

Zborník odborných príspevkov z medzinárodnej vedeckej konferencie

VPLYV INDUSTRY 4.0 NA TVORBU PRACOVNÝCH MIEST

*22. novembra 2018
Hotel Krym, Trenčianske Teplice
Slovenská republika*



*Proceedings of scientific contributions from the international scientific
conference*

THE IMPACT OF INDUSTRY 4.0 ON JOB CREATION

*22. November 2018
Hotel Krym, Trenčianske Teplice
Slovak Republic*

**Publishing House
Alexander Dubček University in Trenčín
2019**

OBSAH

Úvod/Introduction.....	9
ZNALOSTNÁ SPOLOČNOSŤ AKO OBRAZ "SOLLEN" V ČASE REVOLÚCIE 4.0	10
Knowledge Company As the Picture of "Sollen" in Time of Revolution 4.0 <i>Marián AMBROZY, Eva HVIZDOVÁ, Božena SOWA</i>	
ANTI-CRISIS MANAGEMENT OF ECONOMICS IN THE CONTEXT OF DECENTRALISATION.....	20
<i>Natalia ANTONIUK</i>	
DEMOGRAPHIC SAFETY IN THE CONDITIONS OF THE FOURTH REVOLUTION.....	27
<i>Maryna BALDZHYI, Marvyn MBYK</i>	
DIGITALIZATION OF LOGISTIC PROCESSES BY CUSTOMER SERVICES	34
<i>Vladimir BARTOŠEK, Marie JIROVÁ</i>	
SOCIAL AND PROFESSIONAL CHARACTERISTICS OF LABOR MIGRANTS AND LABOR MARKET DEMANDS IN A RUSSIAN MEGALOPOLIS	40
<i>Irina BRITVINA, Olga ERGUNOVA, Galina SAVCHUK</i>	
RECENT DEVELOPMENT TRENDS OF VOCATIONAL EDUCATION AND TRAINING IN LATVIA	46
<i>Ilze BULIGINA, Biruta ŠTOLČA</i>	
PRIJÍMANIE INOVÁCIÍ ELEKTRONICKÝCH PRODUKTOV V OKRUHU SLOVENSÝCH SPÔTREBITELIOV	55
Adoption of Electronic Product Innovation among Slovak Consumers <i>Angelika CSEREČOVÁ, Erika SZÉKES HÚSZÁRIK</i>	
THE OPPORTUNITIES TO IMPROVE INTERNAL AUDIT IN LATVIA PUBLIC SECTOR	65
<i>Ivita FAITUSA</i>	
VPLYV INDUSTRY 4.0 NA POSKYTOVANIE SLUŽIEB V CESTOVNOM RUCHU	74
The Impact of Industry 4.0 on Tourism Services <i>Adriana GREŇČIKOVÁ, Jakub ŠOKOL</i>	
ANALYSIS OF REFLECTED ISSUES RELATED TO HUMAN RESOURCES AND INDUSTRY 4.0 IN CASE OF ENGAGEMENT INTO CLUSTER COOPERATION ON EXAMPLE OF TECHNOLOGICAL SME	81
<i>Katarina HAVIEŠKOVÁ, Katarína KRÁĽOVÁ</i>	
EMPLOYEE MOTIVATORS IN TELECOMMUNICATION COMPANIES IN LATVIA.....	89
<i>Laura KERSULIS, Anete ŠKARVA, Inita SKRŪZKALNE</i>	
THE READINESS OF THE LABOUR MARKET IN THE CZECH REPUBLIC FOR INDUSTRY 4.0	101
<i>Vojtěch KOŘEN</i>	
PERSPECTIVES OF FINANCIAL MARKET FORMATION IN CONDITIONS OF POST-INDUSTRIAL SOCIETY (INDUSTRY 4.0).....	114
<i>M. S. KOVAL, O. M. MARCHUK</i>	

PERSPECTIVES OF LABOR MARKET FORMATION IN CONDITIONS OF POST-INDUSTRIAL SOCIETY (INDUSTRY 4.0)

M.S. Koval, O. L. Mirus, A. I. Harchuk

Lviv State University of Life Safety

In this article are carried out an analysis of the existing material on the development of the modern economy "Industry 4.0", the main principles of its construction, the benefits of permeation of digital technologies in all spheres of life and new problems associated with it. Outlined the results of scientific and technological progress, which form the basis of Industry 4.0, the principles of state regulation of labor relations in the conditions of postindustrial society are highlighted. On the basis of the analysis, the conclusion is made of the possibility of Ukraine to take a worthy place among the leaders of the new concept of economic development under the condition of close cooperation between the state, science and education and business.

Key words: postindustrial societies, principles of building industry 4.0, labor relations, labor market.

The theory of post-industrial society [1] tries to present what will happen after the first realization of the opportunities of an industrial society. This theory (D. Bell, A. Turin, etc.), according to which the industrial society (as a result of scientific and technological progress), grows into a post-industrial society, characterized by the dominant role of the sphere of services, the transition of power to scientists and technocrats.

In a post-industrial society, based on new technologies (mainly microelectronics), there is a sharp increase in output, a transition from commodity to service economy is introduced, elements of planning and control over technological changes are introduced.

In the social structure of such a society, the number of people involved in the service sector is growing, and new elites (technocrats, scientist) are emerging. Technocrats, as a group of technical specialists who are part of the highest functionaries of management, take the leading role in the life of society to technicians and technicians as the basis of modern industrial production. At the heart of their ideological orientation lies the scientific conception of scientific knowledge as a higher cultural value and sufficient condition of orientation of the individual in the world.

Distinguished in the history of mankind, three phases (pre-industrial, industrial and post-industrial), Daniel Bell described the features of a post-industrial society: the transformation of the value of various economic sectors, the domination of the service sector (administration, banks, transport, health, trade, education, science, art, etc.) with the decline of the industrial sector and the limitation of the value of the agricultural sector; change of the prevailing technology, the transition from energy technology to information (the emergence of robots, the development of communications); increase in the importance of planning, forecasting development, technology control; the dominance of pragmatic and technological criteria in reducing the role of ideological and ethical criteria; the flowering of "intellectual technology", that is, the purposeful use of science for the needs of practice; the transformation of the class structure, the nomination as a dominant non-class of owners, and a class of highly skilled professionals (economists, engineers, managers).

The term "Industry 4.0" [2] appeared in Europe in 2011 as well. At one of the industrial exhibitions in Hanover, the German government spoke about the need for wider application of information technology in production. A specially created group of officials and professionals has developed a strategy to turn the country's manufacturing companies into "smart" ones. This example is followed by other countries that are actively mastering new technologies. And the term "Industry 4.0" began to be used as a synonym for the fourth industrial revolution. Its essence lies in the fact that the material world today merges with the virtual, resulting in the creation of new cyber-physics complexes, which are combined into a single digital ecosystem. Robotic production and "smart" factories are one of the components of the transformed industry.

The fourth industrial revolution means more and more automation of absolutely all processes and stages of production: from digital designing of a product, creation of its virtual copy - to the remote setting up of equipment at the plant in accordance with the technical requirements for the release of this particular "smart" product. The manufacturer automatically orders the necessary components in the right quantity, controls their delivery, has the ability to track the way of the finished product from the warehouse to the factory and the store to the end customer. But after the sale, the company does not forget about its product, as it used to be in the classic model, but controls the terms of its use, can remotely change the settings, update the software, warn the customer about a possible malfunction, and at the end of the use cycle - take the product for disposal .

So, now they produce anything - from "smart" dummies and pans to smartphones. A few years ago, Apple began a program for processing old iPhone: the work disassembles them, removes the most valuable parts, which are then reused, and everything else is utilized, besides with minimal harm to the environment. The concept of "Industry 4.0" is often depicted in the form of a mathematical sign of infinite - it illustrates this endless cycle of interaction between the manufacturer and the product and the client.

Representatives of the German government formulated several basic principles for building "Industry 4.0", according to which companies can implement scenarios of the fourth industrial revolution in their enterprises.

The first is compatibility, which means the ability of machines, devices, sensors and people to interact with each other through Internet (IoT).

This leads to the following principle - the transparency that appears as a result of such interaction. In the virtual world, a digital copy of real objects, systems, functions, which exactly repeats what is happening to its physical clone, is created. As a result, the most complete information about all the processes that occur from the equipment is accumulated equipment, "smart" products, production in general and so on. To do this, you need to ensure that all of these sensor and sensor data are collected, as well as the context in which they are generated. Technical support is the third principle of Industry 4.0. Computer systems help people make decisions by collecting, analyzing and visualizing all of the information mentioned above. This support may also consist of completely replacing people with machines when performing hazardous or routine operations. The fourth principle is the detailing of managerial decisions, the delegation of some of them to cyber-physics systems. The idea is that automation should be as complete as it is possible at all: everywhere, where the machine can work efficiently without human intervention, sooner or later it must be replaced by a machine. Employees are assigned the role of controllers who can join in emergency situations. As a result of the transition of industry to these principles, there are also changes in business models. So, instead of focusing on cost-effective production, companies are seeking to launch mass-produced personalized products based on the Agile principle and switch to batch production in a single, single product. The principle of saving is preserved: robotic production is more energy-efficient, it is accompanied by less waste and shortage. The idea is that automation is as complete as it is possible at all. Employees are given the role of controllers. The transformation of the production industry is called the revolution, precisely because the changes are not superficial, but radical: the industry is rebuilt from top to bottom. Business models are changing, new companies are born, and world famous brands with a long history simply disappear if they do not have time to enter the ranks of digital revolutionaries. Customers have changed their behavior, they want an individual approach and unique products. Representatives of the so-called native digital, which grew up in the era of the Internet, have become accustomed to the fact that a whole world of proposals is open to them: millions of variations of prints on T-shirts, all the shades of jeans, whatever appliances and furniture at a distance of one click. They try to emphasize their individual peculiarities and express their mood. Enterprises that are accustomed to producing the same things have to change. The introduction of the "Industry 4.0" principles allows you to obtain a number of benefits that were not available in traditional models of the past. For example, now companies can reach an individual approach and personalize orders according to their personal preferences, which promptly increases their loyalty. Old plants and factories turn into "smart" and begin to

produce literally unique products on an individual order. At the same time, the specific unit costs of production are reduced, companies are given the opportunity to produce a unique personalized product at the price of a mass standardized product. Both engines and servers, and anything else, can be produced on an individual request. Fujitsu Siemens in the German city of Augsburg produces computer systems and servers in just one instance for a specific customer. Costs for product placement under an individual order at an enterprise with a high level of automation are small: if before, under each such pair of sneakers, it would be necessary to manually adjust the equipment, now the computer system in a few seconds does it on its own. The robotizing of Tesla's electric-vehicle plants allowed the company to expand its production not in China, but in California. It turned out to be cheaper than to pay for the work of Chinese workers and the transportation of finished cars. The fourth industrial revolution not only changes the business of individual companies - it affects the alignment of forces at the global level. Who would have thought that a car maker who has not been ten years old (Tesla established in 2008) will be able to overtake the capitalization of the leader of the second industrial revolution that took place as a result of the invention of the conveyor and the transition to mass production - Ford Motors. Highlight the issue Industry 4.0 in Ukraine is devoted to the article [3]. About the new world trends, bearing modern information and communication technologies speak all the time and for a long time. The last decade sounds like Smart or Digital Factory and Digitalization (all and all). Where's Digital Economy. In the United States, which are the largest innovators in the world, everyone is talking about technology such as IOT, Big Data, Cloud computing, Remote & mobile access, wireless communication, 3D printing, etc.

In fact, digitalization - as the penetration of digital technology, automation and IT at all levels of life and economy began in the last century and was called the technological style 3.0. And it continues to this day. But the fact that in recent years the Germans and Americans have brought in a completely new one is a certain rethinking of how companies are doing business. The horizontal and vertical integration of IT, the combination of different technologies, the creation of new cyber-systems and artificial intelligence changes the business models and ways of doing business. It's interesting to observe how the global ratings of the world are migrating - in recent years, in the top ten richest, we see the full domination of software and service companies - and not those who produce oil, gas or metal. Although this was exactly the case a few years ago.

Klaus Schwab, founder and chairman of the World Economic Forum in Geneva, published an interesting article titled "The 4th Industrial Revolution - What It Means and How to Answer". In it, he is available tells about the benefits of mass digitalization, as well as new challenges. Briefly cite the benefits in understanding Klaus Schwab and why they are not a continuation of the "3rd Revolution":

An unprecedented (exponentially, not linear) innovation growth - with regard to their speed, volume and impact. This will greatly improve efficiency, productivity and cost savings.

The unprecedented growth of data and the possibilities of their use for new technologies already makes it easier to attract different layers of developers-users-clients and promote development in many respects.

Artificial intelligence becomes a reality - concrete examples we already see - from mass robotics and to biotechnology. All together, this will contribute to the growth of world wealth and the reduction of inequality between developed countries and others.

Advantages of new technologies are:

1. Cheaper and faster integration - horizontal and vertical. This is precisely what is missing today for full control and improvement of the efficiency of Ukrainian enterprises;
2. Replacing traditional server technologies with clouds also reduces the cost of solutions and maintenance of control systems;
3. Creation and development for integrators and vendors of new niche segments and corresponding decisions;
4. Significant growth of certain traditional segments - for example, everything related to german automation should be smart. Other experts and sources clearly indicate how industrial

dedjitalizatsiya will occur - precisely because of the mass implementation of smart devices (smart devices);

5. Accelerating the development of the market participants ACS TP: today, we are open source talking about the conservatism of our vendors and integrators (and then, respectively, and customers). Trends 4.0, rapprochement and healthy competition with IT will give a powerful boost to our market;

6. As a continuation of the previous one, it will bring new, more competitive players to the arena, as well as promote the development of export potential and domestic producers;

7. These trends will also unequivocally accelerate the reform of the education system: just as businesses look at IT as a model for imitation in the agile field, our ZOOs and educational service providers also understand that we need to reorient ourselves to on-line and interactive learning.

At the same time, new trends bring with it new challenges. Klaus Schwab writes the following: "There is a lot of fears about unemployment and the distribution of world wealth - poorer countries can still become poorer, but rich countries can expect significant upheaval in connection with the massive rotation of productions."

Therefore, the great concern in the World Health Organization (WHO) is the increase in the number of mental illnesses.

In Europe, at least 5% of the population have serious psychiatric disorders (neuroses, functional psychosis), another 15% suffer from less serious but potentially disabling psychiatric disorders.

The number of suicides is increasing: they cause 15% of deaths among adolescents and young men aged 15 to 24 years old and 19% between 25 and 34 years old; in women, the proportion of suicides in these age groups is respectively 12 and 14%. The suicide rate in individuals aged 65 and over is higher than in other age groups. This problem will deepen along with the aging process. It is not for nothing that in 2018 the UK became Minister for Suicide Prevention.

The reasons for increasing the number of suicides are:

- stressful lifestyle in the modern world;
- weakening of family ties, which leads to a decrease in social support and an increase in social isolation;
- Unemployment for a long time;
- Increase in social violence, the manifestation of which is an increase in the number of rapes and deliberate killings.

Since the key factor in development is talent and professional staff, they are already washed away by rich countries. Also, wealthy countries at the level of property rights own all the new technologies. Accordingly, poor countries are already becoming raw material and human resources for the rich.

The threat of cyber security will grow - a lot of polls in the world point to managers' concerns about new threats of cyber attacks.

There are other threats, but in general, Klaus Schwab notes that the speed and benefits of the innovations that the Fourth Industrial Revolution, and the rate of growth of discontinuities and negative phenomena associated with it, are difficult to predict and understand to the end. One thing is clear: those who consciously approached and plan the necessary changes at the level of industries, state, and nation will win.

Many countries in the world have already started their way in the 4th industrial revolution. Platforms similar to the German Industrie 4.0 exist in different countries. States have long been, albeit with less government interference, developing the Digital direction in all areas. In Industrial Automation, their Industrial IoT Initiative (IIoT) has long united dozens of well-known brands in a consortium of the same name. And today they have teamed up with the Industrie 4.0 platform. France launched the The Industry of the Future initiative - and similarly to the Germans at the state level. It includes 34 initiatives aimed at various spheres of the country's economy. India and China have their powerful initiatives. Major conferences devoted to the 4th industrial revolution go all over Eastern Europe. Other neighbors, how Turkey has

been holding this year's conference on the topic of the supply chain and attracting investors to their industrial parks within the framework of the European initiative of the Factory of the Future. Even Africa, on the site of the World Economic Forum, is devoted to a number of articles - some of the noisy statements "Africa should become the hub of the 4th Industrial Revolution." The authors are aware that demand, economic and social problems can be solved today much faster - for example, the problem of vaccination is already solved with the help of drones, mobile communication helps in other health care tasks, by passing timely necessary data about patients. But the main thing - Africa has the greatest potential for growth and in 2050 it will be the youngest continent in the world.

Taking into account the trends and pace of development of the leading countries of the world, Fast Future experts compiled a list of 20 new specialties that will arise in the next two decades:

1. Specialist in the production of organs. The development of science will make possible the production of living organs and even individual systems of the human body, so professionals in this field will need. This also includes professionals who will work in repositories and enterprises to repair damaged grafts.

2. Specialist in Nanomedicine. Achievements in the development of nanotechnology in the field of subatomic mechanisms and treatment methods will contribute to significant changes in health care, and will require specialists in the field of nanomedicine who will practice new treatment methods.

3. Specialists in the cultivation of genetically-modified crops and breeding livestock using genetic engineering. In the future, farmers will use methods of genetic engineering to increase the yield and production of proteins useful for human health. Scientists are already working on the cultivation of tomatoes with the vaccine and the receipt of therapeutic milk from cows, goats and sheep.

4. Wellness consultant for the elderly. The aging population of the planet requires specialists who will be able to help older people care for their health and well-being. In their work such consultants will apply various methods of modern medicine and developments in the field of medicines, prosthetics, psychology, natural remedies, diet and fitness.

5. Surgeon to increase memory. A new specialization of surgeons whose role is to increase the resource of human memory. One of their main tasks will be to help those whose memory is literally "overloaded" and who can not learn new information.

6. Specialist in the ethics of "new science". With the development of cloning and other emerging areas of science, a new class of ethics experts will be needed to deal with these disciplines and help the public decide on whether or not to pursue certain developments. The question is not whether we can do this, but whether we should.

7. Astronauts, space guides and architects. Virgin Atlantic and other companies are already promising to develop space tourism, which may require space guides and pilots, as well as architects who will design an infrastructure for space. Among the current projects of the Sasakava International Space Center for Space Architecture (SICSA) of Houston is the greenhouse on Mars, lunar outpost and space exploration.

8. Experts of vertical farms. By 2020, it will be possible to substantially increase the production of food through the construction of vertical farms in urban skyscrapers. Managers and employees of such enterprises must have knowledge in a range of disciplines, in particular in engineering science and commerce.

9. Specialist in combating climate change. When the effects of climate change are getting stronger, there is a need for engineers who will help to weaken or even turn negative effects. Among the technologies that they can use, for example, the installation of giant umbrellas reflecting sun rays and dropping of iron sawdust into the ocean (which should promote the proliferation of plankton and sea algae that will remove carbon dioxide from the atmosphere).

10. Specialist in quarantine. Many countries may not be prepared for the sudden and rapid spread of a deadly virus. There will not be enough medical personnel to solve problems. When the number of deaths will increase, and whole areas will have to be isolated, one has to monitor compliance with quarantine conditions.

11. Weather Police. The goal is to track and block possible unauthorized attempts to affect the weather. In particular, it concerns the practice of intercepting clouds to cause rain that affects other areas, even at a distance of millions of miles. The weather police should monitor who will be allowed to intervene in natural processes, for example, shooting clouds with silver iodide to cause precipitation.

12. A virtual lawyer. The Internet plays an ever-increasing role in everyday life, and in such circumstances, lawyers are in demand, which will resolve disputes between people from different countries and regions where different laws apply.

13. The avatars manager is a virtual teacher. In the process of studying at the elementary level, the teacher should come to the aid - or even to change - the intelligent avatars or computer characters who would act as the individual interactive assistant of the student. Follow the correct configuration and work avatars for students should special managers - curators.

14. Developers of alternative modes of transport. In the future, there will be a need for designers and manufacturers of new generation vehicles, for the production and operation of which alternative materials and fuel will be used.

15. Specialists in addressing (narrowcaster). As the content on television, radio and the Internet become more personalized, it will be necessary to attract professionals who will work with producers and advertisers on the creation of news, entertainment conferencing and information tailor-made for individual interests.

16. Specialist in disposing of unnecessary information. With the increase in the amount of information stored on computers, the task of quickly and reliably removing unnecessary data arrays is urgent, in order not to become a victim of unauthorized access and theft of personal information.

17. Specialist in organizing virtual space. Professionals in this area will help to organize the "electronic" side of the life of a modern person. They will be responsible for the efficient work of all applications and e-mail, on the orderly storage of data, and will manage the online profiles.

18. Time Broker (Time Bank Trader). A time bank is a mutual community in which any participant can earn time units by rendering service to another (eg, washing a car or walking a dog) and using it to pay for a service that the community performs in its favor. A broker is the organizer of operations on such a peculiar exchange.

19. Social worker in social networks. A social worker for those who can not integrate in the social network or suffered as a result of some difficulties in the virtual community.

20. Specialist in personal branding. It is planned to expand the role of stylists and image-makers of stars. Such a specialist will work on creating a personal "brand" of the client, using social networks and other means. In addition to creating an image in everyday life, his questions will include the "development" of individuality in blogs, social networks and other resources of the Network.

Ukraine is still determined. In a recent WEF report, it was not among the 43 countries that are the first beneficiaries of the 4th industrial. Although Russia, Kazakhstan and Poland are there. But it seems that the movement has gone. After the last Davos all rushed to flag 4.0 - IT, business schools and politics, as always, are the most dynamic. The Kyiv International Economic Forum, scheduled for October, will also be held under the slogan of the 4th industrial. But will they talk about specific things that are already needed by our industrialists? We doubt that even the latest iForum, the largest Internet forum in Ukraine, which already claimed a lot of these technologies, did not mention the Ukrainian industry in any way.

At the same time, 99% of the players in the market for industrial automation are simply "sleeping" - even large international brands present in Ukraine, do not know which side to approach the trends of 4.0 and if any. Meanwhile, large customers - the first innovators from our metallurgy and food industry - are already alarming - decisions on a number of new directions that are already needed - are not available in Ukraine.

It is also important to understand that in the context of Industry 4.0 we are talking about a set of factors driving modern production. Today, not only about other taxation or the conditions of attracting investments, not only about technoparks, but also about completely different things

that are related to the culture of innovation, development and cooperation - all this is unlikely to be the case solely of parliamentarians.

Industrial production of the future is considered in work [4]. A group of scientists and specialists [5] outlined nine developments (outcomes) of scientific and technological progress, which form the basis of Industry 4.0, namely:

1. Large data and analysis (Big Data and Analytics) [6,7];
2. Autonomous Robots are works that are capable of performing tasks without human intervention [8];
3. Simulation, which industry 4.0 will actively engage not only in the stages of designing production business processes, separate new production equipment or new products, but also in the production process itself, for example, during the testing and adjustment of equipment, etc. [5, 9];
4. Horizontal and Vertical System Integration, as in Industry 4.0 everything should be interconnected into a single information space;
5. The Industrial Internet of Things will link all components of production to a single real-time information exchange network [9];
6. Cybersecurity (Cybersecurity) provides for activities related to the protection of storage and processing sites, networks for their transmission [9,10];
7. Clouds. A large number of smart devices will generate a large amount of different information that must be securely stored, processed quickly and accessible to any device from different access points instantly. To this end, cloud technologies are best suited for the moment, with their productivity only rising, providing almost instant access and data processing [5; 9];
8. Additive Manufacturing (Additive Manufacturing). The basis of such production is 3D printing, with which already prototypes of future finished products are being created and simple details or finished products are produced. Such printing has a wide prospect in the production of individual orders of small batches of products, allows you to reduce inventory and costs for logistics services, etc. [5; 9];
9. The expanded (or virtual) reality (Augmented Reality) in Industry 4.0 will be used by a person (employees of enterprises) for learning, making various decisions, etc. [5, 9].

Thus, the basis of Industry 4.0 is the information tools and technologies in any way they manifest. In Ukraine, information technology (IT) is one of the priority areas of the economy, in particular, due to the fact that the volume of exported products and services in this sector of the economy, according to experts, in 2017 was about \$ 2.5 billion (according to other estimates - about \$ 3 billion), most of which belongs to outsourcing companies [11; 12]. The number of IT / companies is over 1000 units and there are about 100 research & development centers [11; 12]. By the number of employed IT specialists (about 90 thousand people) and the number of annual graduates from IT / specialties (about 15 thousand people), Ukraine is a leader among the countries of Central and Eastern Europe [12; 13]. Ukrainian engineers have high competitiveness in the foreign labor market [14], which is confirmed, in particular, by the following: according to the latest ranking of hundreds of the best outsourcing companies in the world.

According to the International Association of Outsourcing Professionals (IAOP), every tenth company has a representative office in Ukraine [15; 16].

If we consider that the main driving force of Industry 4.0 is IT, then Ukraine has sufficient potential to occupy one of the leading places among the leaders of this new concept of economic development. However, this requires a constant interaction of public authorities; industrial enterprises; enterprises that are leaders in their industry; IT companies; universities; scientific innovation centers (technoparks), research centers, etc. Such an interaction can be created on the example of Germany, where at the initial stage (creation of the basis for the implementation of Industry 4.0 in life) the main source of funding is the state, and in the future all projects within the industry 4.0 will be financed exclusively by business.

There is a need for the training of relevant competent specialists and their further development. In our opinion, in the fourth industrial revolution, IT specialists, engineers from different fields (mechanical engineering, electrical engineering, etc.), logistics specialists, economists-analysts occupy one of the main places. For qualitative training of such specialists it

is necessary: 1) to formulate qualification requirements for graduates of institutions of higher education in the context of Industry 4.0; 2) to develop and carry out training in accordance with curricula and programs that reflect the latest trends in the development of the world economy; 3) to take measures at different levels to increase the interest of entrants in the specialties that are important in Industry 4.0, but are not popular among young people; 4) to continuously improve the qualifications of the teachers through, inter alia, internships in the leading international and domestic industrial (industrial) and IT companies; 5) Update the hardware and software of the educational process, etc. All this requires significant financial investment.

As for the domestic IT market, here, for the successful launch of Industry 4.0, along with outsourcing companies (which actually produce innovative products or part of some global project for a foreign customer and for Ukraine, such products are transformed only in the form of export revenues), it is necessary to support and develop companies that are oriented on the domestic market and are able together with the industrial enterprises to create a finished domestic innovative product within the industry 4.0. Of course, such a domestic product will bring Ukraine significant image benefits, as well as significant cash inflows.

Consequently, for the emergence and development of Industry 4.0 in Ukraine there should be constant cooperation between the State, Business, Education and Science (see Figure 1).

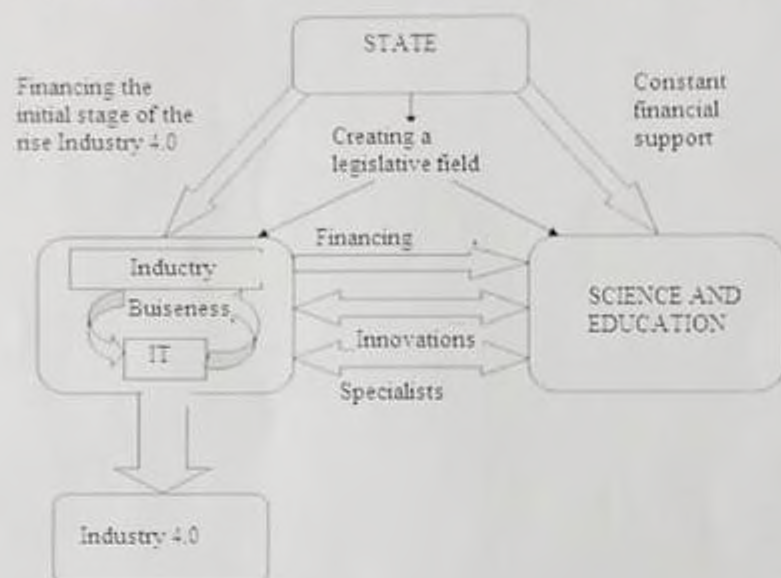


Fig. 1. Conceptual scheme of interaction in the triad "State" - "Education + Science" - "Business" for the emergence and development of the Fourth Industrial Revolution in Ukraine [4]

The state must create a legislative framework, make initial investments related to Industry 4.0, industrial production and IT / companies, which in turn, together with the State, should keep financially supporting the preparation of industry-specific 4.0 specialists from different fields. Between Business and Education and Science there should be constant cooperation between specialists and scientists, exchange of innovations, etc. But without state regulation of labor relations, the further development of post-industrial society is simply impossible. Principles of their regulation are highlighted in [17]:

1. The principle of a systematic approach to employment regulation;
2. The principle of decentralization and giving entities the maximum legal, organizational and economic independence is relevant today, because its implementation will maximize the energy of self-development of the employment system, its separate components [18];
3. Principle of state legal protection of the diversity of forms of employment, which provides for the freedom of choice by individuals of the sphere, type, form of employment; alternative to full, part-time employment, self-determination of the individual, self-realization

with taking responsibility for the choice of oneself. Social vulnerability of unemployed individuals, according to sociological research, is due to low incomes, the impossibility of employment in their specialty, the loss of qualification and the feeling of uselessness [19];

4. State regulation of labor relations in a situation where the latter develop under the pressure of market mechanisms, the deterritorialization and the flexibility of employment, should be based on the principle of deideologization. Under it means the presence of concepts, ideas that reflect the interests of certain social groups, the presence of ideologues, creators, generators of these concepts;

5. The principle of problem-target orientation of regulation of labor relations, which provides for solving the problems of specific social groups and categories of the population. Specialists developing state regional employment regulation programs must take into account the types of people's reaction to unemployment, namely: protective, when workers avoid realistic assessment of the situation (not trying to look at the situation realistically); chaotic job search; job search in conditions of limited awareness; productive dependence (a person delegates responsibility for his labor fate to his neighbors, uses their resources, etc.) [20, p. 39-45];

6. State regulation of labor relations should be based on the principle of awareness and informatization, which involves carrying out by state authorities continuous monitoring of problems, needs of society, citizens of certain regions.

CONCLUSIONS

Industry 4.0 is the industrial production of the future, which is already taking place today. Therefore, Ukraine needs to be actively involved in world processes that are associated with a new trend of economic development, in order to take a worthy place among the developed countries of the world. Although the purpose of Industry 4.0 is the innovative shift in industrial production, its impact will be felt in all sectors of the economy. There is no doubt that such changes will affect the sphere of trade and logistics in the first place. In addition, the need for highly skilled workers leads to appropriate changes in education and science in the training of relevant professionals.

Literature: *Експертне бачення: Ресурси розвитку*

1. https://pidruchniki.com/12120124/sotsiologiya/u_chomu_sutnist_teoriyi_postindustrialno_go_suspilstva

2. <https://delo.ua/business/chetverta-promislova-revoljucija-chogo-nam-ochikuvati-334676/>

3. <https://appau.org.ua/publications/industriya-4-0-shho-tsi-take-ta-navishho-tse-ukrayini/>

4. Skitsko V.I. Industry 4.0 as industrial production of the future / VI Skitsko //

Investments: practice and experience. - 2016. - No. 5. - P. 33-40. - Access mode: http://nbuv.gov.ua/UJRN/ipd_2016_5_8

5. II. RuEmann M. Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries [Electronic Resource] / M. RuEmann, M. Lorenz, P. Gerbert, M. Waldner, J. Justus, P. Engel, M. Harnisch -2015 / - Access mode: https://www.bcgperspectives.com/content/articles/engineered_products/project_business_industry_40_future_productivity/growth_manufacturing_industries/

6. Large data and analytics for IBM Power Systems [Electronic resource]. - Access mode: <http://www/03.ibm.com/systems/ua/power/solutions/bigdata/analytics/>

7. Companies undertake "Big Data" - a Microsoft study [Electronic resource]. 2013. - Access mode: <http://microsoftblog.azurewebsites.net/2013/02/12/kompaniyi/berut/sya/za/veliki/dani/doslidzhen/nya/microsoft/>

8. The page of the concept "Autonomous robot" [Electronic resource] // Network Encyclopedia "Wikipedia". - Access mode: https://uk.wikipedia.org/wiki/Autonomous_work
9. Mac / Kendrick Joe. Industry 4.0: this time the essence of IT [Electronic resource] / Joe McKendrick. - 2015. - Access mode: <http://www.pewe/ek.ru/idea/article/detail.php?ID=174770>
10. Tsyulke D. The report on the creation of technologies for the future: as the Internet of things will revolutionize the industrial production [Electronic resource] / D. Tsulke, D. Goretsky, S. Fischer. - 2015. - Access mode: http://www.skf.com/ua/uk/news_and_media/news/search/2015/02/04/how_the_internet_of_things_will_revolutionise_industrial_production.html
11. Yarovaya M. By 2015, Ukraine earned IT \$ 2.5 billion on export - Elena Minich [Electronic resource]. - 2016. - Mode of access: <http://ain.ua/2016/02/08/631405>
12. Sysoyev Y. IT Ukraine From A to Z: IT Services And Software R & D in Europe's Rising Tech Nation. Version 1. / Y. Sysoyev, Y. Sychikova, A. Henni, J. Kuhuk. - Feb. 2016. - Access mode: http://www.uadn.net/files/ua_hightech.pdf
13. Ishchenko M. The Labor Market Review 2015: Companies Grow, Wages Stand, Programmers Go [Electronic Resource] / M. Ishchenko. - October 26, 2015. - Access mode: <http://dou.ua/lenta/columns/jobs/and/trends/2015/?From=doufp>
14. Member of the Board of Ericsson, Sony, and GlobalLogic - on the potential of Ukraine in IT [Electronic resource]. - 2015. - Access mode: <http://ain.ua/2015/10/02/607251>
15. Global top / 100 outsourcers: every 10th has a representative office in Ukraine [Electronic resource] / Forbes Ukraine. - 2016. - Mode of access: <http://forbes.net.ua/business/1411137/globalnyj/top/100/outsourserov/kazhdyj/10/j/imeet/predstavitelstvo/v/ukraine>
16. IAOP Releases The 2016 Global Outsourcing 100 and the World's Best Outsourcing Advisors [Electronic Resource]. - 2016. - Access mode: <https://www.iaop.org/Content/23/196/4464>
17. Khizhnyak L. M. Principles of State Regulation of Labor Relations in a Post-Industrial Society / L. M. Khizhnyak, V. V. Sychev // Theory and Practice of Public Administration. - 2012. - Exp. 3. - pp. 215-223. - Access mode: http://nbuv.gov.ua/UJRN/Tpdu_2012_3_31
18. Zhadan O. V. Structural-functional approach to the formation of the mechanism of state regulation of social and labor relations / O. Zhadan // State construction: [Electron. sciences profession. kind.]. - 2011. - No. 2. - The mode of access: <http://www.nbuv.gov.ua>
19. Udaltsova MV Social and labor expectations of the unemployed and their relation to self-employment / MV Udaltsova, NM Volovska, L.K. Plyusnina // Socis. - 2003. - No. 7. - P. 16-25.
20. Dyomin AN, Methods of Adapting the Unemployed in a difficult Life Situation / AN Dyomin, I.P. Popova, Sotsis. - 2000. - No. 5. - P. 35-45.