PAPER • OPEN ACCESS

Tools for assessing the level of development of digital technologies in Russia (on the example of the Far East)

Tools for assessing the level of development of digital technologies in Russia (on the example of the Far East)

Nikolay Egorov [1*], **Grigoriy Kovrov** [1], **Irina Nikolaeva** [1] **and Svetlana Pavlova** [1]

[1] North-Eastern Federal University named after M. K. Ammosov, 42, Kulakovskogo str., Yakutsk, 677007, Russia

* E-mail address: ene01@yandex.ru

Abstract. The article presents tools for assessing the potential of the sphere of info communications in the constituent regions of the Far East of Russia. The indicators characterizing the level of development of digital technologies in the constituent regions of Russia are defined. Recommendations for increasing the level of digital transformation of basic sectors of the economy and social sphere are proposed. The study identified indicators characterizing the level of development of digital technologies in the regions of RussiaNumerical calculations of the integral index of the main indicators of the development potential of the digital economy of the FEFD constituent regions are carried out. Built histogram of rating of constituent regions of the Far Eastern Federal district on the composite index and individual indicators. The authors note that a comparison of research results with data from the National Research University, Higher School of Economics shows comparable values for the positions occupied by the regions of the FEFD in terms of the main indicators of the development of the digital economy. This assessment tool adequately reflects the real state of digital technologies development in the FEFD constituent regions and can be used for analysis and evaluation in other regions of the country. Recommendations for increasing the level of digital transformation of the basic sectors of the economy and social sphere are proposed. In the future, the proposed method of evaluation can be replicated to assess the level of readiness of any subject of the Federation to the transition to a new path of economic development.

1. Introduction

At the present moment, the basic documents dictating the objectives, tasks, directions and time frames to implement the measures of the State strategy to create the required conditions for developing digital economy in Russia are the following: The Strategy to Develop the Information Society in the Russian Federation for the Period 2017–2030, the program "Digital Economy of the Russian Federation" [1, 2], and, for the Republic of Sakha (Yakutia) – the State program "Development of the Information Society for the period 2018–2022" [3].

Due to the fact that efficient development of markets and industry branches (spheres of activity) in the digital economy is only possible if there are well-developed platforms, technologies, institutional and infrastructural environments, as well as studying the preparedness of constituent regions of the Federation to transfer to the digital economy on the basis of assessing their potentials.

According to the data from a research "Digital Evolution Index 2017" (https://sites.tufts.edu/digitalplanet/dei17) carried out by the company Mastercard in cooperation with

the Fletcher's School of Law and Diplomacy at Tufts University, Russia has good perspectives to go up in the rating list of digital economy development. Experts say that, despite the relatively low general level of digitalization, Russia is showing stable growth rate and in the height of digital development, which attracts investors. As yet, in the rating of world's digital economies, Russia is No. 39, neighboring China, India, Malay and Philippines. At the moment, the "digital" leading countries are Norway, Sweden and Switzerland. The USA, the UK, Denmark, Finland, Singapore, the South Korea and Hong-Kong are in the top-10 list [4].

The results of a research carried out by Russian scientists regarding the digital map of the world were presented by Yershova T.V., the director of the "National Center of Digital Economy" of the MSU named after M.V. Lomonosov (http://www.niips.ru). The analysis showed that, currently, the leaders of digitalization are Singapore and Switzerland followed by the USA and Sweden. In Russia, the situation with cyber security is the best (No.10 in the world rating), whereas, regarding other indexes, our country is not above no. 26. Such significant lagging of the RF in developing the digital economy behind the world leaders can be attributed to shortage or the normative basis for digital economy and not a sufficiently favorable environment for doing business and introducing innovation and, therefore, a low level of using digital technologies by business structures, as compared with state structures and the general population [5].

The issues related to the possibilities and risks of digital redirecting of the Russian economy, the domestic and world experience of using digital technologies for solving social-economic problems have been widely discussed lately at various scientific-practical events at different levels (for example, at the conferences "Modern Economy: the Concept and Models of Innovative Development" on the topic: "Challenges of the Digital Economy: Russia on the Background of World Trends", 2018, Moscow; "Innovative Clusters in the Digital Economy: Theory and Practice" (INPROM-2017), Saint-Petersburg). It should be noted that the Polytechnic university of Saint-Petersburg named after Peter the Great has a successfully functioning R&D laboratory "Digital Economy in Industry" (headed by Dr. of Economics professor A.V. Babkin) that carries out fundamental and applied research projects related to digital economy development and organizes yearly topical events to discuss this problem [6].

The methodological basis for the research was the works by foreign [7] and Russian economists, such as S. Glaziev [8], K. Schwab [9], R. Urnyshev [10] and E. Mitrofanova [11]. The issues related to development of digital economy in Russia are discussed in the works by Yu. Khokhlov [12], V. Ivanov [13], A. Sadynbeckova [14], Yu. Gnezdov [15], L. Kapranova [16]. M. Izmaylova [17] and other scholars.

Digital technologies are becoming an integral part of the economic, political and cultural life of the society as a whole. During the progressive stage of development of the modern civilization that is characterized by the dominance of knowledge, science, technologies and information in every sphere of life, it is necessary to form the theoretical –methodological basis for analyzing and assessing the level of development of digital technologies in the Russian Federation, which conditions the importance of the research. The purpose of the research is developing the methodological basis for assessing the level of preparedness of a particular constituent region of the Federation for the digital economy with consideration of regional features. For this purpose, the following main tasks have been solved: we defined the indexes characterizing the level of development of digital technologies in constituent regions of Russia; we carried out numeric calculations and analyzed their results.

2. Methods of research

Basing on the analysis of the available methodological approaches to assessing the level of development of digital technologies, the authors offer an adaptation of their own methods for assessing the level of innovative development of economy participants [18]. In accordance with these methods of research, the analysis and assessment of the level of digital technologies development in Russian regions is based on the selected system of statistical indexes (table 1).

Table 1. A system of indexes characterizing the level of digital technologies development in constituent regions of Russia.

No.	Index name
1.	Amount of communication services per person, per person, rubles.
2.	Number of connected mobile cell phone subscriber devices per 1000 people, pcs.
3.	Number of active subscribers of stationary and mobile broadband Internet providers, per 100 people.
4.	Usage of the Internet in organizations (percentage of the total number of polled organizations), %
5.	Costs of information and communication technologies, million rubles.
6.	Usage of the Internet by the general population (percentage of the total number of population aged 15–72 in the corresponding constituent region of the RF), %
7.	Specific weight of households with access to the broadband internet as compared to the total number of households, %
8.	Specific weight of the population using the Internet for ordering goods and services, as compared to the total number of people aged 15–72, %
9.	Specific weight of the population using the Internet for receiving State and municipal services in the electronic form, as compared to the total number of people aged 15–72 who have received such services during the last 12 months, %

Basing on the statistical data for each index, normalization is performed, from 0 to 1, by the method of linear scaling. According to the results of comparative assessment, the constituent regions of the Federation are rated. Their advantages and drawbacks are estimated as to the level of the above-mentioned potentials by particular spheres to form the basis for the corresponding scientifically substantiated recommendations for development of digital economy of the region. The methods offered by the authors for assessing the level of digital technologies development were tested on the example of the Far East federal district of the Russian Federation (FEFD) that includes nine constituent regions of the district.

3. The results
According to the results of the analysis of the basic indexes of digital economy development in the constituent regions of the Russian Federation, FEFD is in the top-10 list of the best macro-regions [19]. For example, in regard of the specific weight of subscribers per 100 people using the broadband access to the Internet using mobile phones, the district is No.1 among 9 other federal districts.

In accordance with the selected system of indexes and basing on the statistical data from Rosstat [20] calculations were carried out for the integral index of constituent regions of FEFD, which were the basis for the hystogram of the rating of levels of digital technologies development of regions of the Far East (figure 1).
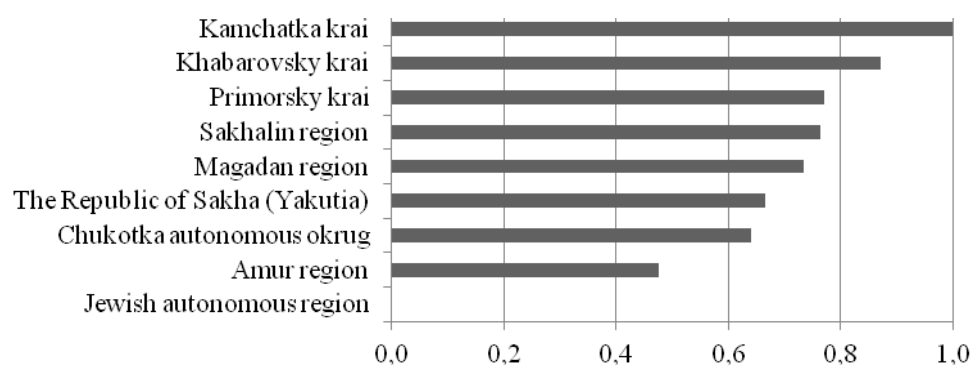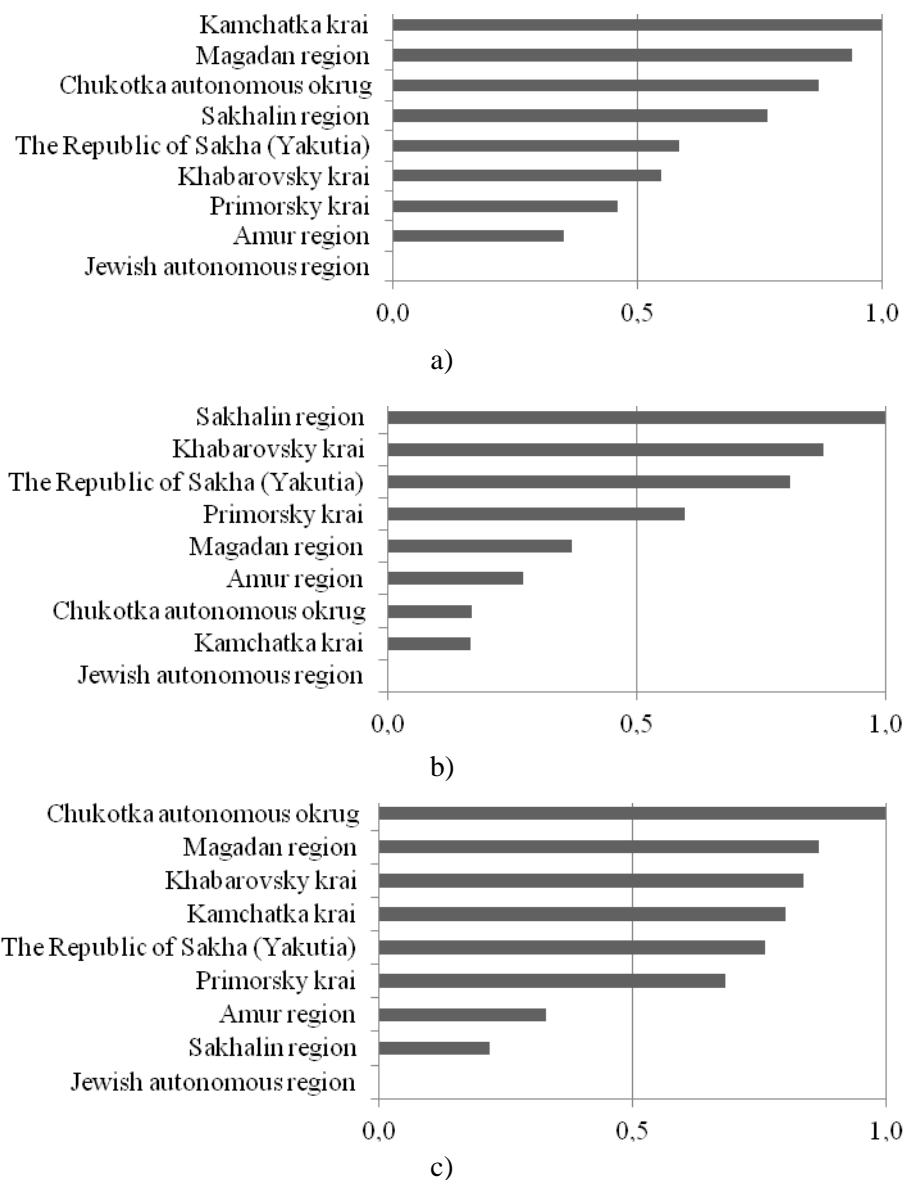
Figure 1. A rating of constituent regions of DVFO by the level of development of digital technologies for 2016.

Analysis of the results of rating shows that the leaders in the level of digital technologies development in constituent regions of FEFD are: Kamchatka region, Khabarovsk region and Primorsky region. The results of assessment by separate indexes characterizing the state of the potential of digital development of constituent regions of FEFD are presented in figure 2.
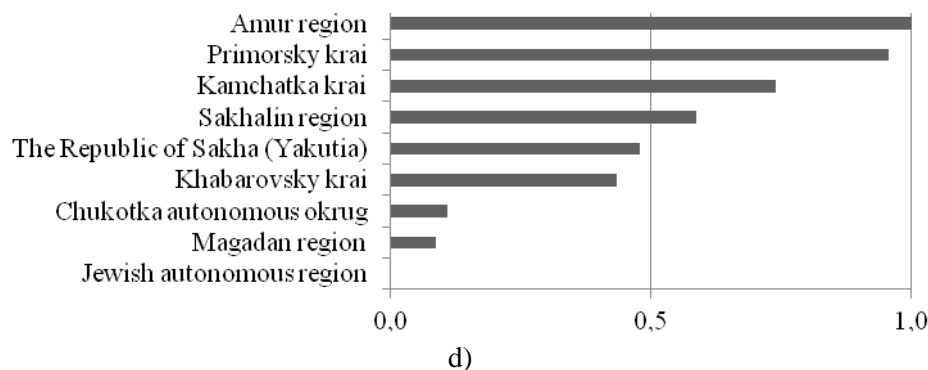

a)

b)

c)

Figure 2. A rating of constituent regions of DVFO for 2016 on the following indicators:

a — the volume of the communication services provided to the population, per one person; b — costs of information and communication technologies; c — use of the Internet by the population (percentage of the total number of the population at the age of 15–72 years of an appropriate subject of the Russian Federation; d — specific weight of the population using the Internet for receiving the state and municipal services in an electronic form, in population at the age of 15–72 years, receiving the state and municipal services for the last 12 months.

According to the results of the research in the regions of the Far East by the index "Amount of communication services provided to the population, per person", the leaders are: Kamchatka region, Magadan district and Chukotka autonomous region. High costs of information and communication technologies are in Sakhalin region, Khabarovsk region and in the Republic of Sakha (Yakutia). In regard of using the Internet by the population, the leaders are Chukotka autonomous region, Magadan district and Khabarovsk region. In regard of the specific weight of the population who use the Internet to receive State and municipal services in the electronic form, Amur region is number 1, Primorsky region is number 2 and Kamchatka region is number 3.

4. Conclusions
During the research, we selected some indexes characterizing the level of digital technologies development in constituent regions of Russia. We carried out numerical calculations of the integral index from the basic indexes of the potential for development of the digital economy of constituent regions of FEFD. We compiled distribution histograms (rating) of constituent regions of FEFD by the integral index, as well as by separate indexes.

It should be noted that comparing the research results with the data from the National Research University. Higher School of Economics showed similar rating numbers of the FEFD constituent regions by the basic indexes of digital economy development [19].

Therefore, the assessment tools used by the authors adequately reflect the actual situation regarding the level of digital technologies development in constituent regions of FEFD and can be used for the analysis and assessment in other regions of the country. The methods used by the authors can be a useful complement to the available scientific-methodological approaches to solving the problems and tasks to assess the level of development of the digital economy.

5. Directions of the further research
In the future, the assessment methods proposed by the authors can be spread to assess the level of preparedness of any constituent region of the Federation to transit to a new path of economy development. Another direction of research can be estimating regional features of digitalization that can help facilitate efficient distribution in specialization of professional schools, which will improve the redundancy situation.

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