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Nature of knowledge society

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Abstract
This paper examines the nature of the knowledge society. The history of the formation of this society is described. A comparative analysis of the theory of the knowledge society with a number of theories has been carried out. The influence of the new society on the economy has been studied, it has been proved that intellectual technologies are becoming the main tool for managing organizations and enterprises. Information and knowledge are the decisive variables of the new society. The production of knowledge becomes an independent sphere of social production, a prerequisite and foundation for the transformation processes taking place in society. A fundamentally new role of science as a factor affecting all spheres of the human life world is considered.

Keywords: Knowledge society, knowledge strategies, intelligence, science, technology;

1 Introduction

In the 30s of the twentieth century in the United States the paradigm of analysis of the information society is formed. In 1962, R. Machlup conceptualized it in his monograph "The Production and Use of Knowledge in the United States." By this time, fierce debates can also be attributed, based on numerous social transformation projects focused on the phenomenon of information and communication technologies, on knowledge, which fully manifested its role and importance as a factor of social development. A new sphere is emerging - "knowledge economy". This is convincing, as a large-scale social shift, J. Neisbit writes in his study "Megatrends": the number assigned to the category of "white collar workers" surpassed the number of industrial workers. Even earlier, P. Drucker uses the term "knowledge worker", referring to those who work with knowledge (cognitive workers). An even earlier the appeal of R. Lane is referred to the conceptual construct "knowledge society": R. Lane used the term "knowledge society" to distinguish the concepts of technology and expertocracy and noted the transformation of the status role and potential of knowledge in management and politics. D.V. Efremenko sees the reason for such attention [3, p. 50], in the increased and uncovered the incompatibility of the unprecedented progress of computer technology, information and communication technologies, computer communication networks, means of information transfer, and at the same time a rather slow pace of modernization of legal, political and social institutions, as J. Gurvich and H. Barnes reported. The construct "technostructure" reflects the rationale for the new status role and knowledge potential in the sphere of politics and management; it became necessary to interpret the potential of technical specialists and experts in the formation of new strategies for managing society. J.K. Galbraith in his work "New Industrial Society" described precisely the interaction of highly qualified specialists within the technical structure as the most important prerequisite for effective management. H. Shelsky reinterpreted the notion of "technostructure", the author is known for "thesis on technocracy". In his work "Man in Scientific Civilization", H. Shelsky describes the patterns of the new "scientific civilization": technology and science acquire the status of a legitimizing condition of domination, and the patterns created by man in the process of labor and scientific knowledge are shaped. H. Shelsky introduced the concept of "technical state", in the framework of this concept a high level of science and technology maximally narrows the range of political decisions [8]. Finally, D. Bell in his work "The Future Post-Industrial Society". "The experience of social forecasting" proposed the concept of a society, called post-industrial. In this paper, the author assigns science and knowledge to the dominant value of society, describes the role of scientific

knowledge in planning and decision-making, and analyzes the process of bureaucratization of intellectual activity.

D.V. Efremenko notes the existing theories of the information society, the post-industrial society and the knowledge society which are a number of theories. They are based on the idea that it is the new role of information and knowledge that is the cause of the projects for the transformation of society that have taken shape in the last half century [3].

2. Analysis of the nature of knowledge society

The theory of the knowledge society has a special status in the range of the listed theories. F. Webster, in his monograph "The Theory of the Information Society," cites the different facets of the process of disseminating information and communication technologies, knowledge, and information in society; A.I. Rakitov believes that the version of the knowledge society is an enhanced version of the information society. Scientists introduce the concept of the "regulatory world" as a world of rules, based on human behavior. The author interprets the technology as a polystructural system, which includes the following structural components:

- technology, " artifacts, specially created for the production, transformation and movement of material objects and the provision of services;
- natural, anthropogenic, human, financial and other resources necessary for the creation of material phenomena and the provision of services;
- goal-oriented activities carried out with the help of technology and the above resources (the author calls this activity technological);
- management of this activity;
- information and knowledge, skills and rules necessary for the implementation and management of technological activities;
- institutional and organizational forms that ensure the implementation of technological activities;
- the interaction of the components of technological activity and its products with the natural and social environment" [7, p. 86].

The knowledge is the main basis of any society and the technologies which are formed on its base. Scientific knowledge and the high technologies formed by their use become the basic basis in the conditions of that civilization that arises at the turn of the XX – XXI centuries. Science is becoming a priority for the development of society, since the process of creating scientific knowledge with its subsequent objectification in technology is dominant among the challenges facing society. Knowledge gains the status of an "information commodity" (J.F. Liotard), becoming the most significant stake in the struggle for the power. It is interesting that the ratio of science and technology is what the typology of societies is defined today. A.I. Rakitov sees this typology as follows:

- "Societies producing all the necessary for life and development of scientific knowledge, high technology, high-tech artifacts and services and living mainly at their expense;
- Societies creating high technologies on the basis of imported and generated by themselves scientific knowledge, as well as relevant artifacts and services;
- Societies living at the expense of imported modern technologies and the exploitation of their natural resources; "Societies importing machinery and living through the exploitation of natural resources" [7, p. 91].

Let us compare such conceptual constructs as the post-industrial society, the information society, and finally, the knowledge society. Among the essential characteristics of the post-industrial society, analysts refer to the departure from the era of the machine industry to the society of intellectual technologies. Harvard sociologist D. Bell represents the scientist-technocratic direction of philosophy, in the study "The coming post-industrial society". "The experience of social forecasting" (1975) calls labor and capital the dominants underlying in the development of industrial society, and the source of development which is dominating in this society— that is the contradiction of labor and capital. As for technology, these are instrumental ways of rational action. There are symbols of occurring technological revolutions. In the post-industrial context, a computer is such a symbol. In the interpretation of the post-industrial society, D. Bell is focused on the "axial principle", this is the core line, which allows interpreting the social, economic, cultural and political outline of any type of society. The axial principle may be the form of ownership, - in this case it is a question of change of forms of ownership, on the difference of formations. If we turn to the potential of such an axial principle as knowledge, the historical process will be represented by such stages as the pre-industrial, industrial, post-industrial society. The new social

structure of the post-industrial society, according to D. Bell, is connected with the current revolution in the organization and processing of information and knowledge, where the computer plays a central role: “The three aspects of the post-industrial society are especially important for understanding of the telecommunication revolution:

1) the transition from industrial to service society;

2) the decisive importance of codified theoretical knowledge for technological innovation;

3) the transformation of the new “intellectual technology” into a key tool for systems analysis and decision-making theory”[6, p. 345].

D. Bell shows the indicators of the transition from the industrial to the service sector. In the United States (1970), 65% of the workforce was employed in the service sector, about 30% in industry and construction, and less than 5% in agriculture. D. Bell calls as the axial principle of the post-industrial society the enormous social significance of theoretical knowledge and its new role as the guiding force of social change; society has always developed on the basis of knowledge, but only in the second half of the twentieth century science and engineering were merged, which led to the transformation of the essence of technology. D. Bell declares the invention in the XIX century as an empirical process of trial and error (the invention of A. Bell’s telephone, the development of a blast furnace process for the improvement of gun casting by G. Bessemer, the invention of an electric lamp and phonograph T. Edison); he writes about the specifics of modern technology, which led to modern engineering: “The essence of the developed technology is in its organically close relationship with science; here the researcher is interested not so much in the final product of his work, as in understanding of the various properties of materials and the basic principles of their combinations, combinations and substitutions. As an outstanding metallurgist S. Smith noted, in our time “materials have been considered in comparison, in terms of their properties, necessary for a particular application. Each new technological development - a radar, a nuclear reactor, a jet engine, a computer, a communications satellite - in its own way destroyed the previous model, in which each given material was rigidly connected with each given type of product. Thus the modern engineering appeared ”[2, p. 331]. The essence of this change, both in technology and in science, is connected with the expansion of the theory's “field of relations” and its scope, as a result of which systematic synergy in the discoveries and developments of new products and theories becomes possible. Science in its foundations is a set of axioms, topologically connected into a unified scheme. But, the new theory changes the system of axioms and establishes new connections at the junctions, which changes the topology. When two sciences merge into one, the new network turns out to be richer and clearer than the simple sum of two parts. As modern science, like almost all other types of human activity, moves along the path of increasing specialization in order to detail its concepts, the most important result of its connections with technology is the integration of various fields or observations into a single theoretical system, having an increasing productivity [2, p. 331]. D. Bell calls technology an instrumental way of rational action, and calls these new developments "intellectual technology": they allow you to put in place the algorithms of intuitive judgments, decision-making rules. Algorithms are materialized in an automatic machine, expressed in a computer program or in a set of instructions based on statistical or mathematical formula, which is a way to formalize judgments and their standard application. Intellectual technologies are becoming the main tool for managing organizations and enterprises; they acquire in post-industrial society the value similar to the value of machine technology in industrial society. Knowledge is involved in the practical processing of resources. Knowledge, but not labor, acts as a source of value.

Economists explained production and exchange using “land, capital, and labor” as variables, complementing this triad with “business initiative” and “enterprise”, emphasizing combinations of capital and labor in the context of the labor theory of value, but the role of knowledge or organizational innovation and management is, in fact, ignored: “However, with the reduction of working time and the decreasing role of the production worker, it becomes clear that knowledge and methods of their practical application replace labor as a source of surplus value. In this sense, both labor and capital were central variables in an industrial society, so information and knowledge become crucial variables of a post-industrial society [2, p. 332]. D. Bell, describing the United States as the country in which the three-stage transition occurred from an agrarian society, also notes the main type of economic activity of such a society: the production and dissemination of information. It is the information factor that is the focus of a post-industrial society. The analyst writes about the tectonic shift in the economy, when production of services replaces the production of goods; at the same time, knowledge acquires the status of the driving force of innovation processes, while the future is entirely predetermined by technologies as instrumental means of rational action and determinants of the evolution of society. And since knowledge acquires the status of a source of wealth and power, intellectual technologies dominate management. The role of the

“axial principle” of post-industrial society is assumed by theoretical knowledge; it is a resource of a strategic level and an agent of changes taking place in society.

A telecommunication system in a post-industrial society is a powerful factor in the organization and processing of emerging arrays of information and theoretical knowledge; theoretical knowledge acquired the codified form is applied in technological innovations, intelligent technologies are turned into an important factor and tool system analysis, as well as an important factor in decision making.

In the first years of the last decade of the twentieth century, the discourse of research on the problems of social transformations and the role of knowledge in these transformations changed. The beginning of the research was laid by such works as “Labor of the Nations” by R. Reich (1991), “Post-Capitalist Society” by P. Drucker (1993), “Knowledge, Labor, Property” by N. Shter (1994). Analysts called the society that emerged from the depths of the postindustrial and informational societies in different ways - such options as the “post-oil society” (R. Barnet), “post-bourgeois society” (J. Lichtheim), the society “post-capitalist” (R. Dahrendorf), “postmodern” (A. Etzioni), “post-civilizational” (K. Boulding), “post-historical” (R. Seidenberg), “post-economic” (G. Kahn), S. Alstrom called this society as “post-Protestant". The listed analysts paid attention to the widest range of different perspectives, which were based, in essence, on the transformation of formalized knowledge into intangible capital, as A. Gorts noted in the article “Knowledge, cost and capital. To criticism of the knowledge economy”. The term “cognitive capitalism ”(a phenomenon which is opposite to industrial capitalism) is formed, as applied to the sphere of cognitive capitalism, the source of profit is expenses for knowledge investments: “Cognitive capitalism should be understood as a knowledge society, managed and organized according to capitalist principles. In addition, cognitive capitalism should be understood as a kind of capitalism in which knowledge is the main source of value, from which its opposition to industrial capitalism follows” [6, p. 66]. The B. Polret’s thesis can be complemented by the idea of A. Gorts, who predicted the knowledge to the role of the grave-digger of capitalism: “Due to its internal contradictions and inconsistency, knowledge capitalism seems to be extremely unstable, vulnerable, fraught with cultural conflicts and social antagonism in the form of social structure. But precisely this instability gives it the opportunity to develop in opposite directions. Knowledge capitalism is not a crisis-prone capitalism, it is the crisis of capitalism itself, a tremendous society to the depths” [4, p. 46].

The doctrine of the knowledge society that is being formed today, does not have a unified model of the knowledge society yet, while the very multiplicity of ideas about this type of society is reflected in the UNESCO report “To societies of knowledge”- here this multiplicity is reflected in such terms as “knowledge society”, “worlds of knowledge”. It is an interesting remark by D.V. Efremenko on the specifics of the report. “It is obvious,” the author believes, “that the content and tasks of this organization (UNESCO) did not allow indicating it in its official document, a transition to a global knowledge society as a plausible and desirable prospect, in which the cultural and ethnic uniqueness will remain subordinated position relative to universal scientific knowledge. Moreover, this situation is considered in the report as extremely undesirable. In fact, the argument that there is no single, initially defined model of the knowledge society does not mean that far-reaching homogenization will not result from transformations in this direction. Conceptual harmony is clearly sacrificed here for political correctness. The authors of the UNESCO report, deliberately “balancing” scientific and technical knowledge with the knowledge of the autochthonous, or “native,” thanks to which there are grounds for speculations about knowledge societies, partly level the fundamental message of the coming global transformation. The multiplicity of knowledge societies can mean one of two things: either scientific knowledge and information only shade the cultural continuum and linguistic heterogeneity, or radical change nevertheless occurs, and cultural and linguistic differences cannot hide the fact that humanity acquires a common destiny in a global knowledge society, no matter how this prospect frightened many of its representatives” [3, p. 59]. The author notes that today humanity is witnessing an unprecedented breakthrough in technology. The specificity of this breakthrough is the fundamental dehierarchization, individualization and convergence of ICT (this idea belongs to M. Castells).

D. Bell, revealing the nature of the post-industrial society, called knowledge and information the strategic resources of this society, noting that in the new role both knowledge and information are turning points in history — the latter was manifested in two points. Primary, first of all, the nature of science has changed: “universal knowledge” has become a productive force, and besides, as D. Bell believes, the second turning point is significant - “the release of technology from its “imperative” character, its almost complete transformation into an obedient tool. Modern technology opens up many alternative ways to achieve unique and at the same time diverse results, with an enormous increase in the production of material goods. These are prospects, the only question is how to implement them ”[2, p. 86].

We noted above that in a knowledge society, the production of knowledge becomes an independent sphere of social production, a prerequisite and basis for the transformation processes taking place in society. The symbiosis of science and its technical applications is reflected in such a phenomenon as "techno-science", which was a manifestation of the changed mechanism of using both scientific and technical knowledge. If we talk about the functional restructuring of science at the turn of the XX – XXI centuries, then it is possible to assert that the technological function becomes the main function of science of this period. Today, such as, for example, the position of a number of researchers (B.G Yudin, V. Shefer, B. Barnes, J. Ottois), - the explanatory potential of science recedes into the background - the ability to change is required from science. We would say a little differently: the technological function of science today is coming to priority positions, existing in parallel with such a function of science as explanation. Techno-science, on the other hand, acquires a hybrid form, being the unity of scientific technology and technologized science - techno-science, in essence, forms the reality under investigation. In this case, as B.G. Yudin noted, a technological process application of science is associated with a certain specificity, which is largely determined by the following factor: research is the knowledge of the natural world, but also the transformation of this world, the creation of an artificial world, research – "... the prototype of the technological method of not only development, but even the outlook of the world" [9 , p 46]. The author introduced the term in order to designate the connection of science and technology, which today has acquired a fundamentally different form. This term is "wrapping." In the relation "produced knowledge - practical application of this knowledge" a new block is included. According to B.G. Yudin, [9, p. 49], the activity itself is built into the process of creating and improving technologies, technologies are created when an order arrives, and these are technologies with a predetermined list of characteristics. The process of knowledge consumption in the knowledge society forms a definite outline of the knowledge structures that will take shape into new technologies. The science firstly revealed this property in the inventions of Justus von Liebig (the invention of artificial fertilizers and methods for preserving animal protein) - P. Drucker connects the beginning of the industrial revolution with these inventions. Today, many authors write about new versions of technological applications. science as a process, the result of which is "techno".

B.G. Yudin and V.A. Lectorsky write about the fundamentally new role of science as a factor affecting all spheres of the vital world of the human being, communicating dynamism to this influence. V.A. Lectorsky at the same time notes the important fact related to the fact that today new information technologies, as well as BNIC converting technologies (bio, nano, information and cognitive) form a new life world and question traditional values. It was changeable in different cultural contexts, but certain invariants were preserved. Today, in the context of the new role of science and technology, these invariants, according to V.A. Lectorsky, "were hacked" [5, p. 32]. The process in which a knowledge-based society seeks to transcend the natural limitations (this applies to the human psyche, its corporeality) will inevitably face a challenge to man. One of these challenges is the position of "transhumanism" and "immortalism" (by addressing the potential of various kinds of technologies, you can realize the idea of immortality). "If you raise the question of the meaning of human life as humanity," writes V.A. Lectorsky, - transhumanists see it in creating conditions for replacing a person with a "postman" ... This, of course, is a challenge of philosophy ... Already in itself, intervention in the most complex human genetic and nervous structures is extremely dangerous ... Instead of a more physically and mentally healthy creature, you can create a monster. But even if we manage to understand all the genetic and nervous structures and accurately predict the results of exposure to them ... there is no certainty that the emerging "superman" will not completely destroy the culture with its ideas about human capabilities, about permissible and unacceptable, about rights and duties, which makes man a man ... the post-human society will be inhumane" [5, p. 33]. The disappearance of death will destroy the idea of the meaning of life. Let us, however, make one remark, which makes it possible to proceed in the future to the characterization of techno-science as a symbiosis of scientific technology and technologized science. This remark concerns the nature of technology. Once Aristotle said in the "Ethics": "If you want to learn to do something, you must do it." Technology is not born purely speculative. A speculative idea of how to do this is only a starting point in the process of creating technology. Usually, technologies are created for mass production of a product, therefore, - since any inaccuracy results in multiple losses, - all stages of technological actions are worked out. Unique projects are also may be called technologies (such as, for example, programming technology). A single project is strictly hierarchical, divided into subprojects, but this is because in such projects each step of the technological action is repeatedly worked out as a technology and, thus, a complex project is a technology from technologies, meta-technology.

Among the broadest spectrum of philosophical problems, in the philosophical literature of Russia and the West are actively discussed today, there is also the problem of risk, condemned in the context of the problems of knowledge society, it takes a rather specific turn in the context of sociology and knowledge economy. The knowledge society itself is interpreted by many analysts as the current stage of the information society. Such is, for example, the research position of G. Behmann [1]: the information society is interpreted and designated as a knowledge society in the case when the emphasis is on socially determined processes of reproduction and application, distribution of knowledge.

The entry of modern society into the stage of knowledge society brings with it new forms of production of scientific knowledge, organizational forms of science are being transformed - design studies appear, analyzing (such is the position of G. Behmann, V. Gorokhov, N. Shter) the phenomenon of design science. The authors call the project design of science reflexive and problematic (but not substantively) oriented, correlated with social expectations. The range of technologies emerging today entails a train of dangers and risks, and this requires long-term planning and is associated with the transformation of science into an actor of political decisions; social assessment of scientific and technological development is formed as a form (tool) of political consultations. However, a situation is possible in which the social assessment of science, technology and technology enters into the relation of competition with the sphere of policy when making strategic decisions. Today, the need to change the organizational forms of science, as well as giving science the status of an institute of political consulting, participating together with political institutions in developing of strategic decisions, is also due to the fact that the transition from purely academic to socially integrated science has emerged. This is noted in the concept of post-non-classical science; for example, V.S. Stepin writes about the expansion of the sphere of reflection over activity, which takes place within the limits of the post-non-classical type of scientific rationality. This takes into account the range of non-scientific values and objectives, the feature of funds activities, the structure of values and goals. And although it is difficult to make an accurate, most effective forecast, there are examples of the establishment of institutions for the social assessment of scientific and technical projects in world practice; in particular, one of them is given in the monograph by G. Behmann. G. Behmann himself, speaking of science as a platform for political counseling and making political, social and economic decisions, writes that only in this case science can activate social areas in which it delivers explanations and models for structuring reality and alternative solutions, and only in this case, the innovation policy will become the basis for science, technology and socio-economic policy. G. Behmann proposes a procedure for humanitarian examination of technical projects: this is a system analysis and forecasting of such objects as energy, and a social assessment of technology and environmental impact assessment.

Political counseling as a result of ongoing humanitarian examination of projects takes such forms as hearings, questionnaire commissions, and expert advice. The overall goal of the ongoing humanitarian examination is formulated with a focus on such units as early recognition / prevention, systemic impact analysis, participation in the process decision making, decision-making orientation, transparency. In the literature, however, there is also a point of view, the authors of which are careful in determining the possibilities of peer review. So D.V. Efremenko interprets the knowledge society as a society with the potential of internal destabilization. The scale of production of new knowledge is enormous, but the political demand for expert knowledge is declining. “Initially,” D.V. Efremenko writes [2, p. 56], - the knowledge society meant a situation when there is a rapid increase in the social and political role of scientific expertise” [1, p. 56]. However, when considering “the knowledge – risk” opposition, it turns out that the new social role of scientific expertise may be challenged. Of course, risk identification and evaluation performed by the scientific community is becoming a very important political tool. The scientific community identifies risks and informs those affected by the problem about these risks; as a result, a new interest group is being formed that can exert the political pressure. Under conditions of uncertainty, the social role of scientific expertise is, in fact, an effect when scientific observations and analysis affect the processes taking place in the system, since they become one of the types of activity system under study.

3 Conclusion

Science, on the one hand, contributes to the adoption of rational socially significant decisions; on the other hand, with its help we can realize how limited expert knowledge is due to uncertainty. Experts are trying to reduce the impact of uncertainty through modeling, using various methods of risk assessment and analysis, hypothetical constructions. However, conflicts between experts are quite frequent. This

leads to a decline in the authority of science and the devaluation of expert knowledge. Scientific analysis is a way to refute any scientifically based political decisions. Thus, the knowledge society is internally unstable.

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