

Current Trends of Digital Economy Development in Supply Chain Policy

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Abstract— Modern trends of development of economy indicate that there is a digital transformation of the international community and the economic environment, which is caused by supply chain policy. The complication of production and public structures and the relations characteristic of modern society put in the forefront a question of formation of digital economy as which fundamentals modern digital technologies act. More and more attention is paid to digital technologies and also new forms of electronic business where human and financial resources of the world collect that undoubtedly confirms relevance and the importance of a subject of a research and cases in point, opening new sides of formation of concepts of economic security of Russia as member of the international community.

Systematization of characteristics of category "digital" economy is given in article, the periodization of formation, development of digital technologies in economic space of various sectors of the economy is considered. Ideas of current trends of development of digital economy in various states are considered and systematized; features of digital economy, stages of formation and development are studied; formations of institutional bases of digital economic space which represent set of theoretical bases and procedures of their practical embodiment.

Keywords— *digital economy, international market of information technologies, supply chain policy, investment priorities, structural shifts, global digital space, indicators of informatization of economy.*

1. Article Purpose

Improvement of scientific-theoretical approaches and the principles to the analysis of digital economic space, systematization of structural elements of digital economy to define characteristics. A research object - economy of digital space at the present stage. Systematization of current trends of development of digital economy, ideas of structural elements of digital economy acts as a subject.

2. Methods

Use of the general methods of the scientific-theoretical analysis for deepening of the studied phenomena and concepts became the theory-and-

methodology basis of a research. In article methods are used: historical – for the analysis of evolution of development of scientific idea of digital economy and chronology of its development; a logical method on the basis of which relationships of cause and effect between economic categories and elements to digital economy were established; the method of scientific abstraction allowing to reveal essence of digital economy as an economic event; methods of the analysis and synthesis which were used by consideration and identification of the factors influencing stages of formation of digital economy and also disclosure of communications between elements, their interaction, contradictions.

Problem statement in a general view and its communication with important scientific and practical tasks. The technological changes characteristic of the 21st century regarding "merging" telecommunication, IK of technologies and innovations, were caused by introduction to a scientific turn of the concepts "digital technologies", "digital agenda", "digital economy". The digital economy represents a new stage in development of market economy which is characterized by active use of digital technologies in modern economy, informatization of all spheres of public and economic activity, opens unique opportunities for development of our economy and improvement of quality of life of citizens.

3. Analysis of the last researches and publications

Important researches of a perspective in the analysis of formation of digital economy are scientific developments and practical researches and such famous scientists and inventors as V. Ayzekson, S. Brand, J. Wales, E. Williams, B. Gates, B. Elbrekht, D. Engelbart J. Licklider, J. Von Neumann, E. Peters, S. Huntington.

Problem of formation of new models of economies among which and digital economy, L. Kot [1], S. Kolyadenko [2], I is actively discussed in domestic scientific literature, in particular in works. Malika, [3], N. Meshko [4], A. Filipenko [5] and others. Authors proved the main conceptual categories and methodical approaches to definition of basic components of modern models of economic development and ways of introduction on economic Wednesday of tools of digital economy. The problem of a research of the main drivers of digital economy is opened more in scientific works of

foreign researchers such as: R. Inkjar, M. Timmer, B. Wang of the ARC [6], S. Haller, D. Sifchlag [7], A. Krimes, R. Cleo, F. Stivins [8], T. Nibel [9] and others.

At the same time, in connection with the high rate of the transformational processes inherent in today's world, many aspects of influence of digital economy on the international economic relations remain not studied. From a research of the general aspects of restructuring and complex modernization in transitional economies and problems of their adaptation to global innovation-digital space names of A. Babkin A. Dobrynina [11], S. Kubiva, P. Kupriyansky, A.D. Namiot, A. Raykov, S. Sinyagov, A. Stankievich, L. Ustinov, etc. are connected [10].

4. Research Results

During an era of digital economy the main resource is inexhaustible, exact, solid, accurate and timely data.

The digital economy understood as "application of Internet technologies for production and trade in goods and services" becomes more and more important part of world economy. It influences life of the growing number of people. It is widespread in business. These transactions play the leading role in global networks of supply chains. However, as supply chains consist of many stages, and only the last stage (the final product or service) is included in calculations of GDP, it is difficult to define a

share of Internet transactions in GDP precisely. Moreover, many new products include digital and non-numerical parts, and it is difficult to define a share of both components. In general, how often it was told, "it would be impossible to protect digital economy from other economy" [11].

Digitalization is not only a way to increase productivity and efficiency, to stimulate innovations, a necessary condition for ensuring steady growth and increase in the general welfare. This creative destruction transforming the behavior of economic agents changing structure and business models of economy. The present stage of digitalization differs introduction in process of production and management of a wide range of digital services, products and systems that will inevitably result in unrecognizability of many sectors of economy, change of structure of production and as a result release of human resources, to rise in unemployment. The main digital technologies which are a basis of formation of national digital economy are: big data, neurobiotechnologies; development and deployment of artificial intelligence and also components of robotics and virtual realities, sensorics.

Digitalization, on the one hand, creates new tools for the decision and simplifications of interaction of subjects of the market, on the other hand, unprecedentedly increases maneuverability of the main players and the related risks.



<p>Особенности цифровой экономики Рост экономики связан с результатами внедрения инноваций, эффективностью</p>	<p>Features of digital economy Growth of economy is connected with results of introduction of innovations, efficiency of the</p>
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<p>организации инновационного процесса Опора государства на высокотехнологичные отрасли, связанные с воспроизводством новых знаний, преобладанием интеллектуального труда, производством интеллектуальных продуктов Развитие ускоренными темпами объема знаний и информации, являющиеся главным продуктом и предметом труда Изменения в структуре занятости Усиление значимости интеллектуальной собственности, преобладание нематериальных активов предприятия Рост количества инновационно-активных предприятий</p>	<p>organization of innovative process Support of the state on the high-tech industries connected with reproduction of new knowledge, prevalence of intellectual work, production of intellectual products Development by the accelerated rates of volume of knowledge and information which are the main product and an object of the labor Changes in structure of employment Strengthening of the importance of intellectual property, prevalence of intangible assets of the enterprise Growth of number of the innovation-active enterprises</p>
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Figure 1. Features of digital economy.

Digital transformations become one of the main factors of stimulation of world economic growth today. According to the experts increases in GDP up to 22% by 2025 in the USA for hopes implementation of digital technologies. Estimated economic growth of Russia by 2025 will increase to 19% of the general expected GDP growth effect of digitalization of economy [12].

For calculation of impact of informatization on economy of the states it is used various indicators:

- The index of network readiness – a complex indicator which characterizes the level of development of communicative technologies (NRI)

- The index of global digital competitiveness (IMD World Digital Competiveness Index — WDCI) which reflects potential opportunities and readiness of various countries to adapt to development of digital economy [13]

- The global innovative index (GII) - allows to estimate elements of national economy in which innovative changes proceed.

- Index of digital economy and society (DESI). This indicator is the summary index which generalizes the corresponding indicators by efficiency of digital technologies in Europe and monitors evolution of EU member states in the field of digital competitiveness.

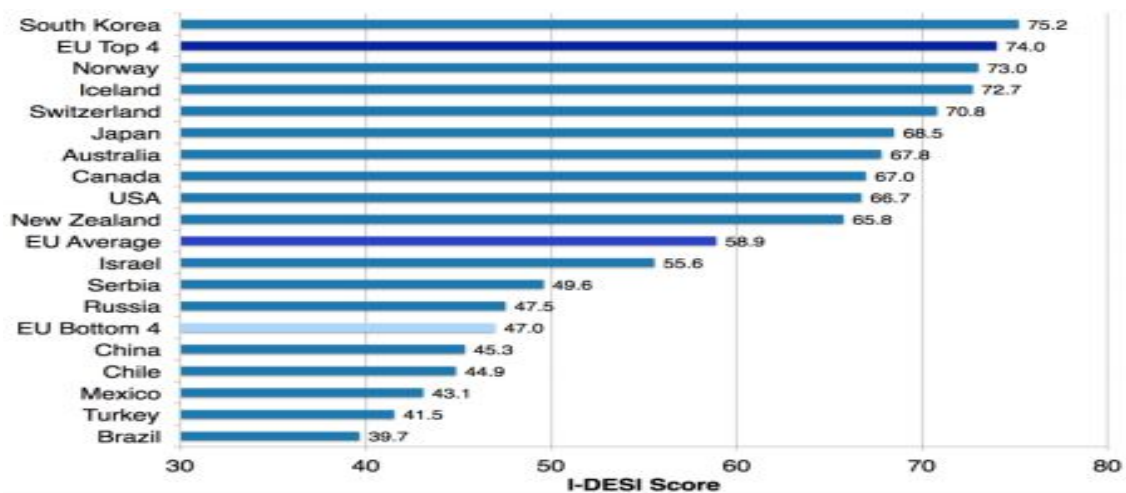


Figure 3. The rating of the states on the level of the index of digital economy and society (DESI)

The European Commission published the International index of digital economy and society (I-DESI), having compared digital indicators of 2016 of EU member states to indicators of 17 countries which are not entering the EU in five areas: coverage degree communication, the human capital and digital skills, use of the Internet by citizens, integration of technologies and digital in public services

South Korea (75.2) and Finland (73.8). Four more other EU member states are in first "ten" the general index: Netherlands, Great Britain, Sweden and Luxembourg. At the same time South Korea for the first time overtook four leading EU member states. Average indicators of 28 EU Member States were 58.9 points. [14].

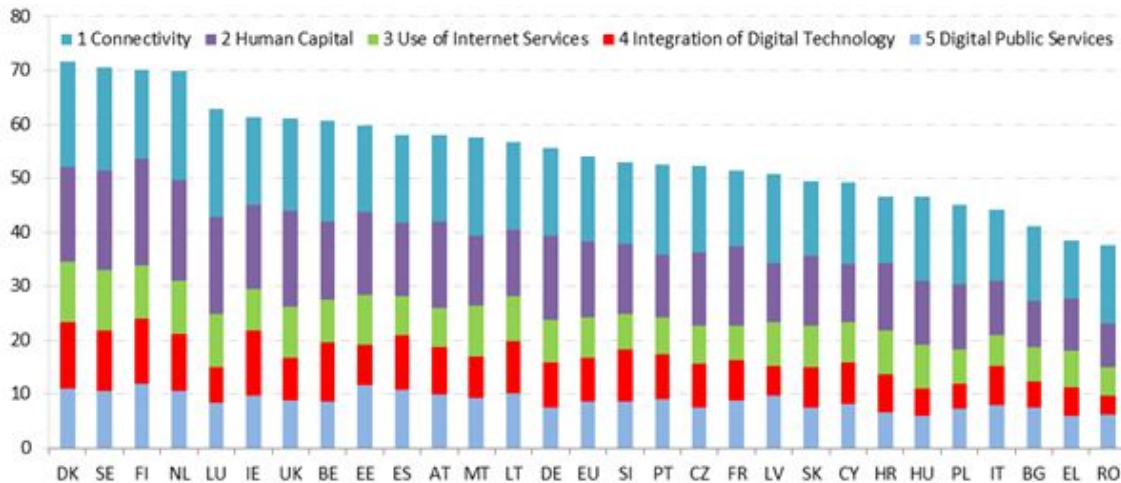


Рисунок 4. The Analysis of structure of indicators of the index of digital economy and society (DESI), 2018

Denmark, Sweden, Finland and the Netherlands have the most developed digital economy in the EU which Luxembourg, Ireland, Great Britain, Belgium and Estonia follow. Romania, Greece and Italy have the lowest marks on DESI.

In 2018 all member states improved the indicators in DESI. Ireland and Spain promoted most of all (about 5 points while on average in the EU 3.2). On the other hand, growth in Denmark and Portugal was low (lower than 2 points).

EU member states are well compared to 17 countries which are not entering the EU, and the best EU countries - 28 have digital indicators at the same or higher level, than the best world countries.

Really, Denmark was the leading country in the I-DESI index. [15]. EU member states show the best results in comparison with 17 countries which are not entering the EU in aspect "Connectivity" (the analysis of expansion and mastering of the fixed and mobile broadband communication) and in aspect "Use by citizens of the Internet".

The modern digital economy of Russia forms as a result of close interaction of three levels of the markets and the industries of economy, development of new platforms and technologies which function in the forming institutional and tactical environment, presented in figure 2

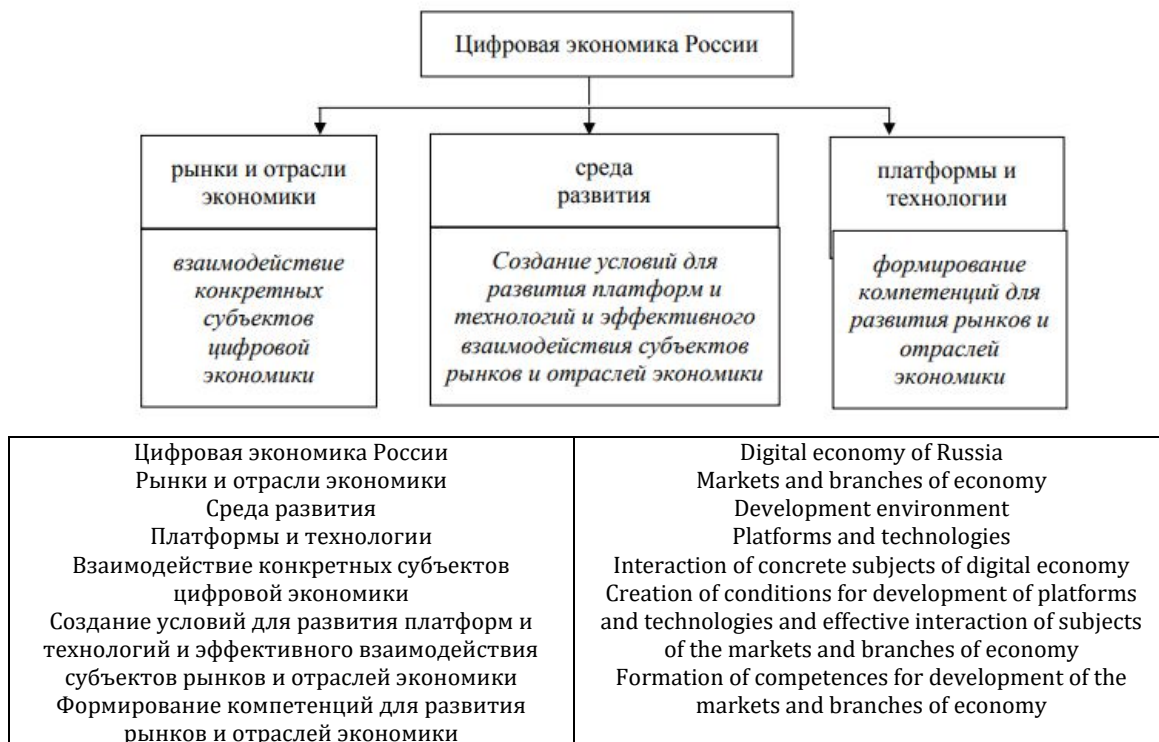


Figure 5. Structure of Modern Digital Economy of Russia

Russia on the level of digitalization of economy was located in the rating of 17 countries which are not entering the EU on the 12th place, having gained in total 47.5 points. It is more, than the minimum Central European indicator. Behind the Russian Federation in the list China (45.3), Chile, Mexico, Turkey and Brazil are specified. At the same time the USA gained 66.7 points, having taken the eighth place.

However the share of the Russian Federation in world export of technological products remains at the previous low level – about 0.3-0.4%. The volume of digital economy in GDP in Russia only 3.9% of GDP, whereas in the USA – 10.9%, in China - 10%, in the countries of the EU - 8.2%. [16].

Table 1. Comparative analysis of a contribution of digital economy to GDP of some countries of the world (GDP %)

Indicator	USA	PRC	EU	RF
Expenses of households in the digital sphere	5,3	4,8	3,7	2,6
Investments into digital economy	5	1,8	3,9	2,8
The public expenditures in digital economy	1,3	0,4	1	0,8
Size of digital economy	10,9	10,0	8,2	3,9

The share of the domestic enterprises which introduce technological innovations makes 8%. According to the analytical company PWC in the USA 27% of the companies focused on innovations could reach considerable reduction of costs for production due to digitalization of economy, and by 2020 72% of the companies expect doubling of the market of digital technologies, summary savings from introduction in production of technologies of the Industry 4.0 to which additive technologies belong, robotics, artificial intelligence, "the Internet of things", will make 421 billion dollars. Market size 3dpechati by 2021 can reach 10.8 billion dollars [17]

Digitalization which represents itself the main modern trend of development of economy and society is based in the Russian Federation on the following standard and legal documents:

1 "The development strategy of information society in the Russian Federation for 2017-2030 years", approved by the Decree of the Russian President of May 9, 2017 No. 203

2 The "Digital Economy of the Russian Federation" program approved by the order of the Government

of the Russian Federation of July 28, 2017 No. 1632-r

It is expected that already in the nearest future as the result of implementation of the adopted program of the Government, in Russia will appear not less than 10 hi-tech enterprises developing

The program is directed to creation of conditions of development of information society in the Russian Federation, assistance to increase in welfare and quality of life of the population, increase in availability of the modern digital technologies provided on commodity market and services, access use, increases in degree of knowledge and digital literacy, improvement of availability and quality of public services for citizens.

The problem is that decisions on installation and start of the robot often are based on economy of means which can be reached in case the robot can replace with himself the person worker. Economy is directly connected with the level of compensation of production workers. It is not surprising to see that in Germany, with the high level of the salary, will reach considerably the bigger level of penetration of robotics, than in India where salaries are much lower.

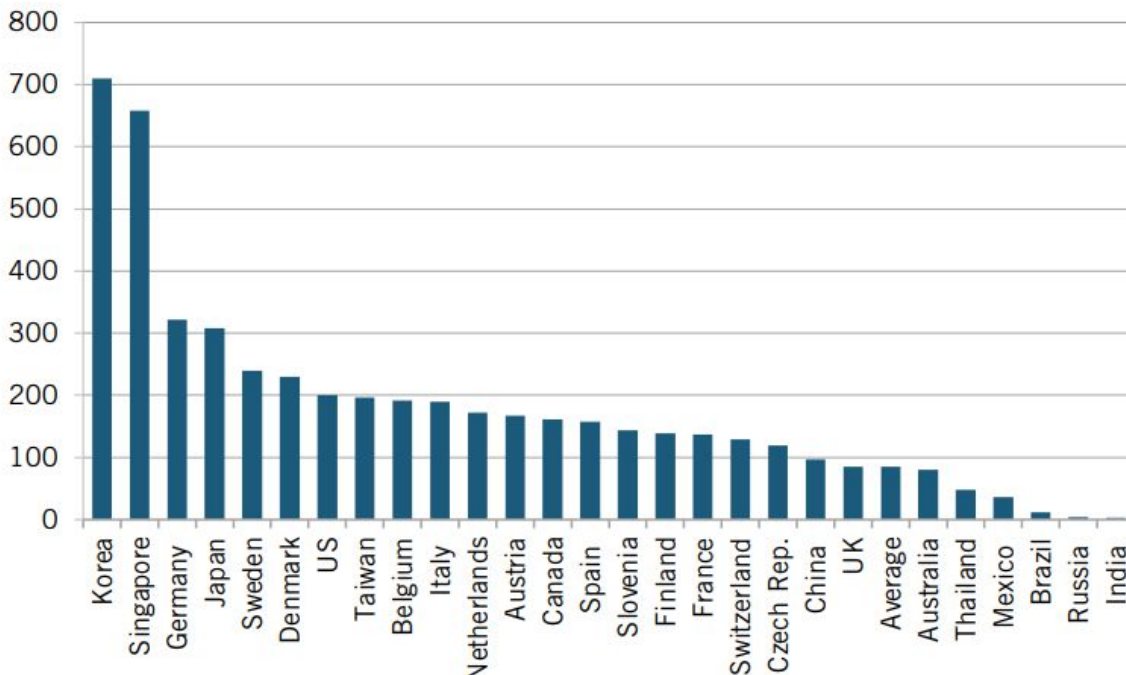


Figure 8. Introduction of robotics on 10 thousand production workers, 2017

Korea became the state with the highest level of introduction of industrial robots - in 2017 710 robots whereas Singapore became the second with 658 robots on 10 thousand workers were the share of 10 thousand workers. Germany was the third with 322 robots, Japan - the fourth with 308,

Sweden - a heel with 240. The USA took the 7th place with 200 industrial robots on 10 thousand workers. On which among the countries data are collected, Russia and India took the last two places with level 4 and 3 of the robot on 10 thousand workers [18].

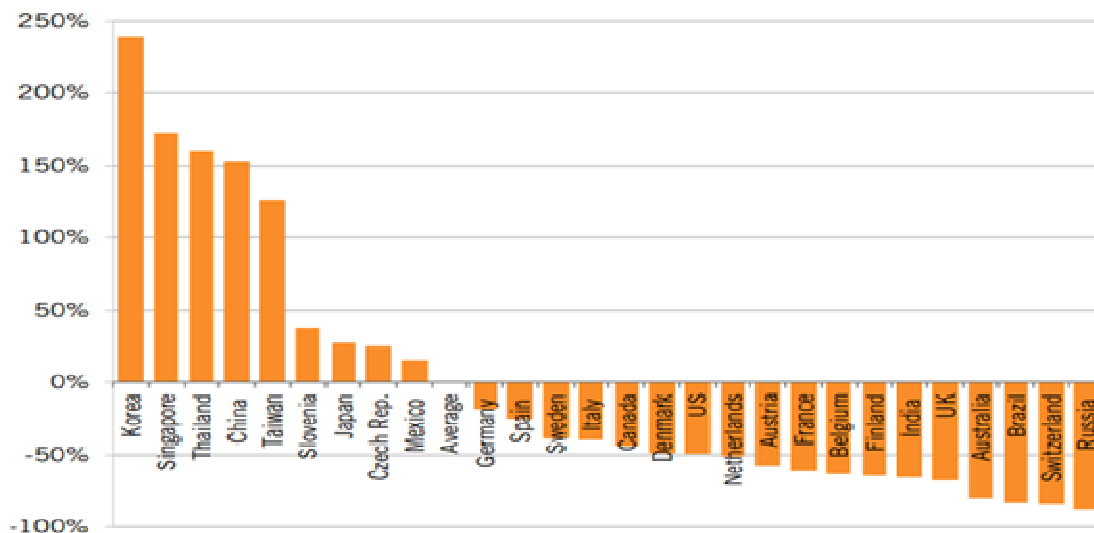


Figure 7. The rating of the states on volumes of introduction of robotics in production

Comparing the rating of the expected indicators of introduction of robots to the actual indicators, it is possible to reveal several standard patterns.

First, the countries of Southeast Asia adjusted for the salary, are in the lead in the world on rates of introduction of industrial robotics, occupying 6 of 7 highest positions in rating: Korea is in the lead with number of robots 2.4 times bigger, than it was expected, it is followed by Singapore, Thailand, China and Taiwan. Japan takes the seventh place

with indicators of adaptation 27% higher, than it was expected. In this plan at the Commonwealth countries everything is much worse: Canada reached only the 14th place (44% lower than the potential level of adaptation), the United Kingdom takes the 23rd place (68% lower), Australia - the 24th (80% lower) [10].

Europe in general lags behind and only two countries showed result above expected taking into account salary level. It is Slovenia on the 6th place,

37% higher expected and the Czech Republic - the 8th place, 25% higher than expected. Other European Union countries show the level of adaptation of robots below expected: Germany for 18%, Spain - for 25%, Sweden - for 39%, Italy - for 40%, Denmark - is 49% lower, the Netherlands - is 51% lower, Austria - is 58% lower, France - is 61% lower, Belgium - is 63% lower, Finland - is 65% lower, Switzerland - is 84% below than the face value [15].

Among the developing countries of Thailand is in the lead with the level of adaptation 159% higher, than the wage level in the country whereas the corrected result of China - 153% that above, than 104% following the results of 2016. Mexico also shows quite good result - the level of adaptation 16% higher. And here Brazil, India and Russia lag behind even despite the low level of wage payment characteristic of these countries. Level of introduction of robotics in these countries is 66% lower in India, for 83% - in Brazil and for 88% in Russia.

5. Conclusions

Implementation of artificial intelligence will influence economic growth, labor productivity and innovative development [19-26]. Also the significant influence of artificial intelligence on creation of jobs is expected. The main industrial calls of development experts call data management (collecting, the analyst, interpretation of data). In this regard the organization of the communication platforms providing real communication of all parties interested in development of digital economy is extremely important. Regions of Russia actively support this initiative

The global digital space dynamically develops and involves active social and economic transformation of society. The digital economy is an accelerator of social and economic policy, incentives of development of GDP today. The digital economy represents essentially new type of the economic relations in all branches of the world market developing prompt rates which will become a main type of commodity-money exchanges at global world level already in the nearest future.

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