1. Introduction

Modern socio-economic systems are developing in terms of new challenges associated with the deployment of the fourth industrial revolution, called Industry 4.0, which has a significant impact on all aspects of public life: economic processes, social interactions, philosophical understanding of human place in the modern world. The scientific discussions of recent years have focused their attention on finding mechanisms for developing competitive advantages in the conditions of the new economy, on potential social benefits and threats. The multilateral aspects of the implementation of the ideas of Industry 4.0 had considered at the economic forum in Davos at its discussion platforms. [1]. Later this topic was on the agenda of the St. Petersburg Economic Forum (2017).

A new digital economy emerging under the impact of the industrial revolution is based on the organization of production processes on a digital basis, which implies a wide automation and control based on intelligent systems, the use of cyber-physical systems in production, constant interaction with the external environment, eroding the boundaries of the enterprise as such, the use of cloudy technologies. Formable digital economy not only has a number of new properties, but also greatly changes the relations of production, the existing social structure of society, social relationships, makes new demands on the personnel and on the system of its preparation [2].

Production processes and relationships are becoming qualitatively different. Earlier also innovation activity, automation of management processes was carried out, but organizationally it happened inside one enterprise (or their group), the employees, as a rule, was in constant communication with the employer, the qualification requirements for personnel were relatively stable for long time. Changes in data exchange with the outside world, their intensification, cloud technologies, digital platforms gives possibilities to form global industrial networks based on new principles, when the processes of automation, generation and implementation of innovations go beyond individual enterprises and create a kind of common production environment.

In the digital economy, data (databases) are becoming key elements for making management decisions. New information systems, in contrast to the previous ones, have a huge performance, with the highest (almost unlimited) level of automation, as well as with high connectivity, which provides interaction regardless of physical distances. The Internet of Everything (IoE) connects into a single complex of people, all kinds of processes, things and services. Management decision-making models are changing. The use of objective databases allows you to overcome the intuitiveness of decision-making in business and in government service, where there is a traditionally high level of subjectivity and "magic of job title of decision-maker".

Changes in economics and management, related to Industry 4.0, significantly affect on the professional structure and needs of the labor market, on the quality and competencies required for human capital carriers. Consequently, the educational system has new tasks, the role of educational institutions is changing significantly. The principles of federalism suppose a high degree of freedom of the regions in choosing ways to develop the economy and in regulating regional markets. Under the conditions of the new economy, educational institutions in the region may become an additional shock absorber of emerging social risks, if such institutions realize their innovative role in these processes.

2. Prerequisites and means for solving the problem

The implementation of the ideas of the new industrial revolution, the construction of enterprises on the basis of the digital economy are becoming sources of competitive advantages for individual organizations, regions and countries. However, one should not overlook the social risks and threats that could potentially arise. These risks and threats form the prerequisites for changing the role of educational institutions in regional development.

Let consider some of them.

In past, many researchers and practitioners had recognized the increasing role of personnel in supporting the activities of an enterprise, also the influence of the human factor on production processes. At the new type enterprises, the employees itself does not mediate decision-making; it is done by means of intelligent systems, relying on databases. Production is becoming flexible, individualized. And this is already a reality. For example, this is how the Siemens plant (Amberg) operates, producing Simatic controllers. About 75% of all work at the plant is carried out without human participation. The plant offers over 1000 production options, and communication with consumers is carried out via the Internet [3].

So, on the one hand, the requirements for personnel, for its adaptability, flexibility, learnable are increased, on the other hand, as in any case of automation, there is a release of labor. And here, therefore, there is a need for continuous training of personnel employed in the production, as well as solving the problem of employment for those released from the production process.

In addition, some professions are at risk due to changes in the technological basis of production, increasing automation of production processes, and robotization. A person can be replaced by robots in those works that are routine in nature, performed on the basis of an It is necessary to pay special attention to the social risks associated with changes in the needs of the labor market and the structure of employment. According to the report “Russia 2025: from cadres to talents” of the organizations WorldSkills Russia, The Boston Consulting group (BCG) and Global Education Futures, by 2025, in Russia there will be the most demand for workers of the so-called category “knowledge”, who have the abilities for making...
improvisation, taking independent decisions, working with uncertain situations. Currently, approximately 17% of employees perform creative or analytical tasks (in European countries - 29-45%), about 50% are mainly engaged in routine work. 35% of employees are engaged in activities that do not require special training (the most popular professions are the driver (7%), the seller (6.8%), the security guard (2%)). It is assumed that in Russia about 10 million people may remain without work in the future. At the same time, there will be a shortage of about 10 million people capable of solving analytical, creative, non-standard tasks [4].

It should be noted that in terms of robotization, Russia is still lagging behind the leading countries. Thus, the average rate of robotization in Europe in 2016 was 99 robots per 10 thousand employees, in South Korea (the absolute leader) - 631 robots per 10 thousand employees (in 2015 this figure was 531), in the most robotized European country - Germany - 309 robotic solutions per 10 thousand employees, in the USA - 189. The average number is 74 robots per 10 thousand employees. In Russia, this figure is 1 [5]. At the same time, the Russian economy is developing in line with global trends, so the risks of employment change may be somewhat postponed in time, but they cannot be ignored.

The potential of economic growth is provided by the manufacturers and providers of Internet services, which are penetrated to the traditional spheres and which are transform them on the basis of cloud technologies (taxi service, accommodation booking, etc. Thus, the Internet of Things is actively developing in the transport industry. It is not only a remote monitoring system. Currently, smartphones are very popular among users (about 50% of all mobile devices), and this gave impetus to the development of services such as Uber, Yandex, to build a system for monitoring road congestion on maps. The taxi market in major cities has changed a lot [6]. So some professions may dissipate in the future, while others may appear dynamically.

According to expert estimates, the most advanced in terms of the use of IoT technologies, currently in Russia are the following industries and fields of activity:
- electric power industry (new technologies for equipment operation, formation of a center for gathering technological information);
- logistics service (cargo tracking system and their geo-location, “smart” transport infrastructure management, primarily in large cities);
- healthcare (electronic health monitoring, remote examinations, for example, drivers, telemedicine);
- “smart city” (management of resources, electricity, transport);
- “smart home” (control of heating, lighting, microclimate, security, consumer services);
- agro-industrial complex (precision farming, remote control of agricultural equipment) [3].

In the report mentioned above the reasons for the low level of Russia’s competitive advantages are cited: insufficient demand for knowledge on the part of employees, systemic problems in the field of education, and the desire of the workforce for stability, not growth. In order to meet the needs of the new economy the content of education must be changed to meet the needs of the new economy: from the knowledge in the subject area to the acquisition of universal competencies, allowing to solve various tasks. The systemic problems of Russian education are: an insufficiently high level of competence, flexibility and abilities to change, which school teachers have; the inability of educational institutions to work in conditions of increasing competition (the emergence of alternative sources of increasing knowledge and competencies); the substitution of education by the presence of a diploma; insufficient level of financing of secondary vocational education and its weak connection with the needs of the regional labor market.

Consumers of educational services at all levels intuitively respond to the defects of the system, which is expressed in such trends as: an increase of almost 10 times from 2008 to 2017 the number of children in home education; a significant increase in the number of consumers of online courses [6]; huge volumes of the market of tutoring services (according to experts of the Center for Economics of continuing education of the Institute of Applied Economic Research of the Russian Academy of National Economy and Public Administration, in 2017 the volume of this market was 120 billion rubles, since 2000 it has grown 6 times, the annual growth is 3-5%) [7].

In addition to the risks to the labor market, it is also necessary to highlight the problem of social adaptation of the population to the digital economy, in particular, it concerns needs for continuous training and for the development of new skills in the digital space.

3. Solution of the examined problem

The essence of social risks can be determined as follows: changing the role of personnel in decision-making and management; abrupt changing in the types of professions and in requirements for them; increasing demands for adaptability, flexibility, creativity, and training of personnel; the threat of a new type of unemployment; and the need for social adaptation of the population to digitalization. It seems that the risks can be reduced by using innovative approaches to education. It is obvious that changes affecting the economy and the labor market cannot but affect the education system. However, traditional models and methods are unlikely to be viable in the future. At the same time, the introduction of innovations in the educational process can bring a synergetic effect, forming not only the prerequisites of the digital economy, but also preventing emerging social threats.

Educational organizations should be guided by a changing competency model. Thus, according to the WorldSkills classification, it is possible to single out New skill - a competence that currently does not exist or exists individually in advanced technological enterprises; Transforming skill - the competence that will change under the influence of new technologies; Redundant skill - competence that will be outdated and disappear. The adopted national program “The Digital Economy of the Russian Federation” is set a number of important tasks for the education sector: formation of educational programs aimed at ensuring digital literacy of the population, as well as training for the digital economy. The special categories of the population in the program are people over 50 years of age, teachers, civil servants, who is extremely interested in advanced training and involvement in the digital economy. By 2024, it is planned that the share of domestic spending on the development of the digital economy will be increased to 5.1% (now 1.7%) [8].

The additional challenges to the education system in the digital economy are the following: reducing the value of obtaining a diploma as an education certificate (leading companies disclaim mandatory requirements, in particular, Google, Apple, IBM); obsolescence of professions in the period of preparation (the period of professional training is 3-4 years); changes in employee competency requirements; growing need for continuous retraining; growing demand from the population for new flexible programs; growing needs of the population in obtaining knowledge about various spheres of life.

The functioning of the modern education system is associated with the manifestation of a number of contradictions. Professional education organizations form and approve recruitment plans for certain professions in advance but the demand for these professions may fall. Also, the terms of training are set by law, while the regional market and the digital economy need to quickly obtain the necessary knowledge and skills. Educational organizations operate in a highly bureaucratic environment, but the market dictates flexibility. Requirements for teacher’s competencies are faced with the routine nature of determining the level of their qualification.
Educational organizations cannot resolve these contradictions on their own, it is necessary to change the legal framework and the whole system of regulation of the education sphere.

Organizations of vocational education in the region can reorient themselves to flexible models for obtaining knowledge in accordance with new needs, offering advanced training courses for workers in new industries in close connection with practical activities (training in connection with practical tasks). For exempt workers, educational organizations may offer comprehensive retraining services in cooperation with employment services (which, in turn, must take into account not only the current situation, but also its forecast). For the population of the region, various formats of learning digital competencies, training of users of “smart systems”, including in the form of tutoring, are possible. School educational organizations need to focus on developing flexible, creative thinking among students. It is possible to solve this task on the base of introduction into educational programs such courses as music education, visual arts, and culture study; these disciplines affect on “right hemisphere” activities development and create an opportunity for students to solve non-standard tasks in various fields of knowledge.

There are some positive experiences of universities activities in Russian regions. The university may be an innovation driver as well as a center of digital development. For example, Omsk Agrarian University is implementing the project “University Open to the Region”, in which the university interacts with the population, business, and educational institutions of a different level (secondary vocational education).

A significant role is played by the organization WorldSkills Russia, which has developed five programs for Russian universities. WorldSkills Academy will be engaged in advanced training of university teachers. This is one of five programs designed specifically for higher education institutions. Other programs are aimed at training experts among university faculty members for holding championships and a demonstration exam on WorldSkills standards, training championship organizers and enhancing the managerial qualifications of the university’s personnel reserve. 11 universities are already participating in the movement. These universities already use the WorldSkills tools in their work: they implement WorldSkills standards in the curriculum, conduct a demonstration exam, develop new competencies, and also create training grounds and specialized competence centers on their basis [9]. These are predominantly technical universities, but also the universities that have the educational program of social work are trying to join the movement.

4. Results and discussion

The formation of the digital economy affects not only on the economic but also the social sphere. The main problems associated with the functioning of the education system in the digital economy, the following: changing the role of staff in decision-making and management; drastic changes in the types of professions and requirements for them; increasing demands for adaptability, flexibility, creativity, training of personnel; the threat of a new type of unemployment; the need for social adaptation of the population to digitalization.

A number of contradictions can be distinguished in the education system, the manifestation of which reduces the effectiveness of the activities of educational institutions: the possible lack of demand for the profession - centrally establishing of students recruitment plans; availability of long-term fixed training periods - the need for their reduction for the regional market; fixing competences in educational programs, strict regulation of their implementation - the requirements of flexibility; the need to change the competencies of teachers - the traditional assessment of qualifications; the need to involve practitioners in teaching - an outdated regulation of teaching. However, these contradictions cannot be resolved within a separate educational organization, even if the quality of management is perfect. Changes in legislation and the entire system of regulation of educational activities are required. If this is not done, the education system can be a brake on the development of the digital economy.

Innovations in professional education contribute to the adaptation of the educational system to new challenges, provide possibilities to use educational institutions as educational centers of regional development. In the new conditions, universities can act as integrators of transformations and a platform for interaction of actors of the regional socio-economic system. It is necessary to study the positive experience of universities aimed at increasing flexibility, developing the concept of continuing education, intensifying contacts with the population of the region and training in the field of additional education programs.

5. Conclusion

Thus, the fourth industrial revolution puts society in the face of new social threats and challenges. The greatest risks are associated with modifications of the social structure of society concerned with the requirements for the professions changing. It is necessary to organize system of lifelong learning for employees. In addition, the population of region needs to adapt to digitalization processes, not only learn how to correctly use new technologies, but also do it in a safe way. The educational system can provide an answer to these challenges, but this requires a significant change in the approaches to knowledge transfer processes, the formation of flexible training modules based on the use of innovations. This, in turn, will be possible only in the conditions of abandoning the old models and methods of regulating the educational environment, including the revision of formalized standardized approaches to assessing the quality of education.

6. References

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