Impact of Technology on Modern Society - A Philosophical Analysis of the Formation of Technogenic Environment

Kulzhanova, Zhuldizay T.; Kulzhanova, Gulbaram T.; Mukhanbetkaliyev, Yesbol Ye.; Kakimzhanova, Margarita K.; Abdildina, Khorlan S.

Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

Empfohlene Zitierung / Suggested Citation:
Kulzhanova, Z. T., Kulzhanova, G. T., Mukhanbetkaliyev, Y. Y., Kakimzhanova, M. K., & Abdildina, K. S. (2020). Impact of Technology on Modern Society - A Philosophical Analysis of the Formation of Technogenic Environment. *Media Watch*, *11*(3), 537-549. https://doi.org/10.15655/mw/2020/13082020

Article | Open Select

Media Watch | E-ISSN 2249-8818
Vol. 11 | Issue No. III |Page 537-549, 2020
DOI:10.15655/mw/2020/13082020

Impact of Technology on Modern Society— A Philosophical Analysis of the Formation of Technogenic Environment

Zhuldizay T. Kulzhanova[1], **Gulbaram T. Kulzhanova**[2], **Yesbol Ye. Mukhanbetkaliyev**[3], **Margarita K. Kakimzhanova**[4], and **Khorlan S. Abdildina**[5]
[1,3,4,5]S. Seifullin Kazakh Agrotechnical University, Kazakhstan
[2]Sh. Kabylbayev Kostanai Academy, Kazakhstan

Received: 11 June 2020 | Accepted: 10 August 2020 | Published: 13 August 2020

Abstract: The interaction between science and technology is highly relevant in recent times of global crisis accompanied by the revision of the ideological principles of universal culture. Modern technological advances and their broader application in human activities naturally lead to the formation of technical complexes. The growth of these complexes and the emerging technological connections between remote regions determine the interdependence of these formations and put forward the idea of a specific global technogenic environment. This paper is aimed to analyze the concept of technology and the technogenic environment and to show the importance of the philosophical aspects of the latter. This research is especially relevant as it facilitates the development of philosophy and the implementation of general scientific and national programs in the field of social and humanitarian research. Based on the past and current research in this field, a philosophical analysis of the formation of the technogenic environment was conducted, an impact of technological progress on modern society was explored.

Keywords: Technology, society, globalization, digitalization, development, technogenic environment

Introduction

Technology is a specific product that emerges during the interaction between the human spirit and nature, which manifests itself as the relationship between them. In this article, we assert that technology should be defined by considering the multifactorial nature of its phenomenon, and this paper discusses the genesis, evolution, and modern interpretation of the concept of a technogenic environment. Moreover, the insufficiency of ecocentric and anthropocentric approaches to the understanding of forming technogenic ecosystems is revealed, as these approaches are based on the elemental opposition of “nature-society-technology” in the context of a global system. We also describe the systematic link between science and technology that can become the formative basis for the creation and construction of the technogenic environment. We substantiate the necessity of creating and applying a truly universal technology for constructing a holistic technogenic environment and the prospects of building it for the whole planet in the context of globalization (Heidegger, 1993).

The globalization of technology and its integrity for the whole planet are the essential trends driven by the objective laws of technological development. It entails the creation of a single technological chain covering the entire planet and the global information and technical environment, which is based on modern communication systems. The consumption of natural resources, the forms of production activities, and lifestyle has become increasingly determined by this trend. Digital media and social media propelled by technological developments have refined the space and sphere of society (Adorno, 1989; Gjylbegaj & Abdi, 2019; Dash & Dash, 2019).

The globalization of technology results in a qualitatively new level of interconnection and interdependence of human capital to form a single technogenic environment. The challenges to the development of modern civilization include the severity of environmental and demographic problems, escalating regional conflicts, and the lack of cultural ideals (Kumar, Camacho, Searby, Teuben, & Balogh, 2020; Patyukova, Minskaya, Sergienko, & Tarasenko, 2018). To what extent are they connected with the objective laws of scientific and technological progress? More specifically, how are they connected to the orientation of technical systems on the completeness, the discrete and step-by-step maintenance of production and natural equilibrium, and the willingness of science and technology to master the ever deeper structural levels of the material world?

Along with "in-scope" globalization, scientific and technological progress is developing "in-depth," with the mastery of new laws of the material world and the creation of tools for manipulating its deep structures and the human psyche. For instance, advances in biotechnology and genetic engineering aim to overcome food shortages and environmental crises. Still, they also bring about unpredictable and possibly fatal consequences, such as pollution of the biosphere with foreign genetic material. The integrity of the biosphere and its ability to self-regulate is among the most prominent problems faced by increasing scientific and technological progress.

Although the technogenic environment is the subject matter of interdisciplinary research, and various aspects of its impact on humankind are routinely studied in numerous sciences, a generalized philosophical analysis can become the starting point for creating an effective theory that would reveal not only certain aspects or effects but also the essence of technological development. The practical result of this analysis is a justification of global environmental and humanitarian programs that control and correct anthropogenic impacts and ensure the development of humankind, conservation of nature, and human capital.

Systemic scientific knowledge requires a worldview based on scientifically sound assumptions formulated during philosophical analysis. The main tasks of modern philosophy and science are to consider the anthropogenic aspect of the global problems of our time and to analyze their essence in the context of the historical development of humankind.

At the beginning of the 21st century, most philosophical schools assume that modern technogenic civilization is facing a crisis. So, its theoretical analysis becomes more relevant, namely, understanding the processes underlying the formation of the technogenic environment and the laws of its functioning, and determining how it affects human life and the characteristics of the natural environment.

The philosophy of technology acts as the methodology of natural and technical sciences, and its concepts should reflect the real processes of technical development as accurately as possible, which would contribute to their deeper understanding. Creating this or that ideal model for the development of technology and its elements, the philosophy of technology helps to understand the focus of modern technology on the formation of a human- sized technogenic environment. Unfortunately, there have been no comprehensive studies on the integration of

technical means. The relevance of research on the formation of an integrated technogenic environment is determined by the practical significance of its results for the theoretical and methodological understanding and awareness of the acceptable ways of industrial, technological, and innovative development of modern society.

Exploring the interaction between people and the artificial world created by technology, T. Adorno (1989),

R. Bell (1999), N. A. Berdyaev (1989), L. Mumford (1974), M. Heidegger (1993), J. Ellul (1986) and others laid the foundations of the philosophical understanding of not only the technology but also the emerging technogenic environment.

Literature Review

The formation of the technogenic environment and its impact on modern society were explored in a body of recent literature. These studies vary in the fields of application. For example, there is a study conducted by Dergacheva (2014). She investigated the features of the technological transitional period in the biosphere. She also examined the negative aspects of the technogenic environment on biological life on Earth. In her study, she states that technogenic social systems globalizing on the basis of scientific and technical productive forces not only destroy the biosphere in order to satisfy their needs, but also create an artificial world of the technosphere, replace the biosphere with it, regardless of the need to preserve the biosphere as a universal self-developing system of biosphere-biological life on Earth. As a result of the integration of social, technosphere, biosphere components and the strengthening of the role of the technosphere, socio-technological and natural processes are spreading, and with them socio-technological globalization. This understanding of the global technospherization of the biosphere allows for a new interpretation of the processes and problems in the socio-philosophical field of global studies.

Similar research was done by Tyurina (2018), where she inspects the ecological impact of technological progress. Author attempts to substantiate the need to study the emerging ecological and technical picture of the world in the minds of an "eco-conscious person".

However, several studies (Shapovalova & Gozhenko, 2015; Shcherbakova, 2018) state that technology has already become an integral part of our everyday life and focuses on the socio-cultural impact of technology. The articles reveal the main theoretical aspects of the study of the technosphere and current problems of the ‘lifestyle’ phenomenon. The analysis of definitions is carried out, and the concepts of "technosphere", "technical reality", "technogenesis" are correlated, which allows to reveal the specifics of the phenomenon of the techno environment from the standpoint of different authors. Authors describe the most probable directions and prospects for the development of society in the conditions of development of technology.

To sum up, most of the researchers noted that it is crucial to thoroughly investigate the technological development and its effects on modern society.

Objectives

The objective of this research is the multidimensional development of technology and its scope is to examine the problems of the establishment of an integrated technogenic environment and its impact on human capital employing philosophical reflection. To accomplish this goal, the researchers have formulated the following objectives:

(i) To analyze the concepts of technology and technogenic environment.
(ii) To explore the anthropological aspect of technology during its integration into the technogenic environment.

(iii) To examine the system of "science and technology" as the main factor in the creation of a technogenic environment.

Methodology

This research is a qualitative analysis of the concept of technology and the technogenic environment in modern society. To gain a better understanding of topic, several recent and past methodological studies were recognized in Kazakh philosophy of science and technology. Working on this paper, we relied on the publications of leading Kazakh philosophers Zh. M. Abdildin, K. A. Abishev (1981), A. N. Nysanbaev (2003), M. Z. Izotov (2017), and A. G. Kosichenko (2014).

The hypotheses and thoughts of philosophers in the field were explored and analyzed to support the ideas of this research. Conducting this research, we used the following principles of philosophical analysis: the unity of the historical and the logical; the unity of the abstract and the concrete; integrity; contradiction; comparative studies; as well as the system, structural, and functional analysis. The basis of the study is the classical philosophy works, the publications of modern Kazakh and international philosophers, and scientists, including the studies of modern Western philosophers. mentioned above.

Results

The socio-natural approach explores the complex effect of the technogenic environment on human life—on the one hand, it creates a comfortable artificial world, satisfies the material needs of people, and supports their existence, while, on the other hand, the anthropogenic factor has an increasingly negative impact on the biosphere and socio-cultural processes. Therefore, philosophers draw completely different conclusions regarding technological development. Some researchers believe that people are bound to lose control over the technical reality as it grows and becomes more complex. Others assume that the aim of technological innovation is human control over the technosphere and the creation of an artificial environment that is most adapted to it.

According to traditional approaches, there is no global technical system. However, they consider the technosphere as a real object: the *technocentric* approach uses the concept of "technosphere" and reveals the unity of the technogenic environment at the level of its development trends that one can observe (the consolidation of technological processes and globalization of technogenic interactions); the *ecocentric* approach highlights the unity of the technogenic environment as a source of global changes in nature (technical objects are grouped based on their impact on natural processes); the *anthropocentric* approach explores the unity of the technological environment at the level of genetic commensurability of all technical objects. Many international researchers have studied this transition period, linking it to the growth and development of simple and complex systems, and proposing various theories of sustainable development (Mercure, Pollitt, Bassi, Viñuales, & Edwards, 2016; Westley et al., 2011; Furlong, 2011).

Therefore, other approaches to the study of the technosphere based on different theoretical and methodological principles can be developed. For example, those that do not *narrow down the technical to the material* (that is, understand technology as historically determined, socio-culturally accepted ways and means of changing nature). This may lead to the emergence of the socio-natural approach. A natural question arises: will it be possible to keep the rigorous definition of the "technosphere," if each change in the methodological positions of its research alters the understanding of its essence and content?

The studied concept can be deobjectified, and the technosphere can be considered in an

unconventional way – *not as an empirically fixed object, but as a concept that requires a special procedure to register it*. In this work, we understand the idea as a means of reality perception. Unlike an objective and unambiguous notion, the concept reveals the meaning of an object, capturing it in the unity of a speech utterance. According to S. S. Neretina, in contrast to the objective and unique nature of the notion, the concept is formed in speech as a subjective actualization of the meaning, and it functions in the process of communication (Neretina, 2001).

The technogenic crisis has shown that a single socio-natural organism has already been formed on Earth, and its future depends not only on humans but also on the biosphere's ability to maintain its characteristics. In his book, American historian Michael Adas (2015) offers a rather interesting point of view when he considers the reason for the dominance of the Western world. He believes that the development of science and technology, as well as internal ideology, are vital to this dominance. Nevertheless, a group of European scientists argues that such a rapid development of technology has led to a decrease in physical labor, which has increased the mental load (Young, Brookhuis, Wickens, & Hancock, 2015). At the same time, science confirms that there is a limit to the extensive use of natural resources and gives a warning of imminent catastrophic changes that are to follow the increasing transformation of the natural environment. Some scholars have studied the impact of such modern phenomena as big data on culture and technology in general. They explored the positive (new smart technologies) and negative (privacy violations) factors that arise from the extensive analysis of big data (Boyd & Crawford, 2012). As early as in the first half of the twentieth century, V. I. Vernadsky, E. Le Roy, P. Teilhard de Chardin described new factors caused by technological development: *hominization of the biosphere* (the cumulative effect of humanity on the biosphere as a whole) and *socialization* of its natural components (their dependence on social activities, primarily industrial) that at the present historical stage have caused environmental problems. According to these scientists, with the right direction of development, they may lead not to degradation of biospheres, and to a new, anthropogenic stage of its evolution, caused by the labor activity of people – to the *noosphere*.

V. I. Vernadsky believed that the technological activity of humankind has a mostly positive effect on the biosphere. He emphasized that it creates favorable conditions for populating areas that biological life could not reach before (Vernadsky, 2012).

Since the 1970s, A. M, Kovalev has been working on his concept of historical development, combining the achievements of formal, post-industrial, and civilizational approaches. He considered the natural change in the production methods and recognized the socio-natural integrity of civilizational organisms. A. M. Kovalev assumes that the mission of humanity is to accelerate the development of nature, to reach a new level, to ensure its organization and harmony (Kovalev, 2000). However, the modern civilization poses the question not about the transformation of nature in the interests of people, but the transformation of "people themselves according to the fundamental laws of nature" (Kovalev, 2000).

E. S. Demidenko also points out the necessity of creating a socio-natural approach. The researcher notes that other meta concepts of historical development – including the most common, formational and post-industrial

– do not reflect the "natural environment" in which human progress is taking place, but consider humans' development as a process isolated from the flow of earthly life. E. S. Demidenko identifies two main stages in the development of life on Earth. The first one is genesis and development of biosphere life, leading to the formation of a *metacommunity* (a global society that acquires control over the biosphere due to scientific and technical productive forces). Then, as a result of the socio-biosphere revolution, the metacommunity reassigns the biosphere

(Demidenko, 2003). As we can see, the principles of an integrated socio-natural approach to social and natural history, reflecting the relationship between the history of humankind and the evolution of Earth's biosphere, enable us to create an unconventional approach to the study of the technosphere – the socio-natural one.

We can systematize the factors of socio-natural changes as *geogenic* (the impact of processes in the geological shells of the Earth), *biogenic* (the exposure of living organisms and biosphere processes), and *anthropogenic* (the effect of humanity, embodying its social and cultural activities in material forms). Scientists are to explore the relative weight of these factors in various historical eras and the degree of control over them. Since geological processes are rather inert, they can be considered only within the empirical data on technogenic changes in the atmosphere, hydrosphere, soil cover, and mineral resources. However, biosphere processes have a much greater speed. What is more, in the past, they underwent crisis changes, which led to the extinction of numerous biological species. Social and cultural factors that influence the mutual transformations of nature and humanity are highly significant. Still, their impact is implicit – through practical transformations made by people based on socio-cultural motivation (Novikov, Zhiritsky, Markushina, & Perelet, 1988).

What is the main direction of socio-natural development? As people achieved relative freedom from natural conditions, their dependence on the artificial environment increased. This tendency manifests itself in the growing volume and diversity of the technogenic environment. However, it also leads to a decrease in the biosphere, humans' separation from biosphere rhythms, the degradation of biological characteristics, the more significant role of technogenic rhythms, and the development of social and cultural qualities of a human. With the formation of scientific and technical productive forces, technogenic systems now exert a more considerable influence on human life than natural ones.

Creating a new research approach that offers a unique, improved design for well-known empirical material, only if it has heuristic potential, makes sense. Therefore, the proposed approach aims to determine the boundaries and sources of autonomy of the technosphere. Unlike the *ecocentric* approach, it claims that the natural environment should be transformed to maintain people's existence. Being able to control the technogenic setting again (or developing this property in it, if the initial spontaneity of its development is proved) should not be accompanied by reducing the control over the natural environment, which has already been achieved. Conversely, both areas of activity should have one goal—maximizing the liberation of the human essence as it becomes fully independent. Unlike the *technocentric* approach, the self-development of the technogenic environment (by purposefully creating technical objects for autonomous techno-evolution) is not considered as a natural consequence of technological growth but as an unwelcome tendency that should be overcome.

In contrast to the *anthropocentric* approach, the incomplete controllability of all artificial processes, including social and cultural ones, is noteworthy. The method of technical development, despite its negative consequences, has more positive outcomes—the planet can support the life of a greater number of people and ensure their self-realization. However, theoretically, we may expect such technogenic changes to undermine the biological parameters required for human existence.

Technology is ambivalent. It is natural since it "is a product of the structural complexity of animate nature." It is also artificial because technology "separates a person from it" (Rapp, 1989). The concept of the "technosphere" expresses the characteristics of the technogenic environment consistently reproduced by people. Linking empirical material to specific categories and offering complexes of theoretical structures to understand the technogenic situation and pragmatic mechanisms of its transformation, the developed research approaches meet human

needs to reduce the complexity of the world. However, the traditional methods used to analyze the technosphere focus on just one aspect: for example, they fail to consider some external relations of the technogenic environment, assuming that they can be reduced to internal laws. As a result of such a study, the autonomy of the technosphere is exaggerated: it is regarded as an external force for a human, even when methodological prerequisites do not perceive it as a self-developing system.

This drawback can be eliminated with a socio-natural approach, which is essentially a synthesis of two traditional approaches: anthropocentric and ecocentric. Sharing the contextual principle of the analysis of the technogenic environment, these approaches differ in the system they stick to. In these systems, technology is empowered either by the natural environment (and then the objective laws of the technosphere appear to be the product of technology that destroys nature for no particular reason) or by the purposeful actions of humankind (and then they are perceived as a coercive influence of an independently existing artificial world on man and society). Both these positions fail to reflect the immediate purpose of the technogenic environment – to *serve* as a material intermediary between nature and humanity, which inevitably leads to contradictions when its role is analyzed. Many international scientists note the importance of the influence of various "smart" technologies on modern education. For example, Wang studied why students choose technical subjects and how the environment determines their choice (Wang, 2013), while a group of Asian scientists examined the advantages and disadvantages of using smartphones (Anshari, Almunawar, Shahrill, Wickasono, & Huda, 2017). Also, American scientists conducted a study on the relationship between technology and the behavior of the younger generation in the school environment (Gobert et al., 2011; Hinduja & Patchin, 2013). Perhaps, the proposed approach will help eliminate the distortions produced by traditional concepts, and the technogenic environment will be recognized as a mediator, not an external force (Simonenko, 2001).

The socio-natural approach explores the contradictory effect of the technogenic environment on people's life: on the one hand, it creates a comfortable artificial world and satisfies the material needs of people, supports their existence; and on the other, the technogenic factor has an increasingly negative impact on the biosphere and socio-cultural processes. Therefore, philosophers give different assessments of technological development. Some researchers believe that with the growth and increasing complexity, the technical reality naturally gets out of people's control. Other scholars assume that the tendency (and the goal) of technological innovation is human control over the technosphere and the creation of an artificial environment that is most adapted to it (Rozin, 1999).

The real essence of socio-natural development is the transition from biosphere evolution (when humanity existed within the biosphere and obeyed its laws) to the technosphere (when people can consciously regulate their life and biosphere processes by technical means). However, the growing technogenic pressure on natural processes (including the biological aspects of human life) and social patterns (the emergence of social mechanisms that embody the inertia of technological development and ensure further growth of the technosphere without humans' conscious wish) have led to undesirable changes.

Having performed the analysis, we identified the incompleteness of human control over the industrial environment. Its functioning has always been autonomous in some aspects, for instance, associated with the spontaneous formation of technical systems and the transformation of nature, the emergence of unforeseen socio-cultural changes in the course of technological growth. We believe that this characteristic is not a temporary (or transient) stage of development, but a real and logical consequence of the very natural-artificial essence of the

technogenic environment. This feature enabled us to formulate its principal contradiction.

Let us consider the reasons for the relative autonomy of the industrial environment. We can distinguish two primary sources of this whose role changes with the development of technology and leads to a complex historical dependence between technological progress and people's freedom from external determination.

First of all, the technical activity itself has creative potential: not only does it reflect the living conditions of people or the material environment of civilization (the strict framework of technological programs suffice for this purpose), but it also brings other results that are not pragmatic and have no prescribed algorithms. Let us consider the following phenomenon. Technology is a process phenomenon covering all types of technical changes. A change is a universal characteristic of technical reality that implies a constant qualitative transformation of technical objects. One can distinguish two types of functional changes: technological (which entails an increase in the complexity of the operating system or complicates and differentiates its connection with the external environment– natural and socio-cultural) and non-technological (which is associated with a simple organization and more basic structure of a technical object due to its consumption or destruction). The very existence of the technogenic environment, despite non-technological changes, depends on the processes that maintain its self- identity, self-reproduction, confronting the processes of decay. The external environment also poses new requirements for artificial reality, and they must be considered when reproducing it (Watt,2008).

Practice shows that the technogenic environment is not limited to self-reproduction. In reality, it is not a question of ensuring its stability, but its renewal and improved organization. Consequently, such a mismatch of expectations (ordering of technical systems) and the results allow us to conclude on the "margin" of stability of the industrial environment, stimulating its organization. The collision of science-oriented rationalism and unforeseen consequences of technical activity (against the general background of its development according to the laws established during its creation) leads to the introduction (for explanatory purposes) of the concept of autonomy.

The source of this autonomy is the freedom of human activity, which objectifies itself in the created technical objects (which means creativity is independent of its rational component). The uncontrolled development of the creative potential of the technogenic environment that is not regulated by discursive practices becomes the primary source of random results of technical activity (regarding the fundamental rules). This allows us to put forward a hypothesis about the autonomous nature of the technosphere as its specific attribute (implemented at the level of the self-organization of the technogenic environment and not associated with the human goal-setting). A human cannot control himself; unable to give up the importance of control in general, a human is looking for a solution to problems (Schurov, 1994). This fails the classical concept of an active subject who organizes their material environment in the form of connected structures. Unknown forces of social reality are embodied in the mechanisms associated with the development of technical reality, bypassing human consciousness. A systematic organization of the technogenic environment is often seen as a way out of this situation since it means subordination to uniform constant laws. This idea is not perfect, although the conditions and consequences of its implementation should be subject to careful consideration.

Consequently, the concept of random fluctuation, which emerges during the interaction of these processes, should be introduced into the categorical apparatus of a new analysis of technology (Kutyrev, 2014). The essential methodological conclusion drawn as a result of the proposed view on the technogenic environment is the withdrawal from considering the mechanical cause-effect relationship when studying technical reality. The ideals of linear determinism that are relevant to traditional concepts (ensuring the predictable behavior of

technical systems) are no longer empirically confirmed: random fluctuations must be considered as the results of the chaotic formation of the technogenic environment.

According to the socio-natural approach, the real cause of technogenic conflicts is the essential contradiction of the technosphere revealed above: between the rational origin of particular technical objects and the spontaneous (unpredictable and uncontrollable) nature of the technogenic environment functioning as a whole. One cannot fully overcome it, but only temporarily mitigate the crisis. Having analyzed the ways of resolving the principal contradiction of the technogenic environment and reducing current global problems caused or exacerbated by it, we obtained several ideas. Modern society creates and uses social mechanisms of continuous scientific and technological development. These mechanisms foster the steady development of the technogenic environment in addition to the consciously formulated people's need for its further growth. Having conducted the philosophical research, we could define the cause of the civilizational crisis as an objective process of altering human's external and internal environment. It has its pace and direction that do not depend on the wishes of individuals, but on the attitudes that exist in the mass consciousness. It also imply adapting the world to oneself, and not oneself to the world. This transformation triggers unpredictable socio-cultural consequences. Thus, the active essence of man and the material manifestations of the activity underlie the negative trends of the modern era that are linked with all aspects of the social-natural whole. The impact of technology on the environment and various areas of life has been considered by many scholars. Technology influences many regions, even journalism (Flew, Spurgeon, Daniel, & Swift, 2012) and tourism (Gretzel, 2011). The crisis of modern civilization was caused by objective laws. According to A. Peccei, the real problem of the human species "lies in the fact that we were unable to culturally keep up and fully adapt to the changes that we introduced into this world" (Peccei, 1985). Our perception of a globally oriented social project aimed at resolving the crisis should be substantially modified to consider indirect relationships and provide new ways of influencing the industrial environment (Pyrin, 2003).

All the problems mentioned above related to the formation of the technogenic environment evolving due to the development of science and technology are highly relevant for modern Kazakhstan. This young sovereign state can and should take its rightful place among the developed countries in the 21st century, the century of new technologies and computer science. There are all objective prerequisites for this. For instance, many fundamental scientific schools that were internationally recognized back in Soviet times are functioning successfully in Kazakhstan. Their foundations were laid by academic K. I. Satpayev (Izotov & Sarsenbaeva, 2009), in particular, in mechanics, mathematics, machine mechanics, and other fields.

Science, engineering, and technology should be developed on a holistic, systemic basis as a result of cooperation between the state and Kazakh scientific and engineering community with determining mutual obligations, basic principles, and conditions for the functioning of science and technology in Kazakhstan, as well as the formation of a man-sized holistic technological environment. This, undoubtedly, will contribute to solving the urgent problems facing the Republic of Kazakhstan related to the industrial and innovative development in the 21st century.

Discussion

In the philosophical analysis of technology and its development in the era of globalization, scholars pay close attention to the quality and functioning of the artificial world. The article shows that the development of technology and its wider use for maintaining human life naturally led to the formation of technical complexes based on spatially concentrated production and mechanical systems. The growth of these complexes and the creation of technological links

between remote regions increase the interdependence of these complexes, which makes it possible to consider a specific –technogenic– layer of the planet. Therefore, a philosophical analysis of technology should be followed with the consideration of the result of technological development – the technogenic environment. Even when exploring individual technical systems at the local engineering level, one should analyze their interaction with humans. In line with the research goal and objectives, having considered the results of the analysis, we came to several conclusions.

First, it was obtained that technology develops in two directions. On the one hand, its dynamics are increased by the internal laws of development and by the level and scale of the technical creativity of the individual (society). On the other hand, the needs of society set the vital areas of technical development, determining technogenic dynamism and integrative.

Second, the study of the technogenic environment is relevant for theory and practice, and its comprehension is a philosophical problem. Also, several features of the technogenic environment were defined: it is created by humanity in the course of socio-economic interactions and conscious aspirations to change the outside world; its operation requires resources – geological, biogenic, and anthropogenic, which are partially turned into waste by it. As a result, it transforms the 'organic' human environment – nature and the socio-cultural environment.

Third, technology is an area of the focused efforts of the individual, and society aimed at creating innovations. Thus, according to the principles of modern philosophy, one perceives technology as a form of activity associated with control and socio-cultural factors of activity in which artifacts are created.

Fourth, the methods of analysis of engineering design change along with technical development. There is an understanding that human and machine components cannot be considered and designed separately. Therefore, a modern engineer cannot work without system concepts, methods of system analysis, and other integrative and general scientific approaches.

Finally, philosophers are interested in the structure and functioning conditions of the technogenic environment. However, it is possible that it is more important to study the technogenic effects on the natural environment and human life because the understanding of the technogenic environment developed at a philosophical level will help to systematize the concepts related to it in other areas and devise efficient programs for its formation and transformation.

Conclusion

To sum up, it was demonstrated that in the modern world, technology acts as a mechanism for generating new cultural meanings and an instrument of socialization and personal development. The lack of controllability of the technical reality in a technogenic society (where the technology represents the source of integrating various aspects of human life) is a global problem that attracts significant attention. Gaining control over technology seems to be a prerequisite for the liberation of humans, the basis for overcoming the insufficient adequacy of their existence.

The research claims that a new technical reality that would be proportional to the truly human in man should be created. Still, it does not question the transitional nature of the very existence of humans: their desire to create new things continually. Technology is to have a liberating role to, first, create the necessary external conditions for people and then help to overcome their dependence on it. If the technical reality does not fulfill this function, we may discuss its autonomy and the need to return the ability to control it to a person.

A different effect of the technogenic environment on human life was revealed. First, it creates a comfortable artificial environment that maintains our existence. Second, technology has an increasingly negative impact on natural and socio-cultural processes. Man is between two

global settings. On the one hand, the creator of the technogenic environment is changing nature, satisfying their ever-increasing needs. On the other hand, the person is building an artificial technogenic world – perceiving its tendencies and, in this sense, turning from a biospheric being into a technospheric being.

This research demonstrated that the objective cause of technological conflicts is its essential contradiction between the rational origin of individual technical objects (the results of purposeful creativity) and the spontaneous (unpredictable and uncontrollable) nature of the functioning of the technological environment as a whole.

It was proved that the technocentric approach should be supplemented by other concepts that reflect the activity aspects of technology and, accordingly, the role of production and use of artifacts in creating the technogenic environment. To ensure the compliance of the two components of professional practices, the subjective (corrected with the activity) and the objective (consideration of the natural processes and characteristics found in the technological means), the main task of technical knowledge is to demonstrate the relationship between them, that is, to reveal the relationship between the structural and functional characteristics of the technology.

It was also proved that the traditional, naturalistic perception of technology should be replaced by understanding it as a manifestation of complex intellectual and socio-cultural processes (cognition, research, engineering, design activities, and technology development). Humans should develop new engineering, which will involve "attentive listening to oneself and culture." Additionally, a new technology that will expand resources and not prescribe humans' needs and lifestyles should be created.

This study claims that philosophy faces the problem of assessing the significance of the technogenic environment for people's lives and determining the desired trends in its development. The solutions to global problems depend on whether people should continue to change nature and themselves or whether one needs to rely on the course of evolution and preserve the "natural" parameters in everything, from biosphere rhythms to moral standards. The main problem of our time is how we can realize our progressive nature by remaining a human being (and therefore being connected with the biosphere, not so much with the material but with internal spiritual links).

References

Abdildin, Zh. M. & Abishev, K.A. (1981). *The formation of the logical structure of thinking in the process of practical activity*. Almaty: Science.

Adas, M. (2015). *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance*. Ithaca: Cornell University Press.

Adorno, T. O. (1989). About technology and humanism. *Philosophy of Technology in Germany.* Retrieved February 14, 2020. Anshari, M., Almunawar, M. N., Shahrill, M., Wickasono, D. K., & Huda, M. (2017). Smartphone usage in the classrooms: Learning aid or interference? *Education and Information Technologies, 22*(6), 3063-3079. https://doi.org/10.1007/s10639-017- 9572-7

Bell, D. (1999). *The Upcoming Post-Industrial Society. Social Forecasting Experience*. Moscow: Academia. Berdyaev, N. A. (1989). Human and machine. *Questions in Philosophy, 2,* 160-169.

Boyd, D. M., & Crawford, K. (2012). Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. *Information Communication and Society, 15*(5), 662-679.

Dash, R. K., & Dash, A. K. (2019). The new media and the promotion of ecological entrepreneurship. *Media Watch*, *10*(2), 419- 431.

Demidenko, E. S. (2003). *Noospheric ascent of the earthly life.* Moscow: Era.

Dergacheva, E. A. (2014). Features of the global technospherization of the biosphere in the modern era. *Age of Globalization, 1,* 124-132.

Ellul, J. (1986). Another revolution. *New Technocratic Wave in the West.*
Flew, T., Spurgeon, C., Daniel, A., & Swift, A. (2012). The promise of computational journalism. *Journalism Practice, 6*(2), 157- 171.
Furlong, K. (2011). Small technologies, big change: Rethinking infrastructure through STS and geography. *Progress in Human Geography, 35*(4), 460-482.
Gjylbegaj, V., & Abdi, H. M. (2019). The Effects of Social Media on Family Communication in the UAE. *Media Watch*, *10*(2), 387- 397.
Gobert, J. D., O'Dwyer, L. M., Horwitz, P., Buckley, B. C., Levy, S. T., & Wilensky, U. J. (2011). Examining the relationship between students' understanding of the nature of models and conceptual learning in biology, physics, and chemistry. *International Journal of Science Education, 33*(5), 653-684.
Gretzel, U. (2011). Intelligent systems in tourism. A social science perspective. *Annals of Tourism Research, 38*(3), 757-779. Heidegger, M. (1993). *Time and being.* Moscow: Respublika.
Hinduja, S., & Patchin, J. W. (2013). Social influences on cyberbullying behaviors among middle and high school students.
Journal of Youth and Adolescence, 42(5), 711-722.
Izotov, M. Z., Sagikyzy, A., Kolchigin, S. Yu., Sartayeva R. S., & Khamidov A. A. (2017). *Kazakhstan on the path to building a knowledge society*. Almaty: KIC IFP MES RK.
Izotov, M. Z., & Sarsenbaeva, Z. N. (2009). Science in Kazakhstan: History and Modern Times (A Philosophical Study in Two Books). Almaty: KIC IFP MES RK.
Kosichenko A. G. (2014). The possibilities of religion in reducing the level of challenges and threats of our time. Almaty: KIC IFP MES RK.
Kovalev, A. M. (2000). *Society as a Developing Organism*. Moscow: Plamya.
Kumar, A. S., Camacho, S., Searby, N. D., Teuben, J., & Balogh, W. (2020). Coordinated Capacity Development to Maximize the Contributions of Space Science, Technology, and its Applications in Support of Implementing Global Sustainable Development Agendas—A Conceptual Framework. *Space Policy*, *51*, 101346.
Kutyrev, V. A. (1996). Ecological crisis, postmodernism, and culture. *Problems of Philosophy*, 23-31. Kutyrev, V. A. (2014). *Natural and Artificial: The Struggle of the Worlds*. Moscow, Berlin: Direct Media.
Mercure, J. F., Pollitt, H., Bassi, A. M., Viñuales, J. E., & Edwards, N. R. (2016). Modeling complex systems of heterogeneous agents to better design sustainability transitions policy. *Global Environmental Change, 37*, 102-115.
Mumford L. (1974). Mythos der Mashine kultur, tehnik und macht, Wien Europaverlag. Neretina, S. S. (2001). Concept. *New Philosophical Encyclopedia*, 2, 306-307.
Novikov, R. A., Zhiritsky, A. K., Markushina, V. I., & Perelet, R. A. (1988). *Global Environmental Issue*. Moscow: Mysl.
Patyukova, R. V., Minskaya, A. N., Sergienko, V. A., & Tarasenko, E. V. (2018). System of technologies for building the information space: Coverage tools. *Media Watch*, *9*(3), 418-425.
Peccei, A. (1985). *Human Qualities.* Moscow: Mysl.
Pyrin, A. G. (2003). Environment. In *Global Studies: Encyclopedia*. Moscow: Raduga, pp. 700-709.
Rapp, F. K. (1989). Prospects for the philosophy of technology. In *the Philosophy of Technology in Germany. Collection of Articles*. Moscow: Progress, pp. 80-97.
Rozin, V. M. (1999). Approaches and methods for studying engineering and technology. In *IT and Technology*. Moscow: IFRAN, p. 213.
Schurov, V. A. (1994). Technology in the World of Man, Man in the World of Technology. Nizhny Novgorod: Respublika. Shapovalova, I. S., Gozhenko G. I. (2015). The concept of technosphere: An analytical review of formation and study. *Scientific Result. Sociology and Management Series, 2,* 51-57. Retrieved July 22, 2020.
Shcherbakova S. I. (2018). Socio-philosophical understanding of the way of life in a technogenic society. *Herald of Vyatka State University, 2,* 57-65.
Simonenko, V. D. (2001). *Technological Culture and Education*. Bryansk: Publishing House of Bryansk State University.
Tyurina, T. A. (2018). Ecological and Technical Picture of the World as An Imperative of Sustainable Development of Modern Civilization. *Bulletin of Buryat State University, 3*(4), 10-18.

Vernadsky, V. I. (2012). *Biosphere and Noosphere*. Moscow: Iris Press.

Wang, X. (2013). Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support.

American Educational Research Journal, 50(5), 1081-1121.

Watt, W. M. (2008). *The Influence of Islam on Medieval Europe*. St. Petersburg: Dilya.

Westley, F., Olsson, P., Folke, C., Homer-Dixon, T., Vredenburg, H., Loorbach, D., Thompson, J., Nilsson, M., Lambin, E., Sendzimir, J., Banerjee, B., Galaz, V., & Van der Leeuw, S. (2011). Tipping toward sustainability: Emerging pathways of transformation. *Ambio, 40*(7), 762-780.

Young, M. S., Brookhuis, K. A., Wickens, C. D., & Hancock, P. A. (2015). State of the science: mental workload in ergonomics. *Ergonomics, 58*(1), 1-17.

Zhuldizay T. Kulzhanova (Candidate in Philosophy) is an associate professor in the Department of Philosophy at the S. Seifullin Kazakh Agrotechnical University, Kazakhstan. Her field of scientific interest is the philosophical impact of technogenic environment on modern society.

Gulbaram T. Kulzhanova (Candidate in Philosophy) is an acting chief of the Faculty of Vocational Training at the Sh. Kabylbayev Kostanai Academy, Ministry of Internal Affairs, Kazakhstan. Her field of scientific interest is the philosophical aspects of human capital.

Yesbol Ye. Mukhanbetkaliyev (Candidate in Philosophy) is the head of the Department of Philosophy at the S. Seifullin Kazakh Agrotechnical University, Kazakhstan. His field of scientific interest is the Abai Kunanbayev's philosophical view on modern society.

Margarita K. Kakimzhanova (Candidate in Philosophy) is an associate professor in the Department of Philosophy at the S. Seifullin Kazakh Agrotechnical University, Kazakhstan. Her field of scientific interest is the adaptation of foreign students in universities.

Khorlan S. Abdildina (Candidate in Philosophy) is an associate professor in the Department of Philosophy at the S. Seifullin Kazakh Agrotechnical University, Republic of Kazakhstan. Her field of scientific interest is the social and political sciences.

Corresponding author: Margarita K. Kakimzhanova, Department of Philosophy at the S. Seifullin Kazakh Agrotechnical University, Republic of Kazakhstan, Zhenisave. 62, Nur-Sultan 010000, Republic of Kazakhstan. E-mail: margarita.kakimzhanova@yandex.ru