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### ANALYSIS OF THE DIGITAL SERVICES DEVELOPMENT INDICATORS IN THE REGION (THE CASE OF THE CITY OF BELGOROD)

**Abstract.** *The penetration of digital technologies into all aspects of everyday life is becoming an increasingly important factor in the socio-economic development of countries and regions. Modern information technologies affect the modern economy and form a new type of economy - the digital economy, the main elements of which are digital ecosystems. Analysis of Russian and foreign practice, as well as theoretical research shows that serviceization and digital transformation of socio-economic systems are carried out on the basis of digital platforms that integrate economic, social and technological processes that form digital service ecosystems. The development of urban services in the city of Belgorod is facilitated by the implementation of the concept of creating a "Smart City". A comparative assessment of the development of the city service system allows us to conclude that Belgorod region is in the lead in most of the studied areas, with the final indicators in areas higher than in the Central Federal District and the Russian Federation. But in comparison with large cities, Belgorod is inferior in many important areas, due to the size of the budget for information and communication technologies. To identify preferences in using digital services, a survey was conducted among residents of Belgorod. Most residents of Belgorod are ready to completely switch to using digital platforms to solve everyday problems.*

**Keywords:** *information and communication technologies, urban service, digital technologies*

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**АНАЛИЗ ПОКАЗАТЕЛЕЙ РАЗВИТИЯ ЦИФРОВЫХ СЕРВИСОВ В РЕГИОНЕ  
(НА ПРИМЕРЕ г. БЕЛГОРОД)**

*Проникновение цифровых технологий во все аспекты повседневной жизни становится все более важным фактором социально-экономического развития стран и регионов. Современные информационные технологии влияют на современную экономику и формируют новый тип экономики – цифровую экономику, основными элементами которой являются цифровые экосистемы. Анализ российской и зарубежной практики, а также теоретических исследований показывает, что сервисизация и цифровая трансформация социально-экономических систем осуществляются на основе цифровых платформ, интегрирующих хозяйственные, социальные и технологические процессы, формирующих цифровые сервисные экосистемы. Развитию городских сервисов в г. Белгород способствует реализация концепции создания «Умного города». Сравнительная оценка развития системы городского сервиса позволяет сделать вывод, что Белгородская область лидирует в большинстве исследуемых направлений, имея итоговые показатели по направлениям выше, чем в ЦФО и РФ. Но в сравнении с крупными городами г. Белгород уступает по многим важным направлениям, что обусловлено размером бюджета на ИКТ. Для выявления предпочтений в пользовании цифровыми сервисами был проведен опрос среди жителей г. Белгород. Большинство жителей Белгорода готовы полностью перейти на использование цифровых платформ для решения повседневных задач.*

**Ключевые слова:** информационные и коммуникационные технологии, городской сервис, цифровые технологии

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**Introduction.** The analysis of Russian and foreign practice, as well as theoretical studies, shows that the servicezation and digital transformation of socio-economic systems are carried out on the basis of digital platforms that integrate economic, social and technological processes, forming digital service ecosystems [1, 2, 3]. The number of electronic services is becoming more and more every year. The work of the city economy is controlled with the help of such services as "Active Citizen", "Our City" and others [4, 5]. But technologies are changing, and it is necessary to reach a new level of development of electronic services, services, and the information city. Therefore, there is a need for a comprehensive approach to the introduction of information technologies in the system of urban service, which would cover all aspects of life [6]. According to the results of 2019, the market volume of solutions for smart cities in Russia exceeded 81 billion rubles, more than 2.5 thousand solutions in the field of smart cities were implemented [7]. The Ministry of Construction plans to introduce digital technologies in eight areas: management, housing and utilities, public transport, urban environment, public and environmental safety systems, communication network infrastructure, tourism and service [8, 9].

**The purpose of the study is** to study and analyze the development of urban digital services in a regional context using the example of Belgorod.

**Materials and research methods.** As a source material, we used statistical data characterizing the development of digital technologies, analytical reports of studies of the digital technologies market in the Russian Federation and the world. Theoretical and comparative analysis was used as a research methodology.

To compile an assessment of the development of the urban service system, was used the method of correlation analysis. The group of criteria for each area (e-business, e-education, e-culture, use of information and communication

technologies by households and the population) in total was maximally equal to 1, thereby for each criterion, depending on their number in the set, the correlation coefficient was calculated. Statistical data, taking into account the correlation coefficient, were summarized for each direction. Also, a questionnaire survey and semantic interpretation of the data were carried out. The target group of the study were residents of the city of Belgorod (50 people) and guests of the city who came with tourist purposes (20 people). The structure of the study includes the following aspects: social portrait (gender, age, education) of residents and guests of the city of Belgorod at the time of study; use of digital services; advantages and disadvantages of digital service.

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**Research results and their discussion.** The development of the city information service system implies the widespread introduction of digital technologies and the readiness of the population to use them. In this regard, we will analyze the development of digital services in the region using the example of the city of Belgorod.

In 2019, in Belgorod region, the Digital Development Department introduced innovative solutions in the following areas: regional information processing center; public transport; electronic prescription; "House.Control"; IT-education; regional portal People's Expertise; digitalization of state and municipal services; development of regional infrastructure of e-government; infrastructure for mobile communications and broadband Internet access, etc<sup>1</sup>.

<sup>1</sup> Department of Digital Development of the Belgorod Region. URL: <https://belregion.ru/author/?ID=2148> (Accessed on March 18, 2021).

In 2019, Belgorod Region became the first region for the introduction of electronic prescriptions into the healthcare system. The application allows receiving a referral from a doctor in digital format, track all appointments for the period of treatment, compare the cost of a medicine in different pharmacies. The service is free, all medical institutions in the region and 190 pharmacies are connected to it. Also in 2019, Belgorod residents have the opportunity to pay for transport services by credit card. In Belgorod and Stary Oskol an application for interaction between residents and management companies "House.Control" has appeared: 90 management companies have already registered in it. The service will help residents to solve online almost all emerging issues and problems.

In 2019, in order to compile a rating taking into account supply and demand indicators in the main areas of everyday urban life (transport, healthcare, finance, administration, education, media), the criteria were analyzed and a rating of Russian cities was compiled. The third position in the ranking is taken by Belgorod - like Krasnodar and Yekaterinburg, it overtakes Moscow and St. Petersburg<sup>2</sup>.

Belgorod is a regional center, has shown an example of a balanced supply and demand, which is developed in public services, healthcare and trade<sup>3</sup>. Supply and demand are developed in administration, health care and trade and also a high supply in education, demand is greatly inferior in finance (fig. 1).

Note that a limited set of criteria was used to compile a rating for the development of digital life. For example, the transport proposal was assessed by the availability of Yandex.Transport or an analogue and the presence of electronic timetables at stops. The demand for transport services by search queries "timetable for transport,

timetable for bus, route bus / trolleybus / tram / route taxi / minibus, Yandex transport, Smart transport" and derivatives - Wordstat Yandex, number of requests for 28.07.2018 – 27.08.2018. Wordstat Yandex makes it possible to analyze a two-year period of requests, which is why the choice of a period limited to one month is not clear<sup>4</sup>. It should also be borne in mind that Yandex is used by about 50-55% of the population of the Russian Federation, respectively, the final figures must be adjusted taking into account this circumstance.

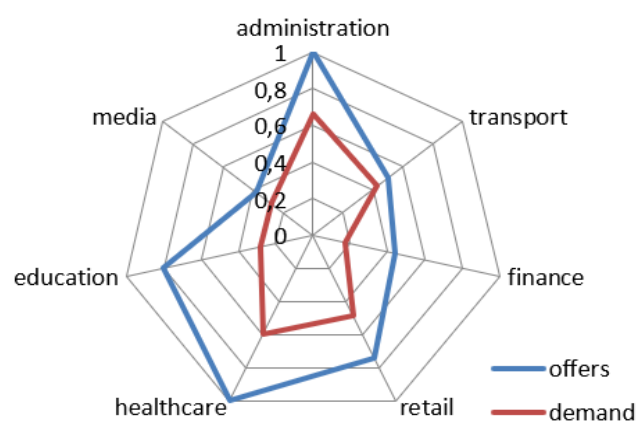


Fig. 1 – The ratio of supply and demand of digital services in the city of Belgorod

In our opinion, in connection with the development of digitalization and the growing role of ICT in the life of society, it is necessary to analyze the expenses of the regions in this area. The ranking of ICT (information and communication technologies) expenditures in Russian regions is based on data published in official sources on regional IT budgets for 2020-2022 as of 03/20/2020 [10, 11].

Moscow (82.5 billion rubles), St. Petersburg (19.3 billion rubles) and the Moscow region (10 billion rubles) are in first place in terms of IT spending. In 2020, the Krasnodar Territory moved up to 4th place from 16th in 2019. It displaced the Perm Territory to the 5th place (4.4 billion rubles). These 5 constituent entities of the Russian

<sup>2</sup> Rating of cities by the quality of electronic government services 2019. URL: <https://nonews.co/directory/lists/cities/city-services-rating> (Accessed on March 12, 2021)

<sup>3</sup> Public services in 2019: the main events and facts. URL: [https://www.gosuslugi.ru/help/news/2019\\_12\\_30\\_results\\_of\\_the\\_year](https://www.gosuslugi.ru/help/news/2019_12_30_results_of_the_year) (Accessed on March 11, 2021)

<sup>4</sup> Indicators of the digital economy 2019: statistical collection. URL: <https://www.hse.ru/data/2019/06/25/1490054019/ice2019.pdf> (Accessed on March 09, 2020)

Federation account for 121.5 billion rubles. or 57.2% of all regional ICT spending.

Note that in many Russian regions, specialized divisions have appeared that are responsible

not only for informatization and communications, but for the digitalization of government bodies. The Department of Digital Development of the Belgorod Region was formed in 2018 [12].

*Table 1 – Total ICT expenditures of Russian regions<sup>5</sup>*

Region	ICT expenses, million rubles		ICT budget expenditures %	Dynamics of ICT ex- penses	Population million peo- ple	Total ICT spend- ing per capita in 2020
	2020	2019				
Moscow	82 468	74 300,60	2,62%	11,00%	12,4	6 650,60
St. Petersburg	19 277	14 877,20	11,59%	29,60%	5,3	3 637,20
Moscow region	9 988,30	9 096,10	1,48%	9,80%	7,4	1 349,80
Krasnodar region	5 360,70	1 555,40	1,83%	244,70%	5,6	957,3
Perm region	4 410,80	3 620,90	2,70%	21,80%	2,6	1 696,50
Belgorod region	1 408,90	857,1	1,36%	64,40%	1,6	880,6

*Table 2 – Criteria for the development of the information society in Russia [16]*

Group	Indicator
1. Factors in the development of the information society	
Human capital	The level of education and professional training of the population
Innovation potential	Resource base of research and development work and innovation activities. Effectiveness of research and development and innovation activities
ICT infrastructure and access	Personal computers and Internet access Affordability of ICT services
Economic environment	Availability of financial resources
Information industry	Characteristics of ICT workers
Information Security	Use of information security tools
2. Using information and communication technologies (ICT) for development	
Electronic government	The use of ICT in the activities of public authorities and compulsory medical insurance
Electronic business	Integration of information systems (IS) and sharing of information within the organization Internet using E-commerce
Electronic education	The use of ICT in the educational process and management of an educational institution Readiness of educational institutions for ICT-based development
E-health	Readiness of healthcare institutions for ICT-based development Use of ICTs in healthcare institutions
Electronic culture	Information resources and services of cultural institutions
Use of ICTs by households and the population	Internet Usage

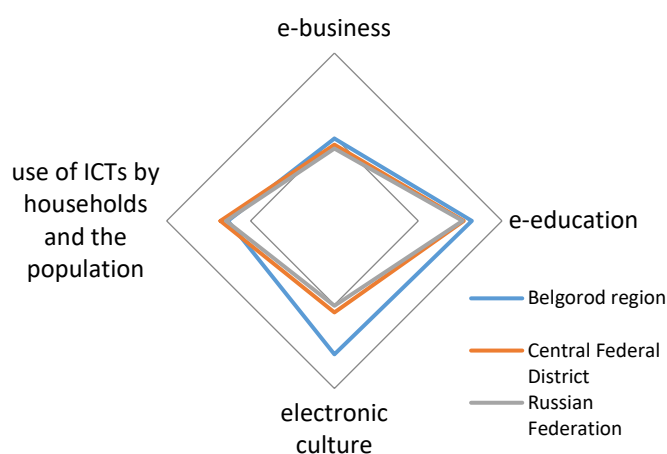
The range of spheres and industries that the regions have chosen as priorities for the introduction of digital technologies is quite wide [13, 14].

For most of the regions, the priority spheres and industries are: health care (75% of regions); urban environment (75% of regions); personnel and

<sup>5</sup> Russian regions plan to increase IT spending by a third. URL: [https://www.cnews.ru/articles/2020-05-22\\_regiony\\_planirovali\\_uvelichit\\_itrashody](https://www.cnews.ru/articles/2020-05-22_regiony_planirovali_uvelichit_itrashody) (Accessed on March 28, 2021)

education (66% of regions); transport and communications, including wireless communications and digital mobility (61% of regions); Housing and communal services and energy (56% of regions) [15].

To analyze and identify criteria by which one could objectively judge the level of digitalization in various fields of activity, it is necessary to monitor statistical material. We analyzed a set of indicators reflecting the development of ICT, and identified a group of criteria that most fully demonstrate the development of the urban service system.



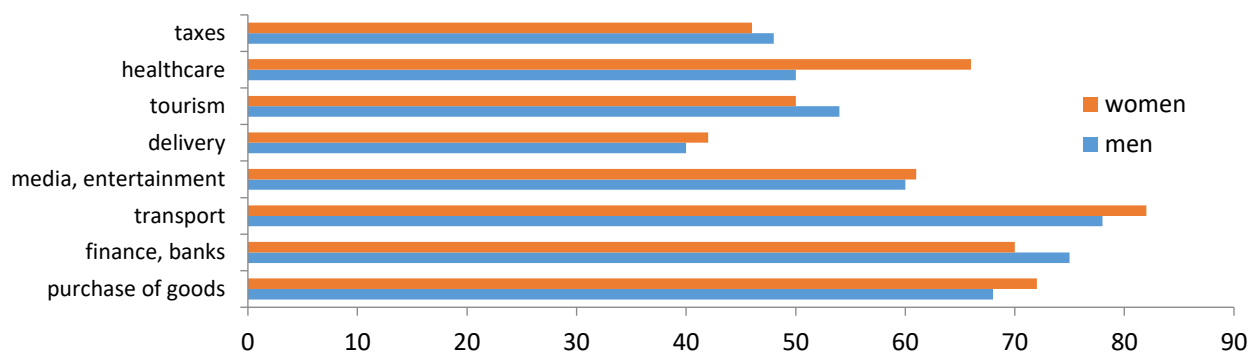
*Fig. 2. – Comparative assessment of the development of the urban service system based on statistical data*

The set of criteria for the development of the information society in Russia, discussed above, we took as a basis for evaluating the

development of the urban service system. We evaluated the development of the city service system based on statistical data in four areas: e-business, e-education, e-culture and the use of ICT by the population. There are no statistical data on other groups of criteria in the regional context. A comparative assessment of the development of the city service system allows us to conclude that the Belgorod region is leading in most of the studied areas, with the final indicators in the areas higher than in the Central Federal District and the Russian Federation.

When compared with Moscow, Belgorod is inferior in many important areas, but the budget for ICT is an important factor. Thus, ICT expenditures in Moscow for 2020 are planned in the amount of 82,468 million rubles (2019-74,300 million rubles), in Belgorod – 1,408.9 million rubles<sup>6</sup>. At the same time, in comparison with 2019, the budget expenditures for ICT in Belgorod increased by 1.64 times (in 2019, the budget for ICT was 857.1 million rubles). But we note that the total expenses per 1 resident in Moscow are equal to 6,650.60 rubles, in Belgorod-880.6 rubles. Such a difference in the ICT budget is reflected in the weak development of urban digital services [17].

To identify preferences in the use of digital services, we conducted a survey among residents of Belgorod. Residents of Belgorod identified the most important areas of application of digital services: transport (80%), financial (72.5%), online shopping (70%), media and entertainment (60.5%) (fig. 3).



*Fig. 3. – Use of digital services, as a percentage*

<sup>6</sup> Russian regions plan to increase IT spending by a third. URL: [https://www.cnews.ru/articles/2020-05-22\\_regiony\\_planirovali\\_uzvelichit\\_itrashody](https://www.cnews.ru/articles/2020-05-22_regiony_planirovali_uzvelichit_itrashody) (Accessed on March 28, 2021)



According to the survey, residents of Belgorod see money savings in using digital services (73%), but they value convenience more (79%) and time savings (72%). 53% of respondents are ready to completely switch to digital services for solving everyday tasks. 7% of citizens already work or earn extra money using digital platforms, 52% are considering such an opportunity

(fig. 4).

The disadvantages of digital platforms were most often identified by citizens as the lack of a guarantee of personal data security (58%), quality control of service provision (51%), instability of work (47%), as well as an inconvenient interface (40.5%). Paid delivery, lack of prompt feedback, and advertising are also negative (fig. 5).

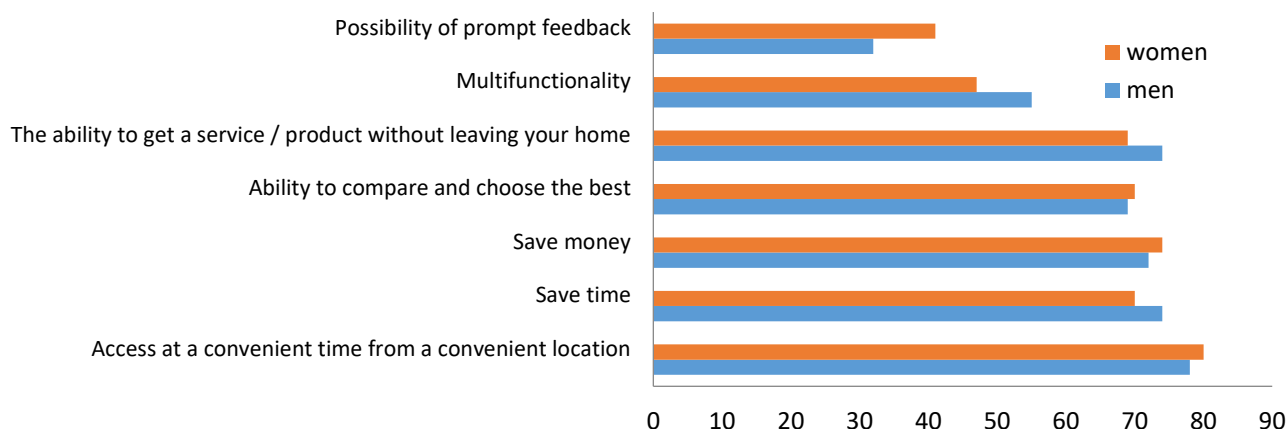


Fig. 4. – Advantages of digital services, in percent

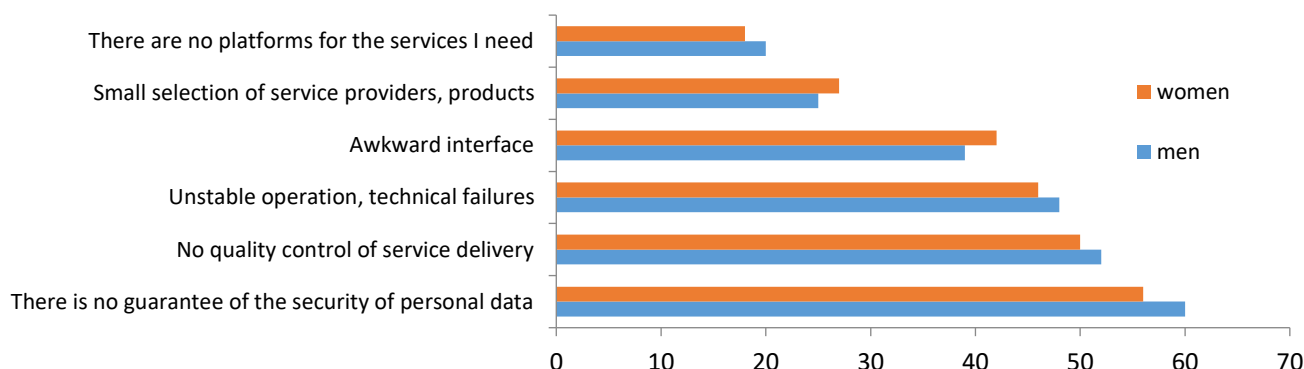


Fig. 5. – Disadvantages of digital services, as a percentage

Readiness to use digital platforms 53% of residents of Belgorod are ready to completely switch to the use of digital platforms for solving everyday tasks, among them 32.5% already use or are going to use digital platforms for part-time work. 42% are not ready to completely switch to digital solutions of everyday tasks, 38% of residents of Belgorod consider the possibility of using digital platforms as a tool for the implementation of their professional activities.

**Conclusion.** The development of the digital environment is a time requirement and an

important indicator of urban comfort. In modern conditions, there is a gradual revision of approaches to the management of urban development, which is increasingly based on advanced technological solutions, digitalization and platformization. There is a need to move towards an integrated digital urban ecosystem that responds to emerging challenges, meets the needs of all stakeholders, and ensures more effective integration of individual elements of urban infrastructure.

In our opinion, the development of digital services is promoted by: the penetration of the

Internet and mobile technologies; digitalization; the convenience of the business model; the growth of private entrepreneurship, the interest of the authorities.

The key barriers to the development of digital services are: imperfect (unclear or absent) legislation; unwillingness of partners to adapt busi-

ness processes for successful integration with the platform; the need for large financial investments to create and maintain a successful digital platform.

To create information city services, it is necessary to use an integrated approach to the implementation of information technologies for city management.

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