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EUROPEAN VECTOR OF ECONOMIC DEVELOPMENT AND MANAGEMENT OF TOURIST DESTINATIONS' COMPETITIVENESS IN DIGITAL ECONOMY

Abstract: The tourism sector remains one of the domains with growth paces consistently higher than those of global economic development. Expansion of digital information and communication technologies is an essential foundation for securing the competitiveness of tourist destinations and innovative products. Their boost caused the reformatting of leading tourist destinations into the smart tourism regions in early 2016. The methodology of the research in the practical framework of the paper is based on the calculation of the Travel and Tourism Competitiveness Index of the World Economic Forum after 2014. The paper suggests the implementation of best global practices of the introduction of digital technologies directed at improving the competitiveness of tourist destinations. The authors emphasize that nowadays, the future of the tourism industry requires the creation of smart destinations and smart regions, which are almost absent in Ukraine today.

Keywords: Tourist innovations, Tourist destinations, Digital information-communication technologies, Digital cooperation, Social media marketing, Sources of big data

1. Introduction

In these rapid times, the tourism sector needs the changes in organization and implementation of tourist products directed at improvement of time management and securing of more impressions and positive feelings for tourists in less time. The tendency will be growing, including due to the fact that, according to the World Tourism Organization UNWTO, the tourism has been and remains to be one of the drivers of economic globalization, whereas it is growing with mostly higher paces than the global GDP, even though the global economic product has slowed down since 2010 UNWTO (2019). A large set of factors boosts the growth of tourism economy, including the improved overall wellbeing of population and solidification of a middle class as the major consumer of tourist services, contributing to the selection of informative and entertaining types of leisure activities and development of transport infrastructure, communications, and Internet technologies. These development tendencies on the tourist services market emphasize the relevance of the conducted research. Meanwhile, the growing strength of global and national economies certainly boosts the tourism industry's income. According to the UNWTO, stable exchange rates, low interest rates, acceptable and stable

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fuel prices, and fast connectivity between the cities contribute to the development of international tourism. Europe and Eurasia hold the highest ranks in global tourist rankings by the number of visits and income gained by the industry, showing the continued growth of the rates, not least due to the accelerated introduction of information technologies by the countries of the Eastern and Southern Europe. However, this is not the only peculiarity of the development vector of modern tourism, posing the new challenges for tourist organization management.

Important analytical materials for the research can be obtained from annual publications of such international institutions as the World Economic Forum (2019) and the World Tourism Organization UNWTO (UNWTO Tourism Highlights, 2014, 2015, 2016, 2017, 2018, 2019).

Telfer and Sharpley (2015) argue that tourism has been built into the major paradigms of society development in industrialized countries after World War II due to specifics of its products and extended attraction of other industries into the services delivery process Macleod (2004). Nilashi et al. (2021) characterize tourism as a part of the globalization process because the tourist flows promote the capital, goods, and information flows from one country or region to the other and contribute to the development of trade, transport, and communication systems, while the tourists are the guides of globalization processes. Toffler (2002) attributes the large-scale tourism growth to the transition of a society to the supraindustrial development stage when "the movement becomes a positive value in its own right, an assertion of freedom, not merely a response to or escape from outside pressures". Digitalization as one of the main modern economic trends is reflected in tourism activity as well. Its efficiency is confirmed by the research of one of the leading global consulting companies McKinsey (Bughin et al., 2019). It shows that adherence to a clearly defined set of digital transformation methods increases the opportunity of exceeding profit expectations by over 50 percent. Moreover, the same combination of digital transformation

methods works for all companies covered by the research, testifying to the practical interest of companies in a globalized virtual economy in the research of digital transformation methods.

The authors addressing the issues of innovations in tourism focus on their various aspects. Thus, Popadynets et al. (2021), Kinash (2019), Danylyshyn et al. (2019, 2020, 2021), Irtyshcheva et al. (2015, 2021) and Samad et al. (2021) analyze several studies that provide different definitions of innovations in tourism pointing to the conclusion that the innovations in tourism are the organization of new types of tourism activity, application of new principles of tourist services delivery, or launch of a new tourist product on the market (either a route or a destination), which for a certain moment in time have higher consumer qualities based on modern information and telecommunication technologies and are directed at improvement of a tourist's satisfaction and quality of life. The innovative activity in tourism undoubtedly includes the introduction of digital technologies, evidently entailing the need to take into account the virtualization of the modern economy on the grounds of digital technologies. The virtualization promotes the further development of visits arrangement both of the organized groups and of tourists, who organize their trips by themselves.

The research of Liberato et al. (2017) explains that digital technology substantially improves the attractiveness of tourist destinations for the so-called "Generation Y". The critical factor is how fast the data on a destination can be received and actualized. On the examples of municipalities Porto and Evora, the authors emphasize that penetration of digital technologies into the marketing of these tourist destinations has led to the growing tourist flows. The major tourism activity directions that can benefit from digital communications are accommodation, catering, transport, local attractions, and recreational facilities (museums, pools, beaches, sports centers, parks, theatres, clubs, etc.) (Hluschenko, 2019; Shaikh, 2019).

Recently the scientists have also been addressing the links between the introduction

of digital technologies in communications, access to and dissemination of information, and the creation of competitive tourist destinations World Economic Forum (2019). In particular, the efficiency and reasonability of Big Data-analysis in tourism statistics is proven in Perez Guilarte (2019) and Alrizq et al. (2021).

2. Methodology

The goal of the research was to define the directions and paces of innovative changes in the tourism industry driven by economy virtualization and introduction of digital technologies in tourism companies' management and tourist services.

To achieve the goal, the following tasks were accomplished:

- components of tourism innovation as a process were determined;
- the impact of digital technologies on the components and process of a tourism innovation in general was detected;
- an understanding of innovative tourist services development in conditions of economy virtualization was developed.

The process approach used to accomplish the first task and throughout the research is the methodological basis of the research.

The research rests on the following hypothesis and reference positions.

A1: economy virtualization in current conditions is impossible without the introduction of digital technologies.

H1: tourism innovation is considered as a result of a set of interrelated processes of tourist entities' activity that include:

- examining the clients' needs and forming (improvement) of tourist products;
- attraction of clients and presentation of a tourist product to them;
- organization of collaboration with self-organized tourists;

- providing visas to organized tourist groups and individual tourists;
- organization of tourists transfer to respective destinations and back to the place of permanent stay or other agreed place;
- organization of stay, accommodation, catering, entertainment, rehabilitation of tourists, etc.;
- organizational, informational support of tourists, problem issues addressing;
- coordination of financial flows between the participants of tourist products creation;
- other.

H2: tourist innovations are eventually consolidated within tourist destinations. We understand destination following the interpretation of the World Tourism Organization as a physical space that includes tourist products like services and attractions as well as tourist resources consumed by a tourist on a trip. The destination has physical and administrative borders, image, and reputation.

H3: tourist innovations and tourist destinations management are substantially influenced by digital technologies, economy virtualization, and human relations.

The following methods were used in the course of the research: analysis (to determine the components of a tourist innovation as a process); induction (to develop a general understanding of tourist innovations development processes); historical (to detect the development direction of the processes under research); hypothetico-deductive (to examine the development of tourist innovations); analysis of scientific literature related to the creation of tourist innovations and information on digital technologies and the most common cases concerning their introduction in the tourist industry. This helps the achievement of the progress in the development of tourism innovations concept and capacity the digital technologies provide to its planning and management in conditions

of economy virtualization.

We used the methodology of calculation of the Travel and Tourism Competitiveness Index in modeling the impact of digital communication technologies on the competitiveness of tourist destinations World Economic Forum (2019). The Index includes four subindices that cover 90 indicators grouped into 14 clusters (Fig. 1).
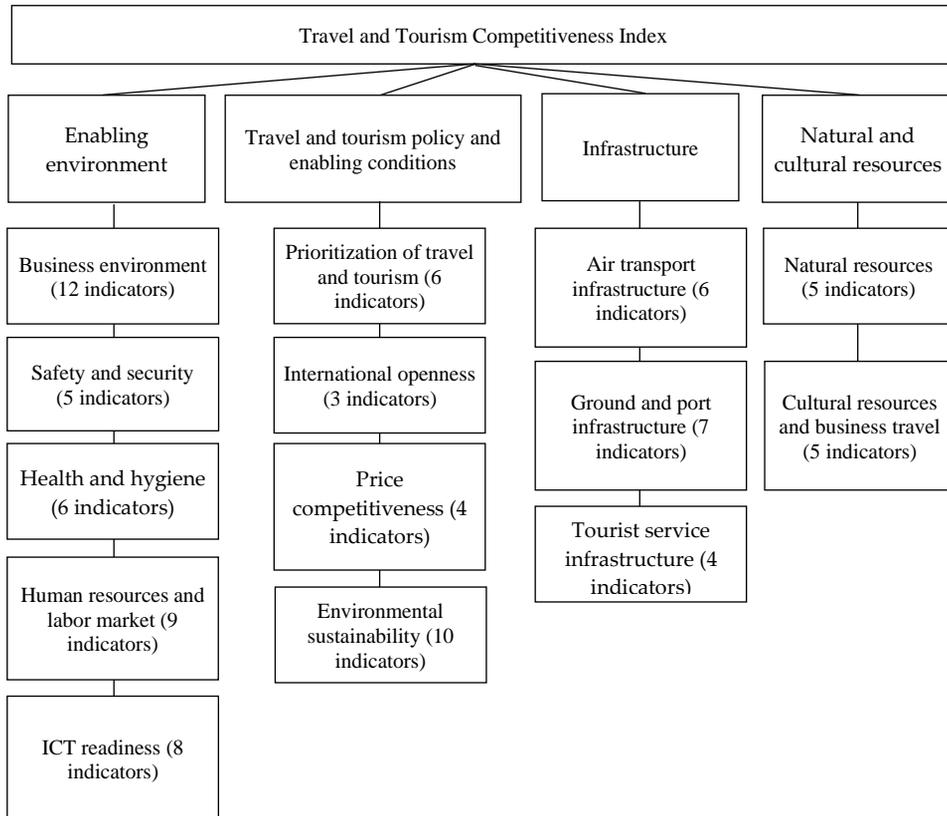

Figure 1. Composition of the Travel and Tourism Competitiveness Index of the World Economic Forum

Scores are attributed to indicators ranging within 1 to 7. Each of the 14 components is calculated as an unweighted average of indicators. Subindices, in turn, are calculated as an unweighted average of respective components Bughin et al. (2019) and Shaikh (2020). For calculations, we assume that the level of digital information and communication technologies has changed by one level, while all other Index components have remained unchanged.

3. Results and discussion

To examine prospective clients, the use of a tool to process big sets of data called the Big Data, including based on the public personalized information, has become relevant recently. The volumes of data generated by the unique users (the data that, in our opinion, should be the information basis to research the clients of tourist businesses using the Big Data) grow exponentially and are already measured in zettabytes (billion terabytes) annually Global

digital overview (2019). The specialists claim that any information flows over 100 GB a day can be justifiably called the Big Data. According to the report of the McKinsey Institute (Manyika et al., 2011) "big data" refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze. However, recently the concept of Big Data has become popular and now is used almost universally.

Tourism organizations are yet to use the Big Data technologies extensively, yet the instrument is being actively introduced in various countries at the level of regional governance (Manyika et al., 2011; Demunter, 2017) including in Ukraine. In Kyiv and Odeska oblast it is used to plan tourist infrastructure. Its efficiency is evident. Kyiv City State Administration uses the Big Data to analyze the tourist flows in the city, their number and countries of tourists' origin, the period of their stay, and the places they visit. To this end, the city uses own capacities and resources. In 2016, Odeska Oblast State Administration launched a pilot project on monitoring of tourist flows in the oblast with the Big Data technologies, using the capacities of data accumulation and systematization of Kyivstar mobile operator (Hluschenko, 2019).

It should be mentioned that various sources are used in the tourism industry to get primary data. In Fig. 2, based on (Demunter, 2017), we outline some of them, which are possibly reasonable to be used in Ukraine.

Such sources as information of mobile operators, geotagging in social media messaging, and history of search requests related to certain destinations and/or groups are the most used. Each of them has its application area.

Information provided by mobile operators helps tracking the places of long-term and dense gatherings due to logging of the users' movement with regard to base stations; operators can (optionally) open the non-personalized information on such movements and gatherings.
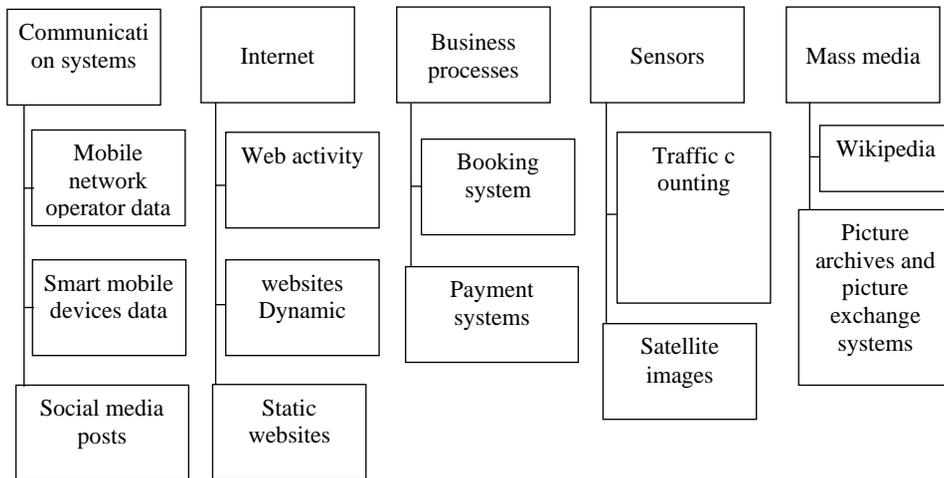

Figure 2. Data sources for Big Data
Source: based on (Demunter, 2017)

In our opinion, the tourist flows traced by the Big Data delivered by mobile operators should be divided into the transit, short-term and long-term ones. The tourists – mobile subscribers should be considered as transit ones if their stay within the tourist region corresponds to the period of time needed to cross the region; usually it takes 3…6 hours;

in this context, the subscribers staying in the region up to a day can be considered the short-term stay tourists, the rest are the long-term stay tourists. Besides, based on information provided by mobile operators, the places of tourists' origin and destinations they leave for after their stay in the region can be traced. Thus, in 2018, the largest flows of tourists – Kyivstar subscribers to Odesa and the oblast were from Kyivska (26.03%), Mykolayivska (12.71%) and Vinnytska (11.41%) oblasts; domestic tourist flow was 79% of the total tourist flow in the oblast, which amounted to 5 million persons. Tourists from Russian Federation (19.6%) and Moldova (10.77%) are the leaders among those coming from abroad (Hluschenko, 2019).

Specific locations interesting for tourists in cities can be determined much more accurately because technical capacities stipulated by denser cells in the city with large flows of citizens than in small settlements and natural destinations are much better. Eventually, regional authorities and/or tourist organizations, having gained access to secondary data from mobile operators or authorities, can form the tourist flows in such a way that the tourists are directed to the maximum number of cultural and tourist objects. Kyiv City State Administration uses such information and quickly adjusts it on the Kyiv. Travel website and in guides on Ukrainian capital, and supports the development and introduction of loyalty programs for tourists. Analysis of Big Data provided by mobile operators also helps to determine the seasonal nature of tourist visits, the popularity of tourist locations per day, etc. The wireless technologies to trace the tourist traffic and reveal attractions can be used without the data of mobile operators. Thus, the municipality of Palma de Mallorca (Spain) provides free Wi-Fi on beaches, in the port, and on the main square and adjoining areas. In such a way, the local authority in close cooperation with tourist companies of the city has large volumes of demographic information (on age, gender, nationality, language) and information on tourist attractions and location (Femenia-Serra & Neuhofer, 2018).

The use of digital communications and analysis of big data volumes has contributed to improving the competitiveness of tourist companies in Valencia (Spain), where 46% of travel agencies and tour operators, 39% of destinations and attractions in the region and 38% of research and advisory companies in tourism cooperate with local authorities in work with the Big Data to create efficient and attractive tourist destinations Bernabeu, C., et al. (2016). The authors collected information for the research by suggesting voluntary placing and filling out the specific questionnaires on the websites of tourist companies in the Valencia region. About half the agents and several thousands of tourists agreed to that (Bernabeu et al., 2016). In other research for the same region (Moreno-Izquierdo et al., 2018), the information collected using Airbnb and processed using neural networks with several models of the dependence of a location's attractiveness on the cost of a night stay was the source of the Big Data.

Overall, we argue that the data provided by the mobile operators are more objective than the reports of tourist companies, yet they cannot help getting the social portrait of a tourist. In this regard, tourist companies and local authorities can address the other data source for analysis – public information from social media. From their point of view, the social media can be used both to receive the data on tourists and for further forming of image and visibility of a region's or a company's brand, and to create the fan community. This research is based on an assumption that in real life and its virtual display in social media, the tourists realize certain common behavior patterns. Experimental research on the problem of detecting tourists among social media users is available. Public data from social networks downloaded using targeting systems were researched as the parameters. Such indicators as age, education, participation in groups in social networks, cultural dedication, activity

in social media, and other similar parameters are established as having no impact on tourist activity. It is impossible to allocate tourists as a group by any of them separately to analyze data on them by means of the Big Data. However, having combined the content of users' posts with other parameters, by means of machine learning it is possible to establish with high probability that the travelers are the people from large cities and regional centers with higher education who are active in social media by the interests: concerts of music bands, extreme sports, exercise therapy, yoga, religion; predominant age of active travelers – 27…31 years old and after 38; they actively post photos during or just after their trips (Liaptseva, 2019). Obviously, tourists are economically and socially active population with a physically active lifestyle. Meanwhile, it should be noted that the reasons for trips have remained relatively consistent despite the digital changes (Table 1).

Table 1. Reasons of a temporary change of a place of stay, %

Reasons	Years					
	20 14	20 15	20 16	20 17	20 18	20 19
Entertainment and rest	52	53	53	55	56	57
Visiting relatives, religion, rehabilitation	27	27	27	27	27	28
Business and profession	14	14	13	13	13	14
Undefined	7	6	7	6	4	4

Stable tourism growth for entertainment, rest, and new impressions at the expense of reduced business trips should be mentioned separately. It is obvious that in the digital world, it is much more convenient to carry out business communications via digital means rather than spend such a non-renewable resource as a time for long trips. The predominance of entertainment and rest as the travel reason is confirmed by destinations statistics because the impact of the tourism

industry is the most essential in the economies of exotic tropical island destinations: Seychelles receive 26.4% of its GDP from tourism, the Bahamas – 19%, Saint Lucia – 15%. The major drivers of inbound tourism in Europe – the region continuously showing the largest growth – are the Southern and Mediterranean Europe, where the most destinations showed over 10% growth in 2018. The most popular destinations in Europe are Italy, Greece, Portugal, Croatia, Turkey, Spain, etc. UNWTO (2019), yet France, as usual, attracts the largest number of tourists UNWTO (2018).

Moreover, according to the UNWTO, constant presence with growing shares of such features as traveling for "shows" and "security awareness" should also be mentioned. In the first case, the tourists register new places of stay and interesting moments of trips at once, gain new experience, and share it on Instagram and other social media, thus contributing to forming the Big Data. In the second case, the tourists secure the zero use of plastic and join the fight against climate changes, having received information about that from global digital media and now forming the picture for it by their content. These features aren't used by tourist organizations, although they can be an essential resource for organized tourism instead of the amateur one. A segment of tourists attracted by the possibility to get their impressions, useful experience, and excitement from a trip has emerged, and virtual technologies can help them. They want to understand and feel the other culture and lifestyles, are eager to spend less money on accommodation, yet to spend more on specific excursions. The creation of such excursions for virtual tourism (see below) is also one of the directions of tourist companies' development.

In the same way, it is possible to research the frequency and dynamics of search requests and activity in specialized media. The results of the analysis should confirm or reject a hypothesis suggested after the Big Data analysis from the preliminary sources. There

are enough data for the analysis, for, in early 2019, the number of accounts in social networks reached 3.49 billion due to registered 288 million new accounts in 2018, contributing to a 45% global social network penetration rate. Dynamics of social networks audience recently has been impressing more than the data on the use of the Internet. Since 2012, the number of social network users in the world has increased by 2 billion persons. It should be noted that social networks are globally distributed unevenly; for example, their penetration rate in some areas in Africa is below 10%, while Middle East countries lead the social networks penetration rankings – the United Arabian Emirates and Qatar share the first spot. According to the UN, in some cases, the number of users of certain platforms in these countries exceeds the number of population, which is possibly related to the fact that both countries have large communities of expatriates not included in official data on the number of the local population. North Korea continues to be on the opposite side of the scale, with the penetration rate below 0.1%. In early 2018, the global audience of social platforms amounted to about 58% of the total "adult" population (above the age of 14), while almost in 100 countries, the rate reached beyond 70%. However, there isn't a direct dependence between the number of social media users for a country (a region) and its tourist attractiveness or tourist activity of the population.

According to the World Bank research (Lopez Cordova, 2020), the extended representation of tourist operators and allocation of new destinations in already existing and new digital tourist platforms like TripAdvisor, Booking, Airbnb have facilitated international travel by reducing the cash and non-cash travel expenses (for example, reduced time for travel planning or more available information on a destination). The model of gravitation equation used in the research and adapted from the trade literature to tourism allowed recommending countries lagging behind the rest of the world by the application of digital technologies (for example, Middle East and North Africa countries) to boost their economic activity in travel and tourism industry based on these technologies.

Development of tourist destinations in the leading tourism countries towards the introduction of digital and communication technologies has resulted in the emergence of a new concept – a smart destination – that is implemented as a system of relations between tourists and tourist companies and authorities at the local and regional levels. Such smart destinations are common for Spain, Italy, Germany, the Netherlands, Singapore, North Korea, etc. Thus in March 2013, the state-owned Spanish company for tourism development Segittur created the technical subcommittee to develop the system of indicators to measure and unify criteria for smart destinations. Its work resulted in PNE 178501:2016 "Management system of smart tourist destinations. Requirements" and PNE 178502 "Indicators of smart tourist destinations". We claim that further development of smart destinations will lead to their consolidation and creation of tourist smart regions, which is also emphasized by (Gretzel, 2018).

Therefore, the primary conclusion can be made about the need to integrate the sources of information on perspective tourists and their needs; the tools and services of the marketing analysis of the Big Data (Brykner, 2019); the endeavors of tourist businesses and regional or national authorities. Modern technologies contribute to the processing of the Big Data in a cloud by combining public and private clouds, i.e. using the hybrid cloud. Private clouds are applied in the case that access to a resource should be permanent, for example, for data storage. The public ones – when resources are needed occasionally, for instance directly in the analysis.

Several further processes are in one way or another related to the use of e-commerce, Internet communication, and artificial intelligence. According to Digital Market

Outlook of the Statista company, in 2018, the expenditures in the e-commerce industry grew by 14% compared to the previous year. The largest share of expenditures accounts for the travel and hospitality category – the users spent $ 750 billion globally to pay for travel. E-commerce penetration rate continues to vary in various regions globally, and the industry has the growth perspectives even in the most developed countries. The Digital 2019 report compares the ARPU (average revenue per user) and GDP per capita and ranks China, where people spend over 7% of GDP per capita on the Internet, the first in the world (Lisun, 2020).

Regarding the organization (improvement) of a tourist product, it is worth mentioning that recently the number of visited destinations on a trip and travel distances have increased, while the duration of each trip has reduced. It is confirmed by the fact that the number of trips and the number of tourists grew in 2018 in almost equal proportions – by 5.4 %, while the distance they travel (according to the reports on international transportation) increased by 6 %. Therefore, due to centralization and the high speed of modern means of transportation, the time of travel reduces for the tourists, while there is more time for impressions. Modern travelers have such an opportunity due to the widespread introduction of digital technologies and global economic virtualization.

To organize (improve) the tourist product from the viewpoint of the mentioned peculiarities, the tourist operators can use artificial intelligence as an instrument of tourism transformation to suggest the hyper-personified approach to clients. According to the research of the McKinsey Institute (Cam et al., 2019), adoption of artificial intelligence by services companies in their operating activities can reduce the costs by about 10% in 23% of cases and over 20% in 11% of cases, or increase the income by over 10% in 15% of cases. According to the results of the survey provided by the report, the tourist companies and related companies had the following priorities in the adoption of the

artificial intelligence selected by:

- robotic process automation – 33% of respondents;
- computer vision – 26% of respondents;
- machine learning – 19% of respondents;
- natural language text understanding – 24% of respondents;
- virtual agents or conversational interfaces – 29% of respondents;
- natural language speech understanding – 12% of respondents;
- natural language generation – 12% of respondents;
- autonomous vehicles – 10% of respondents.

The abovementioned example of Palma de Mallorca helps local tourist companies to offer information to tourists more accurately and to cooperate with them more based on the context marketing strategy (Femenia-Serra & Neuhofer, 2018).

It is also worth mentioning the large number of tourists, who plan and undertake the trips by themselves according to their desires. In the globalized digital world, the tourists are not limited by physical accessibility in a search for partners to get a tourist service. They have an opportunity to establish a stable contact with transport, accommodation, and additional service companies through digital communication networks. E-booking, e-tickets, and e-visas are the most widespread innovations in transport and accommodation services. The increasing mobility of this access has become a noticeable trend recently. To search for information, the modern digital technology users are increasingly using smartphones and tablets, which are already reaching the level of desktop computers and laptops of average price segment by their computational capacities, while the development of mobile communication networks secures them the high-speed Internet access. The Internet audience has been growing especially fast

since 2010 due to the expansion of 3G and 4G mobile networks. In 2019, 3.3 billion and 912 million users are using these technologies of mobile Internet access, and in 2020, their number is bound to reach 4.3 and 1.8 billion respectively.

To meet the needs of independent tourists, the specialized divisions or specific tourist operators are established to carry out all the preparatory and organizational work for a certain commission fee. Unlike the ordered tour, which is formed by an operator, a tourist can cut down expenses substantially (Yakymchuk et al., 2021).

It is also worth emphasizing the active use of augmented reality related to virtual guides, reference systems, navigation products of various producers the tourists use in their real organized by themselves or purchased tourist products. Such products can be commercial or can be ordered by municipalities like mobile application Florence Guide by eTips LTD, Metro AR Pro, or Flightradar24 by Travel Network Ltd, or the already mentioned Kyiv. Travel. It is possible to virtually visit real destinations in real time through web cameras installed in many landmarks transmitting on the Internet.

The tourists' access to information on accommodation in the desired destination without a travel agent helps them reduce the costs and form a tourist product according to their desires, yet the travel agent's work experience and long-term wholesale agreements can eliminate this aspect. Meanwhile, we argue that the travel agency at the current state of communication and visualization technologies development has more opportunities to organize virtual tourism.

Virtual tourism "is an activity of an individual that helps create and get the most realistic sensual information on the desired destination from actually existing ones by means of modern computer technology and communication networks without actual movement thereto". Such tourism allows visiting the desired destination quickly, safely, and without the need to receive unnecessary information on sites not within the tourist's goals. Virtual digital technologies contribute strongly herein (Vishnevskaya & Klimova, 2017). 3D-panorama is one of these technologies. It is specific photography that covers the entire space around a certain point: 360 ° horizontally and at least 180° vertically. It creates a complete impression of a client's presence at a certain site. Nowadays some travel agents can offer the perspective clients to take a virtual 3D-tour before the purchase of a real tourist tour, while in future such tours can replace the real ones. For one, today, there is an opportunity to take a virtual tour of Berlin, San-Francisco, Botswana, and other destinations. Hotels also introduce the virtual reality technologies, for instance, VRoomService is used by MarriottMarquis (New York, USA) and MarriottParkLane (London, Great Britain), which offer virtual trips to the Andes (Chile), visiting ice cream café in Rwanda, and walking the Beijing streets.

Such tourist destinations as museums use digital technologies – iBeacon and QR-codes provide exclusive information about an inspection object (for example, in National Slate Museum in Wales); audio installations, video mapping, holography in such establishments as, for example, the Museum of the History of Polish Jews in Warsaw, the Dutch National Maritime Museum in Helsingør, the MUSE Science Museum in Trento help the visitors to feel the expositions better; navigation systems help moving around the museum complex, taking into account the working hours, distance and interests of tourists. They use even more advanced technologies, for instance, over 200 museums offer the virtual excursions with interaction with the exhibits; augmented reality technologies allow recreate the lost parts of an object (in the British Museum, in the Stellenbosch Museum) (Klementeva, 2018). The use of such technologies, especially, in our point of view, in natural and

historical museums, provides such destinations with substantial competitive advantages.

Evidently, the existing 3D-tours will further be supplemented by actual audio effects and a certain number of other sensory distractions like in the so-called 5D-cinema. To link various sensory distractions with visual and audio tracks, it will be necessary to develop a specific software, which is already initiated by the development of a PhoscodeDevalVR package. Later, the creation of virtual tours with support of travel agents will turn into a separate independent activity related to tourist services that will be provided distantly on the Internet. This is the way we, and not only we for example (Law et al., 2020; Makhovka, 2018), see the perspective of the development of virtual information technologies in tourism. The next step will be "to sew together" an increasing number of 3D-panoramas and to secure interaction of a user (a client of a virtual tourist product) with a tour the way it is in the Google Street View service. Combining similar tours and services due to the increased Internet penetration capacity and computational capacities of the clients' computing devices and servers allows speaking about a single virtual tourist space. Its properties nowadays and for the future are examined in Vishnevskaya and Klimova (2017).

Therefore, the digital technologies and virtualization of communications allow (for now – in the future) the tourist companies to use an artificial intelligence for development of optimal routes with optimal movement schedule based on the Big Data analysis, which address both the desires of each client in a tourist group and capacities of transport partners, infrastructure, accommodation and entertainment facilities, etc. They also allow the tourist companies to transfer the communication with most tourists to virtual agents managed by an artificial intelligence. All forms of virtual communication between the artificial intelligence of a tourist company and tourists should be carried out in the natural human language. According to the statistical reports of the DataRePortal, English (54.0%), Russian (6.1%), German (6.0%), Spanish (4.9%) and French (4.0%) are the most used languages in the Internet.

Digital technologies secure visa simplification. Electronic visas and those obtained directly in the trip become increasingly popular, replacing the traditional ways of obtaining visas – the share of people needing traditional visas for international trips reduced from 75% in 1980 down to 53% in 2018, while each tenth person already has an opportunity to get electronic visas staying at home.

The changes in technological means of communication and ways they are used substantially impact the development of the means of tourists' support. According to global statistics, the fast drifting from desktop computers and laptops to more mobile devices, mostly smartphones, and the use of the mobile Internet has been observed in the last 5-7 years. The number of people using mobile phones increased in 2018 by 100 million. By January 2019, their total number globally had exceeded 5.1 billion, while the number of mobile connections had increased by over 4% and reached 8.8 billion. As a result, according to Ericsson, the global mobile connection penetration rate has increased up to 67%, so two-thirds of the world's population have mobile terminals. Currently, almost 5.5 billion smartphones are being used in the world. The annual growth is 9% or 450 million smartphones. Mobile devices nowadays take almost half the time the people spend online – on average, it is 6 hours 42 minutes each day, with a continuously growing speed of access to the network (Lisun, 2020).

The ways people interact with the Internet and on the Internet are changing as well. In 2019 compared to 2018, the instruments of voice control became more popular. According to the DataRePortal, about four of each ten Internet users use voice commands or voice search at least once a month (Lisun, 2020). It is worth mentioning that about half of the

Internet users in the largest countries in the world (by population), use the voice control, therefore, even greater expansion of voice Internet technologies can be expected. The introduction of these technologies considerably simplifies the relationship between a tourist and artificial intelligence that provides information and other types of assistance to tourists on trips. The intelligence can belong both to a tourist company that has created a tourist product and to any other participant of the tourist service, or a state (local) authority.

The research of the creation of tourist innovations in conditions of economy digitalization remains to be quite new and is concentrated on separate processes and instruments. Such thematic studies are the most common methodology with examples covering mostly local, regional, and very rarely – national, international or companies' level.

Statistics collected and processed using the Big Data provides a broad spectrum of opportunities for tourist companies or local and state administrations. European scientists pay much attention to this scientific-practical problem. We argue that the data are important for statistics, while tourism industry management and creation of tourist innovations require the analysis of the content created by Internet users, including posts on Facebook, Twitter, or Instagram, and data on photos geo-tagging in Flickr, WikiMapia and Google.

Unfortunately, digital and virtual instruments aren't used enough in creating and managing tourist innovations. Therefore, further research should be focused on the creation of mechanisms of information coordination of the tourist business community and authorities with the suppliers of large information volumes, data processing experts, scientific circles.

Having analyzed the indicators of assessing the competitiveness level of regions and countries in tourism and traveling, the following components influenced by digital technologies introduction can be allocated: 1.05 Time required to deal with construction permits; 1.08 Time required to start a business; 1.09 Cost to start a business; 4.03 Extent of staff training; 4.06 Ease of finding skilled employees; 5.01 ICT use for business-to-business transactions; 5.02 Internet use for business-to-consumer transactions; 5.03 Individuals using the Internet; 5.04 Broadband Internet subscribers; 5.05 Mobile telephone subscriptions; 5.06 Mobile broadband subscriptions; 5.07 Mobile network coverage; 12.02 Quality of tourism infrastructure; 13.01 Number of World Heritage natural sites; 13.04 Natural tourism digital demand.

The aspects examined in the paper are in the first place related to the indicator 12.02 Quality of tourism infrastructure. Its impact on the competitiveness index is 8.33%/4 = 2.0825%. The current indicator rate for Ukraine is 4.1, the highest – 6.4, the lowest – 2.2. Therefore, digital technologies' introduction in the tourism industry of Ukraine will increase the 12.02 indicator by 0.1, thus increasing the Travel & Tourism Competitiveness Index by ≈ 0.0021. Marketing activities in social networks related to the promotion of Ukrainian tourist destinations globally will boost the indicator 13.04, which has an impact on the resulting index of 12.5%/5=2.5%. Unfortunately, here Ukraine has 3 points out of 100 possible, so activity in social networks has substantial reserves to boost the competitiveness index. According to our calculations, the overall growth of the Travel & Tourism Competitiveness Index after the digital technologies are introduced at the level of European leaders (for example, Spain) will amount to moving Ukraine from the 78th to the 51st–52nd place.

$$I = \frac{5.02 + 4.5 + 3.4005 + 3.45}{4} \approx 4.1.$$

4. Conclusion

Tourist compnies and state and local governments should extensively use the results of the Big Data analysis of the tourism statistics. Information for this can be obtained for free, including from posts in social networks and specialized forums, and in some cases, it can be collected and processed using the free instruments and open API. It is much harder or even impossible to access the data of mobile operators, payment systems, and bank organizations.

Spain as the country depending on inbound tourism has the leading experience in introducing digital technologies in the maintenance of the tourist destinations' competitiveness and creation of smart destinations and smart regions. The experience should be examined and used in Ukraine and in other countries.

Tourist companies should follow, direct, and actively introduce the means to optimize routes and instruments of virtual (distance) interaction with clients based on artificial intelligence and augmented reality. Now it is possible to speak about virtual tourism as the supporting part of the tourism activity used by travel agents to maintain and develop their core activity. It is reasonable to assume the forming of the future industry, where the virtual tours become the final intrinsically valuable consumption product.

The change of the behavior model of the tourism services' consumers challenges the tourist companies with the task of innovative development of tourist products and search for new individual offers for IT-competent users based on digital technologies.

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