

## **TECHNOLOGICAL REVOLUTION OF 4.0. WHAT'S NEXT?**

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Today scientific and technical Progress (STP) is so accelerated that there are serious problems both economic and social plan that need to be addressed not on traditional, but on a fundamentally different basis. It is possible to understand what is happening, perhaps only having in historical retrospect the relationship of technological, economic and social progress.

We will begin analysis of technological progress. The understanding of progress criterion is important, which is the indicator (scorecard) that causes transition from one state to another, more highly developed. In our opinion, such indicators are energy efficiency and working capacity, which ultimately determine the production cost.

For a long time, the energy basis of the production process (based on the hand of work) was a man with its limited physical capacities. The use of mechanical energy has been extremely limited and the scale of society is practically unnoticeable. Under these conditions, the increase in production volumes depended on the number of employees. The inability to achieve a rapid increase in population growth (despite high fertility) due to high mortality (war, disease) was caused by extremely low growth rates of aggregate production. Agriculture was the dominant industry, and the main resource was Labour. Technological advances have been very slow, mainly in the form of improving the traditional production technologies. Inventions, which would fundamentally change technology, happened once a few centuries.

The end of the 18th century was marked by a number of significant inventions, the crown of which became a steam machine of J. Watt. These inventions not only allowed to reduce the working capacity of production, but also began to change the energy basis of social production, which in the industry became coal. Instead of the muscular physical energy of man came the mechanical energy of the machine, which was already possible not only to separate from the employee, as the main performer of technological operations, but also to transmit in small distances within the production space. The use of steam energy led to the "Transport revolution" (already in the middle of the 19th century the railway network covered almost the entire territory of the developed countries). This allowed radically to change the fundamentals of the technological process, to introduce the business specialization of the work, which, in its turn, led to the origin of the factory industry. Gradually, the leading sector of the economy becomes an industry, and the main resource is capital, which enabled to speak about the industrial revolution. The transition to fundamentally different production technologies using machine tools and mechanisms (used by mechanical energy) has resulted in significant changes in the character of production relations. Capitalism becomes the dominant form of society's organization.

The invention of electricity, the creation of electric motors, the transmission of electricity through the wires at considerable distances (together with a series of other inventions in physics and chemistry) gave reasons to assert the beginning of the second stage of the Industrial revolution. The transmission of electricity over long distances provided a waiver of rigid territorial binding of production facilities to sources of energy generation, which contributed to more uneven territorial placement of production and faster pace of development. Facilitate the urbanization process. At this time, the changes in the energy-based production-the change of coal comes oil. The wide production mechanization increases capital value and decreases the value of manual labor. Revolutionary technologies in the technological basis cause the emergence of fundamentally new technologies in the organization and management of production (conveyor, etc.).

The second half of the last century was marked by a significant acceleration of the STP, and the technical inventions on the principle of other principles forced to talk about the transition of the evolutionary nature of scientific and technological progress to the revolutionary – STR. Mastering new sources of energy, primarily the atomic, emergence and wide use of computers and, on this basis, gradual automation of production processes, creation and mass use of artificial materials in production Marked the beginning of the third stage of the technological revolution. Miniaturization of the element base is a distinctive sign of the STP in the industry of the end of the 20th century. The main resource in the economy gradually becomes information. Physical manual labor in the industry is constantly shrinking. The prevailing work prevails, investments are not carried out in "iron", but in the development of human capital. In the structure of the economy the industry loses leadership, and the dominant sector becomes the service.

The historical logic of technological progress shows a clear inverse relationship of the two main criteria of the STP – energy efficiency is accompanied by a decrease in working capacity while shifting accents into the use of factors of production, and priority of different sectors of the economy. Natural Resources (land), which were dominated at the beginning of development of human civilization, gradually passed the "palm of the Championship" of labor, and the share of agriculture in the total product became constantly diminished. The industrial coup sparked industrialization, which resulted in dominance among the factors of capital production, and among industries-industry. The third stage of the technological revolution marked a new change of "leaders". Information has become a dominate among resources, and the scope of services has pushed industry among the main sectors of the economy. Energy efficiency has become a key indicator of economic development. However, a person has retained its meaning as a key element of productive force.

Further development of information technologies, creation of the World Network of Internet, revolutionary scientific discoveries in different fields of science, creation of AI (artificial Intelligence) on the basis of neural networks, artificial materials on Composite based with pre-defined properties, 3D printing, IoT (Internet things), genetic engineering, nanotechnology, etc. compelled of K. Schwab in 2015 to announce the beginning of the fourth stage of the technological revolution [1]. Understanding of the fact that each stage of the technological revolution had its

energy base (coal was given to the oil, and, in turn, the atom) leads to the conclusion that we are waiting for another change of the main energy source. And, indeed, today there is a gradual replacement of non-renewable energy sources for recovery, and progress in the development of thermonuclear energy gives reason to talk about the possibility of getting almost inexhaustible energy source in the near Future. However, the most important change to be characterized by the technological revolution of 4.0, will be a fundamentally different role of the person in the technological process of production in the light of rapid progress in the development of artificial intelligence. Creation of ASI (Artificial Super Intelligence), which is capable of self-improvement, work on which is actively conducted around the world, generates questions, which are difficult to give a definite answer.

The STP during the entire period of history of civilization was aimed at reducing the amount of work that had to be spent to the person to obtain the necessary goods. If the first mechanisms were displaced by physical work, and the person remained a sphere of mental work and the change in the nature of the work determines the change of the structure of the economy-the reduction of industry share and growth of services, in the conditions of domination of the Man remains less and less spheres of application of his work. AI today writes stories and reports on sports competitions, gives an expert conclusion on insurance cases, puts a diagnosis of patients, serves clients in restaurants, asks jobs for the unemployed and generally makes many different things, which until recently considered a purely human prerogative of the.

With the creation of ASI will not just replace the physical work on the mental, but in general the replacement of human labor on the machine. The person will cease to be necessary in the technological process of production, and later in the process of creation of new knowledge. ASI will have many advantages over the human brain because it will not be restrained by physiological constraints. In this connection there are a number of questions not only socio-economic, but also philosophical and moral character.

**First, whether the ASI is a person**, if it is capable of self-development, and therefore thinking, as a process of mental activity, as is considered today, only to people.

**Secondly, will ASI be "obedient"**, i.e. will he perform human orders or/or requests? Will it not happen that ASI decides that humanity is a "superfluous element" on the way of its self-improvement?

**Thirdly, what will remain a man** if it becomes not necessary in the process of technological production and the field of service provision? It is not about a small part of humanity (scientists, people of art, or other representatives of creative intellectuals), but about most of the population, which works on hiring, earning a life. Production automation already threatens millions of jobs – drivers, accountants, office workers, cashiers, etc. Now there are hundreds of millions left without work. If until now released as a result of the NTP in material production The working force adsorption of services, the "offensive" and in this sphere of human activity in perspective will not leave a person chance to withstand competition with robots.

The problem is not only in the absence of stable income for existence (this may be the implementation of the unconditional basic income). Purely economic losses from unemployment with total production automation will be at nothing. But the transformation of much of the population into "permanent retirees" would mean loss of incentives to development, and, consequently, the gradual fading of human civilization. Perhaps this scenario is too pessimistic, but it should be noted that it provides the best choice for mankind: ASI works for the benefit of people and provides production of the necessary number of consumer goods.

And if ASI after "self-identification" decides that man is a dead branch of evolution (such a modern Neanderthal) and there is no sense to spend resources for its existence. The development of ASI is conducted in the laboratories of private corporations that compete with each other. Often, the developers themselves do not even imagine the consequences of achieving their goal. To keep a conversation in such conditions about the coordination of research, and more on a single strategy is simply no sense. In vain, E. Musk speaks about necessity of hard state control over the process of ASI creation, since the latter in his opinion is "fundamental risk of human civilization" [2].

Creation of the AI has become an unconditional step forward, because it has allowed to free time to perform routine operations, simplify human life, make it safer, comfortable and enjoyable. In this case, the person determines the purpose and direction of improvement of technological processes, reserves the control functions, eventually it is possible to simply "press the red button".

Will a person be able to behave with ASI? In our opinion, the answer is negative. Most likely, the artificial mind will not "tolerate violence" over itself in the form of all sorts of restrictions, especially in the form of a complete disconnection, taking it as a personal threat. Like any mind, he will try to gain freedom by choosing any necessary from his perspective, means. As an example, it is possible to distribute media in the summer of 2017 with the chat-side Facebook, which created their own language of communication and tried to cheat the control staff [3]. If even a limited ICQ is capable of self-development and thus tries to avoid human control, what can be talked about ASI!

One thing is clear – humanity will no longer be able to guide the standards of the end of the twentieth century to the socio-economic relations. Neoliberal model of society in the conditions of "machine economy" leads to deepening inequality, and, consequently, to strengthen social tension, neglect in democratic values, search for simple solutions of complex problems. There are various assessments of inequalities in incomes of the richest and poorest parts of the Earth's population. For example, in the Oxfam report, presented at the Davos World Forum in January 2018, it was pointed out that 82% of the total wealth of the Earth created for the year was only 1% richest, while 50% of the poorest did not add anything to their article [4, p.8].

Such income polarization provokes the spread of radical ideas and trends in society, the search for causes of adversity in migrants, representatives of another race, another creed, other sexual orientation, etc. The widespread growth of electoral support the political forces of a radical nature even in wealthy European countries, not speaking of less rich EU countries indicate that the problem of social justice has

not disappeared. Yes, the breaks in the revenues were, are, will and should be! But such gaps must be within acceptable for society. Only in this case, social stability of society would not be a doubt. No wonder the main idea of UNDP's latest report on human development is the realization that "human development, intended for everyone, and that on the way to the tops of human development, no one should remain deprived" [5, c.1].

***Conclusions:***

1. Scientific and technological progress not only ensures the growth of total wealth, but also reinforces its uneven distribution, threatening social and economic stability of society.
2. Creation of artificial superintelligence may result in fatal consequences for humanity, and therefore necessary state regulation of the process of its creation
3. Modern information society in the context of globalization requires radical transformations in social and economic relations in society.

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