

Issues of statistical evaluation and statistical forecasting of the digital economy development directions in Russia

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Abstract — The article is devoted to the specifics of the counting statistics for individual clusters related to the digital economy in Russia; peculiarities in the definition of digital social and digital economy, the Russian transition to a professional standard in the field of labor and its integration into the country's transition to a digital economy. Some aspects of the demand for areas of training in the cluster of digital economy, the difficulties of state statistics in determining the groups of counting objects and specialists in the digital economy, taking into account the dynamics of the digital economy and its social vector are considered. A comparative analysis of production indices by categories 'production of computers, electronic and optical products', 'activities in the field of information and communication'; the comparison of wage indicators in the economic sphere 'activities in the field of information and communication' and 'production of computers, electronic and optical products' for the period 2018 - 2019 is given. (*Abstract*)

Keywords — *digital economy, information society, professional standard, statistics (key words)*

I. INTRODUCTION

Production in the Russian Federation today is not only the extraction of raw materials and its primary processing. Russian specialists are becoming more confident in mastering the sphere of high-tech industries and high-tech services in the fields of communications and information technology. The classical model of market economy will never be able to set the direction for high-tech industries (development and creation of space ships, high-precision equipment, advanced software, etc.), direction of development of high technologies, including information and communication technologies, can ask the state in accordance with its strategic goals and development objectives; moreover, modern precision and sophisticated engineering technical production consider an environmental component. Compliance with modern environmental standards, as a rule, makes the production process more expensive, respectively, it increases the cost of goods and services. But the requirements for environmental and technical safety of goods and services are established by the state, controlled by the instruments of state coercion for their execution. Given all this, we can state that in the cluster of high-precision industries, including information and communication technologies, today there is fierce competition

not so much between companies (private corporations), but between countries and their governments, within the framework of intergovernmental agreements and requirements for modern goods and services for their technical and environmental safety. This, in turn, requires the training of highly qualified specialists with deep and high-quality knowledge in the field of digital technologies, software, information security, integrated into the modern information and communication environment.

All kinds of programs for the digitalization of the economies of Europe, Asia, the Middle East, the Asia-Pacific region, the American States (Brazil, Argentina, Venezuela, the United States, etc.) – act as a state task for enterprises in the field of information technology and communications, including for commercial companies.

In Russia, the government targeted development programme: the President of the Russian Federation from 09.05.2017 year № 203 'On the Strategy of information society development in the Russian Federation to 2017 - 2030' established the framework requirements of the mechanisms of development of information society in Russia [5], the Decree of the President of Russia from 07.05.2018 G. No. 204 'on national goals and strategic objectives of the development of the Russian Federation for the period up to 2024' indicates the introduction of digital technologies in the economy and social sphere, further, the provisions on the digital economy and digitalization of the social sphere are enshrined in the normative legal acts of various ministries and departments; for example, the provisions on the transition of enterprises to a professional standard until the beginning of 2020 [6]. That is, the date of completion of all measures to bring local regulations of economic entities in Russia is 31.12.2019 [3] as the last date of the transition of all enterprises at professional standard: including, in the labor contracts of the employees of these companies, their job functions according to existing regulations professional standards set by the Ministry of labour of Russia registered in the Ministry of justice of Russia [9], or, in the absence of the required professional standards, labor the functions are executed according to the qualification reference [10]. And, labor functions of workers (in their overwhelming majority) include qualification requirements on possession of information and communication technologies, knowledge, abilities and skills in the field of the modern

software; and also knowledge, abilities and skills of work with the special software and technical devices for specialists of separate directions of preparation and specializations [9].

II. TRANSITION TO THE PROFESSIONAL STANDARD AND ITS CONNECTION WITH THE TRANSITION TO THE DIGITAL ECONOMY

A. Legal regulation of integration of digital technologies into social and economic processes

The population of many countries, including Russia, is forced to improve their literacy in the field of information and communication technologies; at the same time, the Russian Government at the legislative and Executive level is doing everything possible to ensure that the financial and temporary burden on training and retraining of the population in terms of their professional skills falls on employers. In turn, the Russian Government is doing everything possible to motivate and interest employers in training and retraining of employees (employees). The processes of unification and raising the requirements for specialists (employees) associated with the transition to a professional standard make adjustments to the modern economic environment of the Russian Federation, but it is assumed that the current costs of the transition to a professional standard will have a positive cumulative effect in the near future (the next five years), the changes will help to mobilize the hidden labor potential, update the approaches and requirements for the performed labor functions, by making them clear to the expected labor results of individual employees and the integrated labor effect of economic entities. At the same time, qualification requirements in the field of information and communication skills, specialized knowledge on working with software and digital technology, also contribute to increased productivity, and the subsequent reduction of costs in production cycles.

Mechanisms for the digitalization of the social and economic sphere are being developed and adjusted to meet the requirements of global social and economic processes and interactions. There are no ready-made schemes for integrating society into the digital economy, digital education, digital health care, etc. each individual state is a separate social system with its own historical socio – cultural settings. Therefore, it is simply impossible to create a single matrix of the transition of the society of a single state to the digital economic and social sphere using ready-made patterns and schemes.

There are also difficulties in assessing, including statistical assessment, the level of preparedness of the population for the transition to the digital economy and the integration of digital processes into the social sphere. Such difficulties arise not only in the division of the population by sex and age groups, but also in their level of education and understanding of their place in the modern world. Here a huge role played by traditional cultural and moral values that existed in society for a long time lag (from 500 to 1,500 years), as a permanent system of coordinates, which allows in legal and cultural field to form a morally and legally relevant criteria and requirements of the transition to the digitization of the social sphere and to consider the close correlation with economic traditions and economic way of life with the transition to a digital economy. Legal and cultural-traditional coordinate system society the past 500 – 1500 years, will optimally determine the criteria for such a transition.

B. Issues of digital education and digital medicine

To date, in terms of statistical assessment of indicators of readiness of the economy and society for the transition to the digital economy and digitalization of the social sphere, there are, in our opinion, difficulties in determining the criteria and indicators. For example, statistical reporting uses the estimate of gross domestic product by sector of the economy ‘information and communication activities’, which, as a rule, expresses the value of the services provided by mobile mobile communication, television, radio broadcasting, postal services (tables 1 - 5). Bank transfers and transactions, for example, carried out in mobile applications using means of communication are financial services, although today the banking sector closely interacts with information and communication technologies. Mobile advertising of banks to promote financial services is not included in the indicator ‘activities in the field of information and communication’, but at the same time, the impact of the promotion of banking services through mobile applications exists, brings some income, but is statistically taken into account in the financial sector. The same can be said about insurance services. The Federal state statistics service of the Russian Federation has today singled out such an indicator as ‘production of computers, electronic and optical products’, which was not in the constant statistical reporting, for example, ten years ago. But, at the same time, the production and development of software, cost support of modern software environments, ERP – systems, which are also included in the gross domestic product, do not stand out in a separate category associated with the digital economy.

III. ANALYSIS OF INDIVIDUAL INDICATORS OF PRODUCTION IN THE DIGITAL ECONOMY CLUSTER

Analyzing the current statistics directly or indirectly related to the digital economy and the digital social sphere, we can see that most of the indicators have an increasing trend.

TABLE I. PRODUCTION OF GDP AND GROSS VALUE ADDED BY ECONOMIC SECTOR ‘INFORMATION AND COMMUNICATION ACTIVITIES’

Years	I quarter	II quarter	III quarter	January-September
	billion rubles	billion rubles	billion rubles	billion rubles
2017	69,2	478,9	496,9	1345,1
2018	395,0	518,4	527,8	1441,2
2019	451,5	535,4	no data	no data

a. More table copy: Federal state statistics service: information on the socio-economic situation in Russia, 2018 <https://gks.ru/storage/mediabank/oper-12-2018.pdf>

b. Federal state statistics service: information On the socio-economic situation of Russia, January-August 2019: <https://gks.ru/storage/mediabank/oper-08-2019.pdf>

The gross domestic product of the industry ‘activities in the field of information and communication’ as of the first half of the year in 2019 increased almost 2 times compared to 2017: $(451,5 + 535,4) / (69,2 + 478,9) * 100\% = 180\%$ [2]. If we compare 2018 to 2017, for the period January – September 2018 to the same period in 2017, the growth amounted to 7.14% [1].

TABLE II. PRODUCTION INDICES BY CATEGORY 'PRODUCTION OF COMPUTERS, ELECTRONIC AND OPTICAL PRODUCTS' 2017-2018

The production indices	2018 in % by 2017	December 2018 in % to	
		December 2017	November 2018
Manufacture of computers, electronic and optical products	98,5	117,3	113,0

a. More table copy: Federal state statistics service: information on the socio-economic situation in Russia, 2018 <https://gks.ru/storage/mediabank/oper-12-2018.pdf>

Production indices for the category 'production of computers, electronic and optical products' in 2018 decreased by 1.5% (slightly) compared to 2017 [1].

TABLE III. INDICES OF PRODUCTION BY CATEGORY 'PRODUCTION OF COMPUTERS, ELECTRONIC AND OPTICAL PRODUCTS' 2018-2019

The production indices	August 2019 in % to		January-August 2019 in % to January- August 2018
	August 2018	July 2019	
Manufacture of computers, electronic and optical products	112,2	119,0	105,1

a. More table copy: Federal state statistics service: information On the socio-economic situation of Russia, January-August 2019: <https://gks.ru/storage/mediabank/oper-08-2019.pdf>

Production indices for the category 'production of computers, electronic and optical products' in 2019 increased by 5.1% (i.e. compensating for the losses of the previous period) in relation to 2018 [2].

TABLE IV. PRODUCTION INDICES FOR THE CATEGORY 'PRODUCTION OF CERTAIN TYPES OF COMPUTERS, ELECTRONIC AND OPTICAL PRODUCTS' IN 2017-2018

Production categories	2018	2018 in % by 2017	December 2018	December 2018 in % to	
				December 2017	November 2018
Computers, their parts and accessories, billion rubles ^a .	35,8	99,0	7,9	135,9	178,3
Equipment and devices for irradiation, rehabilitation, electrical diagnostic and therapeutic, used for medical purposes, billion rubles ^a .	18,3	143,3	3,0	199,2	123,7
Radar, radio navigation and remote control equipment, billion rubles ^a .	126	102,6	15,5	137,2	88,7

a. Growth (decline) rates are calculated based on the actual prices of the corresponding period

b. More table copy: Federal state statistics service: information on the socio-economic situation in Russia, 2018 <https://gks.ru/storage/mediabank/oper-12-2018.pdf>

Production indices for the category 'production of certain types of computers, electronic and optical products' in 'equipment and devices for irradiation, rehabilitation, electrical diagnostic and therapeutic, used for medical purposes, billion rubles' in 2018. significantly increased by 143,3% relative to 2017 [1].

The index of production in the category of 'electrical equipment' in 2018 compared to 2017 amounted to 102.9%, in December 2018 compared to the corresponding period of the previous year - 112.8% [2].

TABLE V. PRODUCTION INDICES FOR THE CATEGORY 'PRODUCTION OF CERTAIN TYPES OF COMPUTERS, ELECTRONIC AND OPTICAL PRODUCTS' IN 2018-2019

Production categories	August in % to 2019	August 2019 in % to		January-August 2019 in % to January-August 2018
		August 2018	July 2019	
Computers, their parts and accessories, billion rubles ^a .	3,0	79,4	148,3	87,4
Equipment and devices for irradiation, rehabilitation, electrical diagnostic and therapeutic, used for medical purposes, billion rubles ^a .	2,4	169,5	127,1	129,9
Radar, radio navigation and remote control equipment, billion rubles ^a .	10,9	105,8	97,0	105,6

a. Growth (decline) rates are calculated based on the actual prices of the corresponding period

b. More table copy: Federal state statistics service: information On the socio-economic situation of Russia, January-August 2019: <https://gks.ru/storage/mediabank/oper-08-2019.pdf>

Production indices for the category 'production of certain types of computers, electronic and optical products' in 'equipment and devices for irradiation, rehabilitation, electrical diagnostic and therapeutic, used for medical purposes, billion' in 2019. again significantly increased by 169,5% to 2018 [2]. In Russia, the production of 'equipment and devices for irradiation, rehabilitation, electrical diagnostic and therapeutic, used for medical purposes, ' there is a sharp increase for the third year in a row, it can be concluded that the complete renovation of such equipment in medical institutions and its possible current shortage for the needs of health care institutions, unfortunately, from the statistical reporting can not be concluded about the export of such equipment.

IV. ANALYSIS OF DEMAND FOR AREAS OF TRAINING IN THE DIGITAL ECONOMY CLUSTER

Training of specialists in the information and communication sphere, valuation of their work (table 6 - 7), means today not only training of engineers of electronic and digital equipment, programmers, specialists in information security, specialists of mobile and satellite communication, but specialists in maintenance of Bank terminals and service equipment, specialists in work with digital projects, operators of drones, moderators of communication of the population with public authorities through portals of electronic services, coordinators of educational on-line platforms, developers of models of big-data, etc. These specialists in reality already exist, implement their professional projects and services, receive their salaries or income under contracts of a civil nature. The need for their training increases every year, while educational institutions do not have time to adjust their educational programs to new requirements, and the dynamics of current changes in the digital environment increases. Not only the educational system in the country, but also the statistical reporting bodies, which partly form a picture of the statistical demand for services, areas of training in the digital sphere as a whole, do not keep up with the changes. Therefore, the current indicators of statistical reporting cannot reflect the full state in Russia in the development of the digital economy and the digitization of social processes, hence, may not always correctly formed state task on development of directions of development of digitalization of the social sphere. For

example, if the environment ‘smart city’, which, among other things, regulates public safety and law enforcement, distance education as the main form of knowledge, is criticized not only by educational professionals, psychologists, etc., but also by ordinary citizens. Education-in its sense, as the creation of value-cultural image of a person with a set of knowledge skills in the chosen field of activity, involves not only the application of the efforts of the student, but also a certain coercion over him by the subjects of educational activities (educational organizations, parents). An educational portal (platform) as a virtual educational environment cannot provide such coercion. If we consider the student from the position of his age characteristics, the adult learner (over 18 years), with already formed picture of the world, presumably representing his place in this world, can force himself to receive education, to seek new knowledge, to acquire new skills and abilities.

A student of a younger age, for example, 6-8 years, for whom the main form of obtaining new skills is a game, will not be able to consciously force himself to receive an education, due to the lack of a complete picture of the world formed in him, not understanding the purpose of staying in this world. Therefore, children willingly perceive the transition to distance learning as a way not to learn at all, i.e. as a form when they are not forced to do anything, while they have no obligation to provide for themselves, they do not have to work to provide for their basic needs. In view of this, it can be concluded that the digitization of education, including the transfer of the educational system to the distance form, the virtualization of basic education should be approached very carefully. As an auxiliary means of explaining the material and obtaining new knowledge, such systems are now simply necessary, but in terms of basic education, the classical school, which existed in Ancient Greece, today has no replacement. Coercion to gain knowledge, control over the assimilation of knowledge, healthy personal communication skills, including with peers-this is all that gives the classical school. Regarding the digitalization of medicine can say about the same thing. The built health care system, which includes paramedic stations, polyclinics, hospitals, stationary facilities for obtaining highly qualified medical care is not interchangeable with telemedicine and digital medicine. At the same time, the digitalization of medical care simplifies the procedures for its receipt by the population, improves many routine processes within the health care system itself. But in order to give a correct assessment of the replacement of some individual analog processes in the education and health systems to digital, it is necessary to properly and comprehensively assess the internal highly specialized specialists with extensive experience in these areas, which processes or procedures it is advisable to transfer to the digital sphere.

Today, according to state statistics, it is very difficult to assess and even more so to predict which specialists are more in demand, which areas of training require ongoing work on training and (or) retraining of specialists, with their subsequent introduction into production, what costs are required from employers to form a personnel reserve of the necessary areas of training. On the basis of table 6 and table 7, it can be seen that the economic sphere of ‘information and communication activities’ is more highly paid, that is, it is less expensive. it can be concluded that the specialists of this profile have qualification requirements much higher than in the field of ‘production of computers, electronic and optical products’.

TABLE VI. AVERAGE MONTHLY ACCRUED WAGES OF EMPLOYEES OF ORGANIZATIONS (WITHOUT SOCIAL BENEFITS) BY TYPE OF ECONOMIC ACTIVITY IN THE FIELD OF ‘PRODUCTION OF COMPUTERS, ELECTRONIC AND OPTICAL PRODUCTS AND ACTIVITIES IN THE FIELD OF COMMUNICATIONS’ IN 2018

Production categories	January-November 2018			November 2018		
	rubles	in % to		rubles	in % to	
		January-November 2017	the all-Russian level of average wages in		November 2017	October 2018
Manufacture of computers, electronic and optical products	49690	107,3	117	52420	106,1	103,7
Information and communication activities	66627	113,9	157	62635	103,6	102,7

a. More table copy: Federal state statistics service: information on the socio-economic situation in Russia, 2018 <https://gks.ru/storage/mediabank/oper-12-2018.pdf>

Taking into account the above indicators of wages, we note that in the economic sphere ‘activities in the field of information and communication’ wages of the period January-November 2018 to the same period in 2017 had not only a higher average value, but also a higher increase (5% more) than in the field of ‘production of computers, electronic and optical products’ [1].

TABLE VII. AVERAGE MONTHLY ACCRUED WAGES OF EMPLOYEES OF ORGANIZATIONS (WITHOUT SOCIAL BENEFITS) BY TYPE OF ECONOMIC ACTIVITY IN THE FIELD OF ‘PRODUCTION OF COMPUTERS, ELECTRONIC AND OPTICAL PRODUCTS AND ACTIVITIES IN THE FIELD OF COMMUNICATIONS’ IN 2019

Production categories	January-July 2019			July 2019		
	rubles	in % to		rubles	in % to	
		January-July 2018	the all-Russian level of average wages in		July 2018	June 2019
Manufacture of computers, electronic and optical products	52662	107,1	114	55388	107,3	99,8
Information and communication activities	73346	106,0	159	72018	108,2	94,9

a. More table copy: Federal state statistics service: information On the socio-economic situation of Russia, January-August 2019: <https://gks.ru/storage/mediabank/oper-08-2019.pdf>

Comparing the indexes of wages, it is clear that in the economic sphere ‘activities in the field of information and communication’ wage period January-July 2019 to the same period in 2018 again had a higher mean value, and the increase was quite comparable with the salaries in the sector ‘manufacture of computer, electronic and optical products’, i.e. in the segment of digital technologies the specialists, ‘manufacture of computer, electronic and optical products’ were however slightly more popular [2]. Although in comparison with the all-Russian level of wages, the indicator of 2019 in the field of ‘production of computers, electronic and optical products’ decreased in comparison with 2018.

V. SUMMING UP THE RESULTS OF THE STUDY, WE NOTE:

Russian specialists in the field of high-tech industries and high-tech services in the communications and information technology industries are taking an increasingly strong place, the number of specialists in this cluster of the economy increases with the increasing demand of the labor market for them. The average wage is slightly higher than the national average, but still slightly.

A. Improving the labor functions of employees for the transition of society to the digital economy

On 31.12.2019 Russia will complete the transition to a professional standard in the field of labor. At the same time, the qualification requirements in the cluster of information and communication skills, specialized knowledge on working with software and digital technology have become higher and are clearly defined in professional standards and qualification handbooks, which contribute to increased productivity, and the subsequent reduction of costs in production cycles.

1) In Russia, as in other countries of the world, today there are difficulties in assessing, including statistical assessment, the level of preparedness of the population for the transition to the digital economy and the integration of digital processes in the social sphere, due to the lack of clear mechanisms and instructions for such a transition.

2) Government and society must all be considered traditional cultural and moral values that existed in society for a long time lag (from 500 to 1,500 years), as a permanent system of coordinates, which allows in legal and cultural field to form a morally and legally relevant criteria and requirements of the transition to the digitization of the social sphere and the digital economy.

B. Directions of development of statistical reporting in the development of the digital economy

Statistical reporting in Russia on fixing the results of the digital economy has a number of shortcomings: when calculating the indicators are not highlighted (or hidden in other segments of the economy, or not reflected in General): production and development of software, cost support of modern software environments, ERP – systems, which are also included in the gross domestic product, but they are not allocated to a separate category related to the digital economy.

1) Current indicators of statistical reporting cannot reflect the full state in Russia in the development of the digital economy and the digitization of social processes, hence, may

not always correctly formed state task on development of directions of development of digitalization of the social sphere.

2) Today, according to state statistics, it is very difficult to assess and even more so to predict which specialists are more in demand, which areas of training require ongoing work on training and (or) retraining of specialists associated with the digital economy and digitalization of the social sphere, with their subsequent introduction into production, what costs are required from employers to form a personnel reserve of the necessary areas of training.

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