REVISTA ESPACIOS

The influence of virtual information spaces on tourism development

La influencia de los espacios de información virtual sobre el desarrollo turístico

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Content

1. Introduction
2. Method
3. Results
4. Discussion
5. Findings
References

ABSTRACT:

The desire to meet the requirements of the consumer necessitates the study of the influence of modern information and communication technologies on the development of the tourism industry by operators. The urgency of creating a virtual tourist information system, and developing its structure is required in order to match the innovative processes that involve modern technologies of Virtual and Augmented Reality. It allows operators to get new visual information and to develop new tourism products. The purpose of the study is to analyze the modern development of information technologies in the tourism industry, to study the influence of Virtual and Augmented Reality in the emergence of innovative tourism products, and to consider the effects of this on the future development of a virtual information space. The sources used are official statistics, characterizing the development of information technology and telecommunication networks in the world, in the Russian Federation and regions of our country, and analytical research reports on Augmented and Virtual Reality. Theoretical analysis and comparative analysis were used as the research methods) The development of digital technologies led to the emergence of electronic booking, electronic tickets, and electronic sales in general, that give the customer the opportunity to obtain important information about hotels, local culture and events in potential destinations and the various excursions and tourist services. One important developing cultural trend is the mass introduction into society of various programs and projects based on Augmented Reality technology. Its endless applications and the perceived empowerment of consumers point towards a new qualitative leap forward in the development of modern civilization. As regards tourism, the virtual space consists of information fields, flows, resources and the technology market. It is important to say that the development of information technologies in the tourism industry will not only improve the functional efficiency of the industry, but also introduce a new level of development through closer integration with other sectors of the economy and new technology.

Keywords: information technology, virtual reality, information space, mobile applications, the Internet.

RESUMEN:

El deseo de satisfacer los requerimientos del consumidor requiere el estudio de la influencia de las modernas tecnologías de la información y la comunicación sobre el desarrollo de la industria turística por los operadores. La urgencia de la creación de un sistema de información turística virtual, y el desarrollo de su estructura se requiere para que coincida con los procesos innovadores que implican las tecnologías modernas de la realidad virtual y aumentada. Permite a los operadores obtener nueva información visual y desarrollar nuevos productos turísticos. El objetivo del estudio es analizar el desarrollo moderno de las tecnologías de la información en la industria del turismo, estudiar la influencia de la realidad virtual y aumentada en el surgimiento de productos turísticos innovadores, y considerar los efectos de este en el desarrollo futuro de un espacio de información virtual. Las fuentes utilizadas son las estadísticas oficiales, que caracterizan el desarrollo de las redes de tecnología de la información y de las telecomunicaciones en el mundo, en la Federación rusa y en las regiones de nuestro país, y los informes analíticos de la investigación sobre aumentado y virtual Realidad. El análisis teórico y el análisis comparativo se utilizaron como los métodos de investigación) el desarrollo de las tecnologías digitales llevó a la aparición de la reserva electrónica, los billetes electrónicos y las ventas electrónicas en general, que dan al cliente la oportunidad de Obtenga información importante sobre los hoteles, la cultura local y los eventos en los destinos potenciales y las diversas excursiones y servicios turísticos. Una importante tendencia cultural en desarrollo es la introducción masiva en la sociedad de varios programas y proyectos basados en la tecnología de realidad aumentada. Sus infinitas aplicaciones y el empoderamiento percibido de los consumidores apuntan hacia un nuevo salto cualitativo hacia adelante en el desarrollo de la civilización moderna. En cuanto al turismo, el espacio virtual consiste en campos de información, flujos, recursos y el mercado tecnológico. Es importante decir que el desarrollo de las tecnologías de la información en la industria del turismo no sólo mejorará la eficiencia funcional de la industria, sino que también introducirá un nuevo nivel de desarrollo a través de una integración más estrecha con otros sectores de la economía y nuevas tecnologías.

Palabras clave: tecnología de la información, realidad virtual, espacio de información, aplicaciones móviles, Internet.

1. Introduction

The rapid development of information and communication technologies (ICTs) and changes to the social structure of the information society have had a significant influence on the forms and models of communication in affairs of state, social and leisure activities and the business and production sectors (Boychenko 2010). The massive use of ICT in a rapidly changing world has become a necessary condition of participation for the individual in economic activity and the socio-cultural sphere. Changing modern life, the information explosion, the transformation of the system of values and the emergence of new standards of behavior, ethical principles (sometimes significantly contrary to the traditional ones), a new vision of life quality, comfort and level of service compel us to take another look at one of the most important aspects of contemporary life – leisure.

The emergence of the information society, which creates a digital, virtual reality with specific social, cultural and consumer practices, effected innovative processes in tourism in many ways (Augmented reality in tourism). The level of information space development in the modern world determines the direction of innovations in various areas of society including social, political and economic spheres.

The specific characteristics in the information space are caused by the variability of some processes, such as interaction in the process of joint activity and competition (Vishnevskaya 2017). The most significant point pertaining to the information space is the changing nature of the geopolitical competition due to the struggle for possession of more developed information resources which allow informational superiority, which, in turn, allows for better control over a competitor's resources.

The purpose of the study is to analyze the modern development of the information technology in the tourism industry, to study the influence

2. Method

Fundamental and application-oriented studies on the economy of tourism and information technology served as the theoretical and methodological basis for the research. Despite a significant amount of work devoted to the research of information technology in economic literature, little attention is paid to organization of the tourist virtual space, its structuring and the interaction of its components. The analysis of different approaches that determine the concept of "information space" allowed the selection of the core properties and functions that are important for the tourism industry.

Our research method includes a study of monographic, scientific and practical, educational and methodical publications and state-of-the-art reviews about the research subject. While studying the issue of the influence of the virtual information space on tourism development, we conducted desk research based on analysis of the official statistical data, charting the development of information technology, information and telecommunication networks as they occur in the Russian Federation and regions of the Russian Federation, and analytical reports of research into supplemented and virtual reality. Data from selective static research on the use of information technology conducted by the Federal State Statistics Service of the Russian Federation, and the International Telecommunication Union were analyzed (the ITU is a specialized institution of the United Nations concerned with information and communication technologies).

Research was conducted using the dialectic method of scientific understanding, from which perspective we were able to consider the elements of tourist information space comprehensively, in conjunction with, and correlating to and in interaction with other phenomena and the environment.

We propose a conceptual approach to the formation of a tourist virtual space. It allows us to study correlations between the following components: information fields; information flows; information resources; legal and organizational measures; and the market for information technology.

3. Results

Despite the considerable number of works devoted to the study of information space in economic literature, little attention is paid to formation of the information environment for the effective promotion and implementation of tourist services and destinations.

The concept of "information space" is widely used in various fields – economics, sociology, journalism, pedagogy and management. The concept of the formation and development of the United Informational Space of Russia, developed in 1995, gave the following definition: common information space represents a set of databases and databanks, technology used in their continued use, and information and communication systems and networks, which function on the basis of common principles and on common rules. This provides information on interaction between organizations and citizens, as well as satisfying their information needs. (Boychenko, 2010)

Identical to the concept of "information space" the concept of "information environment", is understood as the totality of information resources and systems, as well as relations arising in the course of information processes.

I. M. Dzyaloshinsky examines three common approaches to understanding information spaces:
- from a geopolitical point of view, according to which, the information space is understood as certain virtual area, that belongs to the state, is a specific public resource and must be protected from potential aggressors;
- supporters of the informational approach view the information space as a space of certain information interaction, i.e. as a repository of a variety of images, symbols, concepts, texts, and documents, which are connected with each other through the multiplicity of possible transitions;
-in the framework of the social approach to the information space of the RAS (*Remote Access Service or Russian Academy of Sciences*) was selected as a sphere of relations between people and communities about information, i.e. the information space acts as a set of certain entities (individuals, groups and organizations) connected by relations of collection, production, dissemination and consumption of information (Conceptual approaches to the formation of a regional information-tional space, 2001).

From our point of view, the tourist information space combines elements of these three approaches. On the one hand, tourist resources and destinations have a special location and therefore geopolitically speaking belong to a particular country. On the other hand, the tourist industry, at this stage of development, presupposes the availability of the information field at any point, which gives everyone the opportunity to obtain necessary and sufficient information to adequately meet his information needs in any given situation in an appropriate manner. These represent the main properties of the information space:

1. The information space is structured and variegated; there are attractors that attract the consumer's attention, and barriers that push attention away from this point of the information space.

2. The dynamism of the information space – there is no completed state. As a rule, physical objects have strictly defined physical limits. As a result, the achievement of constant information superiority is quite a difficult task, but a temporary informational advantage can be achieved.

3. The information space is universal: any field of human activity relies on it. This creates conditions for the emergence of a unique opportunity for exposure in any professional field.

4. The security of the information space – there are places, which are deliberately protected from foreign entry. At the same time, the protection assumes the presence of weak points.

5. Information space is not directly related to real space, because it is intangible, and one has the ability to use a civilian information infrastructure, that reaches any point of the globe.

6. The information space has national-specific ways of constructing, processing and disseminating information.

The information space performs the following functions.

1. Integrating various types of human activity (providing there is a unified special environment), including both individuals and whole countries, people and international coalitions, and transnational corporations into a single spatial-communicative and socio-cultural environment.

2. Communicative – allows people exchange information within the created special environment for the cross-border, interactive and mobile communication between various stakeholders.
3. Update – subjects of activities, through the implementation of their information policy, are popularizing their interests.

4. Geopolitical – the formation of their own way of exchanging resources spite of traditional resourcing structures, creating a new environment of geopolitical relations and competition.

5. Social – the transformation of society, the changing nature and content of the socio-political (social) relations in all spheres – politics,

culture, science, religion, and others.

In developing tourism in the modern world, it is necessary to consider the main influences on the formation of an information society, which include:

- access to tourist information;

- human development of the information society;

- the creation of an electronic application tourism infrastructure;

- the development of cultural diversity, cultural identity and linguistic diversity;

- the development of specialized electronic media destinations.

Note, that the information space of modern society is significantly different from that which surrounded people in the twentieth century due to the emergence of a virtual reality driven by information technology and the Internet.

Note, that the ubiquitous spread of the Internet in the tourism industry has seen a shift in the user from the "real" to the virtual market. Changes the algorithm caused by the consumer behavior of tourists, who increasingly create their own tourism products, and determine their journey based on information supplied by the websites of interesting destinations. This results in them booking from accommodation services and transport companies that provide various related services (i.e. car rental that must be ordered on the internet on a specific date of visit of the event).

Statistical data and the results of studies of different analytical companies allow us to state with certainty the great development potential of the tourism industry, beyond the traditional boundaries, with a view to further enhancing the penetration of new information and telecommunication technologies into everyday life.

The number of internet users in 2015 world-wide was 3.5 billion (from a population of 7.3 billion). A large amount of users are situated in developing countries where there are 2.5 billion users, as opposed to the developed countries where there are 1 billion. In percentage terms, the greatest internet penetration remains in developed countries with 81%, compared with 40% in developing countries and 15% in the least developed countries.

According to the International Telecommunication Union (ITU), internet penetration in Europe in 2015 had reached 75%, the highest level in the world, in North and South America it was 66%, in the Asia-Pacific region it was 45%, and in Africa almost 20%. It is expected, that by 2020, 53% of the inhabitants of the Earth will be on-line (ICT Data and Statistics (IDS)).

By country, the highest rates belong to South Korea (94%), Australia (93%) and Canada (90%), but there are levels above 80% in other countries including the USA, the UK, Spain, Israel and Germany. In many large developing countries, 60% of the population uses the Internet, including 72% in Russia and Turkey, 68% in Malaysia, 65% in China and 60% in Brazil (World Internet Users and 2016 Population Stats).

An increasing trend is the spread of the internet on Mobile Network access. The ITU report indicates, that the global mobile internet audience reached 2.1 billion people in 2015. According to estimates by the ITU for the last five years the intensity of Mobile Network access has increased seven-fold (Internet Stats & Facts for 2016).

Russia is actively developing the information space. According to the Ministry of Communications, in 2015 68.3% of citizens were active Internet users, but the percentage ordering goods and services on the Internet was confined to only 19.6%. Note, that the growth of internet users is observed only on smart phones, from 37.2% in 2015 to 42.1% by the end of 2016 (Selective Federal statistical observation on the use of a population of information technologies and information-telecommunication networks).

Figure 1. A graph of the share of the Russian Federation population which are active internet users, and who use the internet for ordering goods (Selective Federal statistical observation on the use of a population of information technologies and information-telecommunication networks)
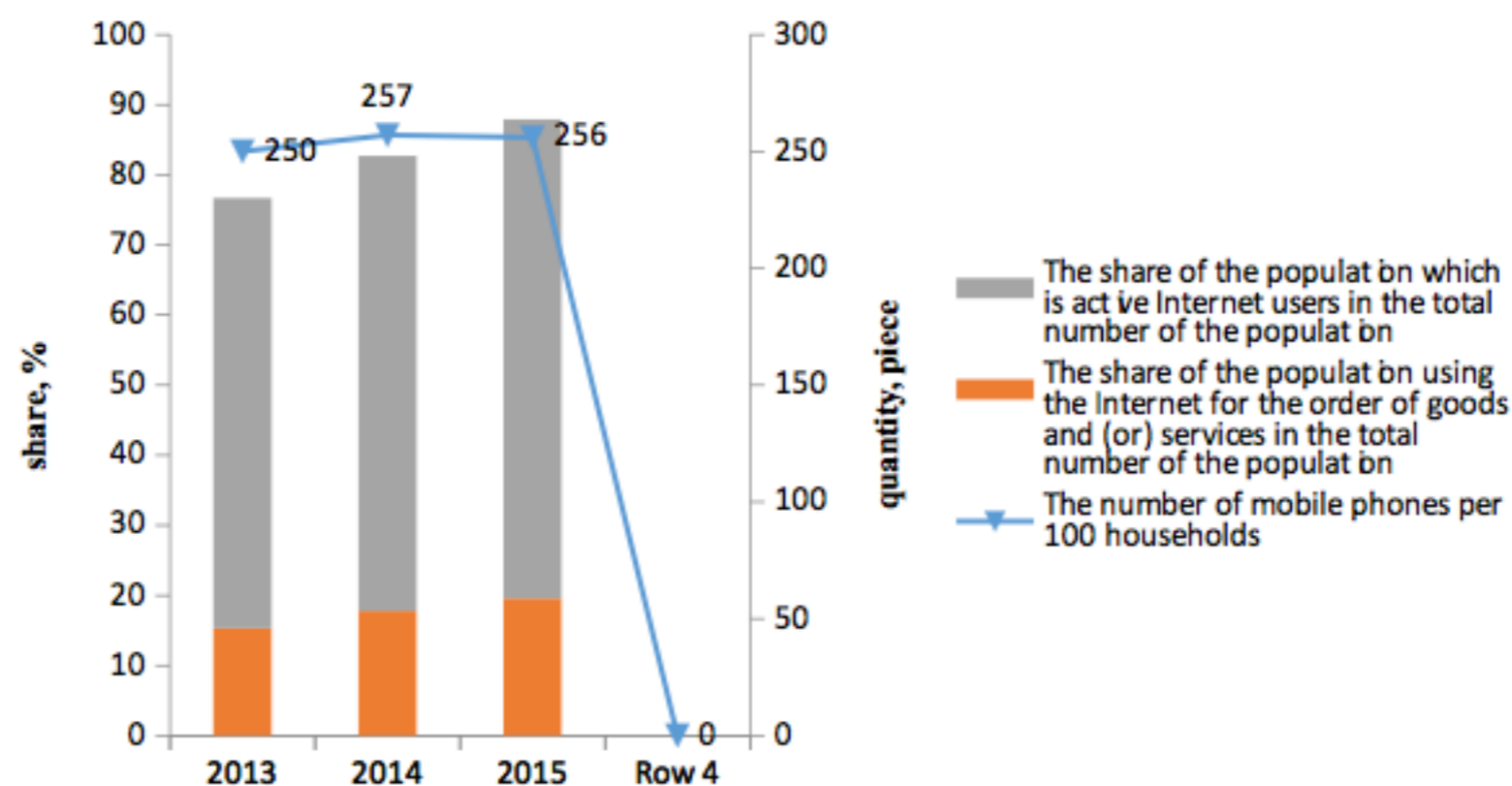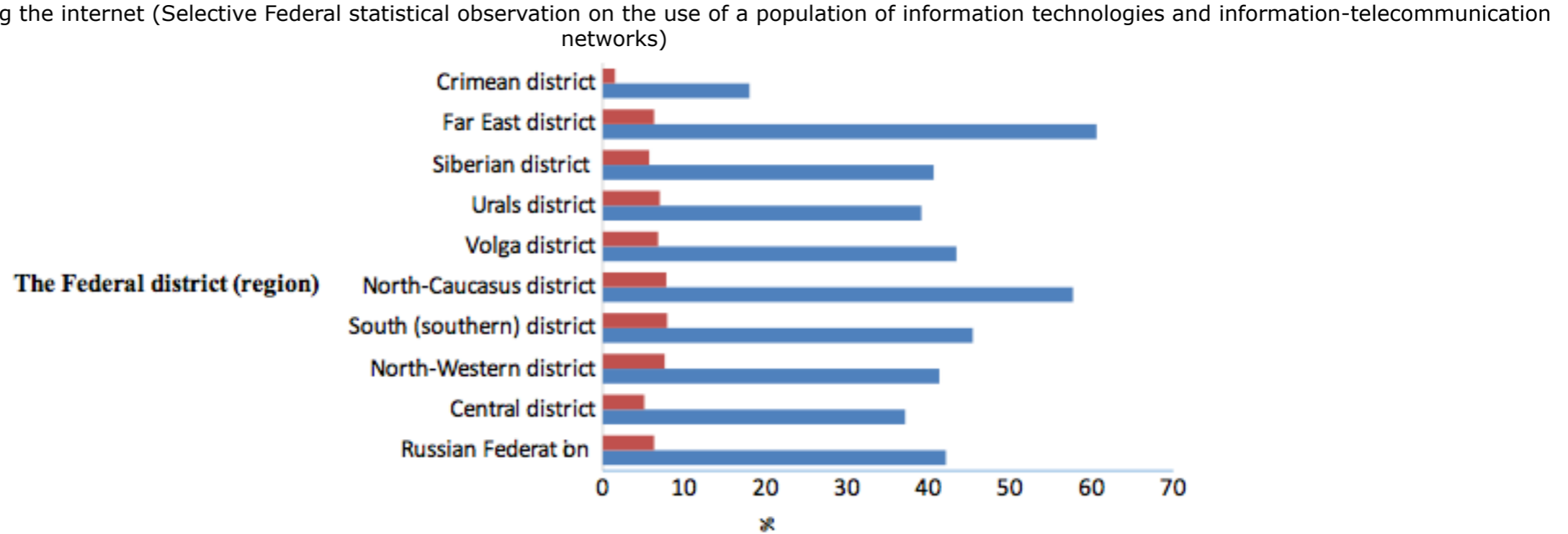

The analysis of statistical data shows, that residents of the Russian Federation prefer to use the internet from a mobile phone with 42.1% of the total population using the internet, using mobile operator services, while 26.1% use the wireless network (Figure 1).

The increase of the audience of Russian Internet users on mobile devices in 2016 was 6 million. Today, 56 million people aged over 16 years access the internet on mobile devices, smart phones and tablets (46.6 per cent of the total users). The user growth observed on smart phones alone went from 37.2% in 2015 to 42.1% by the end of 2016. The output of the network on tablets did not change discernibly.

A likely causal factor for many Russians accessing the internet on their mobile device is down to the specifications of purchased devices. Nearly half of all devices sold in the last year have a screen size of more than 5 inches. People also choose high-tech CPUs (almost 80% have a 4-core device). More than half of smart phones sold in 2016, are LTE devices.

An analysis of the method of access to the network of internet users by Federal districts showed, that in the Central Federal district the ratio of Internet users via mobile phone services of mobile operators and wireless network is almost the same at 37.1% to 33.8%. In other Federal districts the difference is significant, access through the mobile network is 2-3 times higher than over the wireless network. This indicates the weak development of wireless networks on the territory of the Russian Federation.

Figure 2. The use by the population of mobile devices for access to the internet by subjects of the Russian Federation (November-December, 2015), as a percentage of the total

number of the population using the internet (Selective Federal statistical observation on the use of a population of information technologies and information-telecommunication networks)

Thus the cell phone is the most popular way of accessing the internet. Laptops and tablets are 7 times less likely to be used for this purpose at 6.3% and 6.0%, respectively, while 42.1% use mobile phone (Figure 2). Laptops and tablets are more often connected to wireless communication than mobile phones.

Is is to be noted that women are more likely to use the internet than men. The internet is primarily used for participation in social networks (74.6% of the total population using the internet) the second most popular activity is downloading movies and images (49.6%) (Figure 3). Then came access for cultural purposes, such as information about objects of cultural heritage and cultural events, and virtual tours of museums and galleries etc (11.1%).

Figure 3. The share of the Russian Federation population using the Internet by purposes of use, as a percentage of the total number of the population using the internet (November-December, 2015) (The main results of the research company J'son & Partners Consulting "the Russian market of mobile Internet access" at the end of 2015)
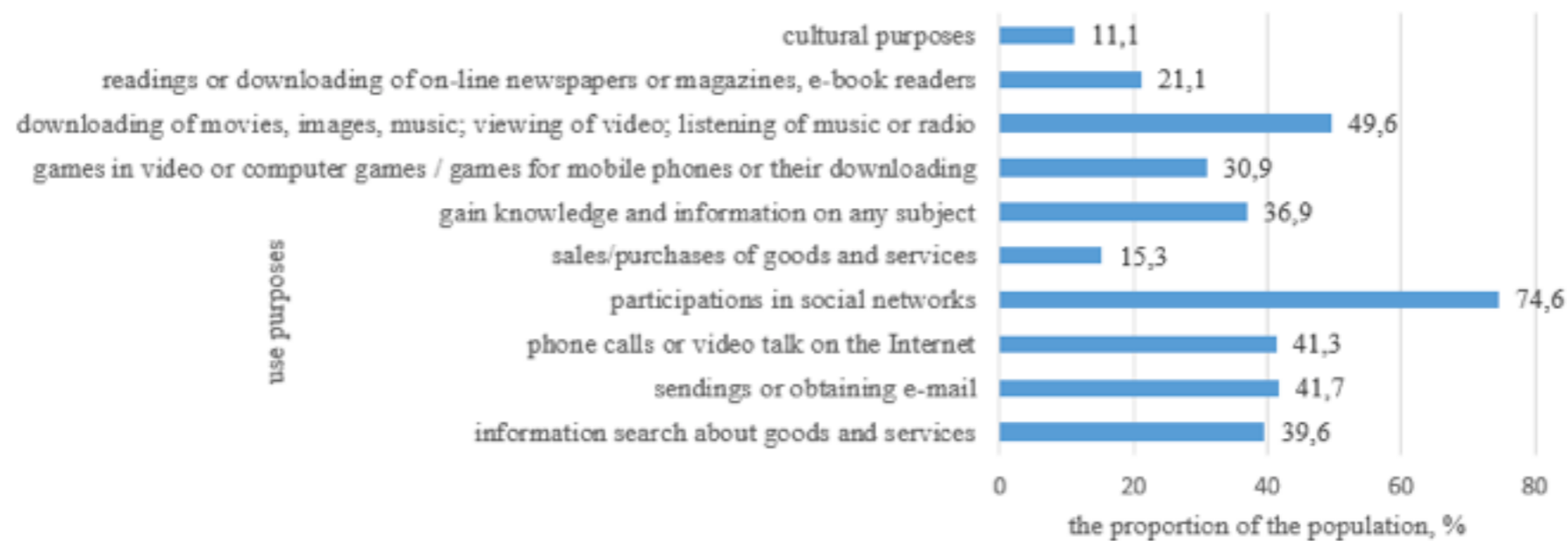
The development of digital technology led the development of electronic booking, electronic tickets, and electronic sales as a whole, giving users the opportunity to obtain necessary information about hotels, culture and events in destinations and information on various accompanying trip services.

The emergence and widespread use of ICT and internet technologies led the development of virtual tourism. Note that the electronic integration of all types of communication has resulted in the construction of a new symbolic environment, where virtual reality becomes reality, and the reality becomes virtual reality. Virtual tourism, which can be understood as the activity of an individual, who, with the help of modern computer technology and communication networks, is able to find out real and tangible information about the actual travel destination without actually being there.

An important emerging cultural trend is the mass introduction into society of various programs and projects based on Augmented Reality technology (AR), the endless opportunities for its application (from advertising, marketing, tourism, museums, exhibitions, coffee business, computer games to medicine and pedagogy) and the broadening of the possibilities of perception broadcast by them, allow us to talk about the approach of a new qualitative leap in the development of modern civilization.

Augmented Reality is so-called because of the addition of the emergence in to the real world of the perceptions of some imaginary (virtual) objects that are, as a rule, informative and complementary. In the late 90s Ronald Azuma identified Augmented Reality as a system, that:

- combines the real and the virtual;

- provides interaction between user and machine interfacing in real time;

- works in 3D.

In a classic description of the Mixed Realities Continuum Paul Milgram and Fumio Kishino, a counterpoint is introduced to Augmented Reality (Virtual) as Augmented Virtual Reality (with real elements) (Boychenko, 2010).
With the improvement of technology to produce real-time overlay of digital data on the image in the cells of certain mobile devices, thanks to built-in special programs, the active adaptation of augmented reality to society was begun. The advantages of using VR technology are:

- new business opportunities "personalizing business";

- the reduction of the development costs of goods and services;

- a cost reduction in teaching staff;

- improving sales by using 3D visualization;

- the removal of restrictions on territory, time and format.

- saving time with transferring information;

- the visualization of the project, a new type of presentations.

The benefits of using AR technology are more interactivity, simplicity, mobility, information in real time, ease of use and the reduced cost of service.
The scope of Augmented Reality is unusually wide, from industry and medicine to education and culture. The versatility of the technology

has led to the fact that it is nearly impossible to imagine an area where it could not be applied.

Research carried out by a Russian company called 'Prosense' has shown that people aged between 30 and 40 use Virtual Reality almost as actively as those aged between 18 to 30, and people aged between 50 and 65 are in lockstep with those aged between 40 and 50 (Prosense has identified interest in virtual reality among Russian consumers and travel agencies). In the study, the most popular content among male respondents was sports events and extreme video, and for females it was travel documentaries and films (Fig. 4).

Figure 4. The relationship with VR – technologies among men and women in the Russian Federation, %
(Prosense has identified interest in virtual reality among Russian consumers and travel agencies)
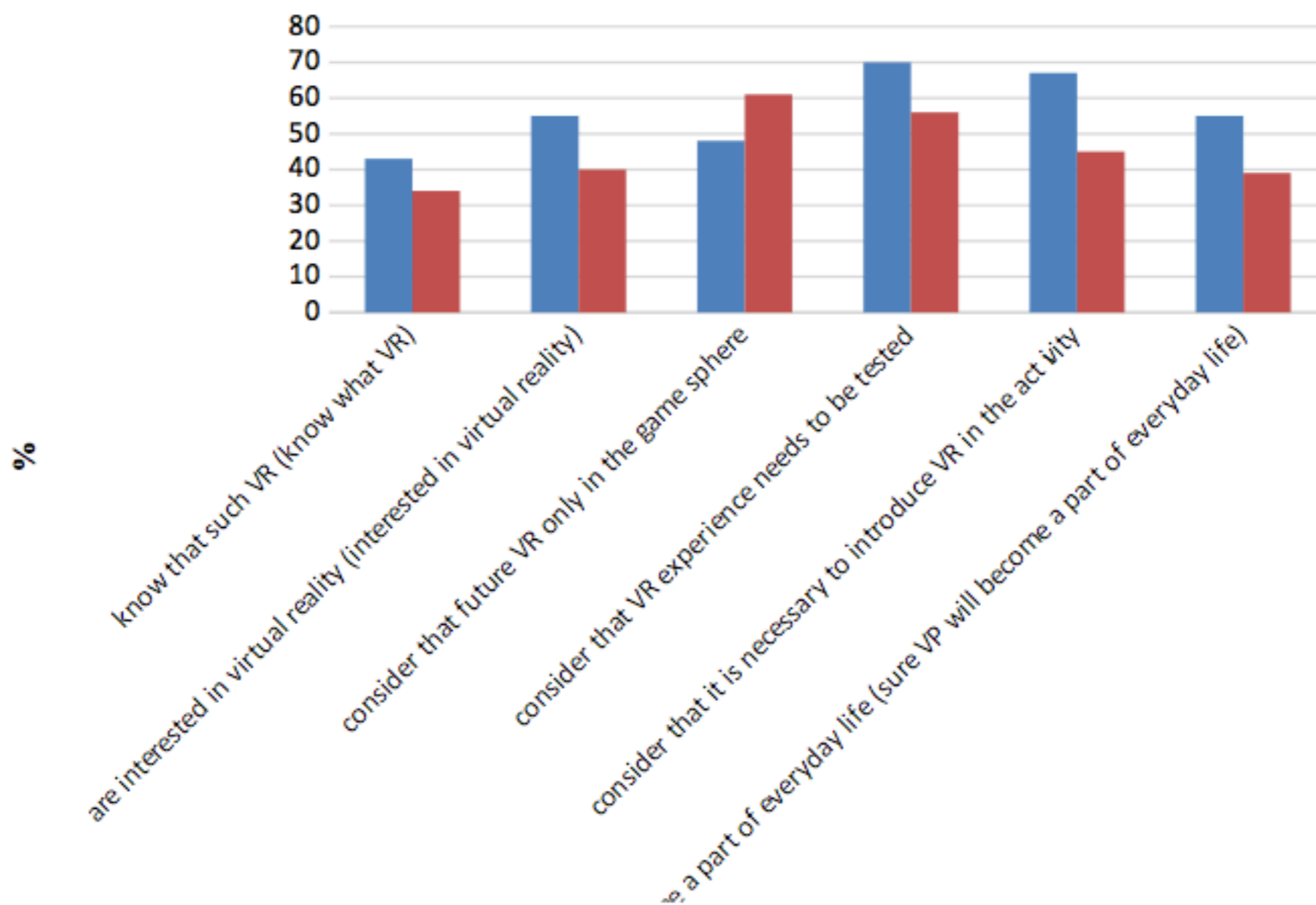
Lets consider how Augmented Reality is implemented in the field of tourism. Of course, a virtual sea is not a substitute for a real sea, but VR can be effectively used for advertising tourist services. Using virtual tours, it will be easier for a tourist to decide where to go on vacation. This technology is especially useful for promoting places which are still unknown, but have considerable potential, in to particularly popular tourist destinations. Tourist services, to some extent, occupy both the virtual and the intangible. It is difficult to imagine what the journey to an unknown place will look like. Augmented Reality, in this case, could help a customer to make a decision about the trip. Even before arriving at your destination, you will be able to see landscapes and sights of interest.

Today, some companies offer the chance to take a virtual tour through Berlin, San Francisco, Botswana and other countries. Enterprising hotels also found the use of VR technology useful. A program called 'VRoom Service' is used in such hotels as the Marriott Marquis (New York, USA) and Marriott Park Lane (London, UK).

Guests can receive Virtual Reality as a hotel services offer, which includes a kit from Samsung with a Gear VR headset.

The Marriott device has pre-installed applications with a viewing angle of 360º, and offers a three-dimensional virtual journey to the Andes mountains (Chile), visits to ice-cream parlors in Rwanda and a walk in the streets of Beijing. Thanks to VR you can get acquainted with real stories from travelers, and experience what they took from the trip.

The main reason for travel is to visit iconic attractions and to sight-see. In modern museums exhibits 'come to life' and are fully interactive. The Google apps 'Arts&Culture' and 'Sites' already have VR panoramas, and Augmented Reality can help visitors navigate through the space and find the right room. Museums create virtual tours, which allow a deeper knowledge of the history of the exhibit. This may include visiting the site of the historic battle or an ancient dwelling. For art museums AR can be used to journey into paintings, as in the Salvador Dali Museum, in the American city of St. Petersburg, which offers its visitors a chance to get inside the painting "the Archaeological Angelus echo mill", painted by the great Spanish artist.

Thanks to Augmented Reality, we have a unique opportunity to travel back in time. Now you can see buildings, streets and cities as they were many years ago. Plunging into the atmosphere of bygone eras, the tourists can become full participants in the various events of by-gone Berlin (mobile app Augmented Reality). Such applications are not only informative, but also entertaining. So the fans can see their favorite fragments of the movies on the streets of London (mobile app Augmented Reality Cinema), and animal lovers can take a photo with a tiger or a Panda (a mobile application "the Arboretum Guide").

Augmented reality will help to orient people in an unfamiliar city, and to understand a complex metro and navigate to their desired station. It can replace the thick paper maps and guide books (mobile app "Florence city guide" by eTips LTD, Metro AR Pro). Using the mobile app 'My Augmented Reality' you can nominate a 'starting point', marking a car, a bike or a public transport stop, and then safely go and explore the city. Using 'My Augmented Reality', you can easily find your way back. You can use the Augmented Reality app 'Flightradar24' to avoid getting lost in the huge space of an airport. There is no need to search, displays and signs, special symbols will make it clear where to drink coffee, put your luggage and buy souvenirs. It is also possible to instantly buy tickets and get information about bonus point schemes from airlines.

However, this works both ways. Not only can a consumer find information about tourist facilities and organizations, but any company with access to the internet, can move in the direction of its customers by harnessing the potential of mobile communication, new gadgets and social networks.

4. Discussion

In recent years tourism has shown extraordinary strength and resilience despite the many difficulties, especially those, which are associated with security issues. International tourism continues to grow steadily and contribute to the creation of jobs and the welfare of communities around the world. In 2016, the demand for international tourism remained the same, despite the difficulties. According to the latest edition of the Barometer of international tourism, UNWTO, international tourist arrivals increased by 3.9% and amounted in total to 1 billion 235

million last year, the number of international tourists (visitors staying overnight) increased by approximately 46 million compared with the figure for the year 2015 (Sustained growth in international tourism despite challenges).

Virtual Reality technology can substantially increase sales of travel products, allowing you to "try out" different kinds of fun and "see" the offered services. Augmented Reality provides instant user access to the mobile communication environment. Through applications you are able to orientate yourself in a new city, get visual and interactive support when you visit museums, exhibitions, sports competitions, business meetings, to optimize the shopping experience through three-dimensional visualization of goods (especially in Electronic Commerce) and to access additional information from magazines, posters and billboards.

As the cost of virtual reality technology gradually reduces, availability increases. There are great opportunities for the development and implementation of mobile applications with Augmented Reality.

One of the important areas of development of information technology in the modern world is the concept of the "Internet of things", first formulated in 1999, by the founder of the research group Auto-ID center at the Massachusetts Institute of technology Kevin Ashton. In Russia the regulatory framework necessary for the development of technology was created in the field of "Internet of things".

The resolution of various technological issues in the marketing of AR/VR has opened the possibility of entry into the mass consumer market. On the wave of popularity generated by AR/VR technology, a trade association was established, the Augmented and Virtual Reality Association (AVRA), and themed conferences are regularly held (Mixar, the AR and VR conference-hackathon). Innovative VR projects have received financial support from SKOLKOVO.

 The High school of Business Informatics commenced teaching "Virtual Reality" and started a training center called "The Academy of Realities". The evolution of technology has led to travelers becoming more demanding and impatient. 44% of tourists believe that in 2017 you will be able to plan a trip with your smart phone, and more than half (52%) think that they will be more likely to use mobile travel apps. Today, people prefer to book holiday online, often from their mobile phones (Vishnevskaya 2017).

The impetus behind the necessarily rapid expansion of the tourist information system in virtual space, is down to the need to meet the innovative processes involving the modern VR/AR technology, which is used to get new visual information and to develop new tourist products.

The Tourist Virtual Space comprises of:

- the information field (the totality of all information about tourist activity);

- information flows (the sum of the data that is communicated in a virtual information space on a specific channel of communication)

-information resources (automated databases, web sites, applications and networks)
   - legal and institutional measures (information law, international normative legal documents, international contracts and conferences)

- the information technology market (Figure 5).

Figure 5. Structure of tourist virtual space
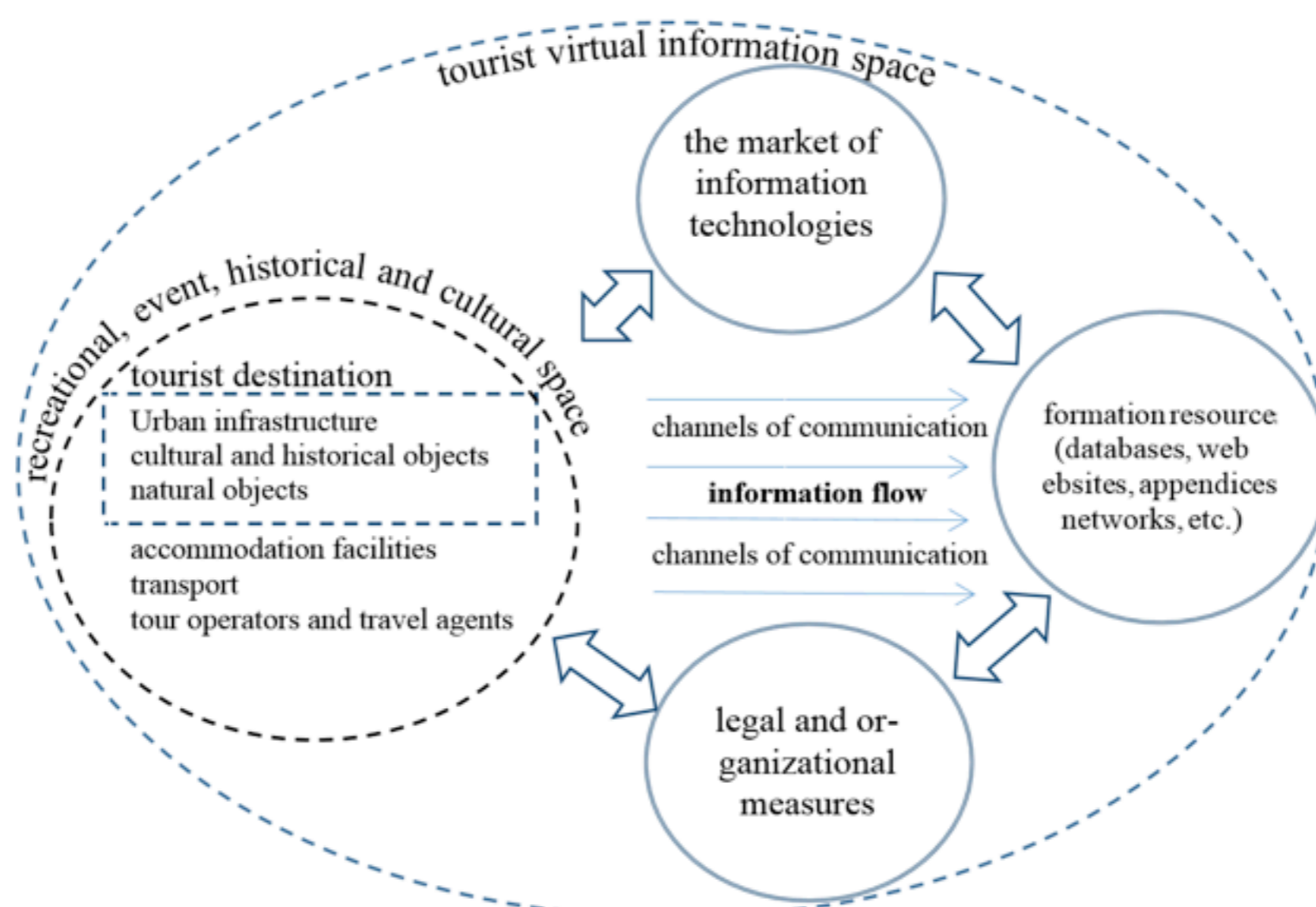
Tourist destination, tourist enterprises (transport, accommodation, catering, tour operators and travel agents) form the recreation, event, cultural space or field of information. The communication channels include electronic, print or other media, commodity-money channels and interpersonal communication.

5. Findings

It is to be noted that the development of information technology in the tourism industry can not only improve the efficiency of the functioning of the industry, but also, through closer integration with other sectors of the economy and technological upgrading, bring a new level of development.

Among the areas of development in the tourist virtual information space we can highlight the following:

- creation of new tourist products and solutions (platforms, services, applications, devices and networks)

- the development of new tourist markets and companies

- the introduction of information technology in related sectors of the economy

- the growth of competitiveness of the Russian tourist business on a global scale.

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