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THE POTENTIAL OF MODERN SCIENCE

Volume 2



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# THE POTENTIAL OF MODERN SCIENCE

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*The Potential of Modern Science*  
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## **INFLUENCE OF MOBILE APPLICATIONS ON TOURISM DEVELOPMENT**

**Introduction.** The growth of mobile traffic is stimulated by the mass use of smartphones in everyday affairs, whether for educational purposes, work or travelling. The progress of mobile traffic is confirmed by the research of various organizations: from Google to telecommunication companies and statistical platforms. According to data of We Are Social and SMM analyst agencies, the percentage of websites' opening via mobile phone in 2018 was 52.2%. The absolute growth of this parameter is significant and is 51.5% as compared to the base year of 2009. Majority of people worldwide uses the Internet via mobile phones – 52% of Internet traffic for 2018 is accrued to them. Also, mobile traffic is growing due to the countries in which not everyone can afford to buy a desktop computer. For example, in Kenya, India and Nigeria, about 80% of website visits is made via smartphones. According to Criteo Research Company, global retailers sell two-fifths of their products and services with the help of smartphones. In European countries, almost 60% of transactions occur on mobile versions of websites and in smartphone applications.

Nowadays, mobile applications designed for tablets and smartphones are an innovative way to stimulate domestic tourism and promote investment projects. The main benefits of mobile applications are the implementation of communication between the brand and the user, economic revenues and operability. Depending on peculiar companies and current business priorities, a mobile application can become an effective tool for attracting new customers or a convenient service to work with an existing customers' base [1, p. 236-237].

In the research by D. Dickinson, V. Filimonau there has been substantiated the use of mobile technologies to increase the number of trips through the mechanism of mobile applications users' motivation that form temporary spatial connections [2, p. 397]. The research is based on attraction of private vehicles to mobile applications. The main emphasis is placed on building a trustworthy transport application system using ratings and setting user etiquette.

The direction of research regarding mobile technologies usage to meet the specific needs of disabled tourists is also being developed, providing them relevant and special

information. A review of mobile applications that can be used to support people with disabilities in their tourism activity is presented [3, p. 29]. All these circumstances change the person's approaches to travel radically. For now, not only passport, credit card or cash and clothes, but also a mobile phone becomes an indispensable attribute, helping to rest. Therefore, the chosen direction of research is extremely relevant in connection with the mass usage of mobile applications, on the one hand, and the growing role of the tourism industry in the world's economy, on the other.

**Research results. Mobile applications: from WAP browser to App Store and Google Play platforms.** A mobile application is a software designed for operation on a mobile device, which may be installed or downloaded for free or fee-based. Each application has a definite functional orientation and is downloaded by users depending on their professional activity (business applications), lifestyle and vacation time (tourist applications), and preferences (games). The mobile application market is extremely diverse and interactive, and provides specific information in a format that can be easily displayed on mobile devices.

The first stage in the development of mobile applications dates back to 1998, when WAP (Wireless Application Protocol) technology was created, which allowed connecting mobile devices and the Internet. Nokia 7100 was the first phone with a WAP browser. WAP technology made it possible to download simple pages from specially created WAP sites. The disadvantage of WAP was a low transfer rate and a solid data protocol, which limited the reception of incoming calls at the time of download. Payment for a WAP connection depended on the traffic amount and was quite high.

The next milestone in the history of mobile applications is the creation of the Symbian operating system and Java applications. The Symbian operating system was developed in 2001 by Nokia, Sony Ericsson, Motorola and Samsung, however, neither it nor its subsequent versions were secured on the market. This happened due to the incompatibility of the applications with the new versions of the operating system, so each application required a follow-up revision. The Java software platform was developed by Sun Microsystems Company. A mobile phone with Java support provided several applications, namely, a clock, a calendar, and two or three games. Also users were able to download other applications, which made the mobile phone more personalized. Java is used on a variety of computer platforms ranging from objects and mobile phones in the lower target segment, to corporate servers and supercomputers in the higher target segment.

In 2008 Apple introduced the App Store, which became the engine for the development of mobile application industry. On the App Store's launch day 500 applications appeared on the market. More than 800 native applications were available in the App Store, of which more than 200 were offered for free and more than 90% for

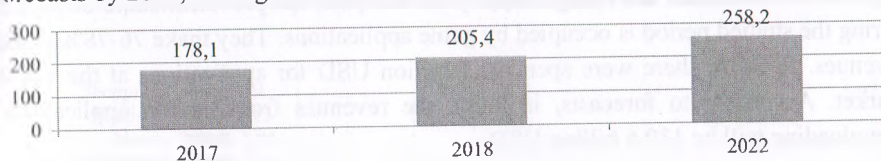


less than 10 USD [4].

In reaction to Apple's creation, Google launched the Android Market in 2008 to download applications and games for the new Android operating system. Marketplace added support for paid applications in 2009 in the US and UK. In 2012, Google has unified its workings (Android Market, Google Music, Google Books etc.) into the Google Play platform. All purchases on Google Play are cloud-based, which means that users will not have to worry about losing the downloaded file. When launching Google Play in March 2012, 450,000 Android applications and games were downloaded on the platform [5].

Today, the Google Play Store for Android Owners is a central marketplace. Although other third-party platforms (such as the Amazon Appstore) are available for Android, none of them has such a large amount of content compared to Google Play [5]. All smartphones and tablets with Android operating system have access to Google Play. In addition, other platforms and products, such as the Android Wear, Android Auto, and Android TV, also use Google Play.

The evolution of mobile applications from the ordinary WAP browser to the App Store and Google Play platforms has transformed them into a powerful business environment. This statement is grounded on mobile applications downloading rate: 178.1 billion of mobile applications were downloaded in 2017 (Fig. 1). According to forecasts by 2022, this figure will increase to 258.2 billion downloads.



**Figure 1.** Number of applications' downloads for mobile devices, worldwide in 2017-2022, billion USA dollars

Reference: [6]

Along with an increase in the number of downloaded applications, the number of mobile phone users is also increasing. In other words, these indices are interconnected, because with the increase in the number of smartphone users, the number of users of mobile applications increases proportionately and, consequently, the volume of downloads increases as well. The dynamics of the number of smartphone users' growth is shown in Figure 2.

The number of smartphone users in the world in 2019 will amount to 3.3 billion people; furthermore Asia-Pacific region's users will make over half of this number. As the global trend is cheapening and production of low-cost smartphones, it is expected that the number of users will reach 3.8 billion by 2021.

The most popular smartphone brands in the world are Samsung and Apple, with market shares of 27% and 24% respectively [4]. The Chinese Companies as Oppo, Xiaomi, and Huawei continue to become more prominent, both locally in China and globally, occupying the market with 9.9%, 8.6% and 8.4% respectively.

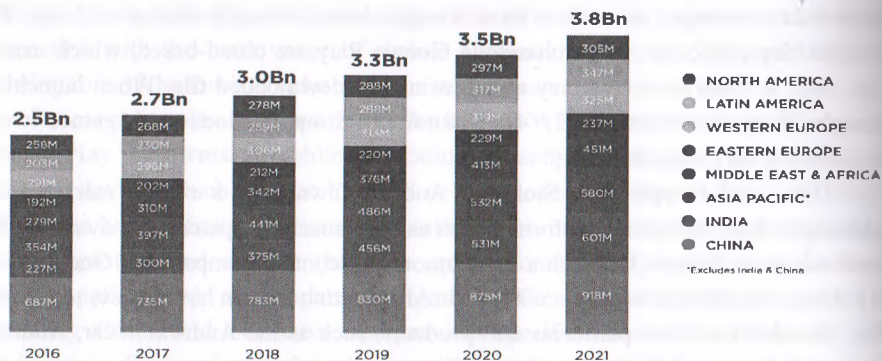


Figure 2. Smartphone users worldwide

Reference: [7]

Profit is the main indicator of the effectiveness of any business processes or commercial activities. As you can see from Figure 3 the revenues from mobile application downloads are rising annually. In addition, the prevalent share of profits during the studied period is occupied by game applications. They make 76-78% of the revenues. In 2018, there were spent 92.1 billion USD for applications at the world market. According to forecasts, in 2021, the revenues from mobile applications' downloading will be 139.6 billion USD.

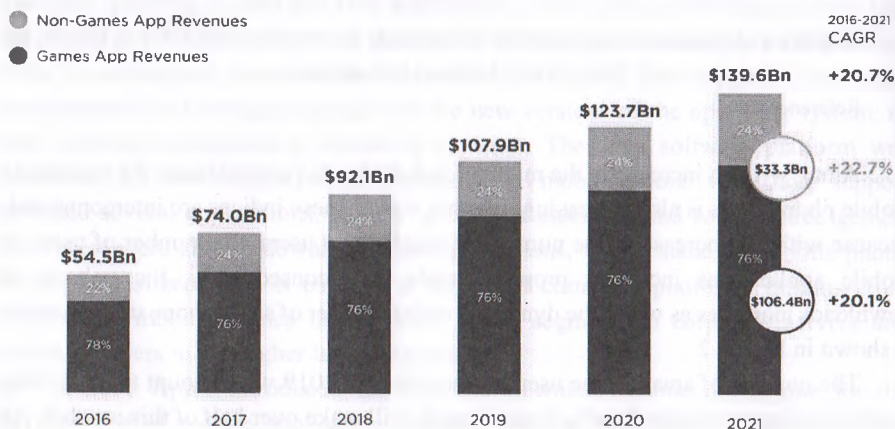
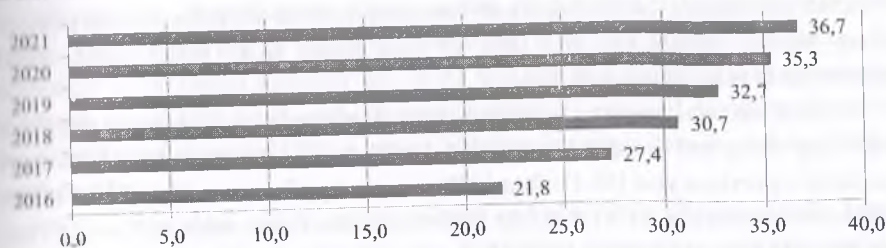


Figure 3. Revenues from mobile application downloads, billions USD

Reference: [7]

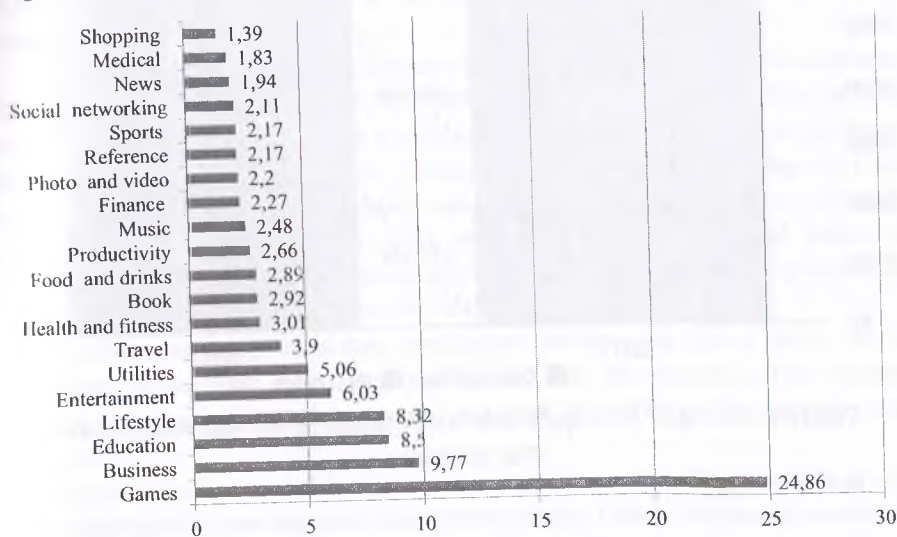


Based on projection data on the number of smartphone users and applications downloads' revenues, there were calculated average expenses for paid mobile applications per one user. The resulting dynamics is positive, since the expenses will grow annually by an average of 3 USD (Fig. 4). In 2018, average expenses amounted to 30,7 USD.



**Figure 4.** Expenses for paid mobile applications per one user, billions USD  
Reference: calculated by the author according to the data of [7]

The most popular applications' category on the Apple App Store was the Games with 24.86%. In 2018, Fortnite was the largest profitable gaming application that was gaining more than 1.9 million USD per day. The average price of a gaming application is about 48 cents, while the average application price is slightly more than one dollar. The second position is occupied by business applications with an indicator of 9.77% (Fig. 5).

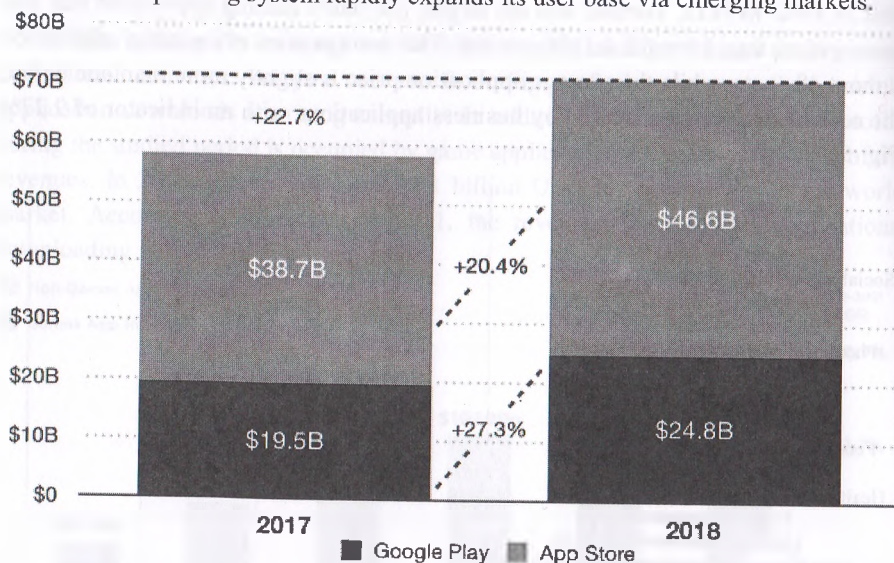


**Figure 5.** The most popular categories on the Apple App Store in September 2018  
Reference: [6]

Tourism applications are at the 7th place with a share of 3.9%. The main function of majority of tourism applications is to provide information of different levels of complexity. Online data update is a particularly valuable and useful peculiarity for today's tourists as it allows them to adjust travel plans to suit their personal needs and preferences.

eMarketer shows that mobile travel-based applications are at the seventh position among popular categories, and 60% of smartphone users prefer using travel applications to plan their leisure time.

In 2018, the total revenues from application downloading on the largest platforms of the App Store and Google Play was 71.3 billion USD, which is by 22.7% more compared to previous year (58.1 billion USD). Apple App Store users spent 46.6 billion USD in 2018, which is by 21.8 billion USD more than it was spent on Google Play. This formed an annual increase of 20.4% for the App Store and 27.3% for Google Play (Figure 6.). Google Play's set-ups increased by 13% compared to previous year and amounted to 75.7 billion downloads in 2018. The Global App Store installation comprised 29.6 billion downloads per year. Downloads' leadership is due to the fact that Android operating system rapidly expands its user base via emerging markets.



**Figure 6.** Revenues from application's downloads on the App Store and Google Play platforms

Reference: [4]

**Tourism-oriented mobile applications.** Among the main advantages of mobile applications in tourism are the following: ease-of-use and convenience, transaction

simplification, wide array, service and communications improvement, localization, real-time tracking, and social adjustment.

**Ease-of-use and convenience.** Mobile applications make the various travel stages faster and easier. By using booking applications, a tourist can get acquainted with the location, find reviews, check the prices, and book a room, in the comfort of his home.

**Transaction simplification.** Using mobile applications, transactions are made easier. Tourists' anxiety in places of recreation is largely affected by thefts. The advantage of the digital economy lies in the fact that now there are applications that allow you to travel in a non-cash way and facilitate all types of payments. Travelers can store several documents in one place, including bookings, emails, tickets, receipts, confirmations, etc.

**Wide array.** The growth in the number and popularity of applications breeds competition between them. Travelers can familiarize themselves with the available range of applications and choose the most suitable one.

**Service and communications improvement.** Specialized tourism industry programs provide integrated travel packages for different purposes and types of travel. Travel programs can be composed according to tourist requirements (route, time, budget and vehicles). Using travel history, customizations and feedbacks, these applications will be able to recommend and plan individual trips. Thus, one of the main reasons to use mobile applications is the integrity of booking for all trip's components and the ability to customize additional features in the application (for example, weather information, famous restaurants at the place of destination, the best places for shopping).

**Localization.** Traveling applications can offer localized choices. For example, Booking.com widely uses location information on mobile devices and offers its users useful accommodation offers with significant discounts. It simultaneously optimizes accommodation facility's efficiency. Using the API for automatical filling-in of user profiles, shopping history and location information provides a high level of mobile travel experience. Hotel Tonight exists only as a mobile version and works via geolocation, offering users a maximum discount if they are in the close proximity to the hotel. The application focuses on the last-minute mobile user.

**Real-time tracking.** Real-time applications become not just a norm, but an imperative of our time. Most applications, as Uber, for example, offer transport booking in online mode, because people can track the traffic of the necessary cars, buses, etc.

**Social adjustment.** Mobile applications contain users' feedback, which greatly affect making deliberate decisions about travel choices (hotels, restaurants, museums, amusement parks, etc.). More than 80% make their decision grounding on reviews and feedbacks. Travel companies that have positive recommendations in such a way have

































sales benefits based on social approval of their service quality.

The popularity of mobile travel applications according to the Travelport Digital survey is conditioned by the following aggregated data [8]:

- 58% use mobile applications to find flights;
- 53% use applications to find accommodation;
- 82% of travelers stated they would load the same number or even more route applications than last year;
- 35% like notifications about new products;
- 90% of tourism industry's specialists are going to invest in a mobile application next year;
- 60% of tourism brands periodically update their applications.

The number of downloads is a popularity indicator of mobile application. Sensor Tower's has allocated three groups of the most popular tourism applications in the world depending on the source of downloads: 1) Overall Downloads; 2) App Store; 3) Google Play. In two groups, namely Overall and Google Play, Uber occupies the first position by number of downloads (Figure 7). And Google Maps is the most downloaded application on the App Store. Top three includes Waze and Where is My Train in all subgroups.

Overall Downloads		App Store Downloads		Google Play Downloads	
1	 Uber	1	 Google Maps	1	 Uber
2	 Google Maps	2	 Uber	2	 Where is My Train
3	 Waze	3	 Waze	3	 Waze
4	 Where is My Train	4	 Booking	4	 Grab
5	 Zomato	5	 AutoNavi	5	 Google Earth
6	 Google Earth	6	 Airbnb	6	 IRCTC
7	 Grab	7	 DiDi	7	 GPS LSM
8	 Booking	8	 Lyft	8	 GPS by App Star
9	 IRCTC	9	 DiDa	9	 Booking
10	 Airbnb	10	 Google Earth	10	 99

**Figure 7.** Most popular mobile tourism applications in the world according to the number of downloads (2018)

Reference: [4]

Let's consider the main functional tendencies of the mentioned applications.

The Uber mobile application helps drivers and passengers. Uber allows you to order a car making a few presses at your phone and pay the trip with a banking card or cash. The algorithm of the trip order consists of filling-in the address, automatic

determination of the geolocation and car's choice, based on the opportunity to see the driver's photo, information about the car and monitor its movement on the map.

Google Maps is considered to be the best navigation program. The application offers directions for travel by car, by public transport, by foot, by taxi or by bicycle. You can download individual locations for offline use, or to use Maps to find out where the nearest museums or restaurants are, and whether there are vacant places in real-time mode.

Waze is a navigational application that reports on the traffic situation (crashes, traffic jams) and provides the opportunity to create an optimal travel variant. The main advantage of the application is the routing of daily travels. Among other features, Waze synchronizes contacts with Facebook, searches for low-cost fuel stations, and informs friends about the route and arrival time. Among the application's disadvantages it is necessary to highlight a focused specialization for drivers, since there are no hiking and public routes.

Airbnb is an online application for accommodation, search and short-term rental services worldwide. The website was created in 2008 in California, and since that time it has been progressing and improving. At Airbnb you can not only rent housing, but also earn by leasing an extra room or apartment, by registering in the system and complying with its rules.

Booking.com offers an online platform through which the travel services can advertise, provide marketing support, sell, promote and offer their products and services for ordering, purchasing and booking services [9] using the mobile application.

More than 1.5 million hotel facilities (hotels, apartments, motels, hostels, bed-and-breakfast hotels) from worldwide and of different price category are registered in the booking system. In addition to hotel booking, the system offers car rental, airline tickets, and restaurant reservations. Established in 1996 in Amsterdam, Booking.com has grown from a small Dutch startup to one of the largest travel companies in the world, employing more than 17,000 workers in 198 offices in 70 countries worldwide. The Booking.com mobile application is available in more than 40 languages, and offers 28,484,882 reservation options in 146,911 destinations in 229 countries and territories around the world. 1,550,000 nights are booked each day on the platform [9]. During 2017, 673.1 million rooms were booked in the system, which is an increase by 116.5 million bookings compared to the previous year (Table 1).

Grab is a Malaysian company providing taxi and logistics' services via application in Singapore and neighboring countries – Malaysia, Indonesia, Philippines, Vietnam, Thailand, Myanmar and Cambodia. In July 2017, the number of drivers registered in the Grab network was over 1 000 000, and the number of mobile devices, using this application, exceeded 45 millions in Southeast Asia [10].



**Table 1** Development indicators of Booking platform

Years	Number of room bookings, millions	Total growth, +/-	Revenues, billions USD	Total growth, +/-
2012	197.5	-	5.26	-
2013	270.5	73	6.79	1.53
2014	346	75.5	8.44	1.65
2015	432.3	86.3	9.22	0.78
2016	556.6	124.3	10.74	1.52
2017	673.1	116.5	12.68	1.94

Reference: calculated by the author according to the data of [9]

The Zomato application allows you to look through the menu of many restaurants. The program is currently popular in 24 countries, including Canada, the USA, Brazil, Chile, the United Kingdom, Portugal, India and others (Figure 8). The functionality of the application allows you to give feedback on restaurants and see other users' ratings, and make online orders and reservations.



**Figure 8.** Areal localization of Zomato application

Reference: [11]

Google Earth is a free application that displays the virtual Earth globe. Within the framework of this project, aerial and satellite photographs of large proportion of the Earth were uploaded to the Internet. For some regions, these photos are of very high quality.

IRCTC is one of the most downloaded applications, which offers electronic tickets' ordering and payment services, the main region of program's outspread is India. Where is my Train is an application that displays real-time trains' status and up-to-date timetables. The program can work offline, without Internet or GPS, and is also the most widespread in India.

DiDi is a Chinese taxi-hiring application that includes 21 million drivers and 450 million registered users, who are requesting 30 million trips overnight. DiDi costs 56 billion USD and is the second most expensive startup in the world after Uber with its 72 billion USD. AutoNavi is a navigation application that is very popular in China. Didi is a transport application specializing in automobiles, presented mainly at Chinese market.

Lyft is an application for finding cars within a given direction, the application works in about 300 US cities. As of June 2018, the company was estimated at 15.1 billion USD, and its total funding amounted to 5.1 billion USD. By the end of 2018, Lyft has held the top place with a market share of 28% in the United States [12].

99 is a transport application funded by DiDi, the Chinese transport company, which has allowed them to open more positions, as well as work with other competitors in the transport business, such as Uber and Cabify. Consequently, a large share of tourism-related applications is, of course, a transport system's programs.

## CONCLUSION

At the present time mobile applications' global usage is based on the production of affordable smartphones, increase in the number of smartphone users in the world and increase in mobile traffic. Each application has a certain functional orientation and is loaded by users depending on their professional activities (business applications), lifestyle and vacation time (tourism applications), or hobbies (game applications). The mobile application market is extremely diverse and interactive and provides specific information in a format that is easy to display on mobile devices.

The evolution of mobile applications from the ordinary WAP browser to the App Store and Google Play platforms has transformed them into a powerful business environment. This statement is based on the level of mobile software downloads: in 2017, 178.1 billion mobile applications were downloaded. According to forecasts by 2022, this figure will increase to 258.2 billion downloads. Income from mobile application downloads grows annually. In this case, the dominant share of profits during the studied period is occupied by game applications. Based on forecast data on the number of smartphone users and application download revenues, the average user's expenses for paid mobile applications were calculated. The resulting dynamics is positive, since the expenses will grow annually by an average of 3 USD. In 2018, average expenses were 30.7 USD. Among the main advantages of mobile applications in tourism are the following: ease-of-use and convenience, transaction simplification, wide array, service and communications improvement, localization, real-time tracking, and social adjustment. The popularity of tourism mobile applications among tourists is determined by the speed and accessibility of air and rail tickets' search, finding of accommodation facilities and catering enterprises. And for tourism enterprises, mobile

applications are a channel for the promotion and sale of their services.

There were determined three groups of the most popular tourism applications in the world depending on the source of downloads: 1) Overall Downloads; 2) App Store; 3) Google Play. In two groups, namely Overall and Google Play, Uber took the first place in terms of downloads. On the App Store the most downloaded application appeared to be the Google Maps. Three leaders in all subgroups include Waze and Where is My Train. Thus, the most popular tourism applications in the world (according to functional purpose and number of downloads) are related to car search, booking of hotels and tickets, food search and navigation systems.

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## **CONCEPTUAL BASES OF MANAGEMENT OF THE NATIONAL ECONOMY DEVELOPMENT**

**Introduction.** The functioning of the national economy takes place under difficult conditions of a dynamic and changing environment, the impact of which greatly complicates the process of managing the development of the national economy as a socio-economic system. This can be explained by the fact that the basic problems of socio-economic systems of different levels are due not only to the limited possibilities of accelerating development, but also to the greater degree of underdevelopment of the conceptual foundations of development management. Modern tendencies in Ukraine to promote strategic management at all levels of management and application of proven practices of its implementation create a general environment for public interest in models of such management, its content. Therefore, it is necessary to form the concept of management of the development of the national economy as a complex socio-economic system, which would allow for purposeful and effective management of its development.

Management is an important stage in balancing the processes taking place in the national economy, creating the basis for its development, which is consistent with the fundamental principles of governance that is scientifically advisable, feasible, sufficient and timely.

The research on the management of the national economy development was studied in the writings of many scholars, in particular: the works of such foreign and domestic scholars as M. Alle, D. Bell, B. Vellman, D. Domar, P. Druker, K. Klark, R. Krouford, S. Kuzniets, A. Liuis, U. Dzh. Martin, F. Perru, T. Stiuart, M. Fridman, R. Kharrod, E. Khansen, Kh. Cheneri, Y. Shumpeter, O. Amosha, M. Afanasiev, V. Balabanova, H. Bashnianyn, V. Bodrov, V. Rohozhyn, V. Rudyka, O. Bieliaiev, I. Bohatyrov, V. Bazylevych, V. Zbarskyi, M. Kriuchkova, O. Mnykh, V. Ievdokymenko, D. Ziuz, B. Kuchyn, V. Bilotserkivets, L. Hryniv, M. Kichurchak, B. Danylyshyn, V. Chyzhova, S. Maistro, R. Maistro, I. Strelets, L. Shynkaruk, I. Kriuchkova ta in. [1-23].

However, despite strong research, the question remains about the formation of a concept for the development of the national economy, which would ensure that changes in the parameters of the national economy in the direction of the transition to a new stage of development.