http://dx.doi.org/10.47475/9785727117026
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Selection and peer-review under responsibility of the Organizing Committee of the conference
ISBN 978-5-7271-1702-6

IV International scientific conference «MEDIAEducation»: vectors of integration in digital space

THE CHALLENGES OF DEVELOPMENT OF DIGITAL ECONOMY IN RUSSIA

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Abstract

The comparative analysis of the level and structure of the investment in the development of high-tech and science-based production is carried out revealing the trend of technological lagging of Russia from economically developed countries. The main global trend of high-tech industries is marked as connected with the development of such sectors as telecommunications, business services, manufacturing industry. The review of factors, events and perspective directions of further development of hi-tech and science-intensive industries in some countries of Asia and Latin America is also presented. The statistical review of the main economic indicators of development for 2010-2019 has shown up the positive and negative directions of activity of certain sectors of hi-tech and knowledge-intensive branches of domestic economy. The trend of Russia's technological lagging behind the European Union countries, the United States, many Asian and Latin American countries is due to the strong dependence of the economy on the extractive and manufacturing sectors, as well as the lag of economic development as a whole. To overcome this gap the state investment is needed in the priority sectors of the national economy, the review of which is presented in the article. The goals, objectives and forecast indicators formed in the Russian government program for the development of high-tech industries are defined

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Keywords: digital economy, digital technology, knowledge-intensive services, high-tech industries, information culture, digital literacy.

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1. Introduction

Currently, the steady growth in the development of high-tech industries is observed in the world economy. The countries such as the USA, Japan, Germany, Great Britain and France have the most significant scientific, technical and technological level of production. Asian countries, such as South Korea, Malaysia, Singapore, Hong Kong and India, have made a rapid breakthrough in the development of production technology. The main feature of the development of these sectors is a synergetic effect on the development of other sectors of a country, both adjacent and not related to high-tech production.

The economic growth is inseparably linked with introduction of new technologies. The development of digital economy offers entrepreneurs innovative opportunities for effective running of real business, increase of profits and reduction of costs. To maintain the grows of home digital economy it is necessary not only to develop the national IT-sector and stimulate the creation of national digital innovative technologies but also to provide the cooperation on the international level. The state program of development of digital economy adopted by the government of the Russian Federation in 2017 proclaimed as the main goal to overcome Russia's lagging behind world's level in this sphere. The main tool for reaching the goal is digital transformation of activities in various fields such as public administration, health care, education and economy. The main task is supposed to be formation and development of the infrastructure of data storage and processing in which all the processes and transactions are based on modern digital technologies

2. Problem Statement

Statistical data show that the United States has the highest share of information and communication technologies (ICT) investment in all domestic industries (measured as the share of the industrial expenditure for ICT in the volume of value-added products) which is 4.7. The most economically developed countries have the following indicators: Japan - 3.2, China - 3.1, the EU - 3.0. Among ICT industries, the United States has significantly higher level of ICT investment in manufacturing industries with medium-high technologies (4.9) and commercial science-intensive services (6.1). The high level of the USA investment in ICT in commercial high-tech services is due to coincidence with the global dominance of the United States. The rate of ICT investment of the other three countries is much lower than that of the United States, China (4.8), the EU (4.6) and the USA have the same level of ICT investment in high-tech manufacturing industries. The share of Japan (1.9) is substantially lower (Organisation for Economic Cooperation and Development (OECD), 2001).

Indonesia has succeeded greatly in the development of commercial science-intensive services (National Science Board: Science and Engineering Indicators, 2014). In the period of 2007-2016 the volume of these services has more than doubled, increasing by 40% faster than the average for all developing countries. The three separate industries grew at the fastest rates - telecommunications, business services, high technologies of manufacturing industry. The growth of these sectors has helped to reduce the country's budget deficit to a large extent and increase the funding for state programs to improve education, health and technological development. Another important advantage of Indonesia was the overcoming of the recession, facilitated by high domestic demand (which accounts for about two thirds of the economy) and the governmental fiscal stimulus set of about 1.4% of the gross domestic product (GDP).

Another positive example of the considerable development of high-tech industries is Australia. The country's commercial services grew four times faster than the average in all developed countries between 2003 and 2016. The financial sector had the fastest growth pace among commercial services, while telecommunications and business services were growing much slower. High-tech manufacturing industries in Australia developed significantly faster than the average of the country, mainly due to the rapid growth of the pharmaceutical industry, the development of which affects, among other things, the indicators of the manufacturing industry. It should be recognized that Australian economy has been growing steadily for more than 20 years, and this fact has helped it (one of few developed countries) to avoid a global recession (National Science Board: Science and Engineering Indicators, 2014).

For the period of 2003-2016, the manufacturing industry of Brazil in the field of high technologies has risen more than two times faster than the average in all developing countries except China. Pharmaceuticals, aviation and aircraft have led to the growth of the Brazilian high-tech industry. Brazil's pharmaceutical industry has been enhanced with the establishment of manufacturing plants by foreign multinational corporations to increase their profits from the growing Brazilian consumer market. Brazil is one of the world's largest aircraft manufacturers, therefore the considerable investments were made in ICT for development of space and satellite communication (Biryukova & Matiukhina, 2016, Perminov, 2019).

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Another example of the significant growth of knowledge-intensive high-tech industries is India's pharmaceutical industry. In general, the pharmaceutical industry is highly competitive all over the world, its development has led to the growth of manufacturing industries (in the period from 2003 to 2016 volume of production in the manufacturing industry has increased fourfold). Currently, the pharmaceutical industry of India is one of the world's largest manufacturers of generic drugs and produces medicines for Western pharmaceutical companies. India has also reached the significant growth in the field of ICT and electronic industry, of knowledge-intensive high-tech industries. In most cases, the production of ICT was connected with a low added value at the enterprises controlled by foreign multinational companies. The government of India has announced its strategy of strengthening the electronics manufacturing industry, which involves improving efficiency of national enterprises, their development, and increase of value added (Nisha, 2015) .

The total impact of the sized applications could amount to $240 billion to $500 billion a year by 2025. Given the contributions of these sectors to India's GDP, MGI estimates that across the entire economy the 12 technologies could have a combined economic impact of $550 billion to $1 trillion by 2025 (Nisha, 2015) .

Thus, the main global trend of high-tech production is associated with the development of such sectors as telecommunications, business services, manufacturing industry.

3. Research Questions

Digitalization of the economy is important not in itself, but as a means of improving the quality of life, as a tool for social integration of citizens, including people in active public life. The problem arising in connection with wide-spreading of modern information technologies has a very important aspect - a humanitarian one. The process of development of the digital economy needs not only increase of the general cultural level of digital economy subjects but also targeted the perfection of their information culture.

4. Purpose of the Study

The purpose of the research is to identify trends in the development of information technologies and challenges of digital culture in Russia.

5. Research Methods

A comparative analysis of statistical data presented by National Science Board NSB Science and Engineering Indicators allows assessing the levels of development of informational technologies in different countries. The overview of normative documents and programs developed by Russian government will reveal the trends of IT development and challenges of digital culture in Russia.

6. Findings

In Russia, the ICT sector determines the results of the development of knowledge-intense industries: It accounts for 90% of the gross value added and 87% of the employed in this field of the economy. In 2016 the national ICT sector accounted for 166 thousand organizations with 1.4 million people employed. Commercial organizations own two-thirds (63%) of the authorized capital of the sector, Federal Executive authorities - 30%, individuals - about 4%. Other shareholders (founders) share less than 3% of the authorized capital. The share of ICT sector in the GDP amounted to 2.9% in 2016. The volume of gross value added in real terms reached 2265 billion rubles, which meant an increase of 19% in constant prices in comparison with 2010 (2.7 times higher than GDP growth) and a decrease of 5% in comparison with 2015 (On the concept of long-term socio-economic development of the Russian Federation for the period up to 2020, 2018).

In the branch structure of the value-added sector, telecommunications (39 % cent) and ICT service providers (31 %) account for the largest share. Over the past five years, the role of these segments has changed structurally: the share of telecommunications has decreased by 20 percentage points, while ICT services have increased by 1.6 times (Selskyi, 2019).

According to the dynamics of gross value added in 2010-2016, the maximum results are demonstrated by the organizations of the information technology (IT) industries (1.9 times increase in constant prices) and wholesale trade of ICT goods (1.5 times). For the period under review the growth did not exceed 8% in the industrial organizations of the sector, a decrease of 7% being in the telecommunication organizations. Only wholesale trade organizations showed positive dynamics in 2016 (109% by 2015). The IT industry showed 94% of the results of 2015, telecommunications – 93%, equipment production – 96%. In 2016 organizations of the sector invested 489 billion rubles in the fixed assets, which is 9% more than in 2010 (in constant prices). For comparison, the growth in the economy as a whole amounted

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to 5%. The most active investment sector is telecommunications. The industry organizations provide 76% of investments in the fixed assets of the sector. It is followed by organizations engaged in the production of ICT equipment (13%) and the provision of ICT services (10%) (Information for All Programme (IFAP) , 2019) .

The trend of Russia's technological lagging behind economically developed countries is due to the strong dependence of the economy on extractive and manufacturing industries. In terms of its level of development, Russian national economy is inferior to the countries of the European Union, the United States, many States of Asia and Latin America. Domestic high-tech exports account for only 1.2% of Chinese exports, 3.7% of the USA exports, and 4.3% of Japanese exports (Hill, 2014).

The beginning of the overcoming of such technological backlog was marked with the Federal Target Program "Electronic Russia (2002-2010) " (Hill, 2014). The program was targeted on the future and declared innovative approaches but used the old tools of economic analysis. The program operated with indicators which are not characteristic of the digital economy.

It is known that the indices of national economic programs do not often reflect the real life of the country. This fact was noticed by R. Kennedy in 1968: "Gross National Product counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armoured cars for the police to fight the riots in our cities. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children. Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile" (Remarks at the university of Kansas, 1968) .

In order to overcome such a significant backlog, the government of the Russian Federation has worked out the program for the development of a number of high-tech industries.

Thus, the goal set for the aircraft industry and engine-building is to achieve 10-15 percent of the world market level in sales of civil aircraft equipment in 2020-2025. The share of the rocket and space industry in the global space market should increase from 8 per cent to 15 per cent during this period.

The growth of production in the shipbuilding industry in 2020 should be 3.6 times compared with 2015, labour productivity being increased by 4-5 times.

The goal of the nuclear power industry to achieve in 2020 is to obtain capacities of 50-53 GW and create power units of small and average power for broadening the supply of the operating nuclear power plants.

The volume of equipment and technology exports in 2020 should be reached at least 8-14 billion US dollars per year (in 2006 prices) (Hill, 2014, Digital economy of Russia: development program, 2019) .

The purpose of the development of is to maintain the growth rate of the information and communication technologies market, exceeding the average annual growth rate of the economy by 2-3 times, the share in the gross domestic product being more than 10 per cent. The main direction of development of the sector is the exceeding of exports of information technology over the volume of imports of these technologies

To overcome the backlog of digital level of Russian economy from that of other countries it is necessary not only to develop digital technologies but also to improve the life quality of the Russians that means the following steps.

- An increase in per capita income and household income.
- Decrease of number of poor people.
- Improvement of social welfare of citizens (old, sick and unemployed).
- Perfection of the public health.
- Perfection of the civil infrastructure and formation of the civil society.
- Improvement of ecological circumstances for living and protection of the environment.
- Development of technologies, equipment and gadgets making people's life more comfortable.
- Providing the high level of education and intelligent level of life (Digital economy of Russia: development program, 2019).

The authors believe that the digitalization of the economy is not important in and of itself, but as a means of improving the quality of life, as an instrument of social inclusion of citizens, of including people in active social life. This understanding of the priorities of the digital economy makes it possible to

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correctly focus attention in economic programs from gross production and financial indicators to social indicators of the quality of life.

In 1996 in its program documents the government of Canada proclaimed the transition from technics-economic strategies to the social inclusive policy in the field of digital economy. The term "social integration" was firstly mentioned in the Canadian "Information Policy Research Program" in 1998 (National Science Board: Science and Engineering Indicators, 2014) .

In July 2017 the Russian government worked out and approved the Program "Digital Economy of the Russian Federation" (Digital economy of Russia: development program, 2019) . The Program is a logical development of the Federal Target Program "Electronic Russia (2002-2010) ", the State Program of the Russian Federation "Information Society (2011-2020) " adopted earlier, and it is focuses on realization of "The Strategy of the Information Society Development in the Russian Federation for 2017-2030" (About Strategy of development of information society in the Russian Federation for 2017-2030, 2019) . Realization of the considered Program is being carried out in accordance with the proper targets, tasks, directions, volumes and terms. The Program formulates the main measures of governmental policy of the Russian Federation for creation of necessary conditions for the digital economy development. The authors of the Program (the Russian government) consider the digital data to be a key factor of production in all fields of social and economic activity. Availability of digital resources improves the competitiveness of the country, the living quality of the Russians and provides the economic growth and national sovereignty.

The main vector of the Program is its focus on creation of conditions for development of the society of knowledge in Russia. Building of such a society will lead to increase of welfare and living quality of the country's citizens by providing the availability of high quality goods and services. The authors of the Program also consider the living quality of the population to be improved by increasing the level of awareness and digital literacy of the citizens. Development of digital resource basis will result in creation of necessary legal, technical, organizational and financial circumstances for integration of digital economy of Russia in the space of digital economies of countries - the members of the Eurasian Economic Union.

The main directions of the Program on the federal level are the following:

- normative regulation if digital environment;
- information infrastructure;
- trained human resources for digital economy;
- informational safety;
- digital technologies;
- digital public administration.

Though, the considered Program has certain shortcomings. The offered measures are of the federal level, therefore the role of regions in digitalization of the economy is not defined. The circumstances created for application of digital technologies in the certain subject of the Russian Federation are not reflected and differed in levels. It would be advisable to accentuate not support of digital companies in regions but digitalization of traditional industries. To do this the subjects of economy should formulate the targets of digital technologies application based on their own needs, circumstances and recourses, and put them into regional programs of social and economic development.

Another important side of the considered program must be offered measures of business motivation to invest in the projects of increasing the digitalization level of a region.

One of new opportunities for fund-raising is the fact that nowadays information technologies are objects of concession agreements and those of agreements on public-private partnership (in accordance with the articles 1 and 3 of the Federal Law № 173 - FZ, 29 June 2018) (About modification of certain legislative acts of the Russian Federation, 2018).

Thus, before normative consolidation of the targets and tasks of regions for realization of the project "Digital Economy" (Directions of the "Digital economy", 2019) it is necessary to use all existing opportunities of digital technologies introduction to apply the positive experience, tested in other regions, to use all the available sources of funding, to integrate already created digital platforms into new projects, to provide training of personnel having knowledge in the field of digital technologies. At the same time, the realization of large-scale technological projects without creating a single system of management of digital transformation of the regional economy on the level of each subject does not have any perspective.

Information or digital culture is a new direction which emerged in the process of creation of the infosphere. It is this process that made the development of the information culture especially actual. According to the indicators-targets of the Program "Digital Economy of Russia" (Directions of the "Digital economy", 2019, Digital literacy, 2019) the part of population owing information skills must reach 40%. Therefore, the development of digital economy has risks not only in the technological and financial

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spheres but first of all in the humanitarian one. Otherwise the population will not be ready to perform the role of an economic subject in the digital space.

Development of economic, political and social processes of the modern world of the early nineties needed to change the paradigm of competence approach development and formulation of main competences of a person. The initiator of these new approaches to competences of a person was the Organization for Economic Cooperation and Development - OECD, economic reviews of which revealed the shortages of adult people competences having the destructive impact on the economic development of Europe. All human competences emerge from the needs of an individual and individual's abilities to reflect and assess his or her own activity. Reflection as an ability to comprehend your own activity is the most important in the structure of competences. It provides the ability not only to apply usual knowledge and skills to a certain situation but also to change yourself, to learn from your experience and to act critically.

The ability to use a digital technology on-line is determined by technological innovations typical for our time. Technological novelties create new requirements to an individual which are necessary on the work place and out of it. At the same time, the technological progress created new people, i.e. people having new opportunities.

The head of the direction "Staff and education" of the autonomous non-commercial organization "Digital Economy" A. Selskyi (2019) believes that improvement of the education system must provide the digital economy with competent personnel by transformation of labour market and creation of stimulating system for gaining of needed competences and the participation in the development of the digital economy of Russia. But the subjects of the economy are not only the personnel but also people as the target of development of the digital economy. If the development of the economy itself is possible by forming the import/export balance of high-tech products and informational technologies then the import/export of population is impossible.

Digital literacy studies (digital literacy index) (Digital literacy, 2019) show the presence of digital inequality in regions where the leaders are Central and North-West Federal Districts, outsiders are Far Eastern and Southern Districts, Siberia having middle values. The studies show the change of citizens' attitudes to the digital economy. People's attitude to digital services if of a pragmatic character people use them properly in cases when their usage makes the process of solving some tasks easier. So slogans and training do not stimulate people to enter the digital economy but the economic reality did.

Ursula Maier-Rabler (2002) considers that the techno-deterministic strategies of e-policy have to be enhanced with individual-orientated psycho-social factors. This conclusion can be related to the digital space of the modern economy. Please replace this text with context of your paper.

Interactive usage of modern technologies requires the understanding of new ways which a person can use in his or her private life. Information and communication technology give people an opportunity to shorten the distances providing an easier and faster access to a work place, making the real location of people unimportant for teamwork, facilitating regular relationships of people all over the world. To use such potential individuals must only use the Internet, e-mail, etc. A technology can be used online, provided that users understand its character and it affects the personality's potential. It is very important that a person can connect the opportunities of informational technologies with his or her own living circumstances and personal goals. Therefore, these technologies need to be incorporated into normal activities, which will lead to an increase in their use.

The information culture is not so related to an individual as to the society. The information culture (like culture in general) is not a mechanical sum of all acts of information activity of people, but the socially developed system of normative technologies and evaluation criteria for informational behavior. And it should be noted here that the modern society declare its orientation on "stimulation of cultural diversity" (Information for All Programme (IFAP) , 2019) . This definition allows tracing the main thesis of the UNESCO's program "Information for All" and revealing that the main goal of every activity is connected with an individual's culture projected through his or her informational competence. Cultural diversity of the modern world is mostly connected with opportunities of information access, i.e. availability of modern information technologies.

7. Conclusion

In conclusion, it should be recognized that the most cost-effective policy for the domestic economy is the export of the main share of manufacturing products, especially high-tech and knowledge-intensive industries. In order to gain the most significant competitive position in the world markets of high-tech products, Russia should strive to increase the fixed level of share in global exports of these products, and most importantly to find strategic partners. This, in its turn, would allow accessing to new markets and innovative technologies, as well as deter the entry of other competing countries into strategic markets.

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Development of the digital economy and achievement of the goals of the Program "Digital Economy of Russia" such as "improvement of the well-being and quality of life of citizens by increasing the availability and quality of goods and services produced in the digital economy using modern digital technologies" is not possible without formation of digital economic competencies of the population (Digital economy of Russia: development program, 2019).

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http://dx.doi.org/10.47475/9785727117026
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ISBN 978-5-7271-1702-6
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