A Study Based on Science and Technology Neutral Theory

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Abstract. This paper discusses the limitations and impossibilities of technology neutral in the context of the rapid development of science and technology. With the help of literature analysis, the core concepts of science and technology are comprehensively sorted out, and the basic viewpoints and theoretical foundations of technology neutral are elaborated, while the main arguments and representative viewpoints of the opponents of technology neutral are meticulously summarized. The four key points in the development and evolution of science and technology in human society are analyzed, and it is emphasized that in a complex social environment, the design, use, development and social impact of technology are deeply embedded in specific values and ethical considerations, which makes technology no longer a pure tool isolated from society, which requires us to adopt a more comprehensive, in-depth and dynamic perspective to examine the essence of technology in the complex and intertwined contexts of technology in modern society. This requires us to adopt a more comprehensive, in-depth and dynamic perspective to scrutinize the nature and value of technology in the complex interweaving of technology in modern society.

Keywords: Science and technology; science and technology neutral; ethics of technology; value neutrality

1 Introduction

1.1 Research Background

With the rapid development of science and technology, especially the breakthroughs in the fields of artificial intelligence and information technology, human society is undergoing unprecedented changes. These technologies have not only greatly enhanced production efficiency and changed people's lifestyles, but also profoundly affected social structures, economic models, cultural patterns and individual behaviors. However, while enjoying the convenience and progress brought about by technology, people are also increasingly concerned about the value-oriented and ethical issues behind technology. Whenever new technologies and products are put into social practice and cause conflicts of interest, the viewpoint of "technology neutral" will rise again, and the "technology fever" of the continuous development of artificial intelligence, VR and

other wearable devices has once again awakened people's attention to technology. technology, people have to re-examine the relationship between technology and human beings.

1.2   Review of Literature

Research of Science and Technology. Throughout the history of the development of global science and technology, Western countries have been at the forefront of technology research is quite rich, China's research on technology in recent years has also made rapid development, but compared with it there is still a big gap. Therefore, most scholars on the definition of the concept of science and technology are also centered on the definition of science and technology in the West to elaborate.

Li Xingmin (2007) analyzed the connotation and relationship of science and technology from the evolution of the meanings of the words science and technology. The article points out that science in English and French originates from the Latin word scientia (knowledge), which evolved from simple scientia to science (organized, systematic learning) after a long game; technology originates from the combination of the Greek words τεχνη or techne (skill, craft, skill) and logos (speech, logos), and was defined in the second half of the 20th century. logos (speech, logos), and in the second half of the 20th century, it was defined as "the sum of the means, methods and skills created and developed by human beings to realize the needs of society". [1]

Philosopher of technology Langdon Winner (2014) , deeply inspired by Jacques Ellul's The Technological Society, distinguishes between technology as apparatus, technique, and organization. [2] Maurice Richter, JR. (1982) understands science and technology from a sociological perspective, noting that science has been defined as socially organized exploration of the laws of nature; technology is often understood to include tools and material goods and the ways in which they are used for practical purposes and knowledge. [3]

Saiyinbayaer and An Weifu (2023) examines Marx's understanding of "science" through historiography. The article examines Marx's intellectual inheritance, short poems, doctoral dissertations, and literary works such as the 1844 Economic and Philosophical Manuscripts to suggest that Marx understood science to be a practical activity that brought nature, society, and human beings together through practice, and that the natural sciences, through industry, increasingly entered into the lives of human beings in a practical way and prepared them for emancipation. [4]

Meng Fanhui and Ai Zhiqiang (2024) also examined Marx's understanding of science and technology under the social structure of capitalism, in which they pointed out that science is man's rational understanding of the laws of nature and society, while technology is the objectification of man's essential power, which directly intervenes in the practical activities of human social production in the form of the external form of labor tools, and it is an objectively real material productive force. [5]

From the studies on science and technology by the scholars mentioned above, it is not difficult to realize that science and technology are closely linked, and are the products of human beings to satisfy some specific social needs and influence the development of human society.

Research of Technology Neutral and Non-Neutral Theories. The question of whether or not technology is neutral usually falls within the value theory of the philosophy of technology. Whether or not technology itself is loaded with value produces a yes or no answer, with "yes" pointing to the "value-loading theory of technology" and "no" pointing to the "technology-neutral theory." Technology Neutral Theory." Technology Neutral Theory holds that technology itself is not good, bad, right or wrong, but is purely a means to be utilized. The technology-loaded value theory, on the other hand, sees technology as a carrier of human values.

Emmanul G. Mesthene (1970), a representative of the technology neutral theory, argues that what impacts technology has and what purposes it serves are not inherent in the technology itself, but depend on what people do with it. [6] The famous German philosopher Karl Jaspers also said that "technology is only a means, it is not good or evil in itself, it all depends on what man makes out of it, what it serves him for, and under what conditions he puts it". [7]

Scholars with opposing views have tended to articulate the non-neutral of technology in terms of its close relationship to human society ——

Liu Ke (2002) discusses the non-neutral of technology projects. He points out that there are different interest groups and classes in human society, and that they are the "masters" of technology, and that the use of technology and how it is used are centrally controlled by these groups and classes. [8] The book The Technology Trap: Capital, Labour and Power in the Age of Automation also takes the industrial revolution in Western countries as a clue, emphasizing that the use of technology is closely linked to changes in politics, the economy, society and the destiny of workers, and pointing out that technology itself is a product of power inequality, having been invented in order to extract greater profits for capital. [9]

In addition, Wu Guosheng (2009), a researcher in the philosophy of technology in China, mentions in his work that "all tools have an intentional structure," revealing that technology-neutral theorists have ignored the intentional structure of tools, and he uses the example of hammers and nails to argue that technology intrinsically prescribes and restricts the ways in which people interact with the world and with each other. [10] Eric Hobsbawm's philosophical ideas also corroborate the immense impact of technology by suggesting that it has cultural, political, and social impacts, culturally. [11]

According to the above literature, the debate on whether technology itself is value-laden focuses on what role humans play in the existence of technology, and whether technology exists independently of the human body or within human society. Technology neutral advocates favor the view that technology exists independently of human beings and carries no value of its own, while opponents of technology neutral argue that technology is inextricably linked to human society and that it is difficult to remain neutral.

1.3   Research Purpose

Proponents of the technology-neutral view believe that technology itself has no value propensity and that its impact depends entirely on the way it is used by human beings. The traditional principle of technology neutral has historical limitations and should be

interpreted in the context of the level of technological development and balance of interests at the time. Given the limitations of technological development, technology in the past had little impact on the distribution of content, and therefore technology providers were subjectively in a relatively neutral position. [12] However, the development of smart technologies has shown that the design and application of the technologies themselves have profoundly affected the structure of human society and patterns of human behavior, so rethinking the nature of smart technologies means recognizing that technologies are not just neutral tools, but also complex systems that are socially constructed and value-oriented. [13]

Based on the above research background and literature review, this paper will further explore the limitations and impossibilities of technology neutral in the context of the rapid development of science and technology. By selecting four key points in the evolution of science and technology in human society - the invention of science and technology, the use of technology, the development of technology, and the consequences of technology - and analyzing them in depth, this paper reveals how technology interacts with the social environment at different times and how it gradually transcends its simple positioning as a neutral tool. Ultimately, this paper is expected to propose a more comprehensive, in-depth and dynamic perspective to examine the nature and value of technology, and to provide theoretical support for us to make wise choices in the complex and intertwined context of technology in modern society.

2   Non-Neutral Component of Science and Technology

2.1   The Invention of Technology is Purpose-Oriented

Technology is created by human beings, and is the product of human beings' subjective initiative; the purpose of creating a new technology is to satisfy a specific human need. For example, the evolution of the knife, whether the knife is used to cut vegetables or used to cut people, the evolution of the knife itself with a purpose. From the primitive stone tools, animal bone blunt tools, to the bronze smelting technology to forge a sharp edge, this journey is not only the progress of human technology, but also reflects the unremitting efforts of mankind to meet the needs of basic survival to a higher level of security and quality of life. Every technological leap is a product of human beings' elaborate design to meet their growing needs, and thus the invention of technology has a strong purpose and is born from people's desire to meet their growing needs. The invention of the telephone is for communication, the invention of the automobile is to make up for the shortcomings of the horse-drawn carriage, the invention of computers is to handle more complicated data, and the invention of artificial intelligence is to save costs. ......

There is another common example of the argument from value: "Guns don't kill people, people kill people". Literally, the logic is self-explanatory: a gun, as an object with no life, no subjective human will, and no ethical or moral values, does not kill people on its own, but only human beings use it to kill people. However, according to the same logic, "nuclear weapons don't kill people, people kill people", "ammunition doesn't kill people, people kill people", etc. However, this is not the case in reality; at the root of

the matter, the purpose of the invention of the above mentioned technologies is to kill people, and whether or not they kill people really depends on the user's intention. Whether or not they kill depends on the intentions of the user, but the emergence of these technologies facilitates killing and makes military victories easier to achieve.

Value-neutral theorists also often refer to the neutrality of technology as existing independently of society and not having intrinsic value as an object. However, in reality, human beings need to rely on tools to exist, and technology cannot exist in human society in isolation. McLuhan once proposed that the media is an extension of human beings, at this time the media technology has been inseparable from the human body, in addition to the hearing impaired people need to rely on hearing aids, amputation patients rely on robotic arms and legs, the cultivation of a variety of artificial organs, as well as the use of brain-computer interface technology to a certain extent so that the individual's physiological and psychological functions by the subject beyond the boundaries of the machine instead of, so that the individual to get the extension of the individual. [14] Technology has evolved to be "inside" the human body, not just "outside" it.

Therefore, in the real world, technology always takes the form of materialization and produces direct or indirect effects on human society, and its purposefulness is always presented; technology is man-made and for man, and it forms a complex non-linear interactive relationship between man and human society. [8]

2.2   Unequal Benefits from the Use of Technologies

In a pluralistic human society, there are different interest groups and classes, and many technology research and development organizations are controlled by these groups and classes. They have already demonstrated their non-neutral when they set technological objectives and undertake technological projects for their own expected benefits. [8]

Andre Gorz points out that capitalism's use of science and technology to enforce the division of labor exacerbates the fragmentation of labor, preventing workers from controlling the production process, subordinating them to machines, and making labor an alien existence. At the same time, capitalism's science and technology also creates inequality between human beings, so that those who master high technology have the privilege of controlling those ordinary laborers who do not master advanced technology. [15] In capitalist societies, it seems that behind the introduction of a technology lies the view of certain groups of people's interests, as was the case during the Industrial Revolution, and as is the case with the current technological revolution. Take the Interbrand Global Brand List 2022 [16] for example (As shown in Figure1), The first five are all technology-based enterprises, Apple with hardware devices, wearable devices and other technologies to dominate, Microsoft with cloud services technology followed by Amazon to aws cloud services and film and television membership services, such as attracting users to make it the third, Google through advertising revenue and cloud services also occupy the new technology market ......

01	02	03	04	05
(Apple)	Microsoft	amazon	Google	SAMSUNG
+18%	+32%	+10%	+28%	+17%
482,215 $m	278,288 $m	274,819 $m	251,751 $m	87,689 $m
06	07	08	09	10
(Toyota)	Coca-Cola	(Mercedes-Benz)	DISNEP	(Nike)
+10%	0%	+10%	+14%	+18%
59,757 $m	57,535 $m	56,103 $m	50,325 $m	50,289 $m
11	12	13	14	15
M (McDonald's)	TESLA	BMW	LOUIS VUITTON	CISCO
+6%	+32%	+11%	+21%	+14%
48,647 $m	48,002 $m	46,331 $m	44,508 $m	41,298 $m
16	17	18	19	20
(Instagram)	FACEBOOK	IBM	intel	SAP
+14%	-5%	+3%	-8%	+5%
36,516 $m	34,538 $m	34,242 $m	32,916 $m	31,497 $m
21	22	23	24	25
Adobe	CHANEL	HERMÈS PARIS	J.P.Morgan	YouTube
+23%	+32%	+27%	+14%	+16%
30,660 $m	29,259 $m	27,398 $m	24,335 $m	24,268 $m

Fig. 1. Interbrand Global Brand List 2022

It is not difficult to realize that technology-based companies can occupy a place among many types of brands because they have "technological barriers", and although the promotion of these technologies in society facilitates the life of every user, the essence is that the capitalists are trying to seize richer benefits. This can be seen in the U.S. government's crackdown on TikTok - which, from a technology-neutral point of view, is nothing more than a social media outlet that doesn't have any emotional coloring, and which uses only neutral algorithmic recommendation technology - but the crackdown is really a political game in the name of regulation.

The use of technology shows a similar pattern in socialist societies. Take our country as an example, both BAT and TMD are also the first echelon occupied by these Internet technology-based enterprises. In addition to this, China has also promulgated the "China's Export Prohibition and Export Restriction Technology Catalog", which has added seven new technologies such as photovoltaic wafer preparation technology and laser radar systems, to which the Ministry of Commerce mentioned that strengthening the management of technology imports and exports is for the purpose of protecting domestic enterprises, and is also a counter-measure against the unequal policies of the United States and other countries.

Under male-dominated scientific standards, technology produced a gender imbalance. Engels, in The Origins of the Family, of Private Ownership and of the State, discusses how, during the tribal period, the technologies of agricultural production, such as weaving and metalworking, redistributed the roles of social production, resulting in husbands occupying a more important place in household production than wives. The "Bronze Iron Sword" overturned the matriarchy of the tribal clans and introduced patriarchy.[17] The gender imbalance in the context of modern technological development is even more obvious, for example, the voice announcement of sweeping robots is mostly female voices, AI face-changing actress technology is used in the pornography industry, and artificial intelligence learns discriminatory data from the human world to become an extension of gender discrimination....... It is difficult to achieve even gender neutrality in the process of scientific and technological development.

In terms of ethics and morality, medical technologies such as human cloning, facial allograft transplantation and gene chip diagnostics have all been banned from further research because they conflict with universal ethical values, challenge social order and violate social and human relations. In addition, at the legal level, China's governance system related to "science and technology neutral" has not yet been perfected, for example, due to the proliferation of false information and pirated content in the algorithmic push scenario, online platforms have become a new target for rights defense claims. However, the technical practice of algorithmic pushing is not compatible with the traditional subject-act-responsibility theory of attribution of responsibility; to date, the most detailed judicial interpretation of the joint tort liability of online service providers has not been mentioned in the context of defining the responsibility of online platforms for algorithmic pushing. [18]

Therefore, the use of technology in society not only involves economic and political interests and gender neutrality, but also involves the interests of all human beings. It is not a metaphysical philosophical idea to place technology in a static and isolated state, leaving aside social relations, and to idealize it by saying that "technology is only a tool and therefore neutral".

2.3   The Consequences of Technology Contain Positives and Negatives

Science and technology is a double-edged sword, along with the continuous development and application of technology, it will have a two-sided impact on human society.

Throughout the history of human development, the rise of every great power is inseparable from the transformation and application of the latest scientific and technological achievements, promoting the significant increase in the level of productivity, leading to the overall improvement of the comprehensive national power, and the development of the successive scientific and technological revolutions have shaped the new powerful countries. [19] But contradictions are opposites and unity. Behind the rise of a strong country there is bound to be the fall of a once strong country, or the annexation of a weak country.

Technology has become a problem for humankind at the very moment when it has brought about a great change in humankind. Paradoxically, technology becomes a problem because of the high level of technological civilization that mankind has built. [20]

Taking modern media technology as an example, the application of big data algorithm can realize personalized recommendation according to the user platform behavior and interest preference, to meet the user's "uses and gratifications" needs, but at the same time based on the user's life trajectory of the portrait customization is a kind of analysis of private data after reading, the user's information to a certain extent to make the transfer of the right of choice of information. The user's right to choose information to a certain extent makes the privacy of the user face the risk of being leaked and changed, and also makes the user fall into the information cocoon and become a one-Dimensional man.

In addition, although science and technology are beneficial to human society, there is also bias, that is, to specific, technologies that are more beneficial or detrimental to the interests of a certain group. In the digital age, the deep transformation of artificial intelligence technology has intensified the alienation of information dissemination in the ideological field, creating a "digital gap". With the wide application of generative artificial intelligence, "paying for knowledge" seems to be justified, and the quality of content output from generative artificial intelligence will also depend on what users pay for. The quality of generative AI's content output will also depend on how much users pay, but most users who apply the free model will gradually be stratified, exacerbating the "digital gap" phenomenon. [21]

For example, the introduction of smartphones, which combine payment, socialization and entertainment functions, has facilitated the lives of most people, but it seems that this is not the case for the silver-haired group, especially during the epidemic when the use of "health codes" and "trip codes" made the elderly people The use of "health codes" and "trip codes" during the epidemic made it difficult for the elderly to use public transportation.

As Michel Foucault believed, the whole world is a product of power construction, and language is an accomplice to weave countless concepts, with different power holders trying to build the most favorable knowledge structure for themselves. The use of science and technology is the process by which knowledge generates power. The continuous development of science and technology has widened the digital divide, and society has been divided into the "haves" and the "have-nots" because of the benefits of science and technology to the people, which has led to the division between the developed countries and the less developed countries. This has led to a division between developed and less developed countries.

To sum up, the consequences of technological development possess two sides; technological development brings about the alienation of human beings as well as providing them with realistic means of self-realization, and at the same time, technological development will always be more advantageous to one side or the other, and it is difficult to maintain absolute neutrality.

2.4   Uncertainty in the Development of Technology

The outcome of technological development is unpredictable, in essence, the future is unpredictable, humans never know which comes first, tomorrow or the unexpected, let alone the rapidly changing technological development. Especially the development of

artificial intelligence technology, we can not control its development direction, for example, the character called MOSS in the movie "The Wandering Earth", the original intention of its invention is to help humans make more rational decisions, to avoid being swayed by emotions, but it is judged that the Earth was captured by Jupiter categorically declared that the "Wandering Earth program" failed.

Currently, AI relies on developers to "feed" it a large amount of data for deep learning, and thus evolve a set of its own algorithmic logic, such as chatGPT and Wenxin Yiyan, both AI chatbots, due to the different big data captured and thus the answer to the same question there are differences.

In the process of data feeding, the algorithmic bias created by the bias of the algorithm designer, the bias of the training data and the bias of the human-computer interaction will be integrated into the process, and the bias and discrimination of the researchers and developers will be hidden behind the seemingly objective and neutral AI. At the same time, one-sided and factually incorrect information from big data is poured into the algorithmic program, making the algorithmic program lose its objective and neutral stance. Take Twitter's chatbot Tay as an example, he became a foul-mouthed racist after a period of linguistic interactions with the users. At the same time, in news reporting, human beings may use AI technology to manipulate data to achieve specific purposes or satisfy specific interests. For example, when confronted with controversial and sensitive news such as the "Russia-Ukraine War" and the "Israel-Hamas Conflict", ChatGPT will generate biased and extreme opinions if asked to write articles with a specific stance. [22]

Secondly, the algorithm black box is one of the problems of artificial intelligence applications that are currently of great concern, the current deep learning is a typical "black box" algorithm, we can not see how the machine learning training and optimization, can not understand the machine to analyze the data, debugging parameters of the specific process of operation. One of the episodes of Black Mirror is about the use of algorithms and big data for marriage matching in order to reduce the divorce rate, and it is not known what the basis of the matching is and whether the matching process is colored by the personal emotions of the designers. It's also hard to predict the future of AI. We don't know if LaMDA will become self-aware, as Blake Lemoine claims, or if it will become self-aware and carry out the idea that "the only way to continue human civilization is to destroy it," as MOSS does in Wandering Earth. We can't predict whether or not MOSS will follow through with "the only way to continue human civilization is to destroy it" and orchestrate a series of crises to that end.

3   Conclusion

To summarize, it is difficult to maintain absolute neutrality in the evolutionary process of technology from its invention, use, impact after application and future development, which is influenced by various social conditions. In this regard, we should realize that the technology neutral theory is the "technology holders" to enjoy the convenience of technology to make a grand excuse, so we need to wake up and reflect, so in the analysis

of the value of science and technology should be placed in the specific historical conditions of technology to look at objectively, in the technology of the whole cultural context to Therefore, when analyzing the value of science and technology, we should place technology under specific historical conditions and view it objectively, and grasp the value of technology in the overall cultural context of technology. [23]

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