THE GREATEST ACHIEVEMENTS OF THE PAST, PRESENT AND FUTURE

Arthur Bura

Faculty of Chemical Technology,

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

Technological breakthroughs are significant innovative achievements that lead to radical changes in society, economy and culture in terms of doing business, communication, education, health care and other areas of life. They expand human capabilities, allowing the achievement of what previously seemed impossible, and often become the basis for global change. Technological breakthroughs at different times have different consequences for the world.

To begin with, let's start with the greatest breakthroughs of the past, so let's consider the steam engine first. The inventor of the steam engine (piston steam engine) is considered an englishman James Watt, who received his first patent for a direct-acting steam engine in 1769. For clarity, a steam engine is any heat engine that converts steam energy into mechanical work.

And then, after the rapid outbreak of industrial revolution, it was a transition from manual manufacturing to machine production, which ended with the creation of a universal engine. During almost the entire 19th century the steam engine determined the energy level of machine production and transport, the pace and direction of their development. The steam engine increased the need for hard coal and satisfied this need because it lifted the coal from the mines, ventilated them, and pumped water out of them. Based on the experience gained in the production of steam engines, a new piston engine was created, which will be discussed later.

On August 6, 1801, the French engineer and professor of mechanics at the School of Bridges and Roads in Paris, Philippe Lebon, issued a patent for the construction of a gas engine. The driving force arose after the explosion of the gas-air mixture inside the working cylinder – the internal combustion engine (ICE) appeared in mankind. The Belgian Jean Etienne Lenoir in 1860 continued the work after the

death of Lebon, who built a gas engine according to personal drawings in 1860, in which the ignition of a combustible mixture was carried out with the help of an electric spark, as it is now. The normal operation of the engine was hindered by the effect of linear expansion. To eliminate it, special lubricants and cooling systems were invented. That's how the world saw the world's first two-stroke internal combustion engine. Which forever changed humanity and set fat horses in motion.

Electricity was first discovered by the ancient Greek philosopher Thales. Rubbing amber against wool, he realized that the stone attracts small objects and generates an electric current between them. But let's look at a more modern creation of energy transmission. In the middle of the 17th century, Otto von Gerike invented the electrostatic generator. Stephen Gray's experiments showed that electricity could be transmitted up to 800 feet by a conductor (wet string) if contact with the ground was avoided and insulators were used; in 1791, Luigi Galvani announced his discovery of bioelectricity; 1800, Alessandro Volta created the first battery, the volt column. This new type of current source was much more reliable than the electrostatic generators used up to that time. In 1821, Michael Faraday invented the electric motor, and in 1827, Georg Ohm established mathematical laws describing currents in electric circuits. Faraday's discovery of electromagnetic induction in 1831 paved the way for the production and use of electrical energy on a large scale, and the second half of the 19th century was a period of numerous inventions in electrical engineering.

Now we will talk about Internet networks. In 1957, the US Department of Defense first thought about reliable information transmission. Therefore, it was necessary to develop a computer network for this. Four US universities were tasked with implementing it. And in 1969, a talented group of scientists created a computer network called ARPANET (Advanced Research Projects Agency Network), which united these 4 universities. By 1973, the ARPANET network had become international. Organizations from Norway and Great Britain connected to the network with the help of a transatlantic telephone cable. By the end of the 1970s, they began actively working on the standardization of data protocols, which were successfully

standardized in 1982-1983. By early 1983, after the ARPANET network switched to the newly created TCP/IP network connection protocol, and got its known name 'Internet'. Modern technologies are now heading in the direction of replacing human labor with AI, so we will talk about it

AI is revolutionizing industries such as healthcare, finance and autonomous systems, allowing machines to learn, adapt and perform tasks that would normally require human intelligence. Therefore, we can say that it is developing and learning every day to reduce our problems.

The next topic is renewable energy technologies and sustainable development. These include solar, wind and battery technologies, which are important for solving the problem of climate change and reducing dependence on fossil fuels. In the 21st century, this problem is very important for us, because there is not much time left before the end of fossil energy resources.

Also, I want to cover a bit of progress in genetic engineering (e.g. CRISPR and new genome editing techniques) molecular scissors can enable scientists to replace a damaged disease-causing gene with the correct copy, potentially transforming a cell into a healthy one. Currently, there are many tests in the world on the effectiveness of CRISPR/Cas9 for the treatment of blood diseases, skin diseases, muscular dystrophy, etc. Also, bioprinting of organs, artificial skin and improved prostheses can open new horizons in transplantology and disease treatment. In my opinion, the development of personalized medicine will also make it possible to select treatment based on the patient's genetic profile.

Another point that I feel is important to be raised is the space development, thus, I'd like to make an overview of commercial space flights, well-known companies such as SpaceX, Blue Origin, Virgin Galactic and others. In recent years more frequent flights into space and the transportation of satellites for research into new horizons have become more common. This, in turn, can accelerate space exploration by making trips to the orbit and the Moon regularly. Also, the development of projects for the study of Mars and the deeper regions of the Solar System bring humanity closer to life outside the Earth.

The development of artificial intelligence and autonomous systems is both beneficial but, at the same time, problem-causing in terms of privacy, security and responsibility. For example, autonomous decision-making algorithms can raise significant concerns about possible bias and discrimination. What's more, modern technologies that use huge amounts of data have risks for privacy. Every day we leave our digital footprints on social networks, apps, payment systems etc. Very often, the development of technology is associated with significant environmental challenges. For example, the production of electronics and new technologies such as quantum computers, which can be resource-intensive and produce toxic waste. The development of technologies such as blockchain leads to increased energy consumption, which harms the environment. The development of policies, ethical standards and legal restrictions is an important condition for ensuring the safe and responsible introduction of new technologies into society.

It can be concluded that technological breakthroughs are constantly changing society, creating new challenges and opportunities for human exploration. If we look to the future, new technologies give hope for development and progress in various fields - energy, health care, intelligence and space exploration. Despite the fact that the future of technological innovation has great prospects, it also requires careful consideration of ethical and moral considerations to ensure a sustainable, just and responsible development of society.

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