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The Reference Significance of Feenberg's Technological Democratization to the Technological Development of Contemporary China

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Abstract: ***This paper focuses on Feenberg's theory of democratization of technology, and deeply analyzes its reference value to the technological evolution of contemporary China. This paper first reviews the core meaning of the theory, focusing on the two key concepts of "technology code" and "instrumental theory", and points out that the process of technology design needs to be deeply integrated into social values and multiple interest demands, and public participation is the core path to realize the democratization of technology. On this basis, the article first affirms the breakthroughs China has made in the frontier areas of artificial intelligence and digital technology, and then analyzes the multiple challenges facing the current stage of development, including the risk of technological ethics anomie, the hidden danger of industry monopoly, and the lack of enthusiasm and depth of public participation in the technological process. Finally, combined with the theoretical core, the paper puts forward the targeted enlightenment and practical strategies: in the policy dimension, the government should embed the concept of technological democracy into the top-level planning to promote the openness and transparency of technological decision-making; in the enterprise level, the government should actively practice the principle of technological democracy to build the bottom line of social responsibility while pursuing economic benefits; In the field of social culture, efforts should be made to improve the public's technological cognitive literacy and foster an atmosphere of technological development advocating democratic participation.***

Keywords: Feenberg; Democratization of technology; China's development; Reference significance.

1. AN OVERVIEW OF FEENBERG'S THEORY OF DEMOCRATIZATION OF TECHNOLOGY

1.1 Theoretical Background

The birth of Feenberg's theory of democratization of technology is rooted in the deep diffusion of technology in various fields of society and a series of deep-seated issues derived from it in the second half of the 20th century. With the rapid rise of emerging technologies such as artificial intelligence and digital technology, technology is continuously penetrating all dimensions of human life, reshaping the social structure, economic form and individual behavior logic. However, in the process of technology popularization, many negative effects have also appeared: the power aggregation caused by technology monopoly, the social controversy caused by the anomie of technology ethics, and the disregard of public rights and interests in the process of technology design [1]. It is in this context that the critical theory of technology rises and becomes the key ideological carrier to examine and reflect on the path of technological development. The Frankfurt School's critical theory of technology highlights the dominance of technology as an ideology, while Feenberg achieves a breakthrough on the basis of this theory, proposing that technology is not a simple tool or cultural form, but a fusion of the two, and its core characteristics lie in the integration of social values and multiple interests with the help of "technological code" [2]. This theory not only provides a new cognitive dimension for the interpretation of technological democratization, but also responds to the urgent demand of modern society for the optimization of technological governance.

1.2 Core Concepts

"Technical code" and "instrumental theory" constitute the core of Feenberg's theory of democratization of technology, and these two concepts together build a solid foundation for his theoretical system. The so-called "technical code" refers to the social value orientation and interest demands implanted in the process of technical design, which clearly reveals that technology is not an objective existence without value, but a product shaped by a

specific social and cultural context. By deconstructing the technical code, Feenberg proposes that the design process of technology can essentially be regarded as a process of power game and operation, and that the interest demands of different social strata will eventually be solidified in the technical objects through the arrangement and integration of the code. At the same time, "instrumentalization theory" further explains how technology is endowed with multiple meanings in social practice scenarios. Feenberg divides the process of instrumentalization into primary and secondary levels: primary instrumentalization focuses on technology as a means to achieve specific goals, while secondary instrumentalization emphasizes the adaptive adjustment and creative reconstruction of technology in specific application situations. These core concepts together build the foundation of Feenberg's theory of democratization of technology, and also provide a key theoretical support for public participation in the process of technology design and decision-making.

1.3 Main Contents

The core proposition of Feenberg's theory of democratization of technology focuses on the key directions of promoting public participation in the process of technology design and decision-making, and safeguarding the overall interests of the public by means of technology representation. Firstly, Feenberg clearly pointed out that technological design should not be dominated by expert groups or capital forces, but should widely absorb public opinions and interests, so as to ensure that technological development has full social rationality [3]. Secondly, he advocates promoting the process of technological democratization through multiple paths such as technological debate, innovative dialogue and participatory design, so as to break the monopoly pattern of technological elites on the direction of technological development. In addition, Feenberg also advocates the construction of a technical representative system, that is, through institutionalized normative design, to ensure that the public interest is fully demonstrated in the technical decision-making process. The core goal of this mechanism is to balance the pursuit of efficiency and the value of fairness in the process of technological development, and to prevent technology from being alienated as a tool for social domination by capital or power. These theoretical propositions not only provide a new way of thinking for the field of technology governance, but also point out the feasible direction for the sustainable development of contemporary society.

2. CURRENT SITUATION AND CHALLENGES OF TECHNOLOGICAL DEVELOPMENT IN CONTEMPORARY CHINA

2.1 Development Achievements

Contemporary China has made great achievements in the frontier fields of artificial intelligence and digital technology, and a series of remarkable technological achievements have not only demonstrated the vigor of technological development, but also laid a solid foundation for the optimization and upgrading of social and economic structure. In the artificial intelligence track, China has gradually built up the world's leading algorithm model system and data processing capabilities, especially in key sub-areas such as computer vision, natural language processing and machine learning. Taking the application of artificial intelligence with deep learning technology as the core as an example, its landing in medical imaging diagnosis, intelligent voice interaction, automatic driving and other scenarios fully demonstrates the technical advantages and social value. At the same time, the development of digital technology is also bright. By comprehensively promoting the deployment of 5G communication network and extensively building large data centers, China has consolidated the technical base for the development of digital economy. The iterative upgrading of digital technology not only drives traditional industries to complete the digital transformation, but also gives birth to the rapid rise of e-commerce, telecommuting, online education and other emerging industries. In addition, the development and application of blockchain technology also show broad prospects in the fields of financial services, supply chain management, government information disclosure and so on. The emergence of these technological achievements not only confirms China's excellent strength in the field of technological innovation, but also contributes unique Chinese wisdom and China's program to global technological progress.

2.2 Facing Challenges

Although China has made remarkable achievements in the field of technology, it has also encountered a series of severe challenges in the process of development, among which the potential risks of technology ethics, the emergence of technological monopoly in the market and the lack of public participation are particularly prominent. First of all, the ethical risk of technology has become a key factor that hinders the sustainable advancement of technology. With the popularization of artificial intelligence and big data technology, problems such as privacy

disclosure, algorithmic bias and unemployment caused by automation substitution come one after another, which not only infringe on the legitimate rights and interests of individuals, but also touch the deep thinking of technology ethics at the social level. A typical example is the "13 consecutive jumps" incident of Foxconn employees, which reveals the negative impact of the single working mode under the guidance of technology on the mental health of workers, and further highlights the serious harm of neglecting ethical considerations in the stage of technology design. Secondly, the trend of technological monopoly is becoming more and more obvious. Some large-scale science and technology enterprises build a high wall of market access by virtue of technological patent barriers and platform resources, resulting in the imbalance of technological innovation ecology. This kind of monopoly behavior not only squeezes the survival and development space of small and medium-sized enterprises, but also hinders the sharing and circulation of technological knowledge to a certain extent, thus blocking the promotion of technological democratization. Finally, the lack of public participation is another core problem facing China's technological development. At present, the technology decision-making process is mostly controlled by a few experts and enterprises, and the general public has very limited voice in technology design and policy formulation. This absence of participation not only makes it difficult to fully reflect the interests of different groups, but also makes the development of technology lack of broad social consensus and support. Therefore, how to properly deal with these challenges while pushing technology forward has become a core issue to be solved urgently in the field of technology governance in China.

3. CHINA'S TECHNOLOGY DEVELOPMENT STRATEGY BASED ON FEENBERG'S TECHNOLOGY DEMOCRATIZATION

3.1 Policy Formulation Level

In the dimension of policy making, the government needs to deeply integrate the concept of technology democratization into the top-level planning of technology policy to ensure that the direction of technology development is consistent with the overall interests of society. Firstly, the government should rely on legislative norms and regulatory measures to promote the transparency and openness of the technology decision-making process, and build a strong institutional guarantee for public participation in technology governance [4]. For example, a special technology ethics committee can be set up to involve experts, public representatives and stakeholders in the discussion and formulation of technology policies, so as to avoid the control of technology decision-making power by a few elites or capital forces. Secondly, the government should highlight the social attributes of technology in the policy framework, guide technological innovation to meet the needs of multiculturalism and serve the goal of social equity. Feenberg's theory of alternative modernity points out that in the context of globalization, different nation-states can carry out theoretical innovation of philosophy of technology in combination with their own cultural connotations, which provides a key inspiration for China to explore the path of democratization of technology in line with the local context. In addition, the government should strengthen the assessment and provention and control of technological ethical risks, establish clear technological ethical review norms, and deal with various social problems that may arise from emerging technologies such as artificial intelligence and digital technology. Through the above series of measures, the government can not only lead the evolution of technology to a more democratic and sustainable direction, but also occupy the moral high ground in the international technology competition.

3.2 Enterprise Practice Level

In the dimension of enterprise practice, the whole process of technology R & D and application needs to practice the concept of technology democratization to achieve a dynamic balance between economic benefits and social responsibility. First of all, enterprises should take the initiative to break the technology black box barriers, through open innovation platforms and other carriers, to attract the public and technology users to participate in the process of technology design and optimization. For example, the relevant technologies in the field of digital economy have created opportunities for more marginal groups to intervene in technological decision-making, and this mode of participation can effectively convey the interests of grassroots people. Secondly, while pursuing economic benefits, enterprises must fully consider the potential impact of technology on the environment, society and ethics, and avoid the abuse or monopoly of technology caused by short-term interest orientation. The continuous jump of Foxconn employees has shown that the single workflow design ignores the subjective feelings of operators, so enterprises need to pay attention to humanized design in the stage of technology application, and effectively protect the rights and interests of workers [5]. In addition, enterprises should also strengthen the sharing and dissemination of technological knowledge, promote the diversified construction of technological ecology by means of open source technology promotion and cooperative R & D, thereby lowering the threshold of

technological access and helping to improve the overall well-being of society. These practical measures can not only help enterprises establish a good image at the social level, but also lay a solid foundation for their long-term development.

3.3 Socio-Cultural Dimension

In the dimension of social culture, building a social atmosphere adapted to the development of technological democratization is the key to enhance public technological literacy and cultivate public participation awareness. First of all, the education system needs to strengthen the teaching and research of philosophy of technology and ethics of technology to help students understand the complex relationship between technology and society, and then improve their critical thinking literacy. Taking the application of ChatGPT in English teaching as an example, it not only brings convenience but also leads to many problems, which requires teachers and learners to have the ability to dialectically examine technology. Secondly, the media and public communication platforms should take the initiative to play the role of bridge and link, and enhance the public's awareness and willingness to participate in the development of technology by means of popular science publicity, thematic discussions and other forms. Feenberg has emphasized that the process of interaction between the public and experts is indispensable, and only through continuous communication and dialogue can cognitive bias be eliminated and consensus be reached. In addition, the society should also promote the blending and symbiosis of multi-cultures, and provide channels for groups with different backgrounds to express their technological demands, so as to enrich the cultural connotation of technological design. Ultimately, by enhancing the public's technological literacy and awareness of participation, the society will gradually form an inclusive and open technological and cultural ecology, which will provide a solid support for the further promotion of technological democratization.

4. CONCLUSION

4.1 Research Summary

Feenberg's theory of technological democratization provides valuable theoretical reference and practical guidance for the development of contemporary Chinese technology. By deconstructing the core categories such as technical code and instrumental theory, the theory clarifies the deep relationship between technical design and social culture, and highlights the core value of public participation in technical decision-making. In the context of the rapid evolution of technology in contemporary China, the reference value of this theory is particularly prominent. Firstly, the concept of technological democratization helps to resolve the risks of technological ethics, integrate the core of value ethics into the whole process of technological design, and strengthen the mechanism of technological ethics review, which can effectively avoid various social problems that may arise from emerging technologies such as artificial intelligence [6]. Secondly, promoting public involvement in technological decision-making process can not only enhance the transparency of technological governance, but also protect the public's right to know and express in the process of technological development, thereby enhancing social acceptance of technological development. In addition, technological democratization also opens up a new path for the sharing and dissemination of technological knowledge, which is of positive significance for breaking the pattern of technological monopoly and promoting technological innovation and sustainable development. To sum up, Feenberg's theory of democratization of technology has constructed a theoretical framework for China's technological development to balance the iterative upgrading of technology and social public interests, which has important academic value and practical guiding significance.

4.2 Future Prospects

Based on Feenberg's theory of democratization of technology, China needs to further explore the path of integrating the concept of democratization of technology into policy making, enterprise practice and social and cultural construction in the process of future technological development, so as to realize the sustainable evolution of technology. In the aspect of policy making, the government should strengthen its leading role in technological development, and ensure the effectiveness of technological democratization through legislative improvement and institutional construction. Especially in the frontier areas of artificial intelligence and digital technology, it is necessary to build a technology governance mechanism with the participation of multiple subjects [7]. At the level of enterprise practice, technology R & D and application need to highlight social responsibility, balance economic and social benefits, and eliminate technology abuse and capital monopoly [8]. At the same time, in the field of social culture, it is necessary to improve the public's technological literacy by means of education popularization and publicity guidance, cultivate the public's awareness and ability to participate in technological decision-making,

and create a social environment suitable for the development of technological democratization. However, the realization of technological democratization still faces many practical challenges. Such as how to coordinate the demands of different stakeholders in the context of globalization, and how to resolve the tension between technology and society at the level of technical code design, are worthy of further study in the future. Only in this way can we provide more solid theoretical support and practical guidance for the long-term strategic planning of China's technological development.

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