

# Personnel training in Russia: response to modern challenges and threats in the context of digitalization of the economy

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**Abstract.** The article discusses the results of a study conducted at the Research Institute "New Economics and Business" of the Plekhanov Russian University of Economics. University science, the system of university research is a modern form of integration of science and digital technologies. The development of the research methodology and the transformation of personnel training for the Russian economy, taking into account the emerging risks and threats to business, society and the state, is one of the priority areas of university research. The rapid development of digital technologies not only opens up opportunities for achieving the goals of sustainable socio-economic development, but also creates threats and risks, including of an ethical nature. It allows us to link positive trends and the growth of sustainable development from the widespread use of digital resources, tools and technologies, as well as possible risks and threats associated with it. According to the authors, the answer to the risks and threats that have arisen can only be a deep complex transformation of the entire domestic personnel training system. Only a digital educational ecosystem is able to form a modern specialist with high adaptability and self-learning. The circumstances considered in the article determine the relevance of such studies and indicate the need for digital transformation of personnel training for the Russian economy in the current socio-economic conditions.

## 1 Introduction

The modern realities of the development of international relations give rise to new challenges and threats to the national economy. This is largely due to the increasing independence and activity of the Russian Federation on the world stage every year. Russia has a serious competitive impact on traditional economic leaders. It occupies leading positions not only in the commodity markets, but also in the markets of computer technology, microelectronics and robotics. On the one hand, the response of our partners is natural, but on the other it is paradoxical – the sanctions policy has become an everyday reality. At the same time, there are serious breakthrough achievements of domestic specialists in such end-to-end technologies as artificial intelligence, big data analysis, quantum technologies, unmanned transport, etc. There is a situation when the restrictive policy of foreign countries spurs the

process of import substitution, Russian advanced research and production facilities pick it up. At the same time, the qualified personnel often does not have sufficient qualitative and quantitative potential to maintain it.

We are deeply convinced that the answer to these challenges can only be a deep comprehensive transformation of the entire domestic personnel training system, which should be based on the following digital solutions [1, 2]:

1. The educational trajectory for each student should be based on an intellectual analysis of the transformation processes taking place in the digital environment of the Russian economy.

2. The availability of global educational resources using high-speed communication channels.

3. End-to-end identification and authentication of the student when implementing any of his own educational requests.

4. Total virtualization of laboratory, experimental and production educational bases.

5. Creating avatars or digital doubles of teachers, mentors, tutors who, based on artificial intelligence systems, will be able to develop basic soft and hard competencies in the student.

6. Digitization of the student himself with the creation of his avatar or digital double for the implementation of routine non-creative search, calculation, sorting and other procedures.

7. Ensuring the priority development of the student's self-competencies, which open up opportunities for self-development and self-learning, again on the basis of recommendation intelligent systems.

It is such a digital educational ecosystem that is able to form a modern specialist with high adaptability and self-learning, which are basic when building artificial intelligence systems. And here we come to a certain futuristic phenomenon – not digital systems are trying to copy wildlife and humans, as it has always been, but a person is equal to neural networks, quantum technologies, etc. Most likely, this trend will increase.

At the same time, the digital transformation of the personnel training system, simultaneously with the response to existing challenges and threats to the Russian economy, generates its own problems, vulnerabilities and dangers.

These circumstances determine the relevance of such studies and indicate the need for digital transformation of personnel training for the Russian economy in the current socio-economic conditions. This issue was particularly acute during the coronavirus pandemic and self-isolation, starting in 2020. When the learning process switched to distance learning in strict lines, and not all educational institutions were ready for such a format of training both in methodological and technical equipment.

## 2 Materials and Methods

The presented research results in this article were based not only on their own authors, but also on the use of existing both foreign and Russian scientific materials using modern approaches and research methods.

Thus, the authors of the article "Societal and ethical issues of digitalization" come to the conclusion that "... digital transformation is not only technological in nature, but affects the entire established way of business: the nature of interaction of subjects within the business ecosystem, the business model of enterprises, the architecture of enterprise management systems, the system of business processes, the architecture of information systems" [3]. In the work "Economic modeling of digital transformation processes", "... an analysis of a new trend that is replacing computerization and informatization of society - the global digitalization of society " was carried out [4].

The authors (Kulaji T. V., Babkin A.V., Murtazaev S. A. Yu., 2019) see the use of digital technologies in solving national projects and programs [5], (Savina T. N. 2018, Erokhina E.

V., Gretchenko A. I. 2019) " ... the uncertainties and risks inextricably linked with the transition to the digital economy are identified, the informatization processes in the Russian Federation are analyzed. It is established that digitalization and informatization are an inseparable unity of processes: intellectualization, computerization, mediatization, associated with a high degree of uncertainty and risks. It is concluded that digital transformation should be considered as a new tool in solving problems that requires enormous efforts at all levels" [6, 7, 8].

In his scientific article Domenico Consol in detail " ... analyzes the introduction and use of ICTs, and their impact on organizations. It is noted that the introduction and use of ICT can bring benefits in terms of efficiency, efficiency, innovation, growth and competitive advantages, especially in small and medium-sized businesses" [9].

Don Tapscott (1996) in the work "Digital Economy" "... focuses on three main areas: "the new economy and the factors that shape it; inter-network interaction and its relation to business and government, and, finally, the need for a strong progressive leadership that will be responsible for transformation or will be a conductor of change in this new era" [10].

The transition to process automation requires certain financial costs and investments. It is necessary to conduct a thorough analysis before the transformation and assess the readiness of the transition to digitalization and automation.

These and other studies prove the ongoing transformation by the impact of digitalization. Digitalization can provide an increase in productivity in the work of enterprises [11] in the field of high-tech industry development and digital technologies in the financial sector require a different level of training of personnel with appropriate digital competencies.

It should be noted that in the course of the study, the authors widely used the methods adopted in modern sociological theory. The focus of this study was an ecosystem approach based on a system paradigm. The universality of the ecosystem approach allows us to apply it to the study of socio-economic processes, in particular, for the system of education and training of personnel. To assess the effectiveness of the professional and educational ecosystem, this article assumes the use of the basics of the theory of stakeholders, a direct subjective methodology, as well as the method of situational analysis. The analysis of the effectiveness of the professional and educational ecosystem is based on the assessment of the importance and satisfaction with the knowledge and skills formed in the learning process in its organizations. An empirical study was also conducted in the form of a survey (written; questionnaire; survey; interview) (faculty; students; administrative staff) for the quality and condition of technological equipment with modern digital technologies.

### **3 Results and Discussion**

Personnel is the most important component of the productive forces of society, accumulating a complex of knowledge and experience, as well as the presence of certain personal abilities and qualities. The revolutionary processes taking place in the scientific and technical sphere are rapidly changing production, which is currently a driver of economic growth. In modern industry, a significant share of knowledge-intensive products is created. Moreover, the digitalization of the Russian economy is one of the strategic directions of development. In this regard, the question arises: what will happen to the labor market? Will there be a million-strong army of unemployed people? The concept of work is changing, the concept of work is changing, employment once appeared, but it will disappear sometime. There are more and more free professions. At present, the main problem, oddly enough, is not how to find a job, but to find your subject of activity, it is desirable that this is a personality-developing activity, and it will provide a source of income. This will not be quite a market and not quite a labor in the current sense. There is a need to develop completely new methodological approaches

to the labor market, training fundamentally new highly qualified personnel, improving the system of personnel reserves, which is the main driving force of a modern organization.

Work is changing to such an extent that it will be difficult to understand what a profession is. Some Russian researchers claim that mathematics and IT come out on top, as the subject of work that a particular person will face will increasingly resemble the solution of a certain algorithm. The content of the work of each individual person in 30-40 years will increasingly approach universal labor. And the number one question will be finding an occupation and forming a lifestyle. The very concept of a profession will change in 10-20 years, that is, today young people are already facing this problem.

An important problem in the conditions of the formation of the information society is the training of personnel capable of developing fundamentally new information and communication technologies. Information and communication technologies (ICT) and digitization are widespread in modern society. ICTs are also linked to other technologies, such as nanotechnology, biotechnology and neurotechnology. This so-called NBIC convergence has become increasingly noticeable since the late 1990s. Digitization penetrates into all aspects of public life: technology takes root in workers (for example, with the help of brain implants), between people (through social networks such as Facebook), learns more and more about us (with the help of big data and methods such as emotion recognition), and constantly learns to behave like us (robots and software demonstrate intelligent behavior and can simulate emotions). The digitization of society pushes the boundaries of our capabilities and offers all sorts of opportunities, but also challenges our moral boundaries.

According to the results of the annual study of the Norton Cybercrime Report 2019, the damage from cyber attacks on educational information resources in the world amounted to \$336 billion (in 2018 - \$110 billion). The situation in our country does not look any better. Studies have shown that in 2019, about 80% of all educational resources were victims of cyber attacks, which led to damage of about 203.3 billion rubles (in 2018 - 102 billion).

This fact, on the one hand, clearly illustrates the value of educational content and infrastructure, and on the other hand, their vulnerability to attacks via communication channels from intruders. The alarm is caused not even by the number of attacks themselves, but by the speed of their increase. And this is despite the fact that the market of means and methods of protecting educational information resources is steadily growing.

It is necessary to observe a kind of "scissors" - an increase in the cost of creating and implementing security tools not only does not stop the growth of damage from attacks, but even creates the impression that it contributes to it. In our opinion, this is determined by the essence of the digital transformation of the educational system itself, which consists in using the following advanced information technologies to provide the digital solutions listed above:

1. Cloud computing.
2. Virtualization of information resources.
3. Internet of Things systems.
4. Mobility of users' devices
5. Artificial intelligence systems.

Cloud technologies, which are widely used nowadays, of course, significantly increase the efficiency of collecting, storing and processing educational content, but at the same time, they lead to its vulnerability, which is very critical, given the high share of intellectual property in its composition. It is enough for an attacker to gain access to the information storage infrastructure, as he has at his disposal its entire array, concentrated in one data processing center.

Some Russian scientists note that "... a sign of the information society, the knowledge society is the increase in requirements for the level of professional training, the quality of education, and an increase in funding for the scientific sphere" [12 - 16].

## 4 Conclusion

The author's research and the results obtained allow us to draw the following conclusions. For the purpose of digital transformation of personnel training for the Russian economy, taking into account the responses to modern challenges and threats, it is necessary to consistently solve the following tasks:

1. Substantiation of the main elements of the concept of studying the digital transformation of educational institution management systems based on artificial intelligence technologies:

- development and implementation of integration platforms for management systems of administrative and economic activities of an educational institution: accounting, budgeting, personnel accounting of students, personnel management, management of the results of the activities of teachers and researchers, management of the alumni community, management of the enrollment of applicants;

- transition to electronic document management in full with the implementation of digital services for electronic interaction with government agencies;

- management of research projects;

- management of educational buildings, dormitories, sports complexes based on resource-saving technologies "Smart", centralized notification systems, intellectualization of access control systems.

2. Theoretical substantiation of the genesis of the transformation of the IT infrastructure of an educational institution:

- transformation of the data processing center in the direction of a software-defined infrastructure;

- connection of high-speed telecommunication lines;

- introduction of a seamless wireless access system in academic buildings and dormitories of an educational institution;

- implementation of a unified authentication and identification system;

- creation of an intelligent computer resource management system;

- creation of digital transformable classrooms and coworking spaces.

3. Justification of the main elements of the security management concept:

- implementation of intelligent recognition systems when organizing access to an educational institution and its individual premises;

- implementation of an infrastructure security incident detection system, adaptation of the system in order to automatically respond to emerging incidents.

4. Development of a methodology for digital transformation of the educational environment:

- placement of educational materials on disciplines and modules in digital form in the LMS of an educational institution, automated task verification;

- asynchronous interaction of all participants of the educational process, orientation to problem-oriented learning;

- introduction of courses on open national MOOCs platforms, mixed classical and e-learning Blended learning into the educational process;

- introduction of adaptive learning methods, adaptive courses with an individual trajectory of training, depending on the features of mastering the educational material (using big data processing technologies and artificial intelligence in the construction of adaptive tracks);

- introduction of interactive products and technologies: simulators, simulators, VR/AR reality systems;

- integration of online interaction services into the educational platform with support for audio and video communication, collaboration of all participants in the educational process;

- creation of corporate cloud computing resources services;

- development and implementation of virtual project laboratories.
  - development of a system for constructing an individual trajectory for each student, taking into account his digital footprint, the recommendations of the teacher and the recommendations of the system based on artificial intelligence;
5. Development of a methodology for the digital transformation of the research environment:
- creation of a cataloged digital platform for interaction in the field of creating innovative products between an educational institution, industrial and academic partners;
  - creation of digital research laboratories within the framework of scientific directions and schools of an educational institution;
  - creation of a digital infrastructure for intelligent processing of big data in the framework of R & D;
  - creation of a spatial and digital infrastructure for an educational factory for piloting innovative projects.

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