namely how they will go there, what they can do, where to find catering and leisure facilities, all through digital applications. Based on this, they make decisions based on the stories and comments of other tourists, and then share their own experiences on the relevant platforms.

Tourism is defined as a service sector in which people can take a break from their working lives for a while to relax and have a good time, travel to gain new experiences and thus contribute to the national economy. Therefore, "tourism", referring to the service sector, is a multifaceted field of activity of the country, which is in constant interaction with the economic, social, cultural and natural environment. Also, tourism activities provide income, employment and foreign exchange flow for developing countries and destinations [12].

Technology, as an integral element of human life, contributes to the rapid development of competition, increased productivity among sectors, as well as the improvement of the current market situation. The development of tourism, transport and communication technologies increases both the needs of people for recreation / holidays and the diversity of products / services in the tourism sector, and the growth in the number of tourists provides a large flow of liquidity to the global economy. Therefore, the transition to digitalization is important for the tourism sector in terms of contribution to the national economy [8].

Digital trends in the tourism sector are changing the expectations of tourists. Today, travel customers want experiences and solutions that are tailor-made for them. In this context, the travel world, which has turned to digital transformation, has begun to benefit from a positive impact on business results, using technologies such as personalized experience, omnichannel customer experience, virtual reality, real-time marketing, messaging platforms and chatbots, mobile integration, data-driven approach and artificial intelligence [11].

In 2009, "smart tourism" was defined by the World Tourism Organization. In 2015, information and communication technologies were included in this definition. However, in 2017, taking into account the current approach to "smart tourism", a definition was given that includes big data (BigData), the Internet of things, smart destinations. "Tourism 4.0" is defined as a tourism activity that integrates information technology and tourism and is also supported by modern innovations. In this regard, Tourism 4.0 represents the integration of five elements: tourist, government,

natural area, clearinghouse and business. In essence, the main goal is to improve the tourism experience and maximize satisfaction by improving competitive conditions within the framework of sustainability [10].

Today, it can be seen that many industries, such as the tourism sector, are being transformed with the help of new technologies. Both tourists and travel companies are seriously affected by changes and transformations in the sector. People who are aware of innovation and change tend to approach businesses that can meet their needs and expectations when they are involved in tourism activities. In this regard, domestic and/or foreign tourists prefer travel companies that can keep up with innovation. Therefore, tourism enterprises are striving to provide competitive advantages in the tourism sector in accordance with the digital age. At the moment, companies should conduct research on various strategies to meet the expectations and needs of people who want to engage in tourism activities. After all, only by closely monitoring digital transformation and adapting it to their business processes can companies increase their efficiency compared to competitors.

Technologies developed during the digital transformation of tourism make it easier for tourists to relax before and after their arrival and offer a wide range of options to make them feel comfortable. For example, with the help of smart cards, tourists have the opportunity to see the address of the hotel, a map of attractions, and much more. Blockchain technology in tourism provides instant tracking of tourism experience, real-time tracking of supply and demand in a working environment without intermediaries. In addition, it can be used in many areas such as developing loyalty programs for the tourism sector, tracking customer comments online, securely transferring money between country borders and stakeholders, and luggage tracking. Artificial intelligence and robotic technologies are used in sales, customer relations and similar processes that touch the consumer, making customers feel more special.

Today, a new client (tourist), upon arrival in the city he decided to visit, prefers the hotel to be technologically equipped. At this moment, smart hotels are emerging - another indicator of the digital transformation in tourism. Smart hotels offer guests more personalized amenities. In this context, tourists can control many systems ranging from lighting, temperature, to the video systems of the hotel room they are staying in. In this way, tourists can manage their in-room comfort and enjoy all kinds of digital amenities. In addition, the fact that these systems can only be controlled through a personal phone allows guests to experience a "touchless" holiday that is becoming increasingly popular in post-COVID times. In addition, in some hotels today tourists are met by robots. An example of a national and/or international business is a hotel called "Henn na hotel" which is run by robots in Japan. All operations in this hotel are carried out by robots [7]. Other examples are also worth mentioning: a robot named "Connie" works in the world-famous hotel chain "Hilton hotel". Thus, today in hotels you can meet robots-housekeepers, robots-waiters, robots-cleaners, robots-cooks. Hotel managers expect that technology will reduce the time and labor costs of various operations and improve the quality of service.

Most often, tourism is almost always a means of gaining experience, but is sometimes perceived by individuals as a certain activity that makes them happy and enriches their lives, and is also an important source of income, such as travel bloggers. In the digital age, tourists often use the Internet and mobile technologies when planning their trips, researching travel information, booking and purchasing. In this regard, tourists began to share their impressions about the places they visited, about the dishes and drinks they tried, on their social media accounts and other platforms. In this way, they provided their acquaintances with information about the places they visited.

At this point, the concept of the "sharing economy" was born, which appeared in the 2000s due to economic, social and technological factors. The European Commission defines the sharing economy as all business models implemented through collaboration platforms that allow individuals to offer products and services to others on a temporary basis. In this respect, the sharing economy includes technology, innovation, marketing and niche services on the one hand, and on the other hand reduces costs and connects people by eliminating intermediary organizations. In fact, the contribution of the sharing economy for tourists can be listed as sharing a house, a car. In addition, the sharing economy creates a new business model in the tourism sector in line with smart tourism [13].

The tourism sector, which consists of two main elements, namely, tourist demand and supply, plays a big role in strengthening the country's economy. In this regard, tourism is a sector that has a positive impact on regional and national development, economic growth and employment of countries in the past and in the future. In addition, the tourism sector, as an invisible export item, ensures the inflow of foreign exchange into the country, increases investment and improves the distribution of income between regions. In fact, the tourism sector covers all services, such as organizing shopping and travel, selling regional products, entertainment, accommodation, telecommunications, transportation, food and drink, and similar services, and also makes a significant contribution to the national economy [6].

The digital transformation in tourism is expected to have a positive impact on both the number of tourists and

tourism revenues. In this context, the development of technology and communications is reflected and smart tourism approaches are emerging. Tourism 4.0 aims to create added value in tourism through the integration of information, technology and innovation. The evolving technologies of the 21st century and the dawn of the digital age have led to the development of the travel and tourism sectors around the world.

With the advent of smart technologies, not only business practices are seriously changing, but also the strategies of many economic sectors. Businesses equipped with smart technologies can design and manage tourism experiences. Developments in the field of smart tourism are helping to recognize tourists and provide them with suitable options. Essentially, smart tourism activities provide a competitive advantage by improving customer satisfaction and reduce costs by increasing profits. Indeed, it is expected that the technological transformation taking place in the world will contribute to the development of the economy by increasing the number of tourists coming to the country, tourism income and the share of tourism income in gross domestic product (GDP). The infrastructure created through smart tourism investments that enable the use of new technological products in the sector contributes to sustainable development and plays an important role in terms of innovative tourism. Therefore, managers need to quickly innovate in the strategy of travel companies in order to stay ahead of their competitors at the global level and attract the consumers of services that make up the profile of the new generation of tourists [9].

The tourism industry contributes to the country's economy, provides employment for the population and brings in foreign currency. Tourism is considered one of the industries where digitalization and digitalization processes have changed business processes on a global scale. At the moment, within the framework of smart tourism (Tourism 4.0), many new technologies are encountered, such as information and communication technologies, cloud computing, augmented and virtual reality technologies, blockchain, artificial intelligence, robotic systems, applications and services based on the location of the device and internal recommender system. In the tourism sector, such smart technologies can be found in hotels, museums, cafes and restaurants. In practice, it can be seen that it becomes inevitable to replace traditional tourism with digital tourism, as smart transformation changes tourism from beginning to end. Today, a person's journey begins with a home computer. Now people are using online platforms and apps to find new places, book tickets, plan what they will do while on vacation, and even evaluate after vacation. Smartphone apps, social media, augmented and virtual reality, 360-degree videos have had a significant impact on the travel industry as factors that have led to the end of traditional travel. However, there may be some risks in terms of inequality of opportunity, data security and cybersecurity in the digitized travel industry.

4. CONCLUSIONS

In conclusion, tourism 4.0 opens up new horizons for travelers and the tourism industry. Personalized experiences, virtual reality, blockchain technology and sustainability all contribute to a better customer experience, safer transactions and a more environmentally responsible attitude. Tourism 4.0 is a future worth exploring and investing in.

Today's new generation of tourists are interactive at all stages of their journey. These tourists can share their great or bad experience with everyone via social media. Therefore, digital transformation is also changing the expectations of tourists and requires the tourism industry to integrate into this situation. In this regard, travel companies must keep pace with digital transformation and increase their competitiveness accordingly. For smart (digital) tourism, tourism enterprises must invest in innovation, allocate a budget for technology, and organize the necessary training to provide appropriate skills for the workforce they will hire.

Technological transformation is expected to contribute to the development of the country's economy by increasing the number of tourists coming to the country, tourism income and the share of tourism income in gross domestic product (GDP). In addition, tourism companies must receive sufficient government support to survive the Industry 4.0 process and adapt to innovation. It should not be forgotten that the viability of economic activity in a country - especially in areas such as the tourism sector, which can generate an influx of money from abroad - is extremely important.

Thus, digital technologies must be applied in the hotel business in a comprehensive and competent way to intensify the benefits from their use. Every year, this area of the digital economy is increasingly developing and replenished with new tools and characteristics, which determines the strategic importance of further research on the problem.

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