



BIOTECHNOLOGICAL TRANSFORMATION OF COEVOLUTION IN THE HUMAN-NATURE- TECHNOLOGY SYSTEM AND ITS CONSEQUENCES

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Abstract: *This article analyzes the transformation of coevolutionary development processes into biotechnological evolution and its biotechnogenic consequences from a socio-philosophical and scientific point of view. The study covers new forms of interaction processes between humans, society and nature associated with the development of biotechnology. It also analyzes the impact of genetic engineering, artificial biotechnological systems, bioengineering and digital biotechnologies on the development of society, their positive and negative aspects. The biotechnogenic consequences of environmental, anthropological and ethical problems arising as a result of biotechnological evolution are revealed. The author has developed scientific conclusions and practical recommendations for coordinating biotechnological development based on the principles of humanism and environmental sustainability.*

Keywords: *Coevolution, biotechnological evolution, biotechnogenic consequences, genetic engineering, bioengineering, transhumanism, artificial intelligence, environmental problems, bioethics, technological development, the relationship between man and nature, civilizational development, innovative technologies, global security.*

Introduction.

The development of modern civilization is characterized by a rise to a new level of relations between man, society and nature. The rapid development of scientific and technological progress, especially innovative changes in the field of biotechnology, is radically changing the way of life, worldview and interaction of mankind with nature. In this process, the idea of coevolutionary development has

gained importance, interpreted as the concept of mutual adaptation and joint development of man and the biosphere.

However, in the 21st century, coevolutionary processes are increasingly taking the form of biotechnological evolution, creating artificially controlled forms of natural development. The development of genetic engineering, cloning, bioengineering, neurotechnology and artificial biological systems has increased man's active intervention not only in the external environment, but also in his own biological nature. As a result, global issues such as disruption of the balance between nature and man, environmental threats, bioethical problems and biotechnogenic consequences are emerging.

Today, the study of the social, ethical and environmental impacts of biotechnological evolution is of great importance. Because the development of technologies, along with creating great opportunities for humanity, also creates new dangers and threats. In particular, such phenomena as interference with the human genome, the creation of artificial organisms and the digitization of biological processes are forming a new paradigm of the development of civilization. This article analyzes the processes of transformation of coevolutionary development into biotechnological evolution, its philosophical and social essence and biotechnogenic consequences. Also, special attention is paid to the issues of maintaining balance in the relationship between man and nature, and coordinating biotechnological development on the basis of ecological and humanistic principles.

Methodology

This study used a comprehensive and interdisciplinary approach. The methods of systematic analysis, dialectical approach, comparative analysis, socio-philosophical analysis and content analysis were used in the research process. The theoretical basis of the scientific research was the theory of coevolution, the concept of technogenic civilization, the principles of bioethics and scientific views on the relationship between man and nature.

During the study, the impact of biotechnological development on human life, ecology and social relations was analyzed. In addition, modern scientific views in the field of genetic engineering and bioengineering were studied and their possible biotechnogenic consequences were predicted.

Discussion

The transformation of coevolution into biotechnological evolution is one of the most controversial topics in modern philosophy, biology, and social sciences. Some scientists assess biotechnology as a new stage in human development and consider it an important tool for solving global problems. In their opinion, genetic engineering, bioengineering, and artificial intelligence technologies are expanding the possibilities of improving human health, reducing hereditary diseases, eliminating food shortages, and solving environmental problems.

Another group of researchers emphasizes that the uncontrolled development of biotechnological evolution poses a serious threat to humanity and the biosphere. In particular, there are opinions that unlimited interference with the human genome, the creation of artificial organisms, and the spread of transhumanist ideas can negatively affect human nature and spiritual values. This is explained by the possibility of reducing biological diversity, disrupting natural evolutionary processes, and increasing social inequality.

The research revealed that two approaches have been formed in relation to biotechnological development: technocratic and humanistic. According to technocratic views, technology is the main driving force of human development, and its restriction slows down development. Supporters of the humanistic approach emphasize that biotechnologies should be developed in accordance with human values, ethical principles, and environmental sustainability.

The discussions show that it is incorrect to assess the processes of biotechnological evolution as an absolutely positive or absolutely negative event. Because this process is a complex civilizational phenomenon that simultaneously

embodies both great opportunities and global threats. From this point of view, ensuring a balance between scientific freedom and bioethical control in the development of biotechnologies is of great importance.

It was also identified that it is necessary to strengthen international cooperation in preventing biotechnological consequences, form unified legal mechanisms in the field of biotechnology, and introduce environmental safety standards. This is an important condition for maintaining a coevolutionary balance between humans, society, and nature.

Results and Analysis

In the course of the research, the processes of transformation of coevolution into biotechnological evolution and their biotechnogenic consequences were analyzed from a socio-philosophical and scientific point of view. The analysis shows that modern biotechnologies are forming a new model of relations between man and nature. Biological processes that previously proceeded according to the laws of natural evolution are now turning into technological processes controlled by man.

In particular, biotechnologies integrated with genetic engineering, bioengineering, neurotechnology and artificial intelligence have widely penetrated various spheres of human life. According to the results of the research, these technologies are playing an important role in the diagnosis and treatment of hereditary diseases in the medical field, expanding the functional capabilities of the human body and improving the quality of life. It was also found that the possibilities of ensuring food security through the production of genetically modified products in agriculture have expanded.

However, the analysis showed that there are also negative aspects of biotechnological evolution. In particular, the uncontrolled spread of genetically modified organisms can negatively affect the stability of the ecosystem. Increasing artificial interference in biological processes is leading to a disruption of the coevolutionary balance in nature. As a result, the mechanism of natural development

of the biosphere is changing, and the likelihood of environmental hazards and biotechnogenic problems is increasing.

The study also analyzed bioethical issues related to interference with the human genome. It was found that the practice of artificially modifying human biological characteristics is causing moral and legal disputes in society. In some cases, the use of biotechnologies for commercial purposes may lead to the subordination of human values to economic interests.

The results show that biotechnological evolution is also having a strong impact on social relations. In particular, countries and societies with high technologies are achieving biotechnological superiority, which may lead to an increase in global social inequality. At the same time, the development of transhumanist ideas is shaping new views on the natural essence of man and traditional values.

Conclusion.

Based on the results of the study, the following important conclusions were drawn:

The transformation of coevolutionary development into biotechnological evolution is shaping a new stage in the development of civilization;

Biotechnologies are creating great social and scientific opportunities for humanity;

The uncontrolled development of biotechnological processes can cause environmental and bioethical risks;

Maintaining the balance between man and nature is an important condition for reducing biotechnological consequences;

It is necessary to strengthen international legal control and bioethical norms in the development of biotechnologies.

Thus, the results of the analysis showed that the biotechnological transformation of coevolutionary processes is both an opportunity and a source of danger for human development. This once again confirms the need to manage biotechnological

development based on the principles of humanism, environmental sustainability and bioethics.

This study analyzed the transformation of coevolutionary development into biotechnological evolution and the resulting biotechnological consequences from a scientific and philosophical perspective. The results obtained show that in the development of modern civilization, natural evolutionary processes are increasingly being replaced by biotechnological systems controlled by humans. This situation means that the traditional coevolutionary balance between humans, society and nature is changing to a new form.

During the research, it was found that biotechnological evolution creates great opportunities for improving the quality of human life, solving problems in the fields of medicine, agriculture and ecology. Through genetic engineering, bioengineering, neurotechnology and digital biotechnologies, human biological and social capabilities are expanding. This brings the scientific and technological potential of civilization to a new level.

However, the analysis also showed that if biotechnological evolution develops uncontrolled, it can lead to serious biotechnogenic consequences. In particular, these include disruption of the ecosystem balance, reduction of biological diversity, genetic threats, bioethical problems related to human dignity and increased social inequality. In particular, the issue of artificial interference with the human genome is intensifying moral and legal contradictions in society.

The results of the study also showed the need for a balance between technocratic and humanistic approaches in biotechnological development. If technological progress is not carried out in harmony with human interests, bioethical principles and environmental sustainability, it can increase global threats. Therefore, the role of international legal norms, bioethical control and environmental standards in the development of biotechnology is extremely important.

In conclusion, the transformation of coevolutionary development into biotechnological evolution is a two-sided process for humanity: on the one hand, it creates enormous scientific and practical opportunities, and on the other hand, it poses serious biotechnological threats. Therefore, it is emphasized that the stability of future civilization directly depends on maintaining the balance between man, nature and technology, as well as on managing biotechnological development based on the principles of humanism and environmental responsibility.

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