

**REPORTS OF THE NATIONAL ACADEMY OF SCIENCES  
OF THE REPUBLIC OF KAZAKHSTAN**

ISSN 2224-5227

<https://doi.org/10.32014/2019.2518-1483.190>

Volume 6, Number 328 (2019), 205 – 211

UDC 338.2

**R.K. Sabirova, Zh.N. Yerniyazova, G.E. Talapbayeva, A.K. Masalimova**<sup>1,4</sup>Atyrau State University named after H. Dosmukhamedov;<sup>2,3</sup>Kyzylorda State University named after Korkyt-AtaSabirova [rysty@mail.ru](mailto:rysty@mail.ru), [Zhan-san@mail.ru](mailto:Zhan-san@mail.ru), [Gulnar.7575@mail.ru](mailto:Gulnar.7575@mail.ru), [bikosh09@mail.ru](mailto:bikosh09@mail.ru)**ANALYSIS OF THE IMPACT OF THE DEVELOPMENT OF DIGITAL  
TECHNOLOGIES ON THE LABOR MARKET**

**Abstract.** The relevance of this issue is determined by the need to create social and economic opportunities in the country for highly productive work of workers in the digital economy, their continuous development and professional realization, high incomes of digital knowledge and skills holders, and a decent standard of living for their households. This will create a competitive economy in the country with attractive conditions for life, work and employment, ensure the attractiveness of the image of Kazakhstan in the global digital economy, as well as its safety in the human dimension. The scientific idea is to form a single concept of orientation of a person, society, organizations in the professional division of labor, taking into account the interests of all subjects of social and labor relations, the prospects for the transformation of the world of professions and the labor market.

**Keywords:** digitalization technologies; labor market; industrial Revolution; technological structure; new forms of employment.

**INTRODUCTION**

Now the world is approaching a transition (leap) to a qualitatively new stage, on the basis of a new 6th technological structure, which is able not only to rebuild the entire lifestyle of a person, but also to fully expand its potentialities, being built into a new social structure. “The more we think about how to take advantage of the enormous advantages of the technological revolution, the more carefully we integrate ourselves into the basic social models that embody and create these technologies, the wider are our opportunities to shape this new revolution to make the world a better place.”

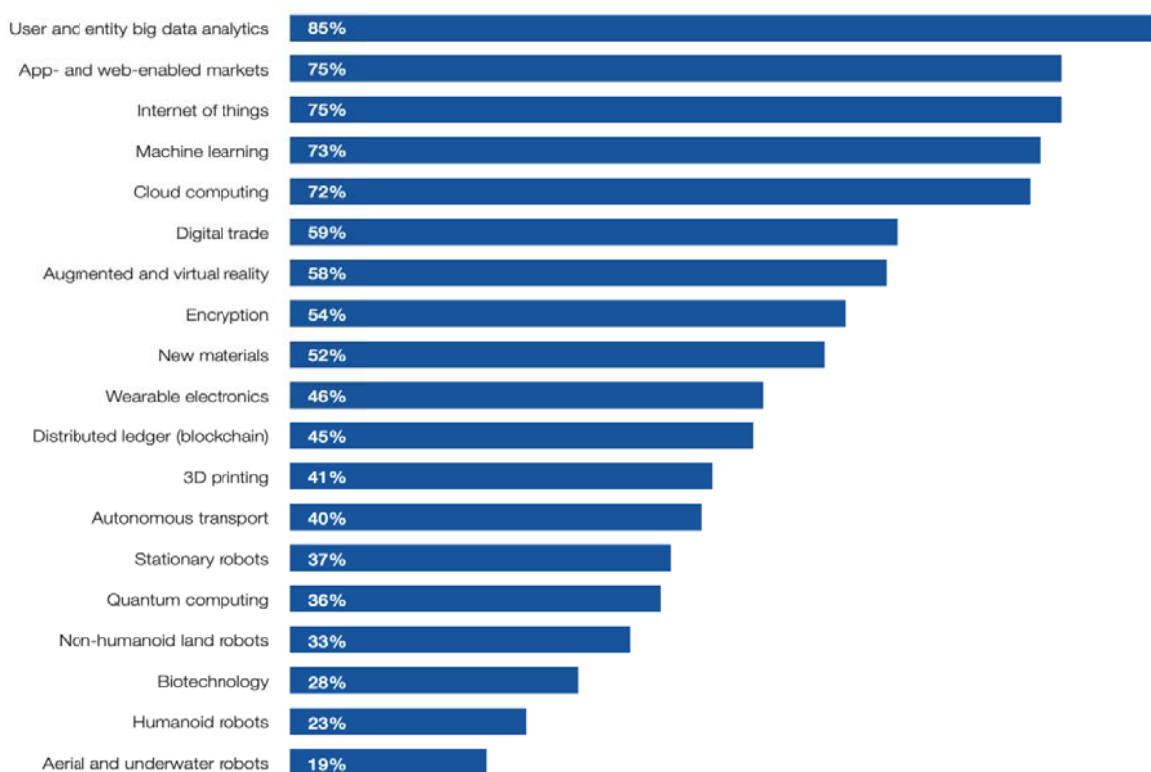
Thus, only a targeted increase in the specific gravity of the technologies of the sixth order creates an adequate technological platform that ensures a reduction in the resource consumption of production on the basis of an increase in its knowledge of capacity. The material basis of production is determined today, primarily by the level of technology. For the modern level of technology, when the 4th and 5th technological modes dominate in industry, the need arises for at least an active industrial policy and strategic planning within the framework of a market economy. This caused a mosaic of equipment and technologies used in the country's economy: it has all production options — from craft to high-tech, and therefore the employer's requests for staffing are equally different.

The third way is in the phase of stagnation, the fourth in maturity, and the fifth in the phase of intensive growth.

**MAIN PART**

The change in technological patterns causes changes in the institutional system of the country's economy, which ensure the development of engineering and technology of a new way. The result is its rapid expansion. It is finally changing the sectoral structure of the economy, becoming the basis and main factor of its growth. At the same time, the next technological order is emerging, and the substitution process is repeated on a different basis.

The technological structure (wave), in the opinion of the authors, is a combination of technologies characteristic of a certain stage in the development of productive forces. It is a system of interconnected industries (including technological chains dependent on each other) with an equal technological level.



Source: Future of Jobs Survey 2018, World Economic Forum.

Figure 1 – Technologies by proportion of companies likely to adopt them by 2022 (projected)

At least 133 million new roles generated as a result of the new division of labor between humans, machines and algorithms may emerge globally by 2022, according to the [World Economic Forum](#). There will also be strong demand for technical skills like programming and app development, along with skills that computers can't easily master such as creative thinking, problem-solving and negotiating. A short-term solution to filling these skills gaps would be for companies to pay a premium to acquire talent with skills in demand. But even if they can find people with the right skills and are happy to bear the cost, it will not help in a few years time when those new skills are no longer needed.

Its core is a certain set of technologically related processes that are used (or characteristic in virtually all areas and sectors of the economy) for a fairly long time. The effectiveness of its functioning and the speed of transfer of new technologies depend on the degree of technological and economic connectedness of the links in the technological structure.

Now the necessary technological prerequisites are beginning to be created for the transition to a qualitatively new production and the satisfaction of human needs. The technological basis of the upcoming 4th industrial revolution is: robotization, additive technologies and digitalization. Basic research in this area is still not enough, although there are many populist publications

The robot today is becoming an active player in the labor market, making more and more noticeable competition to humans. Soon, robots will design and manufacture their own kind. Almost all the functions that a person can perform will be transferred to them, except for strategic, social and the sphere of creative thinking. According to Dell's research, while moving production to countries with a cheap economy can save up to 65% on labor costs, replacing workers with robots can reduce costs by 90%, that is, very soon, robotics can give businesses tangible benefits.

At the same time, they are called: information detectives - employees digging into the employer's data reserves and issuing recommendations for optimizing the business; managers of team interaction between people and machines - ensuring effective cooperation between people and computers; cyber city analysts - designed to ensure that the digital processes of municipalities function smoothly; genetic diversity inspector, virtual store guide, keeper of personal memories, etc.

The main question generated by automation is whether robots will compete with or help workers. Initially, people were afraid that robots would destroy jobs in the economy, but real practice and research by scientists have shown that those companies will benefit from robotics:

- correctly selected operations for robotization;
- improved the technologies and procedures for the selection and training of personnel, since people who have lost their jobs due to robotization are unlikely to take new jobs, as they require other skills and abilities that workers do not have;
- ensured the phased introduction of robots taking into account the time for retraining of employees.

In addition, in the long run, robots due to increased labor productivity will lead to an increase in real income per capita.

Speaking of competition between robots and humans, three possible options can be considered. According to the first - basic, robots compete with people in all types of work and operations, in the second - only in some of them and in the third - they displace low-skilled labor, but increase demand for specialists

The development of digital technologies, robotics and automation should become the basis for predicting the development of the division of labor and the transformation of professions, the content of labor. This, in turn, is the basis for predicting the development of the labor market and employment, hence the requirements for education and the formation of competencies.

From the perspective of practice, it is necessary to evaluate the effectiveness of the applied methods of career guidance and professional self-determination in terms of their compliance with the requirements of the industrial revolution, the prospects for the development of the labor market, forms of employment, etc. It can be noted that in recent years, spontaneously, obviously as an unconscious reaction to the challenges of practice, new one's career guidance methods, new actors. The projects "Quantorium" (centers for robotics and digital technologies) and "Sirius Centers" (centers for personal and professional development) can be called interesting. As a result, there are contradictions between them, inconsistency and multidirectional actions, duplication. Career guidance methods make little use of modern technology, which reduces the effectiveness of career guidance measures. 67% of applicants do not have a sustainable choice of profession and university, even if they participated in at least three career guidance events.

In addition, the existing career guidance systems are more focused on choosing a profession in accordance with the current abilities and preferences of the student (young people, less often the unemployed population). Labor market forecasts, changes in professions, and employment conditions are poorly taken into account. The forecast horizon does not exceed 5 years. Meanwhile, the system should not be based on existing abilities, but on potential, the horizon should be at least 10 years old, and not professional inclinations should be used, but competencies, including over-professional, cross-cutting ones. Almost completely there are no independent methods of career guidance (professional self-determination) for the employed population. Career planning systems are more focused on securing personnel in the organization, rather than on the free movement of people in the labor market, which creates personal and professional contradictions, and inhibits the development of the country's human resources. Therefore, it is necessary to develop a concept that allows overcoming these contradictions and form a unified theoretical base for building a modern perspective system of career guidance and professional self-determination, integrating the efforts of various actors to achieve common goals.

The scientific idea of this concept is to consider career guidance and professional self-determination as a mechanism that ensures unity and continuity of the process of reproduction of human resources from the position of a person choosing his path of professional development, which is due to the cross-cutting nature of changes in the technological, professional and functional division of labor under the influence of the principles of the fourth industrial revolution, the digital economy and the innovative nature of social and labor relations genius. The limitations of the existing approaches to career guidance and professional self-determination are related to the fact that they break the unified process of professional self-determination of a person during all labor activity into at least three parts:

- career guidance in the traditional sense as the choice of a profession by schoolchildren and youth.
- As part of this, we are talking about assessing our preferences and potential, about choosing an educational institution as a sphere of forming primary professional abilities and developing personal qualities, and about job opportunities. These aspects are limited to vocational education, vocational

training, vocational diagnostics (most often based on psychological testing), vocational counseling (mainly for schoolchildren and parents, less often for people changing their profession). This part to a greater extent reflects the interests of man (to find work in accordance with his abilities) and society (to provide the national economy with the necessary amount of human resources);

- regulation of the labor market in terms of the distribution of human resources by sectors of employment, forms of employment, between organizations (employment) and by levels and forms of training (education). To provide themselves with appropriate personnel, enterprises work with schoolchildren and students, hold job fairs, and form an appropriate HR-brand (the brand of the employer in the labor market). In this part, the issues of supply and demand of labor, the formation and return of human capital, forecasting employment, and the formation of competencies are included in the traditional career guidance;

- professional self-determination as a mechanism for planning professional activities, careers, career movements, development of competencies in the process of work. These issues are resolved within the framework of human resources management systems at the level of organizations, corporations and consulting services, business education. It should be noted that the positive aspects of career guidance (namely orientation, choice) are lost in these mechanisms, since the interests of organizations and business prevail and only the trends of “freedom of labor” persistently form the vector of the interests of the employee in this area.

In the digital economy, an employee can be employed remotely outside the territorial and country boundaries of the employer, wherever his competitiveness and working conditions allow, and, last but not least, an attractive income for him. The employee’s social profile includes justification of the types of his employment and the principles and forms of organization on a flexible basis, but with observance of basic labor and social rights, as well as justification of the priority areas of his activity, professional and social status. The economic profile of the employee includes the justification of the size of his remuneration and social benefits that meet the requirements for maintaining and developing his competitiveness, including in comparison with foreign counterparts. The employee’s economic profile in the digital economy should enable him to provide expanded reproduction and a decent standard of living for his family (household).

The subsystem of analysis and forecasting of the labor market, assuming:

- demographic monitoring and forecasting of demographic processes, including their migration component;

- analysis and forecast of the main parameters of the economic development of the region as a whole and its individual regions and republics in the context of the most important sectors of activity, the most labor-intensive enterprises, with an assessment of the extent of the possible release of workers;

- monitoring and forecasting structural changes in the economic complex of the region, trends in the redistribution of labor;

- analysis and forecast of the number of graduates of educational institutions that fall on the labor market;

- analysis and forecast of the number and composition of applicants for employment on employment issues;

- analysis and forecast of the number and composition of the unemployed;

- analysis and forecast of employment opportunities for the unemployed, taking into account the available vacancies;

- analysis and forecast of the possibilities of labor redistribution between regions and republics of the region, as well as labor migrations beyond its borders.

Subsystem for programming employment. This subsystem includes organizational procedures for the development of targeted comprehensive programs to promote employment in the region for short, medium and long term periods.

1. Assessment of the problem situation in the field of employment, the severity of the problems (the result of the functions of the 1st subsystem).

1. Setting goals, objectives.

2. The selection of priority areas of labor market regulation.

3. Formation of a bank-instrument of regulation (a set of principles, forms and methods of regulation).

4. Development of relevant measures, their ranking by implementation time, determination of resource sources and responsible persons (organizations).

III. Subsystem of labor market regulation. The subsystem includes procedures for making specific management decisions on implementing programs to promote employment in the region at various levels of government and administration:

- the level of republican and regional administrations, employment committees, centers, employment departments of the population of the republics and regions;
- the level of city and district administrations, employment services of cities and regions;
- level of enterprises (organizations, institutions);
- level of public organizations. Providing subsystems.

Scientific and methodological support, assuming:

- development of a methodology and methodology for analysis and forecasting of the labor market, programming of employment of the population of the Karaganda region and its regions;
- Conducting specific research on priority issues of ensuring employment, regulation of the labor market, the introduction of advanced organizational technologies in the activities of territorial employment services;

- scientific and methodological support for the development and implementation of programs to promote employment;

- scientific examination of the most important management decisions that have a comprehensive impact on processes in the field of employment in the region.

Information support assuming the presence of:

- an automated databank on the number, composition and location of vacant jobs;
- a databank on the number and composition of the unemployed working-age population who applied to the territorial employment services for help in finding employment;
- databank on public works;
- a databank of educational institutions providing training and retraining of personnel, including those from the unemployed (unemployed) population;
- a bank of statistical, reference, analytical materials, forecast calculations of the labor market, etc.

Of all the supporting subsystems, this subsystem of the mechanism for regulating the territorial labor market is the least developed. It seems advisable to create a working group of 3-5 people to develop draft legislative proposals, put forward legislative initiatives, prepare draft local regulations governing certain aspects of social and labor relations in territories subordinate to legislative bodies.

Resource support. The resource subsystem of the labor market regulation mechanism assumes the presence of the following main blocks:

- 1) staffing;
- 2) material and technical support;
- 3) financial security.

The functions of this subsystem are resource support for the implementation of programs to promote employment of the population, the functioning of the state employment service.

Despite the presence of most of the components, it will take time to debug and pair the individual subsystems of the mechanism for regulating the territorial labor market.

The mechanism of state regulation of the economy is constantly being improved, regardless of whether governments are guided by the monetarist principles of economic policy or are inclined to use more stringent budget regulatory tools. In modern conditions, the practice of state regulation of the economy has been successful enough to prevent general crises and socially dangerous scales of unemployment.

At present, the situation on the labor market is acquiring new features, and this is expressed in the following: firstly, long-term hidden unemployment, which is accompanied by a consequent shortage of labor, continues, and secondly, there are significant disruptions in the reproduction of the vocational qualification structure of employed, i.e. the natural retirement of older workers in many vocational qualification groups is not being made up, primarily due to graduates of educational institutions, which jeopardizes the development of sectors of the national economy and leads to serious problems.

## CONCLUSION

Thus, the scientific idea is to form a single concept of orientation of a person, society, organizations in the professional division of labor, taking into account the interests of all subjects of social and labor relations, the prospects for the transformation of the world of professions and the labor market. Unfortunately, there is no single universal solution that would allow enterprises to focus on the future of their employees. Nevertheless, thanks to the priorities of continuing education, retraining and retention of employees, as well as the release of resources necessary to create a culture of continuous learning, enterprises will have every opportunity to prosper in the framework of the Fourth Industrial Revolution.

УДК 338.2

**Р.К. Сабирава<sup>1</sup>, Ж.Н. Ерниязова<sup>2</sup>,  
Г.Е. Талапбаева<sup>3</sup>, А. К. Масалимова<sup>4</sup>**

<sup>1,4</sup>Х.Досмұхамедов атындағы Атырау мемлекеттік университеті;

<sup>2,3</sup>Қорқыт Ата атындағы Қызылорда мемлекеттік университеті

### **САНДЫҚ ТЕХНОЛОГИЯЛАР ДАМУЫНЫҢ ЕҢБЕК НАРЫҒЫНА ӘСЕРІН ТАЛДАУ**

**Аннотация.** Бұл мәселенің өзектілігі цифрлық экономика саласындағы жұмысшылардың жоғары өнімді жұмысы үшін олардың әлеуметтік-экономикалық мүмкіндіктерін құру қажеттілігімен, олардың үздіксіз дамуы мен кәсіптік іске асырылуымен, цифрлық білім мен дағдылардың иегерлерінің жоғары табыстарымен және үй шаруашылықтары үшін лайықты өмір сүру деңгейімен байланысты. Бұл өмір, жұмыс және жұмыспен қамту үшін тартымды жағдайлары бар елде бәсекеге қабілетті экономика құруға мүмкіндік береді, жаһандық цифрлық экономикадағы Қазақстанның имиджінің тартымдылығын, сонымен қатар оның адами өлшемдегі қауіпсіздігін қамтамасыз етеді. Ғылыми идея - бұл әлеуметтік, еңбек қатынастарының барлық субъектілерінің мүдделерін, кәсіптер әлемі мен еңбек нарығын қайта құру перспективаларын ескере отырып, адамның, қоғамның, ұйымдардың кәсіби еңбек бөлінісіндегі бағдарлануының біртұтас тұжырымдамасын қалыптастыру.

**Түйін сөздер:** цифрландыру технология; еңбек базары; өнеркәсіптік революция; технологиялық құрылым; жұмыспен қамтудың жаңа нысандары.

УДК 338.2

**Р.К. Сабирава<sup>1</sup>, Ж.Н. Ерниязова<sup>2</sup>,  
Г.Е. Талапбаева<sup>3</sup>, А.К. Масалимова<sup>4</sup>**

<sup>1,4</sup>Атырауский государственный университет имени Х.Досмухамедова;

<sup>2,3</sup> Кызылординский государственный университет им.Коркыт-Ата

### **АНАЛИЗ ВЛИЯНИЯ РАЗВИТИЯ ЦИФРОВЫХ ТЕХНОЛОГИЙ НА РЫНОК ТРУДА**

**Аннотация.** Актуальность данной проблематики определяется необходимостью создания в стране социальных и экономических возможностей для высокопроизводительного труда работников в цифровой экономике, их постоянного развития и профессиональной реализации, высоких доходов носителей цифровых знаний и навыков, достойного уровня жизни их домохозяйств. Это позволит создать в стране конкурентоспособную экономику с привлекательными условиями для жизни, труда и занятости населения, обеспечить привлекательность образа РК в глобальной цифровой экономике, а также ее безопасность в человеческом измерении. Научная идея заключается в том, чтобы сформировать единую концепцию ориентации человека, общества, организаций в профессиональном разделении труда с учетом интересов всех субъектов социально-трудовых отношений, перспектив трансформации мира профессий и рынка труда.

**Ключевые слова:** цифровизация; технологии; рынок труда; промышленная революция; технологический уклад; новые формы занятости.

**Information about authors:**

Sabirova R.K. - Atyrau State University named after H. Dosmukhamedov, Sabirova [rysty@mail.ru](mailto:rysty@mail.ru), <https://orcid.org/0000-0002-9947-6564>

Yerniyazova Zh.N. - Kyzylorda State University named after Korkyt-Ata, [Zhan-san@mail.ru](mailto:Zhan-san@mail.ru), <https://orcid.org/0000-0003-2198-3985>

Talapbayeva G.E. - Kyzylorda State University named after Korkyt-Ata, [Gulnar.7575@mail.ru](mailto:Gulnar.7575@mail.ru), <https://orcid.org/0000-0001-5162-6028>

Masalimova A.K. - Atyrau State University named after H. Dosmukhamedov, [bikosh09@mail.ru](mailto:bikosh09@mail.ru), <https://orcid.org/0000-0001-7885-5736>

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