

Ontology of Technology

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Abstract

This article provides a scientific and philosophical analysis of the essence of technology and its social significance. It examines the scientific interaction of technology with such social spheres as labor, activity, science, and culture. From a scientific and philosophical standpoint, the role and significance of theoretical knowledge in production processes are explored, along with the concept of the human factor.

Keywords: Technology, philosophy of technology, technological development, modern technology, labor, the being of technology, the culture of technology.

"We live in a society that absolutely dependent on science and technology, almost no one knows neither science nor technology"
Carl Sagan

Introduction

Nowadays, technology has entered so deeply into the life of mankind that it is difficult to even imagine another sphere capable of taking its place. The existence of technology, its impact on the activities of man and society, leading to both negative and positive results, is one of the most relevant topics that require scientific comprehension. The study of ontological problems of technology shows its essential necessity.

Technology manifests itself in the following forms: 1) as means of labour with the help of which natural objects are transformed, i.e. as a set of various adaptations, mechanisms and devices of an artificial order that do not exist in nature and are made by man to satisfy socio-cultural needs; 2) as specially developed methods of action, a set of various activities aimed at the manufacture, maintenance and application of technical devices (scientific and technical research, the production process of manufacturing and operation of technical devices); 3) as a set of knowledge about the ways and means of a specific kind of human activity; 4) as an integrating element of culture, i.e. as a specific culturally conditioned process that determines the level of development of civilization.

Technics as a means of labour: When it comes to artificial objects, technics is understood primarily as a system of means aimed at achieving some ends. But technics is neutral in relation to the end and can rely as an economical effort, an intermediary. It serves the economic satisfaction of needs and prevents individual actions as a procedure for the use of these actions. is a new set of methods and aids for mastering nature.

Technology is much older than science, it arose with the emergence of man. Homo sapiens. The ability to store and use fire was acquired by man about 800 thousand years ago. This event seems to have been of great importance. By taming the fire, man has already been able to achieve what no living creature has ever achieved. The first tools (spear, stone axe) began to improve the hand. Creating technology, hand tools, man accumulated nature and his own body. As the non-German philosopher E. Kapp notes, "a curved finger becomes the prototype of a hook, a handful of hands becomes a bowl; In the sword, spear, shovel, rake, plough and shovel, it is not difficult to discern various positions and positions of the hand, hand, fingers, the adaptation of which to fishing and hunting, gardening and the use of field tools is quite obvious." As a result of the use of tools, man increased his strength, dexterity, and speed.

In primitive society, tools, the simplest bellows, lows, and structures were understood in the animistic map of the world. Ancient man thought that in tools (weapons, as well as in archaic works of art - drawings, sculptural images, masks, etc.) there are spirits that help or hinder man. Actions for the manufacture or use of tools presuppose the influence on these spirits (sacrifice, offering or persuasion-conspiracies), otherwise nothing will be obtained or the tool will break away from the power of a person and return against him. The animistic comprehension of technology predetermined the essence and character of all ancient technology. In this sense, in the ancient world, technology coincided with magic, and technology was sacred through and through. But unlike all living creatures that resort to technical devices, human technology has been constantly improved. O. Spengler notes that the technique of animals was the technique of the species (the bee builds its honeycombs in the same way and will build them in this way until it becomes extinct, they belong to the bee in the same way as the shape of the wing and the color of the body). The specific technique of an animal is immutable and impersonal. Human technology, on the other hand, is independent of the life of the human species. It is creatively realized by a person, it is personal and inventive. In man's attempts to create a meaningful world, the aesthetics of tools and means of labor played no less a role than the practical needs of man and served as a significant stimulus for the development of technology. Each building, thanks to its combination of volume, mass, color, ornamental pattern, texture, became a new invention expressing the idea of the relationship between man and the universe. Pyramids, obelisks, towers, arches, domes, spires, colored stained-glass windows are examples of combining physical and material needs with the beauty of the world, expressing the search for deep human meaning in the process of improving the means of labor.

The formation of machine production completes the process of separating mental labor from physical labor. The transition from the use of hand tools to machine technics simultaneously becomes a transition from the production of single, piece goods to their mass production. From that moment on, the relationship between art and technology, which had been preserved throughout the existence of handicrafts, was destroyed. Now impersonal industrial goods are no longer objects of art.

Technology as a type of activity: When we are talking mainly about human activity, then technology is understood as the most effective way to achieve something.

K. Jaspers wrote: "Technology arises when intermediate means are used to achieve the goal. Direct activity, like breathing, moving, and eating, is also called technique. Only in the case when these processes are performed incorrectly, and in order to perform them correctly, predetermined actions are taken, breathing techniques are spoken, etc." Technics teaches you to achieve the greatest result with the least effort, so it requires skills, ability and mastery.

Technical activity is a set of actions that ensure the implementation of scientific, industrial and social tasks, which can be considered at two levels:

- 1) theoretical (as technical creativity);
- 2) practical, which begins with engineering research and design, passes through the stage of construction, and ends with the creation of industrial solutions.

Technical creativity is the theoretical level of technical and engineering activity.

There are two concepts of technical creativity:

- 1) the concept of F. Dessauer, based on the Platonic traditions to consider technical creativity as the realization of pre-established ideas that precede human existence, and a person extracts ideas and places them in the sphere of sensory perception (the creator endows a person with the ability to creative activity and creates conditions for the embodiment of divine ideas in the empirical world of things);
- 2) the concept of M. Heidegger, where technical creativity is considered as a process of transferring things from one state to another, namely to a tool state, while translation is conditioned by the very essence of nature, which, as it were, leads the creativity of an engineer to new technological objects and solutions, i.e. technical creativity is interpreted as a way of revealing the ontological determination of things and testing the humanistic beliefs of the individual.

Technical creativity is the process of creating a new technical and technological object, which includes a system of interrelated stages:

- 1) formulation of a specific technical and technological idea (problem) and identification of the direction of its solution (the proposed idea is implemented if there are objective scientific and technical possibilities for its solution and if appropriate resources are allocated - material, financial, organizational, etc.);
- 2) the idea acquires more distinct technical and technological forms of expression, i.e. an effective model of the corresponding object or progress is created.

Technical creativity is realized in two forms: invention and discovery (they will be considered in more detail in the section "Engineering creativity").

There is no watershed between the uplifts of invention and discovery, so the discovery of X-rays required the invention of appropriate technical equipment (X-ray machine). Historically, the relationship between discovery and invention also changes. If at the first stages of the development of scientific and technical knowledge (when its theoretical level was not high enough), the cognitive process began with empirical search in the form of discovery and invention, then from the 20th century the theoretical level of discovery began to prevail. If initially the increment of technical knowledge was associated with the experimenter, today the process of technical knowledge is associated with the theoretical research of the scientist.

The practical level of technical and engineering activity is carried out in two forms: as engineering research and design and as construction (they will be considered in more detail in the section "Engineering creativity").

Technology as a system of knowledge: When we are talking mainly about knowledge, then technology is understood, first of all, as a set of techniques, rules and operations leading to the achievement of some result. Technical knowledge is a generalization of practical human activity. In the narrow sense of the word, technical knowledge is understood as applied sciences - sciences aimed at achieving any practical result. "technology", which is understood as activities and knowledge related to the maintenance, application or manufacture of technical devices.

Today, the field of technology includes not only the use, but also the production of scientific and technical knowledge itself. In addition, the process of applying scientific knowledge in engineering practice is not as simple as it was often thought, and is associated not only with the application of existing knowledge, but also with the acquisition of new knowledge. A. Ridler writes that it does not consist in the simple application of sciences to special goals. Before making such an application, it is necessary to take into account the conditions of this case. The difficulty of application lies in the correct finding of the actual conditions of a given case. The conditionally accepted state of affairs and the neglect of certain given conditions deceive about the real reality. Only application leads to complete understanding; it constitutes the highest stage of knowledge, and general scientific knowledge is only a preliminary to it. Knowledge is the daughter of application. To apply, you need the ability to research and ingenuity.

Today, technoknowledge is a complex system that includes:

- 1) knowledge that forms a general idea of technical and technological systems of various levels and purposes (for example, the sciences of the energy cycle include both general theoretical innovations in power engineering and heat engineering, electrical engineering, etc.) and develop methods and means of designing, constructing and materializing (materializing) the corresponding technical and technological processes and phenomena;
- 2) knowledge that concretizes the corresponding laws of natural science in relation to technical systems and has a certain technological significance (for example, the laws of physics are concretized within the framework of the general theory of machines);
- 3) knowledge that reveals the patterns of development of technical and social systems formed in the process of inclusion of technical objects in the socio-cultural reality (ergonomics, engineering psychology, etc.).

Technical sciences are divided into two levels of theoretical analysis:

- 1) fundamental (theoretical mechanics, technical thermodynamics, etc.), which serve as a theoretical basis for the generalized study of processes in technical objects and systems of a certain type (mechanical, electrical, energy, etc.);
- 2) specific technical sciences (theory of steam machines, theory of acoustics, etc.), which are the theoretical basis for the analysis of processes occurring in local objects and systems, such as steam engines, acoustic systems, etc.

Technology as an element of culture: When we talk about technology as an indicator of the level of development of culture and civilization, we mean that economic epochs differ not in what is

produced, but in how it is produced and by what means of labor. The impact of technology on society is mitigated or intensified depending on the socio-economic conditions of the use of technology. on political and other conditions. At the same time, technology itself stimulates the development of the economy and society as a whole. But the laws of technology development are not reducible to socio-economic laws;

In the IV millennium BC, man invented writing, and from this moment the "visible", traceable part of his history begins.

In the fifth millennium B.C., when human societies were formed, the social pore of doc began to be established. This was facilitated by the development of the language and the division of labor duties. Within the primitive community, groups began to stand out, separately engaged in land, handicrafts, cattle breeding, hunting, and the manufacture of tools; as well as military activities. The transition from the use of personal tools to the organized activity of many also testified to the increased skill in the manufacture and application of technology. O. Spengler notes that "along with the activity of many, a step is taken from organic to organized existence, from life in natural groups to artificial groups, from the pack to the people, estate and state."

With the emergence of the state, the primitive communal system was gradually replaced by the slave-holding system. During this period, handicraft production flourished. Methods of metal processing with the use of metalworking, soldering and welding were improved, the production of gontery products was established, mining and construction were developing. The rise of handicraft production occurred simultaneously with the formation of cities. People begin to erect large building structures. Trade relations and military campaigns lead to improved methods of movement by land and sea. Roads and bridges appeared, along which loaded carts moved, navigation expanded.

For the most part, however, technical inventions were not aimed at improving working conditions. And the hardest, routine work was done by slaves. The physical strength of people and animals was almost the only source of all technical transformations. For centuries, inefficient slave labor did not contribute to progress in technology - people, as in the primitive communal system, mainly used the simplest hand tools. (The mechanical machines of Archimedes and Heron of Alexandria can be considered a rare exception in this regard; moreover, according to Plutarch, they were born as "amusements of scientific muzhes.")

At the same time, the period of the slaveholding system was able to demonstrate examples of the most perfect technical creations, which include, in particular, the pirami of Da Cheops. "Even if we do not make allowances for the primitiveness of the tools available in the 3rd millennium BC, no modern structure surpasses it either in technical virtuosity or in the boldness of the idea. Meanwhile, the great plan was carried out by a culture that had just moved beyond the Stone Age and continued to use stone tools for a long time, although copper was also used for chisels and saws, which served to work massive stone slabs for new monuments. All operations were carried out manually."

Such creations of engineering art were the result of complex work with a high level of collective organization. According to L. Mumford, an American sociologist and historian of technology, the controlled collective actions of people in the period of the slaveholding system were nothing more than prototypes of machines, real examples of which appeared only in the fourteenth century (mechanical clocks, windmills, and watermills). They were, so to speak, real machines, the parts

of which consisted of human bones, sinews, and muscles, performing strictly limited mechanical tasks. When put into operation, these large and complex machines were capable of performing work at a level that could not have been dreamed of before.

Of course, the existence of machines made up of living people also indicates the immensely increased power of the rulers, which was supported by a mythological worldview and an extremely cruel system of punishments...

Under the conditions of the capitalist system, the "spirit of invention" undoubtedly blossoms. And not only because technical creativity began to be "nourished" by scientific discoveries. The fact is that not at all times, not in all eras, inventions found support in society, even if they were obviously useful. Social bans on inventions were often put forward in society. For example, a medieval craftsman who joined a guild organization adopted a general charter, the purpose of which was to ensure equal working conditions for all. According to this charter, it was forbidden to lower or increase the prices of manufactured goods, advertising was prohibited and any kind of inventions that could increase labor productivity (thereby violating equal conditions for everyone) were prohibited. In other words, technical inventions were considered undesirable here. In the conditions of the capitalist system, on the contrary, human activity is oriented towards inventions, as something that gives him access to financial prosperity.

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