

The Background and Perspective of the Development of the 4th Industrial Revolution

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Abstract

Today the 4th Industrial revolution (also called the Digital revolution) embraces the global economy rapidly, becomes a vital part of almost every sphere of life. In the article, a description of the main aspects arousing the development of the Digital revolution is given; its most vital driving factors, challenges and threats for the present economy are characterised. Also, the ambiguity effect of the 4th Industrial revolution is considered; much attention is paid to the outcomes which can be observed today or with the high degree of possibility will arise in the near future in the most important spheres of life: economic, political and socio-cultural ones. The possible ways of overcoming the risks and reducing the influence of threats caused by the 4th Industrial revolution are described. Overall, the problem of digitalisation is considered from the historical perspective.

Keywords: the 4th Industrial Revolution; industrialisation; digital development; technologies; global economy; globalisation

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The Digital revolution pervades the global economy and impresses us with its scope and rates of development. Since 1960s digital innovations have been spreading all over the world, so today they can be found everywhere: from computers and the Internet to robotics and virtual reality [3].

The following stages of human development can be distinguished: Agricultural, Industrial and Post-industrial periods. Today we are facing the 4th stage — the Digital revolution, which can also be called as "the second computer age" [1], "the 4th Industrial revolution" or "Industry 4.0". This revolution creates a world where both virtual and physical objects interact with each other (sometimes even without human's help) contributes to vital breakthroughs in such spheres of knowledge as genetics, mathematics, IT, etc.

The ambiguity of the Digital revolution consists in the fact that we are witnessing the wholesale

expansion of new technologies, while 17% of the population of the world is waiting for the Industrial Revolution, about 1/3 (4 billion of people) — for the Post-industrial revolution [4]. Consequently, it spans mostly overdeveloped countries, increasing the gap between them and developing countries or the ones with transition economy.

Among driving factors of the Digital revolution are the following ones: uncrewed vehicles, 3D-printing, robotics, genetics, new materials, crypto-currency, digital health care, new forms of business, the Internet of things. The advantages of these innovations are apparent: uncrewed vehicles and drones let people with disabilities move quickly in the city, they can also be used in agriculture; 3D-printing makes manufacturing wasteless, creates individual goods; robotics help in performing routine work, increase productivity. New materials that can control the temperature inside can be used in building

homes. With the use of crypto-currency people or organisations who are on different continents and unfamiliar to each other can make deals and transfer money without fear of a fraud; digital health care means health control using portable devices and mobile applications to contact and communicate with doctors immediately.

During last years new forms of business, such as crowd-funding platforms, social networks, websites offering all kinds of services (from babysitting and shopping to parking a car), online-shops and taxi services were created. The peculiarity of these new forms is that they do not have any stock of goods but merely serve as connectors or intermediaries between customers and producers. They make the cost of a good or service cheaper, combining supply with demand (sometimes even from very distant countries).

What is more, the Internet of things (a connection between objects of physical and virtual worlds by technological platforms) gives an opportunity of creating “smart homes” and even “smart cities”. Just imagine a city without traffic jams due to uncrewed cars following the traffic rules and reacting immediately on unexpected events; a home which saves electricity and water, turning it off when they are not used; clothes telling you about your activity during the day and physical condition.

In highly developed countries Artificial Intelligence (AI) almost surrounds us: innovations and new technologies have changed our lives so much, that we can hardly imagine our existence without them. However, it is worth pointing out that all above mentioned fundamental changes can be seen as a mixed blessing do not only give great opportunities but lead to potential threats. It explains the growing interest of many scientists, organisations and committees to the subject. For example, the World Economic Forum in 2015 published a report where 21 Technology Tipping Points forming a new digital world were described [6]. It is remarkable that all these moments may occur in the nearest ten years.

Consequently, we would like to describe the influence of the Digital Revolution on the most important spheres of our life. These spheres encompass economic, political and socio-cultural ones.

The 4th Industrial revolution will affect the world's economy fundamentally. Due to the application of robotics and innovations productivity will increase, causing economic growth. As a result, the quantity and quality of goods produced will grow to make

prices go down. Moreover, robots can replace people not only in routine jobs (i.e. conveyor worker) but also in the professions of an accountant, a driver, a phone operator, etc. The automated workforce is cheaper, works without breaks and performs practically without mistakes. Such replacement will cause a great amount of unemployed all over the world. Jobless people may protest. Subsequently, problems in the political sphere may occur. To avoid this, special courses for the unemployed should be created, where they will be able to retrain for professions like managers, designers, IT specialists, doctors, that will be still in demand.

One more problem the Digital revolution may bring lies in the economic sphere: it is inequality. Consumers on the one side — they share all advantages of the revolution, such as the Internet, applications which help in calling a taxi or buying goods. Manufacturers, who collide with some problems — on the other side with the decrease in the percentage of labour in GDP, the decline in the price of capital goods [2], replacement of labour with capital. As a result, investors, shareholders and inventors (the suppliers of intellectual and physical capital) gain the most benefits of the Industrial Revolution, while workers, who earn their living by hard manual labour are desperate and can lose their jobs.

The next thing worth mentioning is that with the help of digital technologies, companies will be able to receive more transparent and full information about clients, their needs and preferences. This information becomes corporations' competitive advantage and leads to more customised manufacturing of individual goods. Nowadays an increasing number of firms in many spheres turn from producing goods to providing services. It can be explained, in turn, by a growing amount of people who prefer not to buy a physical object, but to pay for a service of using the object whenever they need (car-sharing, e-books).

The Industrial revolution permits businesses to create a product or service with minimal workforce expenses. What is more, the amount of companies lacking any assets or practically without any capital grows enormously: “WhatsApp” or “Instagram” did not need large sums to start the business, but today they are yielding very high profits. The companies which will be in need for capital and human resources will pay more attention to hiring and retaining highly qualified specialists because personnel become the dominant fact of competitive advantage.

Summing up the influence the Digital revolution on the economy we can admit that it gives an opportunity for enormous economic growth, creating new forms of businesses, usage of innovative technologies, but also causes inequality, unemployment, increases the gap between developed countries and ones with the economy in transition, leading to tense political relations, conflicts or even wars.

Let us consider the political sphere and the Digital revolution. Undoubtedly, the introduction of digital technologies will lead to better governance: the number of officials can be reduced — replaced by robotics. Consequently, the level of bureaucracy may increase; corruption declines the productivity of work increases meanwhile. It should be kept in mind that according to changes in the economic sphere, many countries will face unemployment, which will lead to people's discontent and reduce the inflow of money from taxes. Due to this fact, governments will need to interact closely with business, create new workplaces, retraining courses, normative documents and laws to control technological achievements and innovations.

The governments of developed countries should unite their efforts not to let the Digital revolution separate these countries from non-developed ones. Also, the introduction of digital technologies in developing countries will help in predicting natural disasters, saving natural resources, curing infections, etc. The Digital revolution will cause profound influence on international relations and international security. Supposedly, the rate of migration will rise, diminishing cultural differences, national individualities and traditions.

One of the greatest disadvantages of the revolution in the political sphere will be the possibility of usage of digital technologies by criminal groups. With such helpful innovations, they will be able to communicate faster on long distances, produce more harmful and accurate weapon causing international threat. On the other hand, these technologies can provide governments with better weapons and protective clothing, or even robots, drones and automated weapon with Artificial Intelligence that will be able to fight without human interference.

The most vital problem of the Digital age becomes cybernetic war. The more digital data is received, synchronised and kept in the country, the more it is subject to cyber attacks. If governments introduce a system of payments with crypto-currency, the number of cyber thefts and frauds will increase sharply. As a result, authorities of different countries ought

to cooperate to create international rules and regulations controlling new technologies in the military and security sectors.

The third sphere we would like to take a look at is a socio-cultural one. As we have previously mentioned, the influence of the Digital Revolution on the economic and political sphere will cause inequality. According to Credit Suisse "Global Wealth Report" in 2017 "while the bottom half of adults collectively own less than 1% of total wealth, the richest decile (top 10% of adults) owns 88% of global assets, and the top percentile alone accounts for half of the total household wealth" [5]. As a result of increasing inequality of income and unemployment, the number of social unrests or even riots can rise.

The positive factor is the 4th Industrial revolution gives access to various kinds of information whenever you need it, an opportunity to communicate with relatives on long distances, find new friends according to common interests, consume electricity and water carefully, recycle waste and even improve the ecological situation. New technologies help people with disabilities to move in the streets, communicate with others, study or work. On the contrary, the Digital revolution creates a self-contained, forever-online society, where everyone is concerned only about his own needs and wants, unwilling to help others or communicate face-to-face, preferring to chat online. Moreover, it is necessary to have access to various types of information, points of view, but we can never know whether to trust the facts or not, is the opinion reliable or is it just dictated by somebody.

A threat of cyber-crime can also be seen in the socio-cultural sphere. The more personal data is kept in digital bases or websites, the more privacy of life is in danger. In our opinion, the most momentous problem of the digital society is ageing. The birth rate almost in every country declines, consequently, the number of the able-bodied population also decreases, so the productivity falls. It has a very harmful effect on economic and political spheres.

Having observed the influence of the Digital Revolution on the main spheres of life (economic, political and socio-cultural), we have concluded that this revolution can be perceived as a mixed blessing: on the one hand bringing with it great opportunities to people, on the other hand causing considerable threats. To this day, technologies have been helping us to perform more efficiently and quickly with minimal effort. But we should remember the potential

risks and threats from the use of these technologies are large-scaled. Some examples of these opportunities, as well as threats of the 4th Industrial revolution, were described in the article.

To overcome the risks mentioned above and reduce possible threats for the revolution authorities, businesses and civil society ought to unite their efforts, integrate and work in close cooperation. Only through international collaboration and confidence in each other we can achieve a sustainable, bright future and solve arising global problems, overcome inequality and unemployment. It is also important to advance one's intellectual level: competent and

knowledgeable people with a high level of expertise will be successful and powerful because they can compete and surpass the AI.

Today we are at the very beginning of the Digital revolution and can determine the way of its evolution. So let's be responsible and form the future where innovations and technologies will satisfy our needs, lead to sustainable development and improvement of the level of life. We believe it is in our hands to solve arising problems and introduce necessary changes to preserve traditions, moral values, cultural individualities and even achieve technological and economic growth.

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Предпосылки формирования и перспективы развития четвертой промышленной революции

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Аннотация. На сегодняшний день Четвертая Промышленная революция (она же – Цифровая революция) стремительными темпами охватывает мировую экономику, становится важной частью практически каждой сферы жизни. В данной статье приведено описание основных аспектов, побуждающих развитие Цифровой революции и ее наиболее важные движущие факторы. Охарактеризованы вызовы и угрозы современной мировой экономике. Рассмотрен эффект двойственности Четвертой Промышленной революции. Особое внимание уделено последствиям, которые можно наблюдать уже сегодня или которые с большой степенью вероятности возникнут в недалеком будущем в наиболее важных сферах жизни: экономической, политической, социально-культурной. Описаны возможные пути преодоления рисков и уменьшения влияния угроз, вызванных Цифровой революцией. Проблема цифровизации рассмотрена автором в исторической перспективе.

Ключевые слова: Четвертая Промышленная революция; индустриализация; цифровое развитие; технологии; мировая экономика; глобализация

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