Actual issues of digital transformation of the Russian economy in modern conditions

I K Kiyamov1,3, L S Sabitov1,2, G I Kabirova1, L Sh Akhtyamova1 and L Sh Iskhakova1

1Kazan (Volga region) Federal University, Kremlevskaya str., 18, Kazan, 420008, Russia
2Kazan State Power Engineering University, 51 Krasnoselskaya street, Kazan, 420066, Russian Federation
3Autonomous non-profit organization of higher education “Academy of Social Education”, Isaeva str.,12, Kazan, 420039, Russian Federation
l.sabitov@bk.ru

Abstract. The first new kind of inexhaustible resources of modern digital economics - "information" in the article is analyzed; the basics of the concept of “Big Data” are summarized; the promise of concept and “Industry 4.0” is justified; the main conclusions about the prospects of further mutually beneficial cooperation with the People’s Republic of China in the development of a modern digital economy are formulated.

«I am well. It's not me who got sick
It's just the world economy.
pregnant with digitalization
and pregnancy is, as you know,
not a disease, but a normal state»
V.V. Putin [1]

The growth rate of economic development in the most countries has slowed sharply in recent decades. In most cases, this is due to run-to-run structural changes, as well as newly emerging imbalances in the global economy. In such circumstances, the issue of finding new sources of further economic development and growth becomes relevant. In the modern world, the digital economy is becoming such a source. Today, an uncompromising struggle for leadership in the field of digital technology is developed, which on practice become one of the key competitive advantages not only individual companies, but also in many countries.

Modern digital economy has created a new kind of resources - information, which is one of the most important factors of successful economic operators at different levels. Information today is a priority product, the resource of which is practically inexhaustible. The advent of the digital economy has led to a number of significant changes in society, namely [2]:
- to the transformation of existing business models;
- to the changing of the standards of the relationship between the seller and the buyer;
- to the changing of corporate culture, focusing on issues of motivation and staff training;
- to the revision of a number of regulations and the level of responsibility of IT departments with the transition to cloud technologies and virtualization technologies;
- to the changes in the company's infrastructure based on new technologies, hardware and software requirements of the environment, key interests of both sellers and buyers.

Day by day increasing flow of information creates the need for a transition to a qualitatively new level of management of economic processes. The information retrieval systems that exist today make it possible for almost completely automate the managerial decision-making processes. All this contribute to a more detailed analysis of the production and economic participants market, not only at the micro, but also at the macro levels of the modern world economy. The emergence of modern digital devices and their active use led to the genesis of the so-called concept of “Big Data”. The amount of data is increasing every day, and this creates new, promising opportunities for all spheres of modern human activity (science, management, healthcare, etc.). The development of the concept of ” Big Data is a key element of the modern digital economy. Working with big data allows for review a qualitatively new analysis of socio-economic data, the timely processing of which contributes to the further modeling and forecasting the socio-economic development of market actors.

If the world economy was formed at the expense of oil, machine-building, metallurgical large companies in the framework of the fourth technological order, today the rapid development in the fifth and sixth technological order is provided by companies of the digital sector. They are unique growth points, providing the world economy with digital resources. So, according to the analytical company Brand Finance” in the Global 500 annual report on the most valuable brands in the world published in February 2018, the first ten positions were taken by world companies directly or indirectly connected with the digital technology sector. This fact is undoubtedly the evidence that the modern world economy is moving towards digitalization (Fig. 1) [3].

![Fig.1. Rating Top 10 the most valuable (profitable) brands in the world, according to the analytical company Brand Finance” (February, 2018) [3].](image-url)
The digital economy in modern material production is best characterized by the German concept "Industry 4.0". The previous concept to her the of "Industry 3.0" was mainly focused on the automation of individual production processes through machine tools with numerical control in XX century. Nevertheless, it allowed to increase significantly the productivity growth of the German economy and to become one of the most efficient in Europe [4, p.30]. At the beginning of XXI centuries, in order to increase the competitiveness of industrial enterprises, to intensify the integration of “cyber-physical” (CPS) systems into the factory processes began in Germany, which led to the beginning of a new era in the “Industry 4.0” concept. Today, this concept includes “innovative methods like big data analysis, machine learning, machine vision, industrial Internet of things, virtual reality, augmented reality, three-dimensional modeling, three-dimensional printing, unmanned aerial vehicles and robotics” [5]. These technologies are already widely used in the global industry, and their full-scale implementation in the world economy, in future it may have an effect on performance and labor market comparable to industrial revolutions of the past. According to statistics, companies which are already using CPS today are 25% more profitable compared to competitors (Siemens, Cisco), and analysts at Gartner predict that by 2025 all the major global companies and organizations will become digital [6]. Today, the concept of "Industry 4.0" covers the whole world economy. Except Germany, such countries as the USA, China, and Japan have achieved major successes in the implementation of this concept. In the United States, in 2014, the Industrial Internet consortium was formed, combined such large companies as IMB, Intel, AT & T, and several others. In China, the implementation of the “Industry 4.0” concept has opened up the new opportunities for both industrial growth and the development of global e-commerce. A striking example is the Chinese company Alibaba, which develops its business in the b2b market (business to business). The “digital platform” of this company in November 2016, just in one day, sold almost 18 billion goods US $ [7]. By 2020, through the flexibility and openness of using digital technology, China plans to reduce the costs of the national economy above the average level, achieved by the key global companies. Japan's leading companies are focused on internal digitalization processes. Developed digital interoperability technologies allow end-to-end processes to be maintained with the key partners in accordance with the horizontal value chain. This ultimately leads to the improvement of the national economy efficiency by increasing productivity, optimizing costs and improving the quality of manufactured products and services.

What are the prospects for the domestic economy in the conditions of modern processes of world digitalization? Today, more than half of industrial Russian companies operate within the framework of the concept "Industry 3.0". The average age of production capacities in the manufacturing industry is about 10-12 years, more than 25% were commissioned until 2000, half of them no longer meet modern requirements for the production of competitive products [4, p. 32]. Certainly there are individual national companies which have achieved success in today digitalization and the key ones are the company IT-industry. The rating of Russian IT companies, according to research by RBC+ analytical company based on the results of 2016, is presented in Table 1 [8]. Studies have shown that today Russia's entry into the global digital ecosystem is constrained by the following factors:

- firstly, this is the technological lag of the Russian economy in relation to the world industrialized countries, such as the USA, Germany, Japan, and China.

| Position in the ranking | Company (company group)                              | Main activities                                                                 | Growth in 2016 compared to 2015,% |
|------------------------|------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------|
| 1                      | National Computer Corporation (incl. Systematika Group) | Diversified IT-holding; classical distribution - about 70% *                   | 16.2                             |

Table number 1.
In most cases these countries have come into the sixth technological structure, where NBIC technologies are becoming key, in other words NBIK - convergence of such four fundamental knowledge branches as Nano, bio, information and cognitive technologies; 
- secondly, there is not enough attention from business and government to the development of digital infrastructure. However, it should be noted that at the end of July 2017, the Prime Minister of the Russian Federation D. A. Medvedev approved the program "Digital Economy of the Russian Federation" according to which, it is planned to spend more than 500 billion rubles for the priorities for the development of the digital economy of the Russian Federation (regulation, information infrastructure, the formation of research competencies and technological reserves, personnel and information security). It will be show how effectively this program will be implemented;
- and finally, one of the most important factors is the lack of a digital culture and a large shortage of specialists with key competences in the field of the “Industry 4.0” concept.

Nevertheless, in spite of all these factors, it can already be said that relating to the economy of the Russian Federation, Industry 4.0 technology in such industries as oil and gas production, electric power industry creates a significant potential for improving efficiency, without a radical transformation of existing business models. For more labor-intensive industries the key opportunities are concentrated in increase the efficiency of the production process by automation, using connected to industrial internet of things sensors and in-depth analytics. The significant effect from the introduction of digital technologies can be obtained in the manufacturing industry due to its high labor intensity and technological backwardness of Russia from the advanced countries. The efficiency gains are possible at all parts of the value chain - from accelerate development and output to market for new products, synchronization of production chains and supplies, completing till the significant increase in the efficiency of planning, production, quality control and level of service maintenance of the final product. Thanks to the modernization of the Russian engineering industry based on the principles of Industry 4.0, you can significantly improve this industry productivity, reducing the backlog of the most industrialized developed countries. According to experts, the annual effect of the introduction of elements of "Industry 4.0" in Russia approximately will amount from 1.3 to 4.1 trillion rubles by 2025. [9].

In general, many experts are agreed that the transition to the digital economy is one of the key GDP growth factors of the Russian Federation. According to the various estimates forthcoming digitalization up to 2025 years will cause from 19 till 34% from the entire increase in the country's GDP [9]. Similar forecasts exist for other countries too. In accordance with the latest research of the McKinsey Global Institute, in the next 5-10 years, the United States and China will

| #   | Company                                    | Description                                                                 | Percentage |
|-----|--------------------------------------------|-----------------------------------------------------------------------------|------------|
| 2   | LANIT (incl. Treolan and CompTek)          | Diversified IT-holding; classical distribution - 50%                          | 6.9        |
| 3   | EPAM Systems                               | Offshore programming, system integration, consulting                          | 39.9       |
| 4   | GC Softline (incl. Develonica)             | Deliveries of software and computer equipment in retail and wholesale; cloud services | 30.7       |
| 5   | GC "Technoserv" (incl. "Reksoft")         | System integration (share of the project supplies - 18.5%)                  | 1.3        |
| 6   | PJSC "Kaspersky Lab"                       | Information Security Software Development                                     | 14.5       |
| 7   | ITG (Inline Technologies Group)            | System integration (share of project deliveries - 43.5%)                   | 0.6        |
| 8   | I-Teco (incl. "Servionika")                | System integration (share of project supplies - 49%)                        | 3.9        |
| 9   | Cognitive Technologies                     | Software Development and Implementation                                     | 7.2        |
| 10  | SAP CIS                                    | Selling and implementing of a software                                      | 9.1        |
become the absolute leaders in the development of digital technologies. In the United States, by 2025, due to the digitization of the economy, the increase in value will be about $ 1.6–2.2 trillion. In China, where the potential for the rapid growth owing to the large investments and increasing of employment decreased each year, the total GDP growth of the country through the introduction of digital technology to 2025 year will be estimated from 7 before 22% [9]. Modern experience of the development of digital technology in China and the United States suggests that these processes in these countries contribute to the improvement competition, increase productivity and manpower qualifications, to price reduction, and easier access to any relevant information. Our country as quickly as possible is necessary to establish a process of mutually beneficial cooperation with these countries. However, due to tense relations with the United States, today, the development of digital technologies, we should pay attention to cooperation with the People’s Republic of China. Namely:

- first, it is necessary to pay close attention to the national strategy “Made in China - 2025”, strengthen bilateral cooperation in developing the “Industry 4.0” concept, and develop further productive steps to digitize the industry in order to increase the competitiveness of the manufacturing industry of both countries.
- secondly, in order to create a joint digital infrastructure, to ensure the development of joint Russian-Chinese projects in the field of satellite navigation, satellite broadband services, in the development of applications and services supporting the 5G standard, in the field of the Internet of things, Smart city and a number of others.
- thirdly, to create a database in the field of education, through the modern Internet technologies, with the aim of developing a common access to international educational resources. Such a mechanism would create a common platform for the implementation of different types of distance learning and online courses that will surely give real benefits to citizens of both countries.
- and finally, it is necessary to establish cooperation in the development of Smart Energy, covering the development of energy efficient technologies, the development of energy saving industry, the study of the new models of mining, production and distribution of energy using, and the use of new types and sources of energy [10].

In conclusion, we would like to note that the timely and purposeful cooperation with China in the field of digital technologies will contribute to the creation of favorable conditions for the development of Russian Federation competitive economy, the well-being and quality of life of our population, by improving the quality of goods and services, produced Institution in the digital economy based on the use of modern digital technology; the increase awareness and digital literacy of society; as well as the improvement of the quality of public services for the citizens of the Russian Federation.

References
[1] Putin diagnosed the global economy “pregnancy” by digitalization (Electronic Materials): https://www.rbc.ru/economics/25/05/2018/5b07eff6a794708da380dd4?story=5af980859a7947b069a0a9d3 (the date of circulation is 12.04.2018)
[2] Perpelyak A I The digital economy: new business opportunities (Electronic Materials).
URL: https://sibac.info/archive/technic/4(51).pdf (the date of appeal: 06/19/2018)
[3] 2018 Brand Finance Global 500. The annual report on the world’s most valuable brands (Electronic Materials)
URL:http://brandfinance.com/images/upload/bf_global2018_500_website_locked_final_spread_03042018.pdf (accessed date: 19/06/2018)
[4] 2017, Potential of competitive release Expert No 7 (1017) pp 30-35
[5] Business is waiting for digitalization (Electronic Materials) URL http://www.kommersant.ru/doc/2993675 (accessed date 06/03/2017)
[6] The main events of the world IoT. The results of 2017 (Electronic Materials). Access
Mode URL: https://iot.ru/promyshlennost/glavnye-sobytiya-iot-itogi-2017-goda
[7] 2016, Who will win: "more data" or materials science. / Expert No 48 (1009) p 13
[8] The rating of Russian IT companies compiled by RBC + based on 2016 results (Electronic Materials) Access Mode: URL http://rt.rbcplus.ru/news/59013cb47a8aa90a969da442
[9] Digital Russia: a new reality (Electronic Materials). Access Mode: URL :https://www.mckinsey.com/en/~/media/McKinsey/Locations/Europe%20and%20MiddleEast/Russia/Our%20Insights/Digital%20Russia/Digital-Russia-report.ashx (accessed date 04/12/2018)
[10] Timofeev R A, Shlychkov V V 2010 Optimization of the consumption of fuel and energy resources as a factor in increasing the level of economic reliability of an enterprise. (Kazan: Ministry of Education and Science of the Russian Federation, State educational institution of higher professional education ‘Kazan State Energy University” pp 35-41