PSYCHOLOGY

1. Introduction

In the 21st century, the influence of technology on the development of the individual and society is universally recognized. Everyone understands that up-to-date technologies determine contemporary social changes, historical transformations, civilizational projects. All kinds of social interaction in our time depend on new technologies (e. g. Digital devices). However, philosophical studies of technology as a social phenomenon or process are very rare. Usually an engineering, design, applied approach prevails in research. The philosophical status of the concept of "technology" is still outside the attention of researchers. In the same time the concept of "technology" is widely used today in various contexts, such as social, educational, cultural technologies and so on. It can be said that the use of this concept has now become universal. But its general, integrated content has not yet been uncovered. Usually, researchers focus on such social aspects of technology as: Information society; computerization; ecological problems; breakthroughs in medicine, business, economics; new educational technologies; global communications and the like.

For example, it can be learned that technology improvements, such as tripartite catalysts and cleaner fuels, have made vehicles less polluting. Or there is information that transformation technology, such as refining, can release harmful pollutants. But thinking about how technology transforms people's social interaction, the organization of their relationships, the individual development of their personal qualities. Authors such as Edward Denison, Simon Kuznets, Solow, Harrod [1], proposed different models of technical progress, but in connection with economic growth and not with social progress. Although technology has an important relationship with human capital.

Despite this modern technologies affect not only our lifestyle but human society generally and historical movement. In terms of acceleration and intensification of social transformations humanity realized that they have to be managed and technological development should be guided by conscious, humanistic, science-based principles. But philosophical notion of "technology" is far from scientific and theoretical explication [2]. V. Rozin and A. Mironov think that this notion can be generalized as the category of social philosophy [3, 4].

From the socio-philosophical point of view, "technology" is not just aggregate technical devices or tools, but is social interaction generator and scientific principle of organization of human practice. Ontological definitions of technology focus on the device in the form of tools, production processes, objective goal-setting activity or technical reality in general (technosphere). Epistemological definitions represent technology either as application of scientific knowledge in human activity in general or in production in particular, or as technical knowl-

GENERALIZATION OF TECHNOLOGY AND SOCIAL INTERACTION IN PRODUCTION

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Abstract: In our opinion, the stages of production development: craft, manufacture, machine production are the historical phases of technology formation and the corresponding division of labor. Social interaction and organization of relations between people in society depend on these factors. The stages of genesis of knowledge and cognition from the pre-scientific level to science, from spontaneous empirical to the conscious theoretical knowledge and its practical application also correspond to the stages of production development. This study reveals the technology as a universal principle of human activity that unites production and science, practice and theory. Technology connects with each other not only the goal, means and result of activity into single process, but also unites people in certain social groups, communities, collectives. And because of that, the achieved result is an implemented goal. If a person itself, personality and society become a goal of technological progress, then technology serves social self-development.

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edge, knowledge of technology in its various forms. In this case, the authors do not distinguish between the concepts of technique and technology [5]. There is also a management aspect, according to which technology is a purposeful application of technical knowledge to solve practical problems in various spheres of social production and any other sphere of society. Over the past decades, authors often turn to ethical issues when considering the implications of technology; some problems of morality and responsibility in various fields of application of technology [6].

An investigation of technology in the context of human development [7], culture [8], technical and social creativity in the history of society [9] makes possible to deduce universal notion of «technology». This general idea is intended to provide an intellectual prerequisite to regulate technological progress in circumstances of total technology conditionality. Sociological exploration of technological activity is not enough general [10]. When the technical component of activities becomes the subject of social management then technology in addition to objective determination also gets subjective determination in sociocultural context [11, 12]. Researches of technology from the point of view of humaneness are also close to this direction [13]. Philosophical reflection and the integration of all these aspects is a theoretical prerequisite for the transformation of technology into scientifically organized, consistently and consciously perpetrated process.

The history of technology is not confined to specific branches applied sciences and technical resources [14, 15] and involves the history of all material and ideal areas of humanity activity in the history of society [16]. Philosophy in 20th century was for the first time faced with a world in which science was becoming more and more subject to the field of instrumentality and technical expansion with its ends determined by the imperatives of economic struggle or war. And epistemic status of science was changed accordingly. The power that emerged from this new relation was unleashed in the course of the two world wars [17].

The purpose of this study is a philosophical explanation of the dependence of the social process of organizing human interaction and relations on technology in the joint activities of people in general, and in particular in productive activities. For this, such tasks were solved: to identify the specifics the various forms of human interaction with the technical means that underlie handicraft, manufactory, industrial production; to reveal the dependence of the development of technology on the change of these forms; to trace the transformation of the human component of technology and the trend of its change; to consider the generalization of technical means and work force with the passage of time; to trace its interdependence in technology.

2. Methods

Methodology of this work consists of such theoretical approaches as philosophical theory of development, historicism in unity with logical techniques to discover technogenesis, generalization and comparative method. The material for research was the historical sequence of production development: crafts, production, machine production; changing the connection of a person and the means of its activity, people and technical objects.

Unlike science, technology has been overlooked in the philosophical cognition as an important area of reflection and systematic study. When technology becomes a subject of social philosophy, then a narrowly specialized, instrumental, pragmatically-utilitarian consideration of technology from the point of view of production, a benefit or a harm, means for creating conditions of human existence can be overcome. Therefore, the author turned to the theory and methods of social philosophy for generalization of the history of technology formation as form of objectification of social interactions, subjective reality and creative powers of a man. This interpretation of technology helps to find objective ways to human self-development without social crises and technogenic catastrophes.

3. Results

Division of labor in a general sense is a breakdown of the process of production into its special phases and a decomposition of human activity into its various partial operations, each of which is complex or simple. Each stage of production development (craft, manufactory, large-scale industry or machine production) is associated with certain division of labor. Thus, there is a technical system in every single branch of production, but it is one thing – on the basis of craft and manufactory, and another thing – on the basis of large-scale industry. For example, in conditions where the basis of production is a craft based on the use of hand tools, product manufacturing is individualized. An implementation of individual operations depends directly on the characteristics of each individual master such as his/her strength, agility, speed and confidence, his/her skills to handle his tools. The technical basis of such production is restrictive in a sense that it presupposes some tricks, mysteries, secrets of craftsmanship. Scientific-theoretical knowledge here has no significance and does not determine the methods of manufacturing a craft product. Acquired individual practical experience, magical actions, recipes and so on play a major role in the craft. Stand-alone types of such production remain a mystery even for those who are professionally devoted to each field and own an empirical technique of craft. A machine is a way to organize labor of a worker in a special way, to cooperate it in a certain way into a single social productive force. Factory production is based on the fact that separate operations are functions of an individual worker. The transition from craft to machine-based industry takes place through a manufactory that is distinguished by the specific connection of a worker with the means of production.

Manufactory as a form of production and the stage of the whole historical development preceded by large-scale industry based on machines is characterized by the division of labor on the basis of handicraft techniques. In most developed form manufactory is an industrial system of connections between people, the structure of interaction between different groups of people. This form does not achieve a genuine technical unity on its own basis as its organization is not based on the principle of operation of machines. In the context of manufactory machine stands next to or side by side with the division of labor, as it does not determine it. Manufactory only sporadically, from time to time consciously uses machines. Each separate specific process which takes place during product processing at manufacture must be carried out as a partial handicraft work. Handicraft art remains the basis of the process of manufactory production and each worker should adapt him\herself exclusively to carry out one partial function. Tricks of technical art are not founded by science, they are achieved only in empirical way and experience and are based on the virtuosity of a certain worker. The actual technical unity that presupposes the principles of technology is achieved only when the manufactory is transformed into machine production.

Technical unity, that is necessary for application of machine by the aggregate/collective worker, is about dividing of production process into essential phases, connected in series. Each of them stands in correspondence with basic forms of motion and according to objective laws of their transformations. That's why the use of machines in production goes hand in hand with the formation of sciences and knowledge about gradual transitions various spheres of reality, with the discovery of objective laws of those processes of motion that take place in them, as well as with the formulation of scientific ideas and theories that open and formulate these laws, on the basis of which human practice is built. The application of these discoveries and laws to achieve human goals, to improve production activities is one of the driving forces behind the industrial revolution and the transition to machine production. These changes in the methods of production cause changes of the way people interact in the process of cooperative activity, share tasks and build their relations. The objective sequence of stages and the order of usage of machines in industrial production require an appropriate co-operative work and completely determine it in all its manifestations. In view of this, the co-operative character of the labor-process becomes a technical necessity here. Therefore production can function only under control of an immediately associated (socialized) labor, or cooperative labor when the machine becomes a basis of production process. Thus, there is a technical system in every single branch of production, but it is one thing – on the basis of craft and manufactory, and another thing – on the basis of large-scale industry.

When the machine as the basis of the production process is the material form of the existence of the means of labor then that causes the replacement of human forces by the forces of nature. And empirical routine methods processing of the subject of labor are replaced by conscious application of the results and achievements of the natural sciences in production. At the same time, the technical basis of combined labor processes determines the social productivity of labor. The principle of machine production is to decompose the production process into its phases, and then solve the selected problems, applying the means of mechanics, physics, chemistry, all natural sciences. This necessarily becomes a decisive principle of technology wherever the machine becomes the basis of the production process.

In the form of manufactory a division of social labor process is a combination of partial workers. But during the process of machine production development manufactory division of labor has come to an end. With the development of the technical basis of production (for example, in the factory industry), the muscle force is replaced by machines. In machine production, the division of labor is based on the application of combined labor, for example, untrained workers of all ages and genders. A solid, crystallized out structure of manufacture that came from old division of labor dissolve and open the way for continuous techno-technological changes. These changes are no longer

spontaneous, accidental finds, but are increasingly dependent on more developed scientific knowledge, education, engineering, innovations. Therefore, they are essentially limitless in their perspective. That is, they are deliberate and require management, organization and provision by the society.

It should be emphasized that during the transition from manufactory to machine-based industry, a radical revolution takes place not only in the technical basis, but also in the method of labor division. Qualitative changes occur in the structure of work force. Aggregate worker, or combined working personnel forms a single force that is able to flexibly differentiate itself for various functions which become partial operations and complement one another in the production process of the same product. Labor cooperation assumes its integration and combination of separate and specific functions.

The development of machine production opens the veil of secrecy, which concealed from people their own social production process, and formed the sectorial principle of its organization. Scientific achievements can be used in the industrial scale. The industrial application of machines leads to commercial large-scale science. This gives to production such technical unity and interconnection of industries that are very important for the formation of technology as a science.

4. Discussion

A. Mironov and V. Rozin have concluded that general notion "technology" needs to be generalized to the level of the category of social philosophy [3; 4]. We agree with them in this. To achieve such a generalization, they reveal the connection of this notion with such concepts as "science" and "technics". They interpret technics as an artifact and an engineering product; a conversion tool, a technique and a means of activity; special reality; the way of natural forces using. As a result, they understand technology in a narrow sense as:

1) production processes with using of technical means, scientific achievements and methods;

2) a way of organization of technical activities;

3) a way of transforming the natural, social, spiritual reality by a man.

Going further they rightly believe that not only science and technique determine technology, but also a type of civilization and a social order. The level of cooperation and labor culture, the quantity and quality of the workforce, sociocultural sphere and relevant institutions are inextricably linked with technology. In their interpretation, this relationship is the mutual influence of two systems, such as the social system and the technological system. That is, technology affects society and, in turn, is influenced by society. However, their interpretation of this connection is different from our conclusions. From our point of view, the technological process unites people, ways and means of their activity into one system of connections. In this sense, any technology is a social process. This conclusion distinguishes our interpretation of technology from the Gorokhov's results that technical activities depend on engineering and technical sciences [14]; the Snitko's results that the phenomenon of technology is based on the metaphysical structures of being and the human mind [5]; the Bagdasaryan's, Vladlenova's conclusions that technosphere includes both technology and the entire system of actions and decisions in the culture of the technogenic

civilization [11]. The concept of «techno-sphere», «techno-reality» expresses two representations: 1) technology is autonomous and its development is independent of human control, because it develops in accordance with its own logic; 2) the development of technology is determined by the general socio-cultural context. The conclusions of these authors are due to the fact that they view sociality as an external condition for technology. Ethical evaluation of technical sciences and technology, criticism of its consequences from the point of view of humanism [12], moral responsibility [6] and security [17] is also based on this position.

When we explore the craft, manufactory and machinic production in the successive transformation of one into another in the history of society then these forms of objective activity can be treated as historical ways of people interaction, namely, as a means of organizing their relations in the process of creating social conditions of life. The interaction of people is a mediated by technical means. That is material conditions for improvement of both factors and the advent of new technology. These ways of people's cooperative activity have historically replaced each other along with the development of social forms and the progress of cognition and knowledge to the scientific level, to formation of scientific theories and methods, to discovery of objective laws of motion in its basic forms and their transformation into each other. This enables us to associate with them a separation of the stages of technology development. In our opinion, the study of dependence of social organization, modes of interaction and social people relations on the means of their activity, including scientific knowledge, discoveries and inventions, makes possible to understand technology as a universal principle. In this sense it is a concentrated result, a conclusion and a summary of the development and achievements of the entire material and spiritual culture of the history of mankind. And this integrated result is intended to be a social precondition of regulation of technological progress for self-development of humanity.

A scientifically grounded division of a production process into series of activity stages that lead to the achievement of a pre-set goal, to the implementation of this goal in the result obtained by the most suitable means depend on a reached technology. The technology specifies the appropriate way of interaction and such organization of relations between people that ensures success in the process of realizing a common goal. Elements of technology are not only tools, devices and means of production, but also knowledge of how to apply them, sciences and methods of introducing their theories into practice, and of course people in a certain way organized for joint activities in a certain historical form of social division of labor.

The question of technology goes beyond the technical phenomenon and turns into a problem of socio-cultural, civilization, anthropological, historical levels. Therefore, the limitation of purely instrumental (pragmatic) interpretation of technology must be overcome. That is why the adequate solution of the problems of technology and technology related to the question of the knowledge of the reality of man and nature becomes possible through the return to the scientific discourse of philosophy. If an engineer ignores the social foundations of technical artifacts and their relationship to being in general, then he/she is not able to think about the consequences of the use of technology. Further discussion on this topic is impossible without polemic over these points.

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