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New Trends in the Professional Training of Young People in the Modern Conditions

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Abstract

The transformation of the importance of vocational education and training, the determining the development trajectories occur due to the structural changes that are under the influence of technological factor changes. Especially, digitalization, automation, robotics, the artificial intelligence, the transition to industry 4.0, the changing nature of consumer demand directly affect the restructuring of the labor market. The listed factors accelerate the development of new professions in demanded areas and the disappearance of outdated ones, they stimulate the improvement of needed skills and meet the modern requirements from employers for educationalщl programs. The purpose of research paper is to identify the new trends in the training of competitive young employees, taking into account the conditions of digitalization of economy The research methodology includes general scientific and theoretical research methods. Methods of tabular representation of data is used as statistical tool. Originality of the research is that It is relevant and necessary to develop new model of training young specialists, involving the implementation of educational, research, innovative and entrepreneurial, spiritual and moral activities that meet modern trends. Authors carried out the analysis of the level and quality of training of national personnel in terms of ensuring the future needs of the labor market of the Republic of Kazakhstan in the conditions of

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digitalization of economy. It includes the factors affecting the reproduction of competitive national personnel and their provision with high-quality jobs, identifying new trends in the training and retraining of professional personnel and improving their skills, examining the features of training competitive national personnel in the system of ensuring the balance of labor resources and jobs. The paper was prepared within the grant project of the Ministry of Education and Science of the Republic of Kazakhstan AP09260584 «Employment restructuration in Kazakhstan in terms of social and economic tensions».

Introduction

The transformation of the importance of vocational education and training, the determining the development trajectories occur due to the structural changes that are under the influence of technological factor changes. Especially, digitalization, automation, robotics, the artificial intelligence, the transition to industry 4.0, the changing nature of consumer demand directly affect the restructuring of the labor market. The listed factors accelerate the development of new professions in demanded areas and the disappearance of outdated ones, they stimulate the improvement of needed skills and meet the modern requirements from employers for educational programs (Cedefop, 2018a).

According to the forecasts of labor market researchers, about 65% of today's students will be involved in specialties that currently do not exist (the main drivers of these changes are new technologies and new working methods), which means that it is necessary to rethink the quality and content of training programs, introduce new mechanisms for retraining and advanced training of specialists. It is possible to forecast future changes in the policy of implementing additional and continuing education, as well as an increasing role of non-formal education. For example, it is expected to reduce the share of professions that require routine tasks and increase the role of such skills as ICT literacy, the ability to solve complex multi-level problems (Cedefop, 2018b).

The key factor of the country's competitiveness in the context of the formation of Industry 4.0 is high-quality human capital, the most important component of which is education, its quality and accessibility. According to the Organization for Economic Cooperation and Development (OECD), an increase in the duration of education for 1 year leads to an increase in gross domestic product (GDP) by 3-6%, an increase in education spending by 1% leads to an increase in GDP by 0.35% (The challenges of Industry 4.0 and the need for new responses, 2018).

The purpose of research paper is to identify the new trends in the training of competitive young employees, taking into account the conditions of digitalization of economy. There is carried out the analysis of the level and quality of training of national personnel in terms of ensuring the future needs of the labor market of the Republic of Kazakhstan in the conditions of digitalization and suggested the ways of solving the problems of training personnel for the digital economy of country.

Literature review

The analysis of theoretical approaches of determining the competitiveness of specialists in the labor market allowed us to distinguish two conceptual schemes that reflect different points of view and forms of its manifestation.

The proponents of the first scheme identify the competitiveness of personnel as the quality of the labor force (qualification, training profile, age, gender, etc.) and determine the measurement of competitive advantages in the labor market as comparison of the integral characteristics for different competing labor force categories (Ozernikova, Danilenko, and Kravtsevich, 2007)

Representatives of the second conceptual scheme consider the competitiveness of personnel in the labor market as "the competitiveness of labor resources", "the competitiveness of personnel", "the competitiveness of employee". In our opinion, the allocation of such concepts corresponds to the levels of competitiveness, in particular: its level (individual, at the level of an individual employee); micro-level

(corporate, at the level of an organization, enterprise); macro-level (state, regional) (Sadova, 2016).

The existing theoretical approaches to the disclosure of the essence of the concept of "employee competitiveness" link the competitiveness of an employee with the competitiveness of his labor force or ability to work, which passes certain stages, namely: the competitiveness of the individual, the competitiveness of the graduate of an educational institution, the competitiveness of the employee, the competitiveness of labor resources.

According to the classification of employees, Rasmussen (2019) divides employees into three categories: «Skill»; «Rule»; «Knowledge». Based on this classification, the structure of the labor market in different countries by type of categories of employees in the composition of the employed with the allocation of the «highest» trajectory, in which more than 25% of employees work in the specialties of the «Knowledge» category (Shirinkina, 2019).

Taking into account the current trends in the development of the labor market, technological transformation, and the development of global skills and knowledge, the hierarchy of personnel competitiveness is highlighted as global level, national level, corporate and personal level. The competitiveness of national personnel at the global level can be achieved when all three components work – national, corporate, and personal (*Learning throughout life in the conditions of the new economy*, 2006).

The key factors for improving the competitiveness of national personnel include: globalization of financial and labor markets, migration of labor, including highly skilled labor, which exerts cost pressure on the national labor market and is a powerful incentive to increase the competitiveness of personnel; global economic transformation that requires a new quality of labor resources, which is defined as intellectual capital; transition to an innovative model of economic development, involving the formation of intellectual capital; a new quality of management that can ensure an increase in the competitiveness of personnel within the framework

of implemented business projects *(How to update the HR strategy for the digital world, 2017).*

As we see, the time of rapid technological changes is an important condition for economic growth and the competitiveness of the national economy: improvement of training and the development of talents (special innate potential and acquired abilities of the employee).

Methodology

The research consists of the methodology of comparisons, generalizations and systematic analysis with using the data of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan, International Rating Agencies, the United Nations, etc., including:

- system-structural approach - studying changes in the professional and qualification structure of personnel training;
- integrative-developmental approach - studying the professional training of practice-oriented personnel;
- synergetic approach- justifying directions for improving the level of training and retraining of personnel, taking into account all factors and conditions;
- competence-based approach - determining the role of professional competence in the training of qualified specialists.

When analyzing the level and quality of employees' training in the conditions of ensuring the future needs of the labor market in digital economy, the following methods are used: factorial, functional analysis and graphical methods.

Findings and discussion

It is obvious that the main driver of human capital development and an indicator of the global competitiveness of the economy is the high proportion of Knowledge workers engaged in cognitive non-routine work. Kazakhstan is not included in the

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ranking of countries on the top development trajectory. In this regard, the formation of a single professional and educational space with the participation of the state, the system of professional and higher education, as well as employers becomes necessary to improve the quality of human capital and the competitiveness of national personnel.

As for Kazakhstani state on this issue, there are all the main levels of training presented in accordance with the International Standard Classification of Education (ISCED, Table 1).

Table 1. Graduation of students by level of education

Код	Name of the training level	2010		2015		2019	
		people	%	People	%	people	%
ISCED 2	Number of graduates of the main secondary school (9 classes)	281988	35,6	224674	32,8	235404	34,9
ISCED 3	Number of graduates of the general secondary school (11 classes)	151448	19,1	129406	18,9	143089	21,2
ISCED 3 ISCED 4	Graduates of TPPSE organizations (technical and professional, post-secondary education)	190469	24,0	165946	24,3	144080	21,4
ISCED 6	Graduates of higher educational institutions	161964	20,4	147184	21,5	130691	19,4
ISCED 7	Graduates of Master programs	6 843	0,9	15816	2,3	19233	2,9
ISCED 7	Graduation of residency trainees		0,0	603	0,1	1300	0,2
ISCED 8	Graduation of doctoral students	207	0,0	533	0,1	721	0,1
	Total	792919	100,0	684162	100,0	674518	100,0
Note-Source: Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan, 2019							

From 2010 to 2019, the number of graduates at all levels of education decreased by 118.0 thousand people (among the main reasons we can note the decline in the birth rate in the second half of the 90s). The largest group of graduates in the organizations of the category of post – secondary education is the graduates of the TPPSE. The share of graduates of postgraduate education (undergraduates, residency and doctoral students) has increased and is about 3.2%. In other groups, there was a decrease in graduation, including the number of university graduates decreased by almost 30.0 thousand people.

Based on the study, the trend of slowing the growth of higher education coverage is associated with the high cost of education, the quality of education (the possibility of obtaining paid education abroad), insufficient efforts to develop higher education, the possibility of obtaining free vocational education within the framework of the TPPSE development program, etc.

According to the materials of World Bank, spending on HE in 2017 in the most developed countries amounted to more than 1% of GDP, in Russia and Belarus was about 0.8%. In Kazakhstan, this indicator is almost 3 times lower and amounted to 0.3 %, (for reference: in the subsequent years, this indicator was 0.4%).

Over the period from 2000-2019, the level of higher education coverage in Kazakhstan increased by 23% (from 31% to 54%), which corresponds to the level of countries with an upper-middle income (Gross enrolment ratio in higher education, 2019). However, in comparison with China, where this indicator increased from 7% to 51%, or 44%, from 2000-2019, or with Russia and Belarus, the gap in the level of higher education coverage was 35% and 40%, respectively, by 2019, the dynamics of this indicator is low in Kazakhstan.

Admission and training of personnel in Kazakhstan (Admission of students in the main areas of training, 2019) was carried out mainly through the educational services from the funds of the population and enterprises (70% of university students' study at the expense of their own funds and the funds of enterprises (1.2%). According to the data, enterprises have a passive influence on the structure of national personnel training.

Thus, 50% of university students in Kazakhstan are trained in the specialties 5B010000 – «Education» (28%) and 5B070000 – «Technical sciences and technologies» (22%). As for the technical sciences, 50% of students are trained in 7 specialties: - 5B070200 – «Automation and Control»; - 5B070300 – «Information Systems»; - 5B070400 – «Computer Engineering and Software»; – 5B070800 – «Oil and Gas Business»; - 5B071800 – «Electric Power Engineering»; – 5B071900 – «Radio Engineering, Electronics and Telecommunications»; – 5B072900 – «Construction».

From the side of population (mainly due to the purchase of educational services), the least popular technical specialties are: - 5B070500 – «Mathematical and computer modeling»; - 5B071000 – «Materials Science and technology of new materials»; - 5B071500 – «Marine Engineering and Technology»; - 5B072200 – «Polygraphs»; - 5B072300 – «Technical Physics»; - 5B072500 – «Technology of woodworking and wood products»; - 5B073300 – «Technology and design of textile materials»; - 5B073800 – «Technology of materials processing»; - 5B074600 – «Space engineering and technologies»; - 5B075300 – «Chemical technology of refractory non-metallic and silicate materials». Only 3% of students study in these specialties, including 366 people at the expense of the population and enterprises.

Vocational training of students of TPPSE is carried out in 15 enlarged groups of specialties, including 186 specialties under the state educational order and 161 specialties on a paid basis. 45% of TPPSE students are trained in three specialties: 0100000 – «Education»; 0300000 – «Medicine» and «Pharmacy»; 0500000 – «Service, Economics and Management» (Technical and vocational, post-secondary education in the Republic of Kazakhstan, 2019). TPPSE specialists are trained mainly for the service economy – education, management, finance, accounting, and services.

There are 265.2 thousand people are trained on the state order basis, and 224.1 thousand people are trained on a paid basis. The priority group of training specialists under the state order (the largest number) is formed in such specialties as: - 1200000 – «Production, installation, operation and repair (by industry),

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Transport Operation» (44.2 thousand people); - 0500000 – « Service, economics and Management» (33.2 thousand people); - 0100000 – «Education» (30.2 thousand people).

The second priority group of training specialists, for which 34% of the state order is allocated, is carried out in the following specialties: - 1500000- «Agriculture, veterinary medicine and ecology»; - 1300000- « Communications, telecommunications and information technologies. Electronic equipment»; - 1100000 – «Transport»; - 1400000 – «Construction and public utilities».

A small share is occupied by specialties related to mechanical engineering, maintenance, and the mining industry.

When considering the professional and qualification structure of national personnel training, it is necessary to take into account a number of factors that directly or indirectly determine it, in particular:

The factor of urbanization is the main feature of the development of not only Asian countries, but also Kazakhstan. Large cities and urban agglomerations are becoming drivers of employment in the service sector. In Kazakhstan, the share of the urban population is about 55%. It is predicted that the rate of urbanization will accelerate after 2020 and by 2050 the share of the urban population may reach 64.6% (World Development Indicators, 2018).

This situation is caused by a significant number of single-industry towns (27) and small towns (69% of the total number of cities), which act as an intermediate link of migration between rural areas and large cities. The arrival of rural residents from the surrounding villages, low-skilled immigrants, and the departure of the most skilled labor force to larger cities exacerbate the tension in the labor market of these cities. The majority of internal migrants are young people of working age, which leads to a decrease in the share of the economically active population (Demographic statistics. Population migration, 2019)

The migration factor is the search for a stable and well-paid job, the possibility of obtaining professional and higher education. In Kazakhstan, there is an increase in

the intensity of internal migration flows by more than 2 times from 1.9% in 2000 to 5.2% in 2019, 80% of which is accounted for by intra-regional migration, 17-20% - by inter-regional migration. In 2010-2019, 77% of migrants were people of working age, the largest outflow occurred in the southern and northern regions of the country, including Akmola, North Kazakhstan, East Kazakhstan, South Kazakhstan, and Zhambyl regions. The main regions of population inflow were the cities of Nur-Sultan (Astana) (10.5%), Almaty (30.8%), Almaty (12.6%) and Akmola regions (6.4%). In 2015-2019, 42% of the total number of migrants who moved to Nur-Sultan (Astana) were migrants from neighboring regions, and 70% of those who moved to Almaty were residents of Zhambyl, South Kazakhstan and Almaty regions. In Kazakhstan, the structure and quality of migration in the category of migrants in the age group of 15 years and older with higher education continues to deteriorate. From 2000-2019, 171.4 thousand people with higher education left the country, and 82.9 thousand people arrived, mostly with low qualifications and education, the balance was 88.5 thousand people, which represents a big loss for our country (National report "Youth of Kazakhstan", 2018).

The problems of insufficient competitiveness among young professionals and the unbalanced labor market in Kazakhstan include next points:

- employment of young professionals mainly in low-productive industries. Thus, in 2018-19, 16.7% of employed youth worked in the trade sector, 14.2% – in agriculture, 11.1% - in education;

- the unattractiveness of entrepreneurship for young people. Thus, the main share of employed youth is made up of employees (76.1%), self-employed young people account for 23.9% and in most cases is associated with low income and productivity in rural areas as an alternative form of employment. At the same time, a significant part of employees is in the city (64.2%) and self – employed youth-in the countryside (66.4%). The most pressing problems of young entrepreneurs are the lack of start-up capital, high rents, lack of business experience and tax reporting (National report "Youth of Kazakhstan", 2018");

- the level of education of employed youth. Thus, 42.9% of employed youth have higher and incomplete higher education. Moreover, there is a high differentiation of hired youth (48.9% with higher education) and self-employed youth (only 25.2% with higher education) people (Kazakhstani people were offered a job in the Eurasian Union, 2019);

- high wage differentiation. According to official data, the average monthly nominal accrued salary of working youth for the last years averaged 115.4 thousand tenge (Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan, 2019), which is almost one and a half times lower than the average monthly nominal accrued salary for the economy as a whole. The lowest wages are observed in agriculture, health care, and public administration. The segment of highly paid youth covers only a part of the employed youth;

- the quality of the jobs offered, mainly in industries with relatively low productivity and low wages, hinders the desire of young people for decent work;

- a relatively high level of youth unemployment in the city as a result of the process of increasing internal migration «village-city». The availability of work or lack of it, the opportunity to get an education, and the advantages of large economic centers are among the most important motivating factors for the outflow of young people from rural areas;

- differentiation of unemployed youth by level of education. Thus, among unemployed youth, 35.9% have higher and incomplete higher education, and 39% have specialized secondary education. At the same time, unemployment among young people with higher and incomplete higher education is 3.3%, among young people with secondary and vocational (special) education-4.2%, with basic, secondary, general, primary-4.8% (Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan, 2019);

- high unemployment among young women at 4.6%, compared to 3.4% for men for the last year;

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- barriers to youth employment, in particular: insufficient work experience, professional knowledge, skills and qualifications; the gap between the professional orientation of young people and the needs of the labor market, employment outside the specialty, etc. Thus, according to official data, the expected graduates (universities and colleges) in the period from 2013-2019 were more than 3 times higher than the expected demand for labor (taking into account vacant jobs). It should also be taken into account that a significant part of the economically active population of different age groups also applies for free jobs;

- differentiation of the quality of education between the city and the village, related to the quality of the teaching staff, infrastructure, funding, material and technical base, etc.

One of the key challenges in training competitive personnel is to ensure that they are in line with the changes in the labor market and the professions of the future under the influence of digitalization. In this regard, the areas of competitive skills development deserve special attention. In the labor market, it is important not only to get a profession in a specific specialty, but also certain skills that often change faster than the list of professions that has been formed.

To solve the problems of training personnel for the digital economy, it is necessary to:

- develop and implement a digital educational platforms, electronic textbooks, effective digital learning tools for optimizing the educational process, improving the level of qualification;

- have a partnership of IT companies in the creation of laboratories, basic departments and entire faculties in universities to reduce the gap between theory and practice;

- train the future IT specialists starting from school: creation of IT clubs, IT centers, IT classes, digital platforms for learning the basics of programming according to the methods developed by IT market leaders, for obtaining knowledge and skills for young people from remote regions of the country and providing assistance in

finding jobs, participating in various IT competitions and getting a part-time freelance work;

- develop programs for the professions of backend and frontend developers, web developers and data analysts on-the-job at online courses Coursera, «Yandex. Practical training» and provide opportunities for professional mobility of young personnel. In 2015-2019, the number of vacancies in these professions increased by 140%;

- create a unified search system «Unified search system. Work without Borders» on the national platforms of the EAEU countries for interactive interaction between job seekers and employers; to form a common labor market, accelerating the processes of free movement of labor and ensuring the mobility of labor resources, improving the quality of education, obtaining the necessary skills and qualifications. It is projected to receive 1 million requests, 100 thousand responses for vacancies, and 10 thousand invitations from employers in one calendar year (Kazakhstani people were offered a job in the Eurasian Union, 2019).

One of the promising directions of training of competitive personnel and formation of skills of future studies are in the field of Data Science, emerged at the crossroads of different specialties: computer science, mathematics, statistics, economics and business. There are significant employment opportunities in this area today.

Nowadays, it is becoming relevant and necessary to develop training programs in the field of Data Science: since 2015-2019, the number of students at the University of California at Berkeley has grown from 100 to 1100 students in the specialties of law, cognitive neurology, geography, history, civil engineering, immunology, demography, psychology, business and others (Data Science for Undergraduates: opportunities and opportunities, 2019); in Russia, the specialty of Data Science is taught by MSU, MIPT, NSU, HSE (out of 76 places - 55 at the expense of the state budget, 15 on a paid basis, 6 places for foreigners on a paid basis (Master's program "Data Science", 2019).

In Kazakhstan, this area of training is only developing as an independent specialty for information technologies, as well as for business analytics: short-term training

programs based on the training center Data Science Academy; experimental programs at KBTU; since 2017, AlmaU has been implementing the Business Analytics and Economics programs.

High technologies are radically changing business processes in many sectors of the economy, leading to transformation, the disappearance of old ones, the emergence of new professions, and a shortage of specialists with IT skills. Within the framework of the State Enterprise «Digital Kazakhstan», the target indicator for the growth of new jobs due to digitalization will reach 300 thousand people by 2022 and, the number of graduates in the IT field will increase (Ruzanov, 2019).

Table 2 shows the branches of knowledge in the conditions of the formation of the digital economy and the branches of the economy that form the foundation of Industry 4.0, which allows to imagine the employee of the future, to determine the directions of training competitive specialists.

In the creation of competitive national personnel, a significant role is assigned to the improvement of the activities of higher educational institutions. The new model of the modern University 4.0, involves the implementation of educational, research, innovative and entrepreneurial, spiritual and moral activities that meet modern trends.

Improving the system of technical and vocational education, timely provision of the country's economy with the necessary technical specialists and working professions should become a purposeful educational policy of Kazakhstan, including the introduction and expansion of dual training, the organization of training centers that are in demand in the labor market, on the basis of colleges with a guarantee of subsequent employment of graduates, the development of professional standards and legislative regulation of the process of professional qualifications.

In the conditions of increasing the time of training directly at the enterprise and increasing the status of engineering and pedagogical workers, it is necessary to strengthen the relationship of TPPSE with production. According to the evaluation system developed by the International Labour Organization (ILO), the training of

professional personnel must meet 4 qualitative characteristics and 12 indicators (Challenges of Industry 4.0 and the need for new responses, 2019).

This assessment system can be used for the development of the national TPPSE system, in particular, the indicator of the 4-step system of training of the engineering and pedagogical workers involves: obtaining higher special education (formal training) or special training in pedagogical or business skills (informal training); obtaining non-academic work experience; preliminary training in college and certification of skills; continuous professional development.

Table 2. Knowledge and economic sectors in the context of the formation of Industry 4.0

Industry 4.0	
Knowledge	Industry
Mathematics, Physics, Chemistry, Biology Computer science, programming Data transmission, communications Electrical Engineering Materials Science Robotics Metrology Linguistics Information security Sociology, social psychology In-depth analytics	Production and maintenance of computing and communication equipment Creating software and management systems (management tools) Communications Energy industry Production of electrical equipment Chemical industry Mechanical engineering, precision engineering, machine tool construction Transport and logistics
Requirements for the quality of specialists 4.0	

1. General and special skills and abilities:
   - flexibility of mind, creativity, organizational skills;
   - depth of mind, understanding of abstractions and logic (mathematical abilities);
   - good memory, logic, observation (technical ability);
   - good memory, flexibility of mind (linguistic ability).
2. Programs for identifying and developing talents and abilities from preschool age
3. School, special and higher education programs focused on Industry 4.0.
4. Lifelong learning programs for Industry 4.0
5. Professional development of employees:	

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- the formation of competencies with which you can safely integrate into the new digital space and enjoy its benefits;   - modernization of the education system, taking into account the needs of "New Labor 4.0»;   - - formation of a mobile workforce
Challenges of digitalization in Kazakhstan
- -insufficient understanding of the economic benefits of digitalization in the business environment;   - lack of qualified personnel;   - insufficient development of domestic technologies and competencies;   - limited financial resources needed for digitalization;   - - insufficient development of telecommunications infrastructure.
Note-compiled based on the source (Ruzanov, 2019)

An increase in the number of students on a paid basis may lead to an unsecured future needs of the labor market for the required specialists. The growth in the number of employees with higher education in the economy is not always a positive trend. The analysis showed that in the formal sector of the economy, almost 50 percent of the jobs are found to be inconsistent with the employee's received specialty, and in the informal sector, the discrepancy reaches up to 80%.

Conclusion

Thus, in order to train competitive youth employees that meet the long-term needs of a balanced labor market in the context of digital transformation of the economy, it is necessary to: create conditions for improving the quality of human capital by training future employees with high-quality and in-demand skills and competencies; reduce the disproportions in the demand of the new economy for personnel, create conditions for retraining and advanced training of employees; development of a national system for forecasting the needs of the new economy in professional personnel and improvement of the national system of qualifications; modernization of the education system, in particular: development of educational programs according to international standards and requirements of the new

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economy, industry 4.0; updating programs of professional and higher education, professional development, taking into account digital skills at the industry, regional and national levels; improving the quality of training and motivation of teaching staff; partnership between the state and private business, aimed at training qualified personnel with technological and digital competencies; improving the mechanisms of interaction between students and potential employers, creating favorable conditions for the development of high-tech companies and start-ups for the training of qualified personnel in demand by the digital industry market; development of new competence centers in the most popular technological areas with skills in the labor market 4.0, a new type of thinking, professional skills on Digital Skills and Soft Skills; development of co-financing mechanisms from the state, business structures of innovative pilot programs for the acquisition of new skills; creation of new jobs related to cognitive technologies and algorithmized processes support for entrepreneurship and small businesses; creating conditions for the development of talented young people, developing mechanisms for attracting and motivating them, developing forms of remote work, freelancing, self-employment, outsourcing, temporary project teams, etc.

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