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## **TRANSFORMATION OF ECONOMIC DEVELOPMENT OF KAZAKHSTAN IN THE CONDITIONS OF MODERN REALITIES**

**Abstract.** The article examines the features of the fourth industrial revolution and the place that characterizes the transformational concept of modern society in a series of other sociological theories. The published revolution is the result of the latest advances in information and communication, biotechnology, robotics, and artificial intelligence.

Modern requirements of digitalization at the present time: compatibility (compatibility), virtualization, decentralization, and real-time operation. Cyber-physical systems, cloud computing and big data technologies, business on the Internet, virtual and horizontal integration, virtualization and «digitization» of all processes of value chain formation.

Kazakhstan seeks to become not only an industrially developed country, but also a postmodern country, but today it is a postmodern state, primarily of modern man.

Many developed countries and business giants are active participants in the fourth industrial revolution: government programs, business communities, and non-profit organizations were created to remove barriers to creating industry 4.0.

The fourth industrial revolution is a predictable event, mass introduction of cyber-physical systems in production, satisfaction of human needs, including LIFE, Work and leisure. Changes cover various aspects of life: the labor market, environment, political systems, technological regime, human personality, and others. Due to the fact that improving the quality of life comes at the expense of economic efficiency and attractiveness, industry 4.0 performs it at the risk of increasing instability and possible collapse of the world system, so its attack is considered difficult for humanity to react.

**Key words:** transformation, fourth industrial revolution, industry, Internet, development, productivity, information and communication technologies, industry, postmodernism.

**Introduction.** 43 years have passed since the first edition of D. bell's famous work «the Coming post-industrial society» [1] (1973). During this time, many attempts have been made to describe modern society and its future fate in connection with the transformation of information and knowledge into a key resource, as well as the growth of the service sector in the economy.

An example of qualitative systematization of the most recognized theories is given by F. Webster's book «Theory of information society» (1995). All the variety of descriptions of modern society, this author divided into two types: the first proclaim the transition to a fundamentally new, «information» («post-industrial») era, the second postulate the continuity of the social structure. It has been XXI years since the book was published, and the concepts of «knowledge society» and «cognitive capitalism» have been added and updated in the sociological discourse, but the most cited book remains m's. Castels «Information society: economy society and culture» (F. Webster attributed his theory to the first category, although he himself tends to the second direction).

The situation is very typical for modern sociology as a whole: there are a number of the most well-known and discussed concepts, but no generally accepted paradigm has yet been formed. New books are written mainly under the influence of popular authors, they develop or, on the contrary, criticize certain aspects of their theories that claim to be fundamental, but this has not yet led to the emergence of a fundamentally new, quite influential concept.

Changing global market conditions, the transition of the world's leading countries to a low-carbon economy, and the advent of the digital era have become new challenges for Kazakhstan in the XXI century.

**Methods.** The theoretical and methodological basis of the research is the work of domestic and foreign researchers on the theory and assessment of management quality, strategic management, features of logistics management and organization in the conditions of digital transformation of the economy as a whole.

The research is based on a system-logistics approach to the formation of digitalization of economic processes in the country. It was based on dialectical, statistical, inductive and deductive methods used by world science in the knowledge of socio-economic phenomena.

To solve these problems, methods of comparative analysis, grouping of data, indexes, analysis and synthesis, modeling methods, methods of short-term and long-term forecasting, planning, and expert-analytical methods were used as special research methods and tools.

**Results and discussion.** For the modern development of the global and national economy is characterized by the strengthening of globalization processes, formation of the foundations of an innovative economy and post-industrial society, contributing to significant changes in the content of labor workers, improve their skills, human capital formation a new quality, adequate to modern conditions of introduction of new technological structures. Kazakhstan is gradually becoming a part of the global economic system, and the development of its economy is naturally based on the strengthening of innovation processes.

In this light, it is particularly important to meet the challenges of accelerated industrial and innovative development, increase labor productivity and ensure the physical and social well-being of Kazakhstan's citizens.

Therefore, in the complex of nodal problems that need theoretical understanding and justification, the issues of increasing labor productivity and improving the regulation of labor relations in the country's economy are of particular importance and relevance.

The solution of these problems involves a comprehensive approach and a deep study of the realities in the system of labor relations that require the current stage of development of the Kazakh economy.

In the most generalized form, labor can be defined as an objectively inherent sphere of activity for the transformation of natural, material and intellectual resources into products intended for both personal and public consumption. At the same time, work is the basis of human life and development, and its self-realization.

It is known that Karl Marx first spoke about the economic content of future labor. He foresaw that such labor would inevitably appear as universal labor, which is an activity to satisfy the material and spiritual needs of society, not broken up into the production of value and use value, not mediated by the market method of distributing the goods produced, activity as the realization of all human essential forces – the mind, will, moral and aesthetic qualities. It is stimulated not by a particular interest of a person or group of people, but by universal, universal motives; it is an activity based on all the achievements of previous generations' life-making [1, p.50].

New phenomena in the sphere of labor and social organization are widely discussed in modern Western literature. In recent years, the Russian «post-industrial wave», represented by V. Inozemtsev, V. Orlov and others, has joined the discussion. Many of them note that Marx's assumptions about the historical maturation of universal labor clearly come true in modern developed capitalist society. Not only manual labor, but also mechanized labor is becoming a thing of the past, and in General, material productive labor is significantly reduced in its volume.

The spheres of services, management, information, science, mass communications, etc. are expanding. the Structural organization of society, like a pyramid, is replaced by a «network», consisting of small semi-permanent structures supplemented by numerous temporary modules [2, p.459].

There is a transition from materialistic values to post-materialistic ones.

Analyzing today's post-industrial elements in society, we can see the growth of collectivist tendencies, which are the result of new types of labor that arise in the conditions of «post-industrial», information-automated production. One clear example of real collectivism in modern society is the relationship between employees in enterprises with a collective form of ownership. This refers to the so-called national enterprises owned by employees. This is the birth of socialism within the bourgeois economy. There is no hiring, the effect of production – market income-is distributed among employees according to the distribution methods approved in the team [3].

Over the past half-century, the formation of a post-industrial society in the field of labor has undergone radical changes. They were the result of long transformations in all areas of social and economic life.

Until the early 70s of the last century, the basis of both Western and then existing Soviet society was a developed industry and the dominance of two sectors of the economy (mining and manufacturing) over the third sector – the sphere of services. Mass industrial production generated mass professions and "employee-employer" relationships, which were regulated by developed labor law. The subject of labor law was mainly relations in the field of collective labor. At the same time, the legislation was mainly intended to protect employees with minimal consideration for the interests of employers.

However, by the 1970s, the world of work in developed countries began to change. Many labor institutions, such as women's labor protection, have been challenged or changed, and many small and medium-sized employers have begun to ignore labor law or selectively comply with it. These changes were associated not only with post-industrialization, but also with globalization and its accompanying processes. During this period, there was a radical change in the world division of labor with the movement of the main branches of industrial production from the developed countries of the West to the so-called developing countries with the involvement of cheap labor resources in the turnover.

Transnational corporations and transnational banks, together with the entire updated global financial system and such bodies of influence as the international monetary Fund (IMF), the world Bank (WB), and the world trade organization (WTO), have become one of the instruments of this shift in production capacity, capital, and the division of labor. On this basis, industrial modernization of the economy of developing countries, including India, China, and Indonesia, was carried out.

The socio-economic reforms carried out in these countries in recent decades have led to the formation of a new workforce capable of working in the enterprises of transnational corporations (TNCs) established in these countries. On the one hand, in all sectors of the economy on the technocratic wave mentioned above, there was a radical renewal of the technical and technological base on the basis of computerization, Informatization, development of telecommunications, automation, robotics, and the introduction of flexible production systems.

On the other hand, this renewal required new qualities, abilities, and education from employees. There were significant changes in the organization of labor and production: overcoming Taylorism and Fordism with the elimination of conveyors and organizations of flexible production.

A new labor policy has been implemented, based on such terms as «quality of work life», «social engineering», «human resource management», as well as new approaches to the organization of remuneration and incentives for labor. Thus, in the conditions of the post-industrial economy, many new realities in the field of labor have appeared. This is, first of all, a new network worker working in a new economic, cultural, civilizational and ethnic environment.

These employees are concentrated in inter-network nodes-agglomerations, have new creative, informational, and cultural qualities, and bring increased added value to employers. New network workers formed a new layer of network labor resources, which occupied its niche in the highly mobile network labor market, providing new forms of organization, productivity, and remuneration [4,5]. With the transition to a global level of development, national and regional economies are put in conditions of severe competition in almost all parameters and, above all, in terms of labor flows and qualified personnel. The main functions of forming, distributing, placing and using labor resources are changing. In developed countries, there has been a restructuring of the labor force with a shift to high-tech industries.

In 2011, a significant event for Western industry took place, which could potentially, if not give rise to a new strong sociological theory, then at least give a new impetus to the study of social transformations

caused by the development of technology. This is the Hanover fair, the world's largest industrial exhibition, for which the term «industry 4.0» was coined in 2011 [3]. Today, it is used to refer to the fourth industrial revolution.

The first revolution lasted about 100 years and is associated with the mastery of steam energy, the transition from manual to machine labor, the appearance of factories and the division of labor [4] (i.e., with the mechanization of production). The second industrial revolution was driven by electrification and the introduction of conveyor production in the early 20th century [5] (mass production). The third revolution was caused by the development of computer technologies in the second half of the twentieth century [5] (production automation).

One of the most recognized theories is the book by F. Webster «Theory of information society» [6] (1995). All the variety of descriptions of modern society, this author divided into two types: the first proclaim the transition to a fundamentally new, «information» («post-industrial») era, the second postulate the continuity of the social structure. It has been 21 years since the book was published, and the concepts of «knowledge society» and «cognitive capitalism» have been added and updated in the sociological discourse, but the most cited book remains m's. Castels «Information society: economy society and culture» (F. Webster attributed his theory to the first category, although he himself tends to the second direction).

The situation is very typical for modern sociology as a whole: there are a number of the most well-known and discussed concepts, but no generally accepted paradigm has yet been formed. New books are written mainly under the influence of popular authors; they develop or, on the contrary, criticize certain aspects of their theories that claim to be fundamental, but this has not yet led to the emergence of a fundamentally new, rather influential concept. In 2011, a significant event for Western industry took place, which could potentially, if not generate a strong new sociological theory, at least give a new impetus to the study of social transformations caused by the development of technology. This is the Hanover fair, the world's largest industrial exhibition, for which the term «industry 4.0» was coined in 2011 [7].

Today, it is used to refer to the fourth industrial revolution. The first revolution lasted about 100 years and is associated with the mastery of steam energy, the transition from manual to machine labor, the appearance of factories and the division of labor [8] (i.e., with the mechanization of production). The second industrial revolution was driven by electrification and the introduction of conveyor production in the early 20th century6 (mass production). The third revolution was caused by the development of computer technologies in the second half of the twentieth century [9] (production automation).

We are witnessing a change in the world's industrial image. The factor of cheap labor is no longer relevant – digitalization of production and technological modernization based on Industry 4.0. determine the further development and competitiveness of enterprises. Today, most countries have already started implementing their national digital transformation strategies (Germany adopted them in 2011, the US-2012, Japan, China, and other EU countries-2014-2015). According to the calculations of international experts, the introduction of Industry 4.0 technologies increases production efficiency by up to 10% -20%, and the use of digital technologies reduces the cost of production. In order for our companies to remain competitive in foreign markets, it is necessary to follow this trend.

Approximately 300 experts from 150 companies representing various economic circles, associations, trade unions and government agencies are developing concepts and specific recommendations in six working groups (standards and regulations; scenarios for the development and application of technologies; security of connected systems; legal framework conditions; work, training and professional development; digital business models for Industry 4.0). It was announced that the annual investment of the German industry in the development of digital systems until 2020 is estimated at 40 billion euros.

The German government expects that with the positive development of industry in the framework of «Industry 4.0», additional growth of the national economy in the amount of 267 billion euros and the creation of approximately 390 thousand new jobs by 2025 are possible.

By the way, in 2017, the share of enterprises with a high level of digitalization in Germany was about 25%, by 2025 it should increase to 83%. It is expected that the positive effect of the introduction of the fourth industrial revolution, businesses will particularly affect improvement of product quality, increase productivity, and minimize the timing of bringing products to market, improve production flexibility, etc. However, digitalisation in Germany covers not only the production and services sector, but also public administration, education, culture and science.

The transformation of the economy and society is taking place within the framework of the digital agenda of the German Federal government in such thematic areas as digital infrastructure, economy and labor, the innovative state, understanding digital changes in society, education, science, culture and media. etc. In addition to the digital agenda of the government in 2016, the digital strategy for 2020-2025 was presented. It identified key areas and tools for the successful implementation of Germany's digital transformation.

In Kazakhstan, in 2018, together with international experts, the readiness of enterprises to implement the elements of «Industry 4.0» in the manufacturing industry and mining sector was assessed, their technological level was determined. About 600 enterprises were surveyed.

The main barriers and challenges to digitalization of industry are identified (insufficient understanding of the economic benefits of digitalization in the business environment; lack of qualified personnel; insufficient development of domestic technologies; limited financial resources; insufficient infrastructure development). In order to eliminate barriers, taking into account international experience, appropriate systemic measures have been developed (development of own technologies for the elements of Industry 4.0; improvement of regulatory regulation; development of digital infrastructure; financial and other incentive measures). These measures are included in the state program «Digital Kazakhstan».

However, the most pressing issue today is the issue of popularizing and demonstrating the benefits of implementing Industry 4.0 technologies. To do this, this year launched a project to create a digital model of factories on the basis of existing enterprises of the manufacturing industry. Currently, work has begun on technological diagnostics of selected enterprises, and the development of road maps for the introduction of digital technologies on them.

In addition, 14 projects have been identified for the implementation of digitalization elements of system-forming companies until 2025, in the amount of 146 billion tenge. Using the example of implemented projects, we can already see how much they help to increase efficiency and increase their competitiveness.

For example, the ERG «smart quarry» project at the Kacharsky quarry allows to increase the productivity of mining and transport equipment by 10%, which leads to a reduction in capital and operating costs. The economic effect of the project will amount to 9.9 billion tenge by 2021.

This year, under the «Digital Kazakhstan» program, it is planned to ensure the growth of domestic exports to foreign markets both in the raw materials industries and in the agro-industrial complex. This should lead to an increase in the capitalization of the largest manufacturing companies. It is expected that the digitalization of economic sectors will increase the level of labor productivity to the level of the top 30 countries in the world, increase competitiveness and bring the capitalization of domestic companies to a new level.

The introduction of Industry 4.0 technologies is expected in fields and mines, e-Commerce and Commerce, the transport system, agro-industrial and electric power complexes.

The experience of Germany will be used in the mining, metallurgical and manufacturing industries. According to the roadmap, this year it is planned to create an Institute of industrial automation and digitalization, launch 7 «model digital factories», bring the «Digital mine» system to full capacity in the pilot project «Kazatomprom-SaUran», introduce smart Deposit technologies at the enterprises of «Embamunaigas», and start implementing the «Smart mine» project.

Already in 2019, the program plans to introduce the «Digital mine» at three enterprises. By 2020, Kazzinc intends to implement the «Big data» project. This will allow you to optimize many operations, manage risks more effectively, and implement innovations. And if in 2020, the introduction of digital technologies in large and medium-sized enterprises will amount to 5%, then in 2022-11%.

In Kazakhstan, certain elements necessary for the organization of «Industry 4.0» are already being introduced. The main reason for investing in them is the ability to improve control, reduce losses and, consequently, cost. To introduce the technologies associated with the «Industry 4.0», the company intends to McKinsey. To find out how the introduction of «Industry 4.0» affects companies, she conducted her own research. It turned out that about half of the respondents in the US and Germany (50% and 56%) reported good/significant progress over the past year from the introduction of Industry 4.0 tools, while in Japan, a small percentage of respondents noted this level of progress (16%). Technology suppliers reported more progress (47% reported at least good/significant progress) than manufacturing companies (of which only 37% reported at least good/significant progress).

**Summary and Conclusion.** The problem of Kazakhstan is not only a question of the availability or lack of technology, employees, legal framework or goodwill of companies. Improvements in the framework of «Industry 4.0» can work in Kazakhstan, but only if customers are honest – many of those who are engaged in the implementation of «Industry 4.0» say that this problem may arise in one form or another.

The essence of the Fourth industrial revolution is that the physical world connects with the virtual, resulting in the birth of new cyber-physical complexes integrated into a single digital ecosystem.

«Industry 4.0» means increasing automation and intellectualization of all industrial production processes: from digital product design, digital copy creation, predictive real-time maintenance, automated component supply chain to an individualized approach to working with customers.

The technologies of Industry 4.0 include: analysis of large databases, predictive maintenance, collaborative robots, «smart» devices that interact with people, perform dirty, dangerous or excessively routine work, the industrial Internet of things-the concept of building infocommunication infrastructures, which involves connecting equipment, sensors, and sensors to the Internet, as well as integrating these elements among themselves, additive technologies (3D printing), simulation, augmented and virtual reality, Autonomous vehicles [10].

Digitalization increases the flexibility of production, reduces the time to bring new products to market, which allows you to implement new business models. All this significantly increases the efficiency and competitiveness of industrial enterprises:

- labor productivity increases by an average of 10-20% due to process optimization, the ability to quickly analyze data in real time, reduce accidents and downtime, and improve the interaction of employees and equipment;

- labor safety is ensured by minimizing human labor in particularly dangerous areas and in places with a high level of injuries [11]. For example, to check dangerous areas in the mine and data that excludes injuries to personnel. This also allows operators to move from the underground environment to safer and more comfortable working environments in control rooms;

- new product launch times are reduced by 20% thanks to digital engineering and rapid prototyping technologies.

In addition, businesses can strengthen their market positions and develop new markets by better identifying customer needs and market forecasts, as well as producing for specific needs.

Kazakhstan, despite its severe dependence on raw materials and devastating deindustrialization, is getting new chances in the upcoming retaking of the cards of the world industrial game. Opportunities to move up the value chain in the new global system of international division of labor are determined, on the one hand, by the immaturity of the latest technological links of the sixth technological order, and, on the other, by new chances to integrate into the released elements of the rebuilt technological chains.

However, the lack of a clear strategic line in the implementation of Kazakhstan's industrial policy does not help to neutralize the main strategic risks and threats to national security in the industrial sector, which in the long term are:

- preservation of the export-raw material model of national economy development;
- slow transition of the country's industrial and technological base to the development of new production technologies;
- reduced competitiveness of the economy and high dependence of its most important areas on foreign economic conditions;
- loss of control over national resources;
- deterioration of the raw material base of industry and energy;
- uneven development of regions and progressive labor self-sufficiency, coupled with irregular migration.

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### ТРАНСФОРМАЦИЯ ЖАҒДАЙЫНДАҒЫ ҚАЗАҚСТАННЫҢ ЭКОНОМИКАЛЫҚ ДАМУЫНЫҢ ҚАЗІРГІ ШЫНДЫҒЫ

**Аннотация.** Мақалада төртінші индустриалдық революцияның ерекшеліктері және қазіргі заманғы қоғамның басқа социологиялық теориялар сериясындағы трансформациялық ұғымын сипаттайтын орын қарастырылады. Жарияланған революция ақпарат пен байланыс, биотехнология, робототехника және жасанды интеллекттің соңғы жетістіктерінің нәтижесі болып табылады.

Қазіргі кездегі цифровизациялау замануи талабы: үйлесімділік (үйлесімділік), виртуализация, орталықсыздандыру және нақты уақыт режимінде жұмыс істеу. Кибер-физикалық жүйелер, бұлтты есептеу және үлкен деректер технологиялары, Интернеттегі бизнес, виртуалды және көлденең интеграция, виртуалдандыру және құндылық тізбегін қалыптастырудың барлық үдерісін «цифрлау» сияқты бизнесте кеңінен танымал бола түсуде.

Қазақстан индустриалды дамыған мемлекеттің ғана емес, сонымен бірге постмодернистік елге айналуға ұмтылады, бірақ қазіргі таңда бұл постмодернистік мемлекет, ең алдымен қазіргі заманғы адам.

Көптеген дамыған елдер мен іскерлік алыптар төртінші индустриалды революцияның белсенді қатысушылары болып табылады: мемлекеттік бағдарламалар, бизнес қауымдастықтары және коммерциялық емес ұйымдар 4.0 саласын құрудағы кедергілерді жою мақсатында құрылған.

Төртінші индустриалды революция - бұл болжанатын оқиға, өндірістегі кибер-физикалық жүйелерді жаппай енгізу, адамның қажеттіліктерін қанағаттандыру, соның ішінде өмір, жұмыс және бос уақыт. Өзгерістер өмірдің түрлі аспектілерін қамтиды: еңбек нарығы, тіршілік ортасы, саяси жүйелер, технологиялық тәртіп, адамның жеке басы және басқалары. Өмір сүру сапасын жоғарылатудың экономикалық тиімділігі мен тартымдылығы есебінен өмір сүруіне байланысты, Индустрия 4.0 оны тұрақсыздықты жоғарылату және әлемдік жүйенің ықтимал құлдырауы тәуекелдерімен орындайды, сондықтан оның шабуылы адамзаттың жауап беруі қиын деп есептеледі.

**Түйін сөздер:** трансформация, төртінші өнеркәсіптік революция, өнеркәсіп, интернет, даму, өнімділік, ақпараттық және коммуникациялық технологиялар, индустрия, постмодернистік.

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### ТРАНСФОРМАЦИЯ ЭКОНОМИЧЕСКОГО РАЗВИТИЯ КАЗАХСТАНА В УСЛОВИЯХ СОВРЕМЕННЫХ РЕАЛИЙ

**Аннотация.** В статье рассматриваются особенности четвертой индустриальной революции и место, характеризующее трансформационное понятие современного общества в серии других социологических теорий. Объявленная революция является результатом последних достижений информации и связи, биотехнологии, робототехники и искусственного интеллекта.

Современные требования цифровизации в настоящее время: совместимость (совместимость), виртуализация, децентрализация и работа в режиме реального времени. Кибер-физические системы, облачное вычисление и большие технологии данных, бизнес в Интернете, виртуальная и горизонтальная интеграция, виртуализация и «оцифровка» всех процессов формирования цепочек ценностей.

Казахстан стремится стать не только промышленно развитой страной, но и страной постмодерна, но сегодня это государство постмодерна, прежде всего, современного человека. Многие развитые страны и деловые гиганты являются активными участниками четвертой индустриальной революции: государственные

программы, бизнес-сообщества и некоммерческие организации созданы с целью устранения барьеров в создании отрасли 4.0.

Четвертая индустриальная революция – это предсказуемое событие, массовое внедрение киберфизических систем в производстве, удовлетворение потребностей человека, в том числе жизнь, работа и досуг. Изменения охватывают различные аспекты жизни: рынок труда, среда обитания, политические системы, технологический режим, личность человека и другие. В связи с тем, что повышение качества жизни происходит за счет экономической эффективности и привлекательности, Индустрия 4.0 выполняет ее с риском повышения нестабильности и возможного падения мировой системы, поэтому его атака считается сложной, чтобы человечество реагировало.

**Ключевые слова:** трансформация, четвертая промышленная революция, промышленность, интернет, развитие, производительность, информационные и коммуникационные технологии, индустрия, постмодернизм.

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