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**Development of
Entrepreneurial
Competencies in the
Economy (Evidence From
Digital Entrepreneurship)**

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Аннотация

The article defines the essence of competencies and in particular, entrepreneurial competencies, reveals the development features of the entrepreneurial competencies in the context of the digital economy, as well as considers the formation mechanisms of digital competencies, and offers the ways of their further development. The purpose of the article is to consider ways, methods, and tools for the development of entrepreneurial competencies in regard to digital entrepreneurship. The methodology includes a set of empirical

(observation, generalization, inference) and quantitative (statistical analysis, dynamic analysis) research methods. Main research results.

Содержание

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Abstract

The article defines the essence of competencies and in particular, entrepreneurial competencies, reveals the development features of the entrepreneurial competencies in the context of the digital economy, as well as considers the formation mechanisms of digital competencies, and offers the ways of their further development. The purpose of the article is to consider ways, methods, and tools for the development of entrepreneurial competencies in regard to digital entrepreneurship. The methodology includes a set of empirical (observation, generalization, inference)

and quantitative (statistical analysis, dynamic analysis) research methods. Main research results. In terms of professional digital skills, the main objectives in the education segment include implementing approach taking into account the competence, end-to-end (cross-platform) digital competence; increasing the proportion and improving the training quality of ICT specialists; implementing a career guidance program in schools, vocational schools, and universities to identify the ablest students to work in the digital sphere; developing social elevator in the ICT sector, encouraging the development of youth digital entrepreneurship; updating the Standard Classification of Occupations, i.e., developing and approving the digital professions list (based on the requirements of the labor market and digital trends), and implementing them in specialized educational institutions. Applicable scope. The need to reform the education system in accordance with modern requirements, revision of curricula in accordance with the needs of the labor market and the requirements of employers. Conclusion. Today, digitalization and cross-platform competence are the main trends in the general labor market. The ability to use digital technologies in work is gradually becoming necessary for most specializations and occupations, i.e. is becoming end-to-end or cross-platform. Through the use of online technologies, citizens can more effectively acquire knowledge, abilities, and skills in many other areas (for example, learn languages, subjects, learn professions, etc.). Accordingly, digital literacy should be one of the key

entrepreneurial competencies.

Keywords

Competencies – Digitalization – Digital economy Formation and development of digital competencies

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Introduction

Active application of digital technologies in all areas of economic activity, i.e. economy digitalization has been taking place over the past few decades. The current stage can be identified as the one during which the processes

of digitalization have become particularly intense. There are many aspects of digitalization, one of which is the need for all members of society to acquire digital competencies. For each individual, the acquisition of proper digital competencies is of crucial practical importance: currently, most areas of economic and business activities refuse to work directly with commercial customers and use information and communication technologies for remote communication and service. Therefore, the concept of digital competencies is constantly expanding, and it can no longer be limited exclusively to the educational field.

Materials and methods

The very concept of digitalization and its derivatives have been established in the scientific community relatively recently. It can be assumed that this concept is one of the newest in science in general. The first mention of digitalization comes in the early 1990s: then, against the background of large-scale penetration of computer technology in everyday life, it became clear that this phenomenon cannot be simply reduced to just one of the manifestations of scientific and technological progress. Tapscott D. and P. Samuelson were the authors, who laid the foundations of scientific research in digitalization as a particular phenomenon. In turn, the term of digital economy first appeared in 1995 in connection with the development of economic relations, which were based on the use of digital

information and communication technologies. Since then, this term has entrenched in modern scientific circulation. In 2001, Thomas Mesenburg identified three main components of the Digital Economy concept, namely, supporting infrastructure (hardware, software, telecommunications, networks, etc.); e-business (how business processes are conducted through computer networks); and e-commerce (transfer of goods over the Internet). Currently, there is no single approach to the definition of digital economy among scientists. Thus, S. Kolyadenko considers the digital economy as such, based on the production of electronic goods and services by high-tech business structures, and the distribution of these products through e-commerce¹. Karcheva G. defines the digital economy as an innovative dynamic economy based on the active implementation of innovation, information and communication technologies in all economic activities and living environments that allows increasing the efficiency and competitiveness of individual companies, the economy, as well as the standard of living of the population².

The digital economy is seen as "a set of relationships that are formed in the areas of production, distribution, exchange, and consumption, based on online technologies and aimed

¹ S. V. Kolyadenko, "Cifrovaya ekonomika: predposylki i etapy stanovleniya", *Economy. Finance. Management*, num 6 (2016): 106.

² G. T. Karcheva, "Cifrovaya ekonomika i ee vliyanie na razvitie nacional'noj i mezhdunarodnoj ekonomiki", *Financial Space*, num 3e Vol: 27 (2017): 14.

at meeting the needs for the benefits of life"³. This involves the formation of new ways and methods of management. The digital economy leads to the digital transformation of all life spheres, providing them with significant economic and social effects, which in turn opens up new opportunities for the development of entrepreneurship. The rapid development of digital technologies, their penetration into traditional business, the emergence of new types of digital products and services, the mass use of online channels result in the restructuring of business processes, the transformation of business models, marketing management systems, as well as changes in consumer behavior. Professor U. Brenner of the University of St. Gallen in Switzerland states: "Aggressive use of data transforms business models, promotes the emergence of new products and services, creates new processes, generates great utility, and introduces a new management culture"⁴. Innovative business models (freemium, on-demand, crowdsourcing, crowdfunding) allow entrepreneurs and companies to conduct business activities without their own IT infrastructure and software (cloud business, IoT), without their own tangible assets (co-sharing), and without warehouses (dropshipping). The problems of digitalization, the digital economy, and entrepreneurship quickly covered

³ L. V. Lapidus, *Cifrovaya ekonomika: trendy i perspektivy avangardnogo haraktera razvitiya* (Moscow: INFRA-M, 2018), 18.

⁴ What is the digital economy? Unicorns, transformation and the internet of things. Retrieved 01.08.2019 from www2.deloitte.com/mt/en/pages/technology/articles/mt-what-is-digitaleconomy.html

the scientific community. A large number of specific areas were identified, within which certain aspects were considered. However, the issue of digital competencies was considered for a long time only in the context of the educational process and the need to revise educational programs.

In turn, **competency** is "a group of interrelated behavioral actions, which, when they are manifested by the candidate and considered by the observer, characterize *competence* in a specific aspect of the work performed"⁵. The concept of **competence** is broader than **competency** because the latter is included in its composition as the ability of the individual to carry out effective professional activities, using knowledge and skills in practice. The components of competency are presented in Fig. 1.

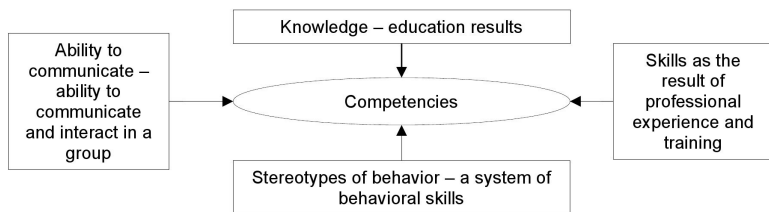


Figure 1
*Competency components*⁶

⁵ A. I. Kondratenko, "Teoreticheskie aspekty postroeniya modeli kompetencij personala", *Alleya Nauki*, num 1 Vol: 17 (2018): 264.

⁶ E. V. Sleptsova and M.Yu. Tumanova, "Upravlenie kompetenciyami v sisteme upravleniya personalom", *The Economics of Sustainable Development*, num 3 Vol: 35

It should be noted that the specialists of any scope of activity must possess general competence (a person's ability for analysis, synthesis, general knowledge, the ability for independent learning, collaboration and communication, commitment, leadership, organized nature, and ability to plan⁷), necessary for existence in social medium, as well as for resolving any situations not even related to a specific professional activity. Along with the general competence of any specialist, there are professional competences, corresponding to the type of activity, specialty, necessary specific knowledge, experience, and personal qualities. Vasilyeva E.V. identifies the following types of competencies in the concepts of competency-based learning of the European Higher Education Area (Fig. 2).

Instrumental competencies
Skills and cognitive abilities required for professional competency
Interpersonal competencies
Empathy, social interaction and cooperation skills
System competencies
Ability to plan for change
Specific competencies related to each profession

Figure 2

(2018): 293.

⁷ O. K. Chulanova, Upravljenje personalom na osnovе kompetencij (Moscow: NITS INFRA-M, 2018), 75.

Types of competencies in terms of competency-based learning of the European Higher Education Area⁸

Professional competence should be considered as an integrated result of the acquired experience associated with the acquisition of professional knowledge, the ability to use their totality in professional activity, the formation of the relevant personal qualities of the individual. Employee's competence is formed on the basis of existing competencies (knowledge, skills, and abilities), as well as the motivation of employees. The last component is very important because the employee can use the existing potential for benefit of the enterprise only if highly motivated. In a competitive environment, the main priorities of professional competence of the specialist are the ability to adapt to rapid changes and new needs of the labor market, be proficient in information technology, more active, make decisions quickly, and learn throughout life⁹. In terms of practical psychology, entrepreneurial competence is a personal quality, ability, and behavior model, necessary to solve successfully certain business tasks and achieve high results in entrepreneurial activity. In the European Reference Framework (Key Competencies for Lifelong Learning),

⁸ E. V. Vasilyeva, "Kompetentnostnyj podhod v gosudarstvennoj sluzhbe: kakie znaniya i navyki vybirayut gossluzhashchie?", Public Administration Issues, num 4 (2018): 122.

⁹ E. I. Pudlina, "Sushchnost' ponyatiya «upravlencheskaya kompetentnost'», Akmeologia, num 3–4 (2014): 147–148.

entrepreneurial competence is interpreted as an individual's ability to translate ideas into the economic life, as integrated quality, which is based on creativity, creative activities, innovativeness, ability to take risks, as well as the ability to plan and organize entrepreneurial activities¹⁰.

Currently, science-intensive industries, such as, in particular, biotechnology, genetic engineering, and computer programming are actively developing; labor efficiency is growing. This has direct impact on improving living standards. The digital economy stimulates relatively high incomes based on small capital and a small number of employees. At the same time, in the field of solving problems in a technologically rich environment, the Russian population is noticeably behind the population of the OECD countries. In particular, Russia recorded low growth in the dissemination of key information and communication skills among its residents, especially in the field of elementary digital literacy. The country lacks monitoring of adult competencies: when testing the assessment of competencies, it was revealed that 33.6 % of Russian testees did not know how to use the keyboard and mouse (while in OECD countries this figure amounted to just 19.5 %) ¹¹.

¹⁰ Definition and selection of competencies. Theoretical and conceptual foundations (DESECO). Strategy paper on key competencies. An Overarching Frame of Reference for an Assessment and Research Program – OECD (Draft), 2018, 8.

¹¹ E. D. Rylko, Naskol'ko kompetentny segodnya vzroslye rossiyanе. Results of the Program for the International Assessment of Adult Competencies (PIAAC) in the Russian Federation. Moscow, National Research University Higher School

The approach, given by different authors to the formulation of competencies for successful employment in the digital economy varies. Thus, some authors¹² argue that there should be four main types of competencies: professional, communicative, information, and digital; while the others¹³ write that in relation to the digital economy, a paradigm of the terms, such as *hard skills*, *soft skills*, and *digital skills* reflecting the drastic changes in the education sphere, has emerged.

There are also several approaches to understanding the content of the *digital competencies* concept. According to one of the generally accepted interpretations, digital competencies (relative to a certain person) are the knowledge and skills, which are necessary for the correct, effective, and safe use of digital technologies, as well as existence in a society, which is saturated with digital technologies¹⁴.

Thus, the review of the materials on the topic of the article allows highlighting the essence of the problem: in the emerging digital reality, the requirements for competencies are changing.

of Economics. 2015. 79. Retrieved 01.07.2019 from http://piaac.ru/wp-content/uploads/2015/05/Report_PIAAC_RUS.pdf

¹² I. L. Sizova and T. M. Khusyainov, “Trud i zanyatost' v cifrovoj ekonomike: problemy rossijskogo rynka truda”, Bulletin of St. Petersburg State University, Vol: 10 num 4 (2017): 376–396.

¹³ Chemu ne uchat v universitetah. Nizhny Novgorod, Professional Science Publishing House, 2018. Retrieved 01.08.2019 from www.vedomosti.ru/opinion/articles/2017/08/03/727760-ne-uchatv-universitetah

¹⁴ K. M. Kraus; N. M. Kraus and A. P. Goloborodko, “Cifrovaya ekonomika: trendy i perspektivy avangardnogo haraktera razvitiya”, Effective Economy, num 1 (2018).

The digital entrepreneurship segment is developing against the background of the sectoral transformation of the national and global economy, which requires the possession of competencies relevant to the new economic reality both for hired personnel and self-employed, but first of all – for entrepreneurs who aim at high competitiveness and intense development of their business. Further, using empirical (observation, generalization, inference) and quantitative (statistical analysis, dynamic analysis) research methods, the authors propose to consider the ways, mechanisms, and forms of development of entrepreneurial competencies in the digital entrepreneurship segment.

Results

The World Bank and IMF estimate that the list of the world's largest economies will not change significantly by 2030. Leadership will belong to those countries which are already winning the global competition in technology and innovation and are leaders in research and development of new technologies (Fig. 3)¹⁵.

¹⁵ International Macroeconomic Data Set. USDA. With reference to the World Bank, IMF, HIS, and OEF. Retrieved 01.08.2019 from www.ers.usda.gov/data-products/international-macroeconomic-data-set/international-macroeconomic-data-set

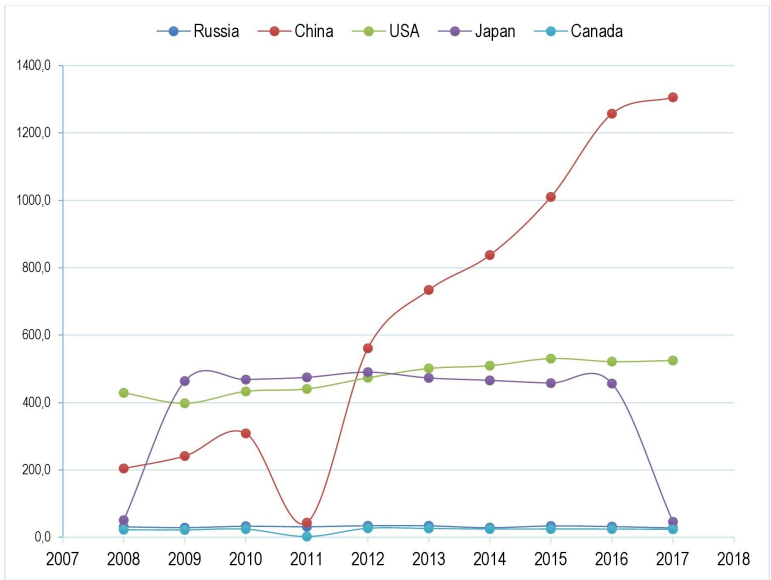


Figure 3

World leaders in the number of patents granted annually¹⁶

Digitalization, artificial intelligence (AI), and robotics will become the main drivers of global economic growth until 2030 (Fig. 4).

¹⁶ Statistical Country Profiles. World Intellectual Property Organization. Retrieved 01.08.2019 from www.wipo.int/ipstats/en/statistics/country_profile/

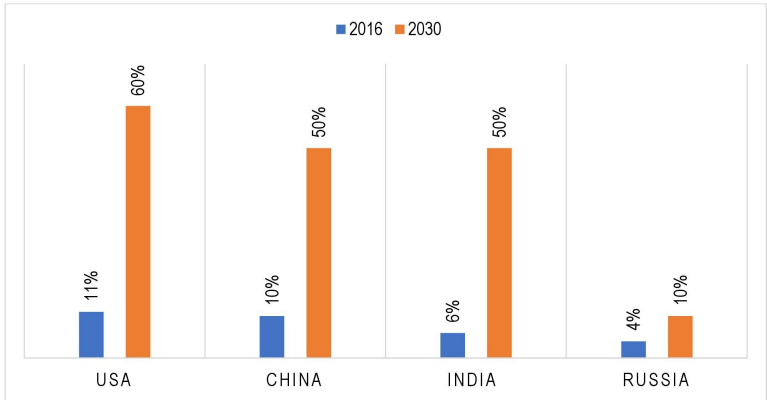


Figure 4

The proportion of the digital economy in GDP of individual countries, %; Compiled by the authors based on¹⁷

Economic growth will be associated with full automation of processes, increased labor productivity, and the implementation of fundamentally new business models and technologies, such as digital platforms, digital ecosystems, and Industry 4.0 technologies. Analysts at McKinsey and Accenture estimate that the Internet of things alone will generate between USD 4 and 11 trillion annually by 2025, while Industrial Internet of things will generate USD 14 trillion by 2030. According to PricewaterhouseCoopers (PWC)

¹⁷ Cifrovaya Rossiya: novaya real'nost', McKinsey, 2017. Retrieved 01.08.2019 from www.mckinsey.com/~/media/McKinsey/Locations/Europe%20and%20Middle%20East/Russia/Our%20Insights/Digital%20Russia/Digital-Russia-report.ashx

forecasts, artificial intelligence will increase world GDP in 2030 by USD 1.57 trillion¹⁸.

It is expected that breakthrough technologies, in particular, artificial intelligence (AI), will be able to solve many social problems associated with meeting basic human needs. The purchasing power of the population will increase. New segments related to creative self-actualization and leisure of people will be created, new types of demand for atypical goods and services will appear. If all the routine work is done by robots, people will be involved in industry sectors, where higher added value is created. Digitalization and new technologies will also influence global competition conditions. As AI and robots become involved in manufacturing processes and services, the cost of labor will become less important in determining a country's competitiveness, while technological competence and infrastructure quality, on the contrary, will be more significant. Technologies, such as Big Data and the Internet of Things (IoT) will help to optimize production processes and reduce operating costs, as well as to develop new products and services. Virtual reality (VR) will be used to expand professional skills, while AI and robotics – to increase productivity.

The volume of each country's economy and the growth

¹⁸ Sizing the prize. What's the real value of AI for your business and how can you capitalize? Price Waterhouse Coopers. Retrieved 01.08.2019 from www.pwc.com/gx/en/issues/analytics/assets/pwcai-analysis-sizing-the-prize-report.pdf

of citizens' welfare by 2030 will depend on how much money is invested in innovation over the next 10 years, with what intensity and how it will happen. The implementation of digital technologies is accompanied by challenges that society must overcome for the successful implementation of the digital economy in life. These challenges are as follows:

- insufficient competencies and knowledge, low level of digital literacy of population;
- short-term reduction in labor productivity caused by the implementation of new technologies;
- growing technological unemployment;
- significant changes in the regional structure of productive forces;
- lack of qualified personnel to implement the digital transformation strategy;
- lack of a strategy and regulatory framework for the use of digital technologies for competition and innovation.

The digital transformation strategy of the business environment requires improving customer service and transiting to a customer-oriented service system, developing partnerships and integrating flexibly with partner companies (digital partnership becomes one of the factors of business scale), using databases, implementing new HR strategies and a culture of innovation.

Competencies in digital entrepreneurship include confident, critical, and responsible use and interaction with digital technologies for the study, operation, and involvement

in society. This includes information and data literacy, communication and collaboration, creation of digital content (including programming), security (including digital well-being and cybersecurity-related competencies), and problem-solving.

Discussion

The acquisition of digital competencies is considered as a need for the whole society. This problem has been also identified at the level of public administration. As a response, mechanisms for the digital competencies formation in society have been developed and implemented. The following types of mechanisms for digital competencies formation can be identified (Table 1). The sphere of digital skills and competences in the Russian Federation develops unevenly, chaotically, and often in isolation from academic (so-called formal) education.

Mechanism	The essence of the mechanism
Government programs for the dissemination of digital competencies	Creating educational institutions, whose task is implementing educational programs for the acquisition of digital competencies, and promoting self-improvement of citizens
Restructuring of the secondary education system	Implementing a new standard of secondary education, which provides for the assimilation of digital competencies from the very beginning of training, using digital technologies as the basis of the educational process
Reorganizing the university education system	Using the opportunities of the higher education system in order to form a new approach to obtain a profession, training a new generation of employees to the need to constantly improve themselves
Intensification of corporate education	Continuous training and professional development of employees in the personal sector is one of the significant factors in the assimilation of digital competencies in society in general
Creating training platforms	Using Internet platforms for mass assimilation of digital competencies, updating platforms, disseminating information about the emergence of new technologies, providing relevant training courses
Motivating to master digital competencies at the microlevels	Mastering digital competencies can occur at the level of individual companies and organizations: if in the personal sector of the economy there is a trend for the dissemination of digital technologies and their assimilation by the population, this may have a general social effect

Table 1

Mechanisms of digital competencies formation Source:

developed by the authors

In the early 2000s, outdated teaching methods, the lack of educational standards, trained teachers, as well as the inaccessibility of digital technologies for the educational process led to an extremely low level of digital literacy in all existing segments of the public education system (preschool, primary, secondary, and higher education). Digital skills in secondary schools, for example, were limited to computer science lessons, where schoolchildren were taught the general principles of computer structure and the basics of algorithmization. This approach does not meet modern requirements, is not end-to-end

(cross-platform), and has therefore very questionable results.

Thus, the largest and most extensive formal education system does not meet the needs of the labor market, is unable to generate quality manpower, does not contribute to the welfare of citizens, essentially reduces their employment prospects, and capitalization. This leads to the fact that both the digital industries of entrepreneurship and the economy of the country, in general, lose out.

In the commercial segment (the so-called nonformal education), the situation is better, since modern methods are used there, while the technical support and motivational component of teachers are much higher.

It is absolutely clear that approaches, solutions, and initiatives on the development of digital literacy through academic formal education and nonformal education will differ based on their specificity. Thus, in the first segment, the state is the provider of educational services, while in the second case – commercial (or charitable) companies.

The key solution to this issue is a combined strategy, which is characterized by long-term activities and scale inherent in the public education system, and short-term rapid measures, more relevant for implementation exactly in the segment of commercial education.

State programs are the most common mechanism for digital competencies formation in society. They aim at adapting society to the digital economy conditions. Among existing programs,

one can distinguish those, whose priorities are overcoming digital inequality, the intensification of innovative activity of the population, increasing competitiveness, etc. Since the problem of should be the main initiator to overcome it. Personnel and education are included in the program "Digital Economy of the Russian Federation" as one of the key institutions within which the conditions for the digital economy development are created. The Program outlines the main objectives of each direction¹⁹ concerning training and education, namely, "creating the key conditions for training the personnel for digital economy; improving the education system, which should provide the digital economy with competent personnel; creating the labor market, which should be based on the demands of the digital economy; creating a system of motivation for the development of the necessary competencies and involvement of personnel in the development of the digital economy of Russia".

Secondary education is best suited to prepare a new generation for the digital economy. On the one hand, currently, digital technologies are easily accessible, and their application does not require large investments. Every person, who is involved in economic life, has the opportunity to acquire such competencies through training and self-development. On the other hand, it is the basic educational skills acquired in secondary

¹⁹ Cifrovaya ekonomika Rossijskoj Federacii, Approved by the Decree of the Russian Federation Government of July 28, 2017 No. 1632-R. Retrieved 01.07.2019 from www.government.ru/docs/28653/

school that shape a person's future worldview.

Entrepreneurs need to be critical of the authenticity, reliability, and impact of information and data that are available digitally and be aware of the legal and ethical principles associated with the use of digital technologies. Entrepreneurs should be able to use digital technologies to maintain active citizenship and social integration, to collaborate with others, to be creative for achieving personal, social or commercial purposes.

Companies that have bet on global trends are world leaders. However, how long they will be able to hold out is a big question, largely related to the competencies of their employees. The new model of higher education forms "portfolios of competencies" based on the assessment of the future demand of companies. Its implementation is largely related to the coincidence of three groups of factors: using new technologies (including online education); transiting to the concept of "entrepreneurial university", which combines education, science, and business; and developing end-user demand within the concept of lifelong learning²⁰. Skills include the ability to use, access, filter, evaluate, create, program, and distribute digital content. Individuals must be able to manage and protect information, content, data, and digital identities, as well as recognize and work

²⁰ S. N. Bobylev and L. M. Grigoriev, *CHelovecheskoe razvitie v Rossijskoj Federacii za 2018 god*. Analytical Center under the Government of the Russian Federation, 2018. Retrieved 14.03.2019 from <http://ac.gov.ru/files/publication/a/19663.pdf>

effectively with programs, devices, artificial intelligence, and robots. Working with digital technologies and content requires a reflective and critical attitude to their development, and at the same time – curious, open and promising attitude. This also requires a moral, safe, and responsible approach to the use of these tools. The modern educational policy should be based on approaches, such as the openness of education to external needs and the labor market demands, the needs of society, practical orientation, innovativeness, application of innovative pedagogical technologies focused on developing skills of the 21st century and professional competencies in graduates, competition-based identification and support of the leaders, who successfully implement innovations in practice, informal communication with the business, in particular, the formation of innovative research in the form of startups involving students, etc.

Creating favorable conditions and searching for appropriate models of a public-private partnership with nonformal education operators, supporting them, will contribute to the growth of private investment in this area. The emergence of new operators within a short time will significantly expand the opportunities of citizens, especially in the regions, to obtain appropriate digital skills and learn new professions. One important task is to update the State Standard Classification of Occupations, that is, to develop and approve a list of digital professions based on the requirements of the labor market

and digital trends, followed by the development of an appropriate program for their implementation in specialized educational institutions.

Digitalization of the real sector of the economy is the major component of the digital economy and a determining factor in the growth of the economy in general, including the digital industry itself, as a technology producer. In many sectors, digital technologies are the basis of product and production strategies. In order to implement large-scale digital transformations, it is important for domestic enterprises, small and medium-sized businesses, and industry to create conditions and appropriate motivations – from information and marketing to fiscal incentives. In Russia, digital technologies should be accessible both from the viewpoint of organizational and technical access to the relevant digital infrastructure and from the financial and economic standpoints, that is, through the creation of conditions and incentives that will encourage businesses to digitalize. This activity will result in the modernization of the economy, its recovery, and competitiveness. Integration of digital technologies into production processes, or digitalization of industry, is a priority of the state industrial policy. The state policy of stimulating the development of digital competencies of entrepreneurs is carried out in three directions:

- creating Industry 4.0 infrastructure, i.e. industrial parks, and industry-oriented technology centers;

- access to capital to create new innovative industries;
- developing digital skills to train personnel capable of working with Industry 4.0 technologies.

To develop the potential of Industry 4.0 in Russia, it is important to implement the following initiatives.

1) Targeting, i.e. analysis and research of industrial sectors in order to assess competitiveness and development prospects. This work requires the involvement of research agencies, obtaining relevant insights, identifying growth drivers, organizing communication of results, etc. The research results should be used for further planning and reducing risks for potential investors;

2) Informatization of industry, or a program aimed at education and transfer of best practices of IT sector and digital industries to industrial sectors. At present, the industrial sectors lag far behind the trends, technologies, and opportunities of the digital market. The lack of practices on Industry 4.0 driving technologies, as well as insufficient knowledge of innovation and investment management, and managing approaches (agile, scrum) are real obstacles to Industry 4.0. The informatization of the industry should result in the creation of joint competent groups consisting of representatives of IT and digital industries, on the one hand, and industry, on the other hand, focused on cooperation and development of new products and services;

3) Engineering clusters. Powerful developers in industrial engineering have the opportunity to dramatically affect

industrial innovation, R&D, export marketing, etc. The activities of the industrial engineering companies are aimed at exactly the development of new industrial products, generation of ideas, industrial design, prototyping, and the like. Economy industries such as food and processing industry, metallurgical engineering, and agriculture, are the most promising for the creation and development of industrial engineering;

4) Industry roadmaps of digital transformation. Creating roadmaps of digital transformation aims at the search, development, and implementation of appropriate actions and initiatives towards digitalization of industries. For many sectors, this is a plan for recovery, enhancing competitiveness and, in some cases, return to the economic environment.

Conclusion

Mass dissemination of information and communication technologies contributes to the formation of network relations and the emergence of information networks built on the interaction of individual members of society. The increase in information pressure on a person through the saturation of everyday life with new technologies makes the previous algorithms for obtaining information and its processing insufficiently effective.

Creating programs, holding training, improving continuously the digital competencies level of entrepreneurs is an urgent

need for economic development at the present stage. Forming professionally competent personnel can improve the quality of work performed and ensure high labor efficiency in a competitive environment. This requires using the ways and methods, such as public dissemination of digital competencies, restructuring of the secondary education system, reorganizing university education, enhancing corporate education, building educational platforms, and encouraging the mastery of digital competences at the microlevel. To develop the potential of Industry 4.0 in Russia, it is important to implement the following initiatives: targeting; informatization of industry, or a program of education and transfer of best practices of IT sector and digital industries to industrial sectors; creating engineering clusters, and developing sectoral roadmaps of digital transformations. Thus, creating and implementing the national curriculum of general and professional digital competencies/knowledge is a priority on the way towards the accelerated development of the digital economy.

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