

CSIS 2019
**11th International Scientific and Theoretical Conference “Communicative
Strategies of Information Society”**

**TECHNOLOGICAL DETERMINISM: BREAKTHROUGH INTO
THE FUTURE**

Sergei Mezentsev (a)*
*Corresponding author

(a) Department of History and Philosophy, National Research Moscow State University of Civil Engineering, 129337
Moscow, Russia, e-mail: perevolochnoe@mail.ru

Abstract

Modern technogenic civilization has entered a new, informational stage of its development. At the same time, the transition from the industrial stage to the informational one was not spontaneous, chaotic or accidental. To a large extent, it was theoretically justified by technological determinism, according to which technics and technology are the determining factors of social development. The materials for the study were the works of theorists, classics of technological determinism and publications of modern authors studying the problems of technics and technology. In the process of research, such methods as: analysis and synthesis were used. Today, technics and technology are an integral part of people's daily lives. Moreover, they determine social relations and communication. Globalization brings States and people closer together, strengthens political, economic and cultural ties, and forms various international organizations. Information technology, artificial intelligence lay the foundations of a society of knowledge, a society in which people, clones and androids will exist together. Technological determinism not only stimulates the development of technics and technology, but is also capable of constructive acceptance of criticism to solve the problems of humanization of technology, environmental and other problems.

2357-1330 © 2020 Published by European Publisher.

Keywords: Determinism, technology, information, communication.



1. Introduction

Technological determinism, as it is known, arose in the 20-s of the twentieth century in the United States of America in connection with the rapid progress in the development of science and technology, the increasing efficiency of their mass application in production. Technological determinism is a unity of different concepts, denoting a set of ideas, united by the idea of the determining role of technology and social development technology. It includes the following postulates: 1) technology has «autonomy of development» (both in the sense of having an immanent evolutionary potential and its own logic of development, and in the sense of independence from socio-cultural control and self-sufficiency, up to understanding it as a *causa sui*); 2) the development of technology is treated as progress (and in the sense that all without exception technical innovations are considered advanced, and in the sense of considering social progress as a derivative of technical progress); 3) the development of technology is emergent, i.e. it is the determinant of all social transformations and cultural modifications.

Its founders argued that the technogenetics civilization created by the mind and hands of man has independence from man and society. At the same time, technology is artificially separated by them from social relations, is put on with the phenomena of nature and is considered as a supersocial and superhuman reality, which has its own laws and obeys the immanent logic of development. The autonomy of technology in relation to man is considered by them as its ability to self-development, as the possibility of its unlimited improvement. Technical progress unfolds, in their opinion, on a single upward line from the worst to the best in such a way that the current state of technology is determined by its yesterday state, and tomorrow will be just as clearly determined by today state. Independence from the human will of technological progress is manifested in the advancing and dominant impact of technology on the old (machine) and new (information-computer, robotic) industry and, consequently, on the industrial and post-industrial society as a whole, on its social and cultural life. Subordinating the life of society to the interests of the constant development of the technical and economic sphere, which requires increasing financial, raw materials, energy and other costs, technological determinism promotes consumer, uncontrolled use of natural resources, which leads to an exacerbation of environmental problems on our planet.

Critics of technological determinism accuse it in many errors, but first of all in the absolutization of the role of technology, the assertion of the derivation of social processes from technical and technological ones. For technology, on the one hand, it is a special world, independent of man, infinitely developing according to its own laws, and on the other one – it dominates man and society, dictates its rules and determines the prospects of their development. Man has only to make a choice between technicism, adaptation to the technical world and antitechnicism, protest against technology.

But this protest is ultimately not directed against technology at all. It is directed only against the equipment and technologies destroying environment and depriving the person of safety. This protest does not create insurmountable obstacles to the development of modern civilization, which has different names, but in almost all cases it is recognized that it is based on technics and technology. It is technics and technology that determine today the nature of society and individual human development. Therefore, it is not by chance that civilization is most often called technogenic. The technogenic civilization is a

stage of development of mankind having the reason, the primary source machine equipment and technology and the technosphere created on their basis.

2. Problem Statement

In philosophical-historical terms it is necessary to talk about the state of global society at the turn, which reached leaders, those who are currently on top of the world technological and economic development, those who are the flagship and benchmark for all other countries, at different times, entered, or entering on the path of scientific and technological progress. The fact is that in relation to the lagging countries, there is a pattern and correlation, by virtue of which the «lagging Nations» are pulled up to a higher level and pass the path of leaders faster. The essence of this process is manifested in the leaders of pulling up outsiders through the export of equipment and technologies, and with them new social relations and social forms, thanks to which the last ones are rapidly developing. And although the movement towards the information society takes place in different countries at different rates, the vast majority of the world's population is already developing in this direction.

The theoretical basis of the information and computer revolution that occurred in the 90s of the twentieth century and sent technogenic civilization to the next stage of development information, was technological determinism-theoretical and methodological setting in philosophical and sociological concepts, based on the decisive role of technics and technology in the development of mankind. Climate, land, water, subsoil, trade are no longer the leading factors of social and historical development.

3. Research Questions

The materials of the present studying are presented with the works of classical theorists of technological determinism and modern authors studying technological determinism and problems of engineering and technology. The main works of theorists of technological determinism are:

«The Theory of Leisure Class, An Economic Study of Institutions» (Veblen, 1918). In this book, the American scientist Veblen (1921) assigns a major role in economic development to the technocracy, proposes to transfer the leadership of the state and the economy to the industrial and technical intelligentsia, technical specialists, as they contribute to a more rational activity of the whole society. In the book «The Engineers and the Price System» Veblen outlined his vision of the situation during the industrial boom, formulated the main provisions of the concept of building a technocratic state.

In his work «Social Change: with Respect to Culture and Original Nature» Ogburn (1922) considers the source and cause of social change inventions in the field of material culture: tools, weapons and technological processes.

Fourastier's (1949) book «The great hope of the 20th century: Technical progress, economic progress, social progress» examines the division of the economy into primary (mining, agriculture, forestry and fishing), secondary (industrial production and construction) and tertiary (services, education and tourism) sectors and argues that underdeveloped countries receive national income mainly from the primary sector, medium-developed -mainly from the secondary sector, and highly developed – mainly from the tertiary sector.

In the work «The Stages of Economic Growth» Rostow (1960) formulated the theory of stages of economic growth, according to which the development of human society passes through the following stages: 1. Stage of traditional society; 2. The stage of «creating prerequisites for takeoff»; 3. Stages of «take-off»; 4. Maturity; 5. Stages of «high mass consumption». The sixth stage—the stage of «search for quality of life» he added in his other work – «Politics and the Stages of Growth» (Rostow, 1971).

In Aron's (1967) book «Three tests on the industrial age» the theory of the uniform industrial society in which capitalist and socialist societies are considered as two versions of industrial society which in the future can be united in one capitalist society.

In the work «The New Industrial State» by Galbraith (1967) assigns a leading role to the state, global planning, merger of large corporations with the state. The defining characteristic of the new society is the «industrial system».

French sociologist Touraine (1969) in his book «Post-industrial society» believes that post-industrial society should represent, on the one hand, a radical break with industrial society, and on the other one – to maintain continuity with it. The gap lies in the fact that as a result of convergence with the production of all spheres of social life – science, information, consumption, education – society becomes manageable, self-programmed.

In «Between Two Ages: America's Role in the Technotronic Era», Brzezinski predicts the significant impact of technology and electronics on post-industrial society. He proposed the theory that technology would connect peoples and States around the world, creating a homogeneous dynamic that would have both positive and negative results (Brzezinski, 1970).

In the fundamental work «The coming of post-industrial society: A venture of social forecasting», Bell (1973) introduced the concept of postindustrial society, which includes the following core components: a shift of emphasis from production of goods for services; the predominance of the professional and technical classes; the «axis» of social development is the theoretical knowledge as the source of innovations in formation of different social groups' activity directions; focus on control technologies and evaluation techniques; decision-making on the basis of a new «intellectual technology». The post-industrial society is replacing with the industrial one. If industrial society is the organization of machines and men for the production of goods, then in post-industrial society the Central place is occupied by theoretical knowledge.

Masuda (1980), in his book «The information society as post-industrial society», believed that the basis of a new information society would be computer technology. The information and computer revolution will lead to the emergence of a new productive force and will make possible the mass production of cognitive, systematized information, technology and knowledge. The leading sector of the economy will be intellectual production. The goal of the new society will be the realization of the «value of time».

In the work of American sociologist Toffler (1980) «The Third Wave: the Classic Study of Tomorrow» there are three main stages (waves) of human development – agrarian, industrial and post-industrial. A wave is a leap in science and technology that leads to profound shifts in society. For the first wave of the breakthrough was the introduction of agriculture, for the second industrial revolution, to the

third – technological revolution in which science has become a direct productive force, and became the main factor of development of society and its self-preservation.

Various aspects of technological determinism are reflected in contemporary publications such as:

Organizing and reframing technological determinism (Paragas & Lin, 2014); Overcoming Technological Determinism in Understanding the Digital Divide: Where Do We Go From Here? (Qureshi, 2014); Epistemic and technological determinism in development aid (Cherlet, 2014); On Technological Determinism: A Typology, Scope Conditions, and a Mechanism (Dafoe, 2015); Power, Ideology, and Technological Determinism (Hess, 2015); Technological Determinism and Permissionless Innovation as Technocratic Governing Mentalities: Psychocultural Barriers to the Democratization of Technology (Dotson, 2015); Borders of information society: Theory and reality (Kondrashov, 2017); Philosophy of Technology Assumptions in Educational Technology Leadership (Webster, 2017); On Technological Determinism (Peters, 2017); Technological determinism and new media (Hauer, 2017); Teaching technological determinism and social construction of technology using everyday objects (Giotta, 2018); Cyborgs, robots and society: Implications for the future of society from human enhancement with in-the-body technologies (Fox, 2018); A libel against technological determinism (Azevedo, 2018).

4. Purpose of the Study

The purpose of the study is the rapid development of technology and technology, which led to a breakthrough of mankind in almost all areas of its activities – from the study and exploration of outer space to life and work at home, from personal communication through natural language and writing texts on paper to the use of mobile communications in the communication processes, information and computer tools and sending electronic letters and messages.

5. Research Methods

In the course of studying the philosophical and scientific literature of classical theorists of technological determinism, as well as modern authors, such research methods as: analysis and synthesis were used.

Analysis is a method of mentally dissecting an object or phenomenon into its constituent parts and studying them separately. With its help, the study identified separate parts of technological determinism: determinism, technology, engineering, industry, information, communication. Comparative analysis was also used to compare technological determinism with other concepts in some aspects.

Synthesis is a method of mentally connecting the parts selected in the process of analysis into a single unite. Thanks to the use of this method in the process of research it was possible to obtain a unified picture of the theory and practical implementation of technological determinism.

6. Findings

Theorists of technological determinism looked far ahead into the future, absolutizing in the mid-twentieth century the role of technics and technology in the development of human society. For this they

were often criticized. However, in the process of further development of technics and technology, it became clear that they were not so far from the truth. In the XIX century German philosopher Karl Marx drew attention to the relationship between the level of development of technology and the same one of human society. His thought was: if the physical force of man is used, then it is a slave society, if the energy of wind, water, then it is a feudal society, if steam energy, then it is a capitalist society. But this «technological» thought found no further development in Marx's theory. The main thing he still considered not technics and technology, and industrial relations, which eventually formed the basis of his main work on political economy – «Capital» (Marx, 1984).

About half a century later, «technological» thought was picked up by the founders of technological determinism and then further presented in an expanded form by their followers. By now it has become obvious that the role of technics and technology is greatly increasing not only in the development of human society, but also in the daily life of every person. The study suggests that technics and technology have now become determinants, ruling factors in the development of modern man-made civilization, its information stage. Talking about the absolutization of technics and technology now has no theoretical and practical sense (Huesemann & Huesemann, 2011).

Technics and technology are changing social relations not only where they have been created, implemented and applied, but also where they are exported. When computers began to be exported to Russia and the Internet came, social relations in Russian society also began to undergo changes and to converge with the social relations that existed in those countries where computers and the Internet by that time had become widespread. As a result, working at the computer, using the Internet in professional activities or in everyday life have become as commonplace and habitual as in other countries. The user of the computer or mobile phone in Russia is practically no different from the user in the United States or the European Union, he also sends photos, avatars, etc (Winner, 1986).

It was thanks to the rapid development of technics and technology in capitalist countries that capitalism won an epoch-making victory over socialism and communism. Could it be otherwise? It could, if the Soviet Union and other socialist countries would be able to get ahead of their bourgeois rivals. One of the few striking examples is the launch of the first artificial earth satellite by the Soviet Union and the flight of the first man into space by Yuri Gagarin. All over the world and in all countries, Russian words «Спутник», «Космонавт», «Корабль», «Восток» and others were often scattered without translation (Zakharov, 2007). It was the peak of technical and technological development of the Soviet Union. The Russian language clearly claimed to acquire the status of an international language, to become an international language of communication. Now English is the main contender for international status (Slesareva, 2017).

Even more increase the chances of new English, NewEng, developed by English teacher A. Dragunkin. NewEng is a simplified English, with simplified grammar, graphics, and correlation of pronunciation and spelling, lack of any kind of exceptions, irregular verbs, etc. Being not so radically different from English and its possession remains the possibility of mutual understanding with English language. For those who don't speak English as a native language or who don't fully understand the nuances of this language, the inferiority complex disappears in communication with English experts, what

is very important. For this reason, NewEng can become a serious competitor to artificial intelligence-translator (Dragunkin, 2008).

The importance of the international language of communication is associated with the development of science, technics and technology, increasing contacts and relationships between people around the world. Thanks to the development of science, technics and technology, many international institutions and organizations have already been established. Globalization accelerates this process, despite cultural and linguistic differences (Heywood, 2014). The previously created (UN, WTO, UNESCO, IOC, etc.) will be joined by new ones. But the fastest growth of international structures is in network marketing, that involves millions of people around the world. The largest of them are: Amway, AVON, Mary Kay (Kaźmierczak & Łabuz, 2018). With the advent of Internet technologies there were also international IT companies: Google, Microsoft, Apple, etc (Dolata, 2017). Now new technologies are almost immediately implemented in business, including in the network. Moreover, the creation of IT companies on the network principle is a new direction that connects virtual reality with reality, communication through electronic and mobile communication with personal, direct communication. One of these newly established companies is the international IT company «Teamring».

Scientific and technical knowledge, culture, art, sports thanks to modern technologies are available to every citizen of our planet, for example, In the world League of cyber chess (Buyanova & Kozilina, 2017). Moreover, you can be not only a spectator, but also a participant, an expert, an appraiser of various events, including on-line.

The development of science, technics and technology has already led to the creation of robotics and then it comes to the creation of artificial intelligence. Humanoid robots (androids) become a part of people's daily lives. They can already not only perform human-like actions, such as walking, serving coffee, but also do human work: be salesmen in stores, replace wait staff in hotels, and even treat people in clinics. This has already put on the agenda the problem of communication between humans and robots and the recognition of their legal personality. The precedent is already there: the robot Sofia received Saudi citizenship (Yigit, Kose, & Sengoz, 2018).

Very interesting is the communication of people with artificial intelligence, with which you can communicate and give him commands. For example, you go to your «smart home», say: «SIM-SIM, open the door!» and the doors open. You give commands before entering the house or already being in the house, and the artificial intelligence carries out your instructions, requests, wishes and meets you. And you get everything like in a fairy tale.

But the more we are surrounded by technology, the more we use technology, the more we become dependent on it. In this case, they dictate social actions and determine communication. A good example is automobile traffic. People (subjects), driving cars (objects) in traffic, find themselves in (objective) reality, which they are not able to change until they get out of it (Gasnikov, Dorn, Nurminsky, & Shamray, 2013).

7. Conclusion

Technological determinism has made a significant contribution to the transition of man-made civilization from the industrial stage of development to the post-industrial (information) stage, contributed to the breakthrough of mankind into the future in technical, technological and economic terms.

In this new situation, in which the advanced countries of the world find themselves, the catch phrase «who owns the information, owns the world» acquires special significance. In this regard, the ability to use information, technology of its transmission and dissemination is very relevant. In the information society, with all the importance of technical, technological and economic development, the main capital becomes a person, his knowledge, communication skills, abilities, values, priorities. This is the leading resource in the 21st century. There is a new society ahead of us -a society of knowledge.

References

- Aron, R. (1967). *The Industrial Society: Three Essays on Ideology and Development*. London: Weidenfeld and Nicolson.
- Azevedo, F. (2018). A libel against technological determinism. *MATRIZES*, 12(3), 321-329. <http://doi.org/10.11606/issn.1982-8160.v12i3p321-329>
- Bell, D. (1973). *The coming of post-industrial society: A venture of social forecasting*. New York: Basic Books.
- Brzezinski, Z. (1970). *Between Two Ages: America's Role in the Technotronic Era*. New York: Viking Press.
- Buyanova, A. V., & Kozilina, V. (2017). Kibersport: istoriya stanovleniya, sovremennoye sostoyaniye i perspektivy razvitiya [Esports: the history of formation, current state and prospects development]. *Social and political Sciences. Series Physical culture and sports*, 5, 77-80. [in Rus.]
- Cherlet, J. (2014). Epistemic and technological determinism in development aid. *Science, technology & human values*, 39(6), 773–794. <https://doi.org/10.1177/0162243913516806>
- Dafoe, A. (2015). On Technological Determinism: A Typology, Scope Conditions, and a Mechanism. *Science, Technology, & Human Values*, 40(6), 1047-1076. <https://doi.org/10.1177/0162243915579283>
- Dolata, U. (2017). *Apple, Amazon, Google, Facebook, Microsoft: Market concentration - competition - innovation strategies*. Stuttgart: University of Stuttgart.
- Dotson, T. (2015). Technological Determinism and Permissionless Innovation as Technocratic Governing Mentalities: Psychocultural Barriers to the Democratization of Technology. *Engaging Science, Technology, & Society*, 1, 98-120. <http://doi.org/10.17351/ests2015.009>
- Dragunkin, A. N. (2008). *Universal'nyy uchebnik angliyskogo yazyka: Novyy podkhod [Universal textbook of the English language: a New approach]*. Moscow: RIPOL classic, St. Petersburg: Respex. [in Rus.]
- Fourastier's, J. (1949). *The great hope of the 20th century: Technical progress, economic progress, social progress*. Paris: Presses universitaires de France.
- Fox, S. (2018). Cyborgs, robots and society: Implications for the future of society from human enhancement with in-the-body technologies. *Technologies*, 6(2), 1-11. <https://doi.org/10.3390/technologies6020050>
- Galbraith, J. K. (1967). *The New Industrial State*. Boston, Houghton Mifflin.
- Gasnikov, A., Dorn, Yu., Nurminsky, E., & Shamray, N. (2013). Avtomobil'nyye probki: kogda ratsional'nost' vedet k kollapsu [Traffic jams: when rationality leads to collapse]. *Quantum*, 1, 13-18. [in Rus.]
- Giotta, G. (2018). Teaching technological determinism and social construction of technology using everyday objects. *Communication Teacher*, 32(3), 136-140. <https://doi.org/10.1080/17404622.2017.1372589>

- Hauer, T. (2017). Technological determinism and new media. *International Journal of English, Literature & Social Science*, 2(2), 1-4.
- Hess, D. J. (2015). Power, Ideology, and Technological Determinism. *Engaging Science, Technology, & Society*, 1, 121-125. <https://doi.org/10.17351/ests2015.010>
- Heywood, A. (2014). *Global politics*. Basingstoke: Palgrave Macmillan.
- Huesemann, M., & Huesemann, J. (2011). *Techno-Fix: Why Technology Won't Save Us or the Environment*. Gabriola Island, BC: New Society Publishers.
- Kaźmierczak, Ju., & Łabuz, A. (2018). Multy-level marketing. Features and controversy. *Annals of Marketing Management & Economics*, 4(1), 25–34. <https://doi.org/10.22630/AMME.2018.4.1.2>
- Kondrashov, S. I. (2017). Granitsy informatsionnogo obshchestva: teoriya i real'nost' [Borders of information society: Theory and reality]. *Bulletin of science of Siberia*, 3, 72-80. [in Rus.]
- Marx, K. (1984). Kapital [Capital]. In 3 vol. Moscow: Publishing house of political literature. [in Rus.]
- Masuda, Y. (1980). *The information society as post-industrial society*. Tokyo: Institute for the Information Society.
- Ogburn, W. F. (1922). *Social Change: with Respect to Culture and Original Nature*. New York: B.W. Huebsch, Inc.
- Paragas, F., & Lin, T. (2014). Organizing and reframing technological determinism. *New Media & Society*, 18(8), 1528-1546. <https://doi.org/10.1177/1461444814562156>
- Peters, J. D. (2017). «You mean my whole fallacy is wrong»: On technological determinism. *Representations*, 140(1), 10-26. <https://doi.org/10.1525/rep.2017.140.1.10>
- Qureshi, S. (2014). Overcoming Technological Determinism in Understanding the Digital Divide: Where Do We Go From Here? *Information Technology for Development*, 20(3), 215-217. <https://doi.org/10.1080/02681102.2014.930981>
- Rostow, W. W. (1971). *Politics and the Stages of Growth*. Cambridge: Cambridge University Press.
- Rostow, W. W. (1960). *Stages of Economic Growth*. Cambridge: Cambridge University Press.
- Slesareva, A. A. (2017). Globalizatsiya angliyskogo yazyka [Globalization of the English language] *Bulletin of Volgograd state University. Series 9, 15*, 78-80. [in Rus.]
- Toffler, A. (1980). *The Third Wave*. London: Collins.
- Touraine, A. (1969). *Post-industrial society*. Paris: Denoël.
- Veblen, T. (1921). *The Engineers and the Price System*. New York: B.W. Huebsch, Inc.
- Veblen, T. (1918). *The Theory of the Leisure Class: An Economic Study of Institutions*. New York: B. W. Huebsch, Inc.
- Webster, M. D. (2017). Philosophy of Technology Assumptions in Educational Technology Leadership. *Educational Technology & Society*, 20(1), 25-36.
- Winner, L. (1986). *The Whale and Reactor: A Search for Limits in an Age of High Technology*. Chicago and London: The University of Chicago Press.
- Yigit, T., Kose, U., & Sengoz, N. (2018). Robotics Rights and Ethics Rules. *Journal of Multidisciplinary Developments*, 3(1), 30-37.
- Zakharov, A. V. (Eds.). (2007). *Pervaya kosmicheskaya. Sbornik statey, posvyashchennykh 50-letnemu yubileyu zapuska pervogo iskusstvennogo sputnika Zemli* [The first space. Collection of articles dedicated to the 50th anniversary of the launch of The first artificial earth satellite]. Moscow: Institute of space research of the Russian Academy of Sciences. [in Rus.]