

# *Society and Economy in Digitalization Era*

Osipova Elena

Higher School of Economy, Management and Law  
Northern (Arctic) Federal University  
named after M.V. Lomonosov  
Arkhangelsk, Russia  
e.e.osipova@narfu.ru

Shirikhina Elena

Higher School of Economy, Management and Law  
Northern (Arctic) Federal University  
named after M.V. Lomonosov  
Arkhangelsk, Russia  
e.shirikhina@narfu.ru

**Abstract**—A technological structure is a set of technologies that are characteristic of a certain level of production development. Now we are on the threshold of the 6th technological mode, which is just beginning to emerge in developed countries. Its characteristic feature is the improvement of nano-and biotechnology, quantum and membrane technologies, genetic engineering, thermonuclear energy and the like, as well as their active use. This will make it possible to reach an advanced level in the management of the state, economy and society.

**Keywords**—digitalization, digital economy, labour potential

## I. INTRODUCTION

Many years ago, Joseph Schumpeter linked technological structures with the waves discovered by the Russian scientist, economist N. D. Kondratyev.

Currently, there is still no certainty as to what industries, first of all, will be characterized as this new technological structure, but it is absolutely safe to say that it will be biotechnology, nanotechnology, artificial intelligence, human development, design of living, new forms of natural resources use, new methodological tools in medicine, robotics, the highest technology in the Humanities, the design of a futuristic model and mechanisms for its management, methods of formation and elimination of social actors. This will be the era of NBICS technology.

In the context of the formation of the innovative Russian, a large number of factors is important, but meaning and importance of labour potential are invaluable. Features of modern market conditions and the short-term prospect of studying labour potential in the context of innovative development of both the country as a whole, and the region in particular, becomes a more and more actual object of researches of various levels and directions.

## II. METHODS AND MATERIALS

Currently, Russia is lagging behind in the development of labour potential as a factor of intensive development of innovative economy. There are a number of reasons for this, such as, first of all, rather low sensitivity of labour potential to innovative changes, which is manifested in building barriers to innovation, their low adaptability to practical application.

The next point is the lack of highly qualified specialists who are ready to approach the challenges faced by enterprises, who are ready to continue to improve, professionally, effectively

apply their experience, skills in the production process and implement it on a scientific basis and with a high degree of creativity.

The negative aspects include the irrational use of labour potential in general, at the level of the economy of the state, society, industry, and in particular at the level of a specific enterprise, an individual.

Further, there is no regulated technology to create labour potential on the basis of new innovative competencies. And finally, state support in the sphere of formation of labour potential of the enterprise, region, industry, country is not pronounced. The labour potential of any country continues to be one of the most important indicators of economic development.

The creation of a “smart” economy determines the need for the preventive development of Russian science with the indispensable highly dynamic implementation of the achievements of science and technology.

Today, all countries of the world are facing an era of unprecedented changes. The recession and the economic crisis created conditions that radically changed the perception of the global business environment. The era of the digital economy has come.

The digital economy is a type of economy that is based on digital technologies. Sometimes it is also called the Internet economy, the New economy or the Web economy. Today, the digital economy is increasingly intertwined with the traditional economy, making it difficult to distinguish them clearly.

The main issue on the agenda of numerous economic and political events today is the digital economy, and, rather, from the philosophical, economic, practical point of view. The main trend is the creation of an innovative, healthy global economy. The long-term perspective of all economic growth is the introduction of innovation and the realization of the digital economy potential.

The digital economy is a transition from the third industrial revolution to the fourth. The third industrial revolution is otherwise defined as the digital revolution. It is directly related to the changes that took place at the end of the XX century in connection with the switch from analog electronic and mechanical devices to digital technologies. The fourth industrial revolution is based on the digital revolution, as

today's technologies continue to connect the physical world and the cyber world.

The digital economy lies far beyond digitization and automation.

This new form implies a huge number of advanced technologies and platforms that include, but are not limited to Hyper-communication, the Internet and Big Data, advanced analytics, wireless networks, mobile devices and social media.

Unfortunately the digital economy is not just about creation. There are new companies and new ways of interaction. However, many companies and industries that have been unable or unwilling to take advantage of new technologies to change their operations have experienced a decline in sales, a drop in market share, and even a complete collapse.

### III. RESULT AND DISCUSSION

Leading business experts agree that the digital economy is gaining momentum. It shapes and undermines traditional perceptions of how enterprises are structured, how firms interact and how consumers receive services, information and goods. The world economy is also undergoing a digital transformation, and it is happening at a breakneck pace.

There are four main areas of digital transformation for business success in the digital economy.

**Digital supply chains.** It is expected that by 2030 the middle class in the global context will increase by three times, the pressure on core business resources is increasing, which are growing slower by one and a half times. The answer to this mismatch is how enterprises securely share real-time data to allow the next generation of commercial applications to thrive. The digitization of everything is creating new intelligent digital network activities which are radically changing the way of managing, optimizing, sharing, and expanding trade.

**The future place of work.** People regularly work from different offices, their home or local coffee shop. Although the place where we work has changed, we all expect the same level of communication, connectivity, as in a physical office. Therefore, ensuring high-quality, ultramodern digital business processes of a flexible global enterprise is always effective regardless of how employees are distributed across different time zones and continents.

**Customer experience.** In the digital economy all customers in both a business-to-business model and a business-to-consumer model want to interact with business when and where they want, and in the most convenient way for them. In addition, customers want to interact with brands through a multi-channel, direct, contextual, personalized experience.

**Internet of things.** First of all, the Internet of things is a system of interconnected computing devices, mechanical and digital machines, some objects, people or animals, which are equipped with exceptional identifiers and the ability to transmit data through the network, without the need to communicate with a person or a computer. As prices are sensitive to the market and continue to fall, we are on the threshold of an era where everything can be connected – people, businesses, devices and processes – to each other. The fusion of the physical

and digital worlds is driving each asset into a digital realm dominated by software [4].

Thus, the digital economy is the latest economic, social and cultural reality in the world today, the so-called “smart” reality. Today, having started its way in the United States of America, this process under the influence of a new technological wave captures the entire global social, cultural and economic space, is being introduced into almost all spheres of production, replaces industrial and post-industrial technologies with digital, and makes the benefits manifested in goods and services digital.

Today, the digital economy is the engine of economic growth, despite its contradictory consequences, it is an innovative space for joining the efforts of the Eurasian Economic Union (EAEU) and the Silk Road Economic Belt (SREB), as well as the Eurasian Economic Partnership (EAEU) in the format of the EAEU +1 (China).

“The positive effect of digital technologies is directly related to the quality of organizational and human resources... the most important trend in the new economy is not the digitalization of everything, but the increasing role of human intellectual competencies” [6].

Now let's conduct a research analysis of the demonstration of digitalization in different industries.

It is reasonable to start with the education system as it determines the generation and dissemination of new knowledge, skills and competencies.

The education system has not remained on the sidelines, and digitalization affects it quite significantly. It affects differently, and depending on the bias in the education system, universities produce differently trained professionals.

For example, in a number of Western countries and their South-Eastern colonies, higher education is aimed to train specialists as an application to modern high technologies.

In Russia education has always been comprehensive, integrative with a holistic approach that allows one to prepare a versatile creative thinking professionals. Unfortunately, this is not the case at all universities.

Within the framework of digitalization of education, the Russian Academy of Sciences presented a creation project of an organizational and technological platform and a centralized operator of the economy of the digital model with the appropriate infrastructure, which is able to combine server stations and centers that process data obtained from the leading higher educational institutions of our country. This project was called “Digital valley”.

The activities of such organizations as the UN, UNESCO and the world Bank are based on the existing “best practices” in the creation of education systems, which are present in a large part of the OECD countries, and is aimed at their subsequent progressive (educational systems) development, which is designed to solve the problems of harmonization of educational approaches and assimilation in the international educational space, for example, in the rankings of educational institutions such as QS World University Rankings, the Times Higher Education World University Rankings, Webometrics Ranking,

Academic Ranking of World Universities and the international protocols such as the Bologna process, European Higher Education Area.

Digital technologies are making changes in everything from the evaluation process to the management of educational institutions. In addition, they, in their essence, go beyond one nation, one state and specific culture. They are independent of political, religious, ethnic and other systems. The main constraint on the diffusion of technology is only its cost, which means that in principle it is accessible to all segments of society.

Today's situation puts forward new requirements for employees, which consist in a high degree of creativity, maximum flexibility, in addition, employees must be able to operate in a variety of socio-cultural and technological environments, in teams and individually. This demonstrates the changing conditions of basic education.

The trend towards so-called "rapid education" has become particularly clear in recent years, when educational institutions train specialists to perform a narrow range of tasks in a particular workplace. A model of continuous professional learning that allows continually improving the competence level of staff in accordance with the tasks of the production process is relevant now. Often, educational institutions are unprepared to respond quickly to the demands of time and changing demand from the state, society and business structures [2].

But it is important to note that same countries are now seriously thinking about reengineering of their educational systems, as they face a number of environmental factors. So what place does the digital economy occupy in the activities of higher education institutions? Certainly not the last position.

First of all, from the point of view of University management, digitalization allows one to systematize all available data, correlate these data with each other in a more efficient way, with a minimum loss of time, human and other resources.

From the point of view of the competence level of the teaching staff, the digital economy also plays an important role, because it allows one to expand the range and quality of research activities of teachers, as well as to significantly make the educational process more interesting, practice-oriented, and accessible.

In addition, "the introduction of modern information and communication technologies in the educational process contribute to the modernization of higher education" [4, p. 297].

Taking into account foregoing, it is appropriate to say that professionals educated in the spirit of digitalization are able to make production processes more efficient regardless of the industry.

Within the framework of this article, the impact of digitalization on the shipbuilding industry will be considered.

In this area, digital technologies will replace the current full-scale modelling, which is a significant part of the ship-building process. Such examples already exist in St. Petersburg. Since large vessels in St. Petersburg are not built, but only designed

and modeled, the current huge buildings of enterprises in which models are placed will not be needed. In this case, a large number of workers and equipment will be released; firms specializing in the manufacture of such models will be closed. Undoubtedly, the consequences of this will have a social nature and the emerging problems will need to be solved.

As repeatedly noted, modern material production is characterized by the use of increasingly complex and sophisticated technology, high technology, highly qualified personnel. It is here that the accumulated backlog is most acutely affected, and the need to identify and implement mechanisms for accelerated but balanced development is growing.

It is obvious that with the development of the level of scientific knowledge and the possibility of their implementation in the material production in each product (product, object), natural component plays a smaller role but technologies and knowledge are becoming increasingly important.

The techno sphere, which includes instruments of labour and skills of their use, is formed as a system of knowledge embodied in the instrument of production. This very fact serve as a reason for the transformation of generation and transfer of knowledge, their practical application in a specialized and extremely important sphere of social activity. Along with the fundamental science and professional education, which in the technologically developed countries is given increased attention and they consume a significant share of state budgets, the underdevelopment and low efficiency of emerging market mechanisms of technological transfer, which hinders innovation processes, is further manifested in the Russian reality.

In addition, the industry faces more stringent or even new requirements for production and products, including increased criteria for energy efficiency, environmental protection, intellectual equipment and reduction of staff. These changes lead to the redistribution of participants positions in the production process, as well as to the formation of new promising areas of specialization. Access to financial resources and technological modernization are the key factors of preservation even in the domestic market, but, unfortunately, the majority of domestic enterprises cannot boast of this. There is a problem of low productivity and weak competitiveness of products.

Russian industries are characterized by high depreciation of fixed assets, a shortage of qualified personnel, a significant part of imported elements and materials, which makes them unattractive for investors, requires active participation of the state, and limits innovation activity. These problems are more or less related to the industry of any region.

The report of the Ministry of economic development of the Russian Federation for 2016 and tasks for 2017 states that for the global economy recent years have become a period of transition to a new model of development. The rapid spread of the digital economy, the growth of a critical mass of disruptive technologies, profound changes in consumer behavior and preferences are changing the principles of production of goods and services. The boundaries of traditional industries are

rapidly expanding, and the concept of “industry” no longer reflects the essence of economic relations of modern companies with suppliers and consumers of goods and services. Therefore, today it is necessary to form a vision of business models of the future, to link traditional industries with the sectors of engineering and transport, as well as to create mechanisms for finding promising products and providing leadership in new markets. In this regard, one of the priorities of the Ministry in 2017 and 2018 is the formation, together with the Federal Executive authorities and the business community, of new sectorial strategies in key sectors [6].

The tasks of digitalization of the economy in accordance with the achievements of scientific and technological progress have become a real necessity to ensure the competitiveness of industrial production, are closely related to the implementation of the Strategy of scientific and technological development of the Russian Federation and the practical implementation of projects of the National technological initiative.

At the same time, in recent years, manufacturing enterprises have appreciated the advantages of digital capabilities and advanced production technologies, effectively introducing additive methods and new non-traditional materials in everyday practice. First of all, this applies to aviation, automotive and shipbuilding enterprises, as well as to certain areas of machine-building production.

Shipbuilding is an industry that is considered to be conservative, but it also makes full use of information technology. For example, three-dimensional scanning and printing already allow to play objects of complex spatial forms, previously virtually inaccessible for practical use. As a result, for shipbuilding and ship repair there is a possibility of significant production processes optimization. Additive technologies can reduce the cost of manufacturing parts and significantly save time on their production. At the same time, many traditional methods are clearly outdated and hinder the implementation of promising projects.

For the decision of tasks in the shipbuilding industry, specialists already used 3D scanners and rangefinders for industrial, domestic and imported software for simulation or analysis of the digital mock-up control all stages of production. In particular, 3D printing can solve the problem of transportation and storage of spare parts, because the desired part can be scanned and “printed” from existing raw materials directly at the location of the repaired object.

Despite the high cost of appropriate equipment and limited choice of materials, as well as large initial investments and additional requirements for personnel qualification, the effect is so significant that these restrictions will not be so essential in the near future.

Production digital technologies begin with a single information space, which to some extent is implemented in domestic shipbuilding enterprises, most of which are part of JSC “United Shipbuilding Corporation”. 3D-models are used in design bureau and in the production. Because of them, experts produce drawings, they also become the basis for engineering calculations, simulation and writing programs for machines. In PDM-systems there are published product data, documented

processes and road maps, also paper drawings and paper technology notice are saved. Full information interaction of design bureaus and almost all construction plants is already being carried out by the transfer of design documentation and data to ensure the construction of orders. At the shipyards, 3D models obtained from the design bureaus are used to organize the processes of metal cutting, equipment layout, modeling of pipelines and cable runs. At the same time, more than 70% of enterprises belonging to JSC United Shipbuilding Corporation use automated systems for planning and monitoring the progress of work, some of which are formed in the integrated planning and accounting unit for the state of production.

The use of modern technological capabilities, new materials and digital technology is rapidly changing the face of production; it became possible to use “smart models” and digital counterparts (smart digital twins) as products and production facilities. This lays the groundwork for the formation of “Factories of the future” and “Internet of things”.

According to experts, by 2035 the Russian Federation will be in the top-10 countries in the rankings, taking into account the introduction of advanced production technologies as a factor in the growth of the industrial potential of the country, for example, Global Manufacturing Competitiveness Index.

By 2035, a number of Russian companies should appear with a capitalization of more than \$10 million, which will become suppliers of advanced production technologies and integrated technological solutions for the production of a new generation in the global market. Russia's share in the target market of design and engineering services of “Factories of the future” by 2035 may reach 1.5%, which will be provided, among them those using formation of technological chains, development of pilot projects based on the best world-class technologies in various sectors of economy.

At the same time, many enterprises beginning to use digital technologies do not have a targeted corporate strategy and in fact focus on selective automation, replacing digitalization with simple digitization.

#### IV. CONCLUSION

It is obvious that different industries and enterprises are differentiated in their susceptibility to digitalization and introduction of elements of “industry 4.0”, differ in both the basic incentives for transformation and the basis for technological transfer. Currently, the main regulators of “digital activities” and technological modernization are government regulation (national targets and government funding), the efficiency of the business environment (emerging markets and high profitability) or the adoption of foreign technologies (the products of mass demand and large Assembly plants).

Speaking about the future of shipbuilding, it is possible to rise above the problems of reality and look into a much more distant future, the basis for which is already being laid. If earlier the transfer of production to the figure, access to the Internet was something of an advantage for the company, now it becomes a necessity. And the main trends that are used by the digitalization of production in shipbuilding are artificial intelligence, augmented reality, green technologies, Internet of things, robotics, drones, etc.

Therefore, along with the digitalization of the economy, the transformation of industrial production, the solution of problems of technology transfer, the introduction of innovations in traditional enterprises, it is necessary to solve related social problems, improving the structure of employment and vocational education.

Much of this is already being applied today. Our digital future depends on the synergy between all these components.

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