

Influence of the Digital Transformation of the Russian Economy on Productive Forces

Naylya Rifatovna Amirova¹; Vladimir Nikolaevich Krasnov²; Lyudmila Vasilyevna Sargina³
^{1,2,3}Plekhanov Russian University of Economics, Russian Federation.

Abstract

The article deals with the influence of the digital transformation of the Russian economy on its material and technical resources. The analysis of the research subject reveals significant changes taking place in the employment structure of the Russian population. It has been substantiated that the education system is intended to play a key role in overcoming the emerging imbalances in the labor market. It is particularly important given the current decline in workforce productivity growth rate in various sectors, which diminishes the competitiveness of the Russian economy as a whole. The digital economy will yield results only when technological innovations start to equally influence all the elements of society.

Key-words: Digital Economy, Material and Technical Resources, Technological Innovations, Workforce Productivity, Human Capital Index.

1. Introduction

The increase in the share of information and communications technologies (ICT) in GDP and their rapid introduction to numerous fields along with the fast proliferation of internet resources gave rise to the digital economy. The respective modern term “digital economy” was introduced into the scientific discourse by N. Negroponte (1995) and was indissolubly linked to progress in ICT and the rise of the second-generation informatization. In their research into the digitalization of the economic environment, P. Romer and K. Schwab concurred that digital economy is the basis of the fourth industrial revolution in the age of unprecedented growth of workforce productivity and implementation of advanced manufacturing technologies, enabling the transition to more sustainable models of economic development (Schwab: 2017, pp. 43-49). Moreover, D. Tapscott (1994) studied

the effect of the Internet on the changes in business operations and noted that the high-tech revolution paves the way for a new digital society and influences the public administration system.

The concept of the digital economy as a special industry where various information products are produced in digital form is currently considered much wider. The processes of creation, distribution, exchange, and consumption of real and virtual goods are carried out in the context of the implementation of information technologies, resulting in a qualitative change in the way productive forces function (Amirova: 2014, p. 63). Moreover, the algorithm of technical and organizational interaction between material elements of productive forces is being increasingly determined by information systems rather than by an economic agent. This indicates that along with the process of incorporating all social production into a single information space, information technologies extend beyond the boundaries of the economy and permeate all areas of public and private life. During his speech at the St. Petersburg Economic Forum in 2017, V.V. Putin noted the need to define the digital economy as a civilizational phenomenon, “Digital economy <...> sets a new paradigm for the development of the state, economy, and society”. Undoubtedly, the process of digitalization along with the need to implement the newest technologies and to accelerate service provision and realization implies that society is mobile and ready for modern modifications. The new reality determined by the development of the digital economy creates not only the potential for human progress but also carries certain risks for society (Sargina: 2016, p. 8).

2. Methods

In the course of the research, we studied works by Russian and foreign scholars and professionals, which allowed us to investigate the challenges in the development of the digital economy in Russia. During the research into the topic of the article, we utilized a range of scientific approaches and methods, such as the systematic method, methods of logical and comparative analysis, expert assessment, and statistical analysis. These methods and approaches allowed us to identify the issue of upgrading material and technical resources in Russia caused by the trend of decline in workforce productivity growth. Moreover, these methods enabled us to justify the transformation of socio-economic relations, caused by severe shortage of skilled specialists in the face of the rising level of structural unemployment in Russia and abroad in the context of the development of digital technologies, reflecting the special role of the Russian education system, that

should meet the standards of the 21st-century information society, in the search for the solution to this problem.

3. Results

The digitalization of the life of society in Russia is taking place quite drastically and rapidly whereas in the USA, Japan, and Germany this process occurred at a moderate rate, evolutionally. This way, Russia, given the historical geopolitical realities that appeared from the moment of its formation as a single state, must master the opportunities of a civilizational shift caused by digital technologies and use them in its interests to preserve its integrity and confirm the status of the subject that determines the structure of the new world.

However, it will remain risky to fulfill even the most optimistic prognoses for the digitalization of Russian economy if the index of the digital economy contribution to Russia's GDP remains at 3.9%, which is 2-3 times lower than in the USA or the EU (Akhmadeev et al.: 2018, p. 71). Therefore, there is a clear need to find digital economy growth drivers that will ensure that Russia stays on track for digitalization and leaves the path of catch-up development.

Given the state of the material and technical resources of the Russian economy, the economic and production aspect of the transition to the digital economy seems particularly important. It is worth noting that production efficiency ultimately depends on the material and technical resources of the economy. The digitalization of manufacturing resources by itself will not lead to economic growth. According to the common plan on the achievement of accelerated technological development of Russia by 2024, the share of organizations implementing technological innovations should amount to 50% of the total number (Table 1).

Table 1. Basic share of Russian organizations implementing technological innovations, % (Sorokin: 2018)

Year	2017	2018	2019 (target)	2020 (target)	2021 (target)	2022 (target)	2023 (target)
Share of organizations	16.1	16.5	17.1	19	22	29	39

Additionally, when looking at the issue of upgrading material and technical resources of the country, one must note that the share of industrial enterprises implementing technological innovations at year-end 2016 is at the same level as in 2000 – 9.2 %. In the most technologically advanced countries, this index is at 40-50%.

The creation of the specialized national project “Workforce productivity and support for employment” demonstrates that, in the medium term, economic growth of Russia will be determined by the level and growth rate of workforce productivity. According to the project, workforce productivity growth acceleration in non-resource-based economic sectors must take place at the rate of at least 5% per year by 2014 (Sorokin: 2018, p. 38).

According to experts, workforce productivity growth has tended to decelerate in recent years. For example, its growth in the first half of the 2000s averaged at 5.9 %, whereas in 2010-2017 merely at 1.4%.

As for the prognosis, in 2019, this figure is expected to accelerate slightly to range from 1.7% to 2.9%. The analysis of the workforce productivity dynamics reveals that the goal of workforce productivity growth acceleration appears unattainable without technological reequipment of the respective fields (Table 2).

Table 2. Annual average workforce productivity growth rate in the Russian Federation (2010-2017, %) (Sorokin: 2018)

Economy as a whole	1.4
Agriculture, hunting and forestry	3
Manufacturing	1.4
Construction	-0.1
Transport and communication	1.2
Wholesale and retail trade, repair of vehicles and household goods	-0.2

The process of containing workforce productivity growth in Russia is definitely rooted in a number of factors, such as economic uncertainty, weak domestic demand, workforce shift to high-productivity sectors, technological sanctions, decrease in foreign direct investment inflow, low incentives for entrepreneurs to invest in the fixed capital, and technological refurbishment (Sirotin, Arkhipova: 2017, p. 200). At the same time, workforce productivity growth acceleration appears unattainable without technological reequipment of the respective fields. In view of this, the indicators of productive and economic efficiency of the production, rather than the indicators of technological resource digitalization should be the target indicators for the integration of the technological refurbishment programs and digitalization programs for the economy and economic agents. In this case, digital technologies should be viewed as tools for the growth of such efficiency.

According to the World Bank, ranking 34th (out of 157) in the Human Capital Index rating, Russia is among the countries with a high level of human capital. The focus of state policy on science and education in such countries as Japan, Singapore, South Korea, and other Asian economies allows them to secure leading positions in the world workforce capacity ratings (Fig. 1).

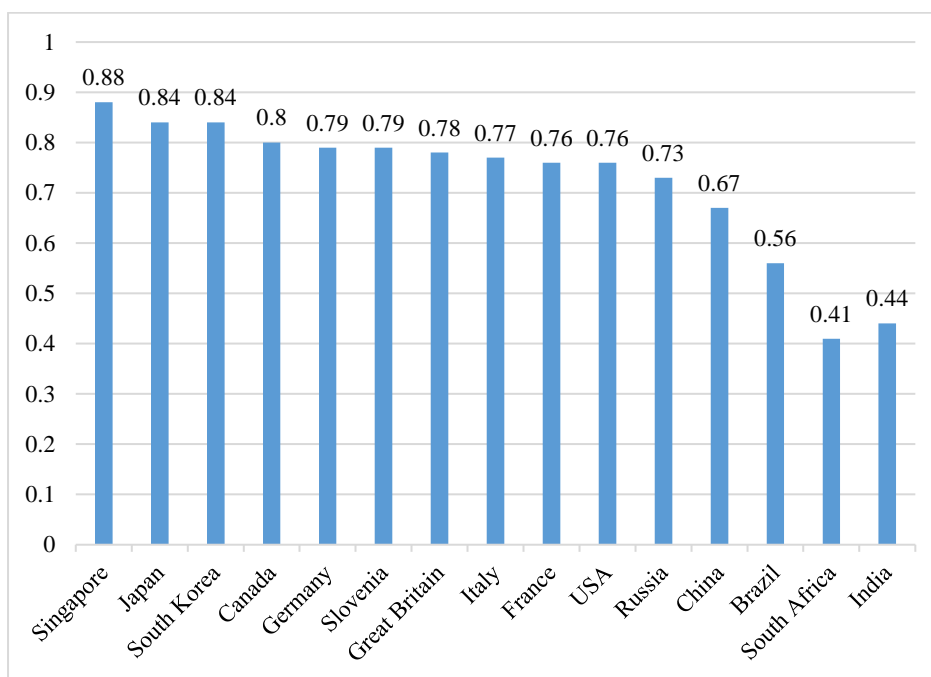


Figure 1. Human Capital Index in selected countries, 2018 (The World Bank: 2019)

A definitive sign of the transition to a digital economy is a significant increase in the share of labor in the field of the processing of data, which is the main resource in the digital environment, which causes the transformation of socio-economic relations (Krasnov: 2010, p. 35). However, a severe shortage of specialists from the required fields and of needed qualification is forecast to cause social difficulties in the coming years. For instance, there is a risk of shortage in new labor resources in the countries with developed market economies, high levels of education, and income, where the promotion of growth and implementation of high-tech innovations in the sectors of the economy is seen as a priority (Ryazanova, Nazarova: 2017, p. 188). In other words, staff shortage might affect the strategy of digital economy development.

Thus, Boston Consulting Group experts believe that due to the rapid development of digital technologies and their implementation in the economy, there will be a shortage of corresponding specialists already by 2020. For example, there will be a 73% shortage in digital product managers, a 26% shortage in front-end developers, a 1% shortage in solution architects, a 45% shortage in back-end developers, and a 71% shortage in UI/UX designers, which will lead to a 30% vacancy rate in the sphere of technologies (Peshkova, Samarina: 2018, p. 61).

In this context, reference should be made to the trend first discovered by R. Solow in 1987, namely that digitalization proves unable to increase workforce productivity. This paradox of

information technology efficiency in the light of the development of the digital economy may be interpreted as the need to create special educational principles and programs, adjust the education system, and upgrade the workers' skills in the context of digital technology implementation.

In view of this, human resources and education became one of the five core development areas according to the program "Digital Economy of the Russian Federation", which was adopted in 2017. This demonstrates the importance of the issue of using human resource potential in the context of digitalization (Resolution of the Government of the Russian Federation: 2017). A special role in the search for the solutions to the problem of structural unemployment caused by the implementation of new technologies is assigned to the Russian education system that should provide all economic sectors and fields with qualified specialists. These specialists must possess a high level of digital literacy, abilities, skills, and competencies that meet the standards of the 21st-century information society.

Providing people of different ages and social situations with opportunities for high-quality education with access to a one-stop-shop service with a wide range of online courses along with the traditional way will create an effective communication system in the field of science, technology, and innovation, as well as increase society's susceptibility to innovation. Thus, according to the state program "Development of education", the number of students in educational institutions that have taken online courses must double in 2020 compared to 2019 and amount to 6,010 people (Resolution of the Government of the Russian Federation: 2017). The system of personal digital state certificates for teaching digital economy competencies to children and adults, as well as the introduction of the "digital equivalent of RLD norms" for prospective university students should be in place already by December 2020. These methods will also allow to accelerate many processes of economic activity and reduce communication time in the long run.

It is worth noting that in the context of digitalization of Russian economy both skilled worker shortage and unemployment will be evident as confirmed by the study by the company SuperJob. Thus, by 2022 about a fourth of the working-age population will be unemployed, but since 2018, there has been an annual trend for the reduction of the amount of low-skilled jobs by 5% in contrast to increasing demand for qualified specialists (Peshkova, Samarina: 2018, p. 65). Total digitalization will unavoidably change the employment structure of the population. Thus, currently, 6.9% of the working population in Russia are employed in the field of agriculture, forestry, hunting, fishing, and fish farming, 8.9% are working in construction, 7.5% – in transportation and storage, 7.6% – in education, and only 2% and 4% are employed in the fields of information, communications, and

professional, scientific, or technical work respectively. This confirms the expectation that in the near future, companies will contend for skilled labor at the stage of digital modernization of the Russian economy (Peshkova, Samarina: 2018, p. 73).

As part of a complex approach to solving the problem of staff shortages in the context of digitalization at the state level, it is necessary to adopt a policy to return young specialists from abroad, creating a perspective for the development of their potential. It is known that the newly created technologies are not in great demand in the Russian domestic market, which leads to an increase of Russian specialist flow abroad due to the inability to continue working in the field of groundbreaking technologies.

After that, since the invention returns approximately in the middle of the innovation cycle with the already substantial added value, Russia acts as an ordinary consumer of products developed and created, in fact, by its citizens.

The creation and formation of a network for the emergence and support of new and relevant professions, as well as support for startups, should also be considered as factors in overcoming the difficulties of digitalization.

4. Conclusions

Currently, the changes in socio-economic relations are caused by the emergence of the informational digital society. Along with great opportunities, the development of the new era of digitalization presents issues connected to the transformation of the current system. The programs of the digital refurbishment of the economy as a whole and economic agents in particular should be accompanied by target indicators not only of technological resource digitalization, but also of production and economic efficiency of the company and, most importantly, by an upward trend in workforce productivity.

In the context of the current transformation of the labor market caused by structural changes in employment in the near future, along with an increase in the level of unemployment, there will be a qualified specialist shortage that will prevent the realization of the national-level activities aimed at the digitalization of the Russian economy. A special role in the search for the solutions to the problem is assigned to the education system, especially to higher education institutions. They are entrusted with ensuring the thorough formation of the specialized competencies needed to workers by developing remote courses of ICT competencies for graduates from all specialties in higher education

institutions and modules of professional retraining for persons who already have higher education. This will facilitate their adaptation to the conditions of digital modernization of production, technological, and economic processes. Given the high rate of digitalization in all economic spheres, it is the opportunity to possess the necessary competencies that turn human resources into the main source of growth for workforce productivity and competitiveness of economic entities in Russia and the national economy as a whole.

In conclusion, it can be justifiably stated that despite the undeniable benefits and existing problems on the way of implementation of the digital economy into Russian practice, digital economy implies modification of organizational and economic connections and processes at every stage, in every economic agent, and within the economy as a whole.

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