N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF SOCIAL AND HUMAN SCIENCES
ISSN 2224-5294 **https://doi.org/10.32014/2020.2224-5294.37**
Volume 2, Number 330 (2020), 57 – 63

МРНТИ: 06.77.02

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LABOR MARKET TRANSFORMATION IN THE CONDITIONS OF DIGITAL ECONOMY DEVELOPMENT

Abstract. The article considers the transformation of the labor market in the context of the development of the digital economy, the new industrial revolution, questions about jobs and possible unemployment caused by the introduction of new technologies, by replacing all repetitive actions with machines and automation processes. The control and management process must be accessible from anywhere in the world. The purpose of this concept is to save costs, time and increase the flexibility and productivity of production and enterprises in general. The main requirement for a manufacturing company using the Industry 4.0 concept is a very flexible response to constantly and dynamically changing demand, as well as significant adaptation of products to individual customer requirements. For this to work, you need to have everything you need for production at the moment. The approach that this condition represents is called "just in time," and its typical feature is extreme logistics requirements. Thanks to this approach, logistics costs increase significantly, which contradicts one of the goals of the concept by reducing logistics costs. In the research process, we set ourselves the goal of discussing and analyzing the benefits and impact on the structure of the workforce, especially in the production sectors, possible changes that will depend on labor knowledge and job requirements. Of course, this will affect education in many schools and universities, as it will create new specializations. The article is devoted to the selected technologies, the whole concept and the specific impact on the manufacturing sector.

Keywords: industrial revolution, labor market transformation, labor demand, automation, digital economy.

The new industrial revolution puts jobs and possible unemployment in many areas at the forefront. This will have a significant impact on entire societies and economic groups. This will especially affect the workforce.

The purpose of the study is to discuss and analyze the benefits and impact on the structure of the workforce, especially in the manufacturing sectors, and the possible changes that will depend on labor knowledge and job requirements. Of course, this will affect education in many schools and universities, as it will create new specializations.

As a likely result, unemployment is likely to decline in all sectors on average, as old and new specializations will be needed simultaneously. Later in the future, the result is unclear. According to many authors, unemployment will increase, and, according to many, should decrease. Since the unemployment caused by these technologies will depend on these technologies, it is likely that individual sectors will be unevenly affected by the introduction of new technologies in such sectors, that is, in the regions. The article is devoted to the selected important technologies, the entire concept and the specific impact on the manufacturing sectors.

The area of the 4th Industrial Revolution is a highly topical issue. It is also a very extensive topic with an anticipated societal impact, affecting technological, economic, social and political areas and aspects of life (MAŘÍK et al., 2015). But the concept of this concept will not be equally timed in all parts of the world.

In the early days of the development of this concept, the impact of the changes will be particularly evident for states that are world technology leaders. The reason is their privileged position, technological capabilities, technological readiness and capacities, which enable faster implementation than in other countries. Another affected group will be countries whose economies are based on cheap labor, in connection with the assumption of reversing the trend of outsourcing (GILCHRIST, 2016).

Most industrialized countries of the world currently have a vision of implementing this concept and are actively engaged in it. The most distant are the USA, China, South Korea, Germany, France, the Nordic European states and Japan. Among the large economies, Russia is on the other side of the ranking, where the government program starts several years behind Europe and America (GULIN and USKOV, 2017). If the global economies want to maintain their position, one element of the strategy is the rapid implementation of the concept of the fourth industrial revolution. The speed of implementation predetermines whether the state is more of a trendsetter and actively influences development or is allowed to be dragged by circumstances. Early implementation makes it possible to gain a competitive advantage and increase the company's market share.

Soon after successful implementation in the most advanced economies, this concept will have an impact on economies that are closely tied to technology leaders (such as the Czech Republic tied to Germany). It will be necessary to adapt and technologically connect with customers and suppliers. A global impact can be expected during the development and dissemination of these technologies.

The area of future labor requirements in connection with the implementation of the Industry 4.0 concept has an impact not only on the economic, but also on the political and social spheres of life. This is one of the reasons why not only technology and industrial companies, but also politicians of different levels are actively involved in this topic. The strategy for preventing possible negative impacts is also being actively discussed at the level of European Union leadership. Negative influences and countermeasures should be considered now - in advance in order to minimize the negative impact on various aspects of human society.

The fourth industrial revolution will have a significant impact on the labor market and, at least in the early stages, on rising unemployment (FINNERAN, 2015). Employee requirements will also change, which will also affect the job opportunities of some groups of workers. Analysts and scientists on the Fourth Industrial Revolution expect some jobs to disappear and create new, more complex jobs.According to some sources, the total number of jobs should be lower, which would mean an increase in unemployment. Other optimistic sources suggest a net increase in the total number of jobs, that is, a decrease in unemployment. However, it is certain that workers must be much more flexible than ever.

The requirement for sufficient flexibility of employees places high demands on the education system. Lifelong learning is an important element in maintaining the competitiveness and employability of employees in such a dynamic environment. Therefore, the education system and the education system also will not change.

The concept of «Industry 4.0» is a relatively discussed topic in the field of production, but few people imagine something specific under this term. Often these are ideas and approaches, quite futuristic, without an explicit connection with modern technology.The aim of this work is to familiarize the reader with the question «Industry 4.0» and further technical and philosophical explanation of this concept. The goal is also to put theoretical information into practice and identify specific technologies and systems currently used in companies that are key to the concept. The result and advantage of this work is also an analysis of the impact of the deployment of this concept on the labor market and its structure in the field of industrial production, especially automobile production, as well as a detailed analysis of the impact on the company

The purpose of the study is to answer the following research questions: how will the workforce structure develop in manufacturing companies engaged in the production of automotive components at the individual stages of the implementation of this concept? How will the requirements for individual groups of workers in manufacturing enterprises of this type change when developing this concept?

The importance of this topic can be divided into two areas in terms of their impact. The first, broader and more general area is the expected social impact on the social sphere of human society (MAŘÍK et al., 2015).This area is discussed in more detail in the text of the third chapter, which deals with the impact on employment and society as a whole. The second area of impact, which is narrower, but with potential for general application, is the specific impact on the automobile factory in which I am engaged in research.

Technical solutions to the Fourth Industrial Revolution and ICT in general are universal and have the potential to dramatically change business models and increase productivity (BRYNJOLFSSON and MCAFEE, 2012). The benefit from the perspective of the company is naming and specifying the technical and technological foundations of the implementation of this concept. That is, to determine the strategic direction (especially) in IT and what to implement to successfully deploy the Industry 4.0 concept.

In addition to the acquired knowledge as a result of a detailed research of professional literature, the conclusions of this work are also important. The employer thus gains an overview of the degree of threat to individual groups of workers and is able to respond to this threat. Like at the onset of the economic crisis, it is advisable to have some employees sufficiently flexible in terms of workload (eg. time jobs at the time specified, the group contracts ending on a regular basis throughout the year, etc.). Beyond the ethical perspective and focusing on business and economic survival issues, it is easier for a company to «get rid of unnecessary burdens» and better overcome the negative effects of the crisis or changes caused by disruptive technology.

The term «Industry 4.0» or 4th Industrial Revolution refers to a gradual change in the functioning of the economy from today's normal state to the final state, when production plants and enterprises are completely digitized and production technology and work in them is fully automated. All routine activities replaced machines. This whole situation has a real impact on the labor market and human society itself. The labor market is gradually changing, the requirements for human resources that revolutionize the concept and later implement and develop it are revolutionizing (MAŘÍK et al., 2015). On a global scale, there is a digital interconnection of companies, production becomes distributed (MAYNARD, 2015).

Technically, this is the transition from the isolated use of computer and robotic production and administrative support to interconnected intelligent systems. In the context of «Industry 4.0», manufacturing units (including business, managerial and economic units) are seen as complex distributed systems that are integrated with each other but function as autonomous subsystems that handle subtasks. These subsystems cooperate and coordinate their activities (MAŘÍK et al., 2015).

The «Industry 4.0» concept is the result of the development of several non-linear converging technologies (HUJSAK, 2016). It is therefore a concept that results from the convergence or convergence of technologies and their interconnection produces the resulting synergistic effect.

But this is not just a replacement of physical work by machines. Automation also applies to office workers. Smart warehouse systems order commodity materials separately and automatically for the best price, logistics systems order transport according to actual needs of customers and production. The transport itself is shared to reduce costs and the autonomous transport object optimizes its route, for example on the basis of information about the load on individual roads or other traffic restrictions.

Man becomes an operator and maintainer of these systems and further develops them, implements further extensions. Management determines the business strategy based on online data collection, and all changes are first simulated, tested and detailed in detail before being deployed for full operation.

The Industry 4.0 concept cannot be perceived as a single technology, it is a set or a set of technologies that, in cooperation and interconnection, create the functionality and capabilities defined under the Industry 4.0 concept. However, this set of technologies is not closed, but is gradually changing and evolving, reflecting current technical and technological possibilities.

The implementation of this set of technologies in practice and their subsequent dissemination presupposes a disruptive impact on human society and its various aspects.

The main idea is to replace all repetitive activities with machines and process automation. All control and management should work remotely and be accessible from anywhere.

The aim of this concept is to save costs, time and increase flexibility and productivity of production and enterprises in general. The basic requirement for a production plant using the Industry 4.0 concept is a very flexible response to constantly and dynamically changing demand, as well as a significant adaptation of products to individual customer requirements. For this to work, it is necessary to have everything that is needed for production at the moment. The approach that represents this condition is called «just in time» and its typical feature is the extreme demands on logistics. Thanks to this approach, the costs of logistics increase significantly, which is in contradiction with one of the objectives of the concept, by reducing the costs of logistics (MIT CR, 2016).

The growth in logistics costs is mainly due to the changing frequency and volume of traffic. The concept of «just in time» is characterized by a large number of empty journeys. These costs must be reduced. A possible solution is to use one of the logistics technologies to optimize journeys (eg«HUB AND SPOKE») or to share and optimize traffic in another way (MIT CR, 2016).

Logistics companies need to know the requirements and philosophy of its customers (eg. Preference speed traffic or large supply of savings from range). Key indicators (KPI) to help clients understand the situation, logistics companies, to design and optimize traffic management system (Stallard, 2018).

The potential of this technological advancement lies in the fact that automated products (almost) without human intervention have the potential to be much cheaper due to higher economic efficiency (MCCLOSKEY, 2017; PRISECARU, 2017), and also that money from new and better paid positions are moving further, eg to services (MIT CR, 2016).

The problem, however, is that we are not yet able to define precisely the areas of services, specific services or other jobs that will be in demand due to wage increases, and we cannot accurately predict the impact of this concept on employment. But the fact that we do not know and know specific areas and specific jobs with high potential does not mean that such areas do not exist or will not be created (AUTOR, 2016). It is certain that technology creates new areas of work (STEVENS, 2016). The number of occupations and specialists most sought after 10 years ago did not exist and this rate of change tends to accelerate (CLICHICI et al., 2017).

Each innovation technology wave creates new resources and new ways of using them, regulates the organization of production and new business opportunities (PRISECAR, 2017). These opportunities need to be systematically sought and exploited to their full potential. From the automotive point of view, a significant potential benefit is the modular production of cars, which enables the production of all models on one production line (PRISECAR, 2017).

Another potential benefit is the assumption that efficiency and productivity will increase on the supply side in the long term, due to lower transport costs (increased logistics efficiency), communication and trade, and global supply chains that break down market entry barriers and provide easier access to global markets. markets. Higher efficiency is expected to reduce drastically the consumption of energy and raw materials in industry (MAŘÍK et al., 2015; PRISECAR, 2017). One reason for reducing energy consumption may be that smart and fully automated factories do not need lighting, heating, ventilation or air conditioning (HUJSAK, 2016).

More efficient production, better use of resources and more sophisticated logistics and the associated higher efficiency are also a hope for reducing the negative externalities of industrial production and for implementing sustainable development. Thus, inefficient modes of transport, such as special transports, should be a thing of the past for optimal functioning.

At present, there are common situations where if the company as a supplier is not able to deliver on time, then due to the amount of fines prefer to use special transports. This means it sends packages with only hundreds or even dozens of pieces over often very long distances, either alone or by air! The financial penalty for stopping the customer's line is higher than the cost of this express transport and, in addition, its use does not reduce the reliability of the supplier in the eyes of the customer. In such an inefficient way, the goods are often transported for weeks, until the state is consolidated. This is a huge waste of resources and is happening worldwide on a large scale. The Industry 4.0 concept and automated production and transport planning can relieve such a waste of resources and support the implementation of sustainable development worldwide.

The concept and concept of Industry 4.0 comes from Germany, but very similar concepts are currently being developed in all the major economies of the world.

In the US, it is the «Industrial Internet Consortium», which was founded in 2014 and brought together the largest US IT companies. Since 2016, the company has also brought together non-US businesses and emphasizes security and compatibility of solutions (MIT, 2016).

In Japan, this is an initiative called «Industrial Value-Chain Initiative». The focus is on the standardization of interconnections of factories and internationalization (MIT CR, 2016).

In China, changes of this nature are contained in the broader and all-encompassing concept of «Made in China 2025» (KENNEDY, 2015). It is crucial for China to develop its industry in this direction, because otherwise it is losing its main comparative advantage in the form of cheap labor (MIT CR, 2016;

GILCHRIST, 2016). China is massively investing in this area and in the near future may even overtake the US and become a world leader.

China may at first glance seem paradoxical about the implementation of Industry 4.0. This concept is developing dynamically especially in countries where labor is expensive and the desired goal is to reduce production costs. While China has an extremely cheap workforce, as the country's economy is built on it, industry needs to be further developed to sustain growth and prosperity. China is one of the countries most threatened by the Fourth Industrial Revolution (FREY et al., 2016).

In terms of cheap labor, competition for China is also increasing, for example, in Cambodia, the total cost of labor is one fifth (20%) (HUJSAK, 2016). There is demand in China on labor market for operators much higher than their supply, mainly due to wages lower than in other fields (eg services) (HUJSAK, 2016) and this is another factor accelerating the onset of automation.

France uses the term «Industrie du Futur», a concept that was defined and communicated in 2015 and aims to support the development of future industry and to promote European and international cooperation in the field of standardization of solutions (MIT, 2016).

South Korea introduced the «Manufacturing Industry Innovation 3.0» strategy in 2014, as in other countries, the goal is to develop the «intelligent» industry (MIT, 2016).

The Russian Federation is an example of a state where the government approved the concept of the digital economy rather than the global leaders quite late. It was approved in the summer of 2017 (GULIN and USKOV, 2017).

The Industry 4.0 concept causes a disruptive change in the existing approach to production. Manufacturing in advanced economies is becoming more cost-effective than hitherto. The benefits of moving production plants to countries with lower labor costs are being mitigated. The situation reverses the trend of outsourcing production in recent decades (GILCHRIST, 2016).

Likewise, in the process of researching I would like to pay for the job - to look and apply the first and the first time to the structure of the work rail, to get to the manufacturing sector, and to get to the next level. In other words, it reflects on the education of many schools and universities, as well as new specialization. As a versatile result, a simple workhorse to fit all the sectors in the middle, as well as the old and new specialization to make it unobtrusive.Because of the workmanship, the use of these technologies, the quality of technology, the quality of the hotel sector, the need to convert to the new model of the new technology, the new technology.

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ЦИФРЛЫҚ ЭКОНОМИКАНЫ ДАМЫТУ ЖАҒДАЙЫНДАҒЫ ЕҢБЕК НАРЫҒЫНЫҢ ТРАНСФОРМАЦИЯСЫ

Аннотация. Мақалада цифрлық экономиканың даму жағдайындағы еңбек нарығының трансформа-циясы, жаңа өнеркәсіптік революция, жаңа технологияларды енгізуден туындаған жұмыс орындары мен мүмкін болатын жұмыссыздық мәселелері, машиналармен және автоматтандыру процестерімен барлық қайталанатын іс-әрекеттерді ауыстыру арқылы қаралды. Бақылау және басқару процесі әлемнің кез келген нүктесінен қолжетімді болуы тиіс. Бұл тұжырымдаманың мақсаты – өндіріс пен жалпы кәсіпорындардың шығындарын, уақытын үнемдеу және икемділігі мен өнімділігін арттыру. Industry 4.0 тұжырымдамасын пайдаланатын өндірістік кәсіпорынға қойылатын негізгі талап – бұл тұрақты және серпінді өзгермелі сұранысқа өте икемді жауап, сондай-ақ өнімдердің клиенттердің жеке талаптарына айтарлықтай бейімделуі. Бұл жұмыс істеу үшін, қазіргі уақытта өндіріске қажет барлық нәрсе болуы керек. Бұл шартты білдіретін тәсіл «уақытында» деп аталады және оның типтік ерекшеліғі логистикаға қойылатын экстремалды талаптармен байланысты. Мұндай тәсілдің арқасында логистикаға арналған шығындар айтарлықтай артады, бұл логистикаға арналған шығындарды азайту есебінен тұжырымдама мақсаттарының біріне қайшы келеді. Зерттеу барысында біз алдымызға мақсат қойдық, ол – жұмыс күшінің, әсіресе, өндірістік секторларда еңбек білімі мен жұмыс орнына қойылатын талаптарға байланысты болатын өзгерістерді талқылау және талдау. Әрине, бұл көптеген мектептер мен университеттерде білім алуға әсер етеді, өйткені жаңа мамандандырулар жасайды. Сондай-ақ мақалада Industry 4.0 тұжырымдамасының даму тарихына талдау жасалған. Тұжырымдама Германиядан келді, бірақ қазіргі уақытта осындай тұжырымдамалар әлемнің барлық негізгі экономикаларында әзірленеді. АҚШ-та бұл «өнеркәсіптік интернет-консорциум», ол АҚШ-тың ірі

ат-компанияларын біріктірді. Жапонияда бұл бастама «құнды жасаудың өнеркәсіптік тізбегінің бастамасы» деп аталады. Негізгі назар кәсіпорындардың өзара байланысын стандарттау мен интернационализациялауға бөлінеді. Қытай осы облысқа белсенді инвестиция салып, таяу болашақта АҚШ-ты басып озып, әлемдік көшбасшы бола алады. Франция «Industrie du Futur» терминін пайдаланады, ол – болашақ өнеркәсіптің дамуын қолдауға және шешімдерді стандарттау саласындағы еуропалық және халықаралық ынтымақтас-тыққа жәрдемдесуге бағытталған ұғым. Оңтүстік Корея «өңдеуші өнеркәсіп индустриясы 3.0" стратегиясын ұсынды, басқа елдердегі сияқты, мақсаты «зияткерлік» индустрияны дамытумен байланысты. Ресей Федера-циясы – Үкіметі сандық экономика тұжырымдамасын өте кеш бекіткен мемлекеттің үлгісі. Industry 4.0 тұжырымдамасы өндірістің қазіргі тәсілінде жойқын өзгерістерді тудырады. Экономикасы дамыған елдер-дегі өндіріс әлі күнге дейін рентабельді болып келеді. Өндірістік кәсіпорындардың жұмыс күшіне шығындары неғұрлым төмен елдерге ауысуының артықшылықтары азаяды. Жагдай соңғы онжылдықтарда өндіріс аутсорсингінің беталысын тудырады. Мақала таңдалған технологияларға, барлық тұжырымдамаларға және өндірістік секторга нақты әсер етуге арналған.

Түйін сөздер: өнеркәсіптік революция, еңбек нарығының трансформациясы, жұмыс күшіпе сұраныс, автоматтандыру, цифрлық экономика.

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ТРАНСФОРМАЦИЯ РЫНКА ТРУДА В УСЛОВИЯХ РАЗВИТИЯ ЦИФРОВОЙ ЭКОНОМИКИ

Аннотация. В статье рассмотрена трансформация рынка труда в условиях развития цифровой экономики, новая промышленная революция, вопросы о рабочих местах и возможной безработицы, вызванная внедрением новых технологий путем замены повторяющихся действий машин процессами автоматизации. Процесс контроля и управления должны быть доступными с любой точки мира. Целью этой концепции является экономия затрат, времени и повышение гибкости и производительности производства и предприятий в целом. Основное требование к производственному предприятию, использующему концепцию Industry 4.0, – это очень гибкий ответ на постоянно и динамично меняющийся спрос, а также значительная адаптация продуктов к индивидуальным требованиям клиентов. Чтобы это работало, необходимо иметь все, что нужно для производства на данный момент. Подход, который представляет это условие, называется «как раз вовремя», и его типичной чертой являются экстремальные требования к логистике. Благодаря такому подходу затраты на логистику значительно возрастают, что противоречит одной из целей концепции за счет снижения затрат на логистику. В процессе исследования мы ставили перед собой цель – обсудить и проанализировать преимущества и влияние на структуру рабочей силы, особенно в производственных секторах возможные изменения, которые будет зависеть от трудовых знаний и требований к рабочему месту. Конечно, это повлияет на образование во многих школах и университетах, так как создаст новые специализации. А также в статье представлен анализ истории развития концепции Industry 4.0. Концепция пришла из Германии, но в настоящее время очень похожие концепции разрабатываются во всех основных экономиках мира. В США это «Промышленный интернет-консорциум», который объединил крупнейшие ИТ-компании США. В Японии эта инициатива называется «Инициатива промышленной цепочки создания стоимости». Основное внимание уделяется стандартизации взаимосвязей предприятий и интернационали-зации. Китай активно инвестирует в эту область и в ближайшем будущем может даже обогнать США и стать мировым лидером. Франция использует термин «Industrie du Futur» – понятие, которое было направлено на поддержку развития будущей промышленности и содействие европейскому и международному сотруд-ничеству в области стандартизации решений. Южная Корея представила стратегию «Индустрия обрабаты-вающей промышленности 3.0», как и в других странах, целью является развитие «интеллектуальной» индустрии. Российская Федерация является примером государства, в котором Правительство довольно поздно утвердило концепцию цифровой экономики. Концепция Industry 4.0 вызывает разрушительные изменения в существующем подходе к производству. Производство в странах с развитой экономикой стано-вится более рентабельным, чем до сих пор. Преимущества перемещения производственных предприятий в страны с более низкими затратами на рабочую силу уменьшаются. Ситуация обращает тенденцию аутсорсинга производства в последние десятилетия. Статья посвящена выбранным технологиям, всей концепции и конкретному влиянию на производственный сектор.

Ключевые слова: промышленная революция, трансформация рынка труда, спрос на рабочую силу, автоматизация, цифровая экономика.

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