What Comes after 5G? Reflections on the Ideological Attributes of New Communication Technologies

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Abstract: In the 1950s, a vigorous debate on the relationship between technology and societal development emerged in Western theoretical circles, which continues to influence contemporary discussions. Under the banner of progressivism, science and technology were considered neutral, serving as essential drivers of societal progress. The Frankfurt School first proposed the idea that "science and technology are ideologies," exposing the negative aspects of the technological ideology in capitalist societies, while communication political economists also emphasized the "non-neutrality" of technology. The communication environment in Chinese society is currently being rewritten and reshaped by new communication technologies such as 5G, algorithms, and big data. As we anticipate the possibilities brought by these new communication technologies, it is essential to consider their ideological attributes. Technology itself is a result of social processes, and beyond the development logic dominated by the state and capital, more people should be involved in the design and selection of new communication technologies.

Keywords: New communication technologies, ideology, 5G, big data, algorithms

1.   Introduction

The current wave of technological innovation is unleashing the fourth industrial revolution globally, and Chinese society is also witnessing a new era of technological revolution and industrial transformation, with its impact permeating all aspects of social life. In the field of journalism and media, the contemporary news and communication environment is constantly being rewritten and reshaped by the emergence of new communication technologies. Given the immense power that new communication technologies can wield, it is imperative to approach their development with caution. This paper continues the line of thought from the Frankfurt School and the field of communication political economy in considering technology and raises the following research questions: How can we understand the ideological attributes of technology? What ideological attributes do new communication technologies possess? How can we seek alternative paths for technological practices? This paper adopts a critical research paradigm and primarily employs speculative research methods. Drawing on the history of thought, it identifies myths in the process of technological development and, in combination with empirical observations and analyses, explores the ideological attributes of

new communication technologies represented by 5G, big data, and algorithms. Based on this exploration, it proposes new possibilities for the development trajectory of technology.

2. The Ideological Attributes of Technology: A Historical Discussion

The rise of scientific discourse can be traced back to the "scientific revolution" that began during the Renaissance period [1], and it gradually established its own position alongside the modernization process initiated by the Enlightenment. Influenced by Enlightenment philosophy and the theory of evolution, 19th-century theorists often referred to the context of the history of science when arguing the process of societal rationalization. Marx believed that "societal rationalization is the great development of productivity," which includes the "growth of empirical knowledge" and the "improvement of production technology" [2]. Science and technology were considered to possess a liberating and progressive force.

However, after two devastating wars in the first half of the 20th century, modernity faced a legitimacy crisis, and the development of modernity itself became a symptom. The Frankfurt School was the first to "direct the critique of ideology towards the cornerstone of Western industrial civilization theory - the modern 'Enlightenment spirit'" [3]. Max Horkheimer argued that Enlightenment reason had been trapped in the shackles of instrumental reason, and technology was the basis of instrumental reason. Science became an ideology because it "retained a form that obstructed its discovery of the true causes of social crises" [4]. Horkheimer, along with Adorno, extended the logic of technological rationality with the concept of the "culture industry," suggesting that the culture industry produced a significant amount of "social cement" to sustain industrial society. Herbert Marcuse, in "One-Dimensional Man," revealed the dual nature of science and technology as both means of production and ideology. He believed that the nature of the authoritarian control in advanced industrial societies lay in "the progress of technology," where "the rationality of science and technology is fused with a new form of social control" [5]. Jurgen Habermas, on the other hand, saw technology as the "first productive force" and the foundation of "the legitimacy of domination." He argued that the ideology of technology no longer manifested as social control and oppression but had become a "new kind of ideology with science as its idol" [6].

The political economy of communication school emerged as a critique following the Frankfurt School's critical research. The founding figure of Western political economy of communication, Dallas Smythe, visited China in the 1970s and wrote "What Comes After the Bicycle?" Smythe particularly emphasized the "non-neutrality" of technology, arguing that technology is not autonomous, and "the constituents of science undoubtedly reflect the worldview and political structure of the particular socio-culture of that moment." Smythe also suggested that China envision a more democratic and networked "two-way television system" to transform mass media, which "serves the capitalist profit reproduction," into a means of achieving mass democracy [7].

Looking back at the development of technology in Chinese society in the current context, Smythe's warnings seem to have been consistently absent. The root of this issue lies in the fact that the "catching up" logic of "four modernizations" established since the founding of New China was dominated by politics and ideology, without exploring the unique path of socialist technological development. After the "New Technology Revolution" in the 1980s [8], the consensus logic became "science and technology as the primary productive force driving societal development," and Chinese society wholeheartedly embraced the "third wave" of the information revolution. This historical process resulted in a comprehensive replacement of technology concepts: on one hand, the ideological color of technology was completely erased, and on the other hand, the more than century-old imagination of technological nationalism continued to resonate and ferment. In this context, China's path of technological development has adopted a more pragmatic utilitarian approach, emphasizing that technology as a tool is neutral. However, technology is inevitably the result of specific social

processes, involving the participation and operation of specific political powers and interest groups, and there exists varying degrees of contention. "Technology neutrality" obscures the inherent logic of technology's ideological attributes. After all, in socialist countries, the question of "who technology serves" and "how technology contributes to reproduction" must always be considered.

3. Unexamined Certainties: A Critique of the Ideological Attributes of New Communication Technologies

Communication political economist Yuezhi Zhao argues that "China's economic development and the successful diffusion of information and communication technologies may be eloquent, but they are not beyond doubt." In her view, "the 'information superhighway' constructed under market authoritarianism will not lead to 'socialist democracy.'" [9] While China's communication environment and media ecosystem are being rewritten and reshaped by new communication technologies, the process by which technology establishes its legitimacy seems to have gone unexamined. The underlying ideological attributes have been taken for granted. Taking popular technologies such as 5G, big data, and algorithms as examples, how are new communication technologies developed, and in what ways are they utilized? What are the hidden ideological attributes behind them? When considering the possibilities that new communication technologies bring, it is essential to reflect on the political and economic factors behind these technologies.

3.1. 5G as a Revolutionary Technology: Whose Revolution?

5G, short for the fifth generation of mobile communication technology, is typically regarded as having characteristics of "high speed, high connectivity, low latency, and low energy consumption." One prevalent viewpoint suggests that 5G, unlike the previous four generations of communication technology, is a revolutionary technology that "relates to industrial revolutions in many fields" and "points to significant social change" [10]. In the realm of communication, 5G is envisioned to restructure all relationships in the information network, making it possible for "everyone to participate in the process of social communication - that is, 'everyone is a communicator.'" [11] However, this outcome is not an inherent logical consequence of 5G's development. The notion that new communication technology enables everyone to have a voice is itself an expression of ideology. Fox points out that the ideology of social media is "participation, connection, and sharing," which grafts onto voluntary, free, and equal capitalist values. However, it conceals issues such as users contributing free labor to the platform, being guided into consumption logic, new technology becoming a tool for state or organizational surveillance of personal privacy, and power disparities among individuals under the control of capital interests [12]. Currently, discussions in China's communication academia regarding 5G technology largely revolve around its application prospects. If the "everyone is a microphone," "internet of everything," and "digital presence" created by 5G is just an amplified version of "participation, connection, and sharing" and does not affect or change existing social production relations, then 5G cannot be considered a revolutionary technology. Furthermore, the technological and political-economic background of 5G development needs to be considered: the ongoing China-US trade disputes are indicative of intense competition between latecomer nations and established capitalist countries. Thus, China's government defines the 5G contest as "not only a contest of technology and standards but also a strategic competition between nations." Unlike the past transitions from 1G to 2G, 3G, and 4G, China's 5G development "has a strong momentum to 'catch up' or even 'lead'." [13] What comes after 5G? The research and development of 6G is already in full swing. According to Yuezhi Zhao, China's "digital revolution" is taking the path of "top-down governance by technological experts and integration with the global

capitalist market system." This approach may deviate from the mass line of "socialist democracy" to some extent. [14]

3.2. Big Data and Algorithms: A New Form of Control Technology

Big data and algorithms have been widely applied in various aspects of society, including algorithmic news services and consumer decision-making services based on big data, social security monitoring and early warning using facial recognition technology and facial data, and the use of personal communication tool location data for crowd regulation and diversion in case of emergencies. However, the advancement of technology highlights the social issues brought about by excessive instrumental rationality, as humans are increasingly controlled by big data and algorithms. Take big data-driven consumer decision-making as an example. When an individual's basic information, living radius, consumption preferences, and purchasing power are stored in data form by platforms, individuals are essentially unable to resist the platform's control. This has led to phenomena such as "price discrimination based on big data" (charging loyal customers higher prices). The issue at hand is not just a matter of commercial ethics; because the technology "understands" people too well, big data, through algorithms, maximizes profits through optimal solutions, effectively becoming a precise and all-encompassing tool of capital control. American political scientist and technology philosopher Langdon Winner argues, "Technology is essentially political, inevitably linked to institutionalized forms of power and authority. When Engels described the machines in the spinning mill as more authoritarian than any capitalist, he was confirming the view that modern technology strongly shapes political life." [15] The rules and systems established by algorithms are similar to what Weber referred to as "bureaucracy"; technology positions each person as a "node subject" and a "data subject" manipulated by the algorithmic governance system. The question is, is such a subject still a subject? The loss of human subjectivity is also evident in the control of the human spirit by big data and algorithms. For example, on a short video platform, algorithms analyze user behavior, such as click rates, viewing time, likes, comments, and shares, label each preference, and in the next precise recommendation of videos, optimize existing models based on user habits, providing a continuous and irresistible viewing experience. Data and algorithms are creating more realistic "simulated environments," causing cognitive biases in people and providing continuous comfort as a form of compensation. This is precisely the covert way in which technology exercises its ideological role, as one of the consequences of ideology is "the practical application of ideology to deny its ideological nature within ideology itself." [16] People are always within the confines of ideology without realizing it, accepting a set of seemingly natural rational expressions.

4. Alternative Paths of Technological Practice: Technology as a Social Process

The preceding analysis has explored how the ideological attributes of new communication technologies come into play within specific practical contexts. There are potential social risks: firstly, the current Chinese development path exhibits a certain isomorphic relationship between the legitimacy of technology and the legitimacy of governance. Science and technology, as a discourse of progress, have become what Habermas refers to as a "new type of ideology centered on science." Simultaneously, this discourse has been intertwined with the tragic imagination of technological nationalism developed in modern China over the past century, becoming an ideological myth written spontaneously by the Chinese people. The inherent crisis of technology may be obscured or replaced by other issues. Secondly, the technocratic pragmatism that arises in this context can lead to cognitive blind spots, i.e., overlooking the political and ideological attributes behind technology. The consequence of this is that sometimes people treat technology as a "scapegoat" for modern societal issues, while at other times, they view it as a "panacea" for problem-solving. However, the real causes

of problems often lie in the "specific social systems and ideologies" behind technology development and application, as Smelser pointed out, "The maintenance of capitalism relies on the development of its technological and consumption relationships. Socialism cannot and should not follow the same path but should create an alternative technological culture (public service, mass line, proletarian politics)." [17]

Quoting Smelser's statements from the 1970s is not an attempt to return China's technological development to its old path, but rather to explore the introduction of new variables beyond the logic of "state-capital" domination of technological development. On one hand, contemporary Chinese society is wholeheartedly embracing new technologies; on the other hand, technology is causing unprecedented levels of general anxiety. Technology creates utopia in production but also manufactures its antithesis. Cultural studies scholar Dai Jinhua points out that throughout the history of technology invention and adoption since the Industrial Revolution, "technology itself is the result of a social process," or, in other words, "the result of a social game." People have the right and even the possibility to choose how to use these technologies. However, the current problem lies in the fact that "the choice is with capital, which doesn't even need personification - this is the problem." [18] Therefore, the question to ponder is: Can the use of technology be subject to social discussion once again? How can more people be involved in the process of technology design and selection? If people wish to rebuild human values in this era or have already realized that "algorithms also have values," [19] it demands making a decision regarding technological development: giving full attention to democratic participation by different social forces and prioritizing it in the path of technological development.

5. Conclusion

This paper retraces the discussions of the Frankfurt School and the Political Economy of Communication School regarding the ideological attributes of technology, emphasizing the non-neutrality of science and technology. This constitutes what Smelser referred to as a "blind spot" in the exploration of China's technological development. By analyzing the process through which the ideological attributes of new communication technologies, such as 5G, big data, and algorithms, come into play within specific practical contexts, it reveals the political and economic factors behind technology. More importantly, unveiling the mysterious veil of technological ideology is aimed at achieving the healthy development of technology. This paper proposes the concept of "technology as a social process," emphasizing the importance of democratic participation, with the hope of creating a more benevolent technological environment.

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