Original Paper

On the High Level Ethical Governance of Science and Technology(S&T) in China

Minglei Ding[1]

[1] Chinese Academy of Science and Technology for Development, Beijing 100038, China

Abstract

High-level ethical governance of S&T is the inevitable demand of high quality development of S&T. On the basis of analyzing the situation and demand of the ethical governance of S&T in the new era, this paper studies the shortcomings of the ethical governance of S&T in China and its manifestations, as well as two misunderstandings to avoid, and proposes to adhere to "talents oriented" and "people centered" in the development of S&T. The ideas, key tasks and five suggestions of systematically promoting the ethical governance of S&T centering on "S&T for good".

Keywords

Ethics of S&T, Governance, Ethical Governance of S&T, High-quality Development

1. Introduction

Ethics of S&T is the application of ethical thought in scientific and technological activities such as scientific research and technological development. It is a value and a code of conduct to be followed in S&T activities. The Chinese government attaches great importance to the construction of ethics in S&T. In recent years, it has made decisions and plans to "improve the regulatory system for ethics in S&T" and "improve the ethical governance system in S&T", formed the National S&T Ethics Committee, improved the governance system and mechanism, and promoted the positive progress of S&T ethics governance. In December 2021, the Chinese government issued the guiding opinions on strengthening the governance of S&T ethics, emphasizing that S&T ethics is a value criterion that must be observed in scientific and technological activities, improving the governance system and mechanism of multi-party participation and collaborative governance, and shaping the cultural concept and guarantee mechanism for technology for social good. This is important for accelerating the construction of an ethical system of S&T with Chinese characteristics, improving the institutional mechanism for the governance of ethics of S&T with the participation of multiple parties and collaborative governance,

and realizing the positive interaction between S&T innovation and ethics of S&T. This is important for accelerating the construction of an ethical system of S&T with China's distinctive features, improving the institutional mechanism for the governance of ethics of S&T with the participation of multiple parties and collaborative governance, and realizing the positive interaction between S&T innovation and ethics of S&T.

2. High-level Ethical Governance of S&T is the Inevitable Demand of High Quality Development of S&T

2.1 A New Round of S&T Revolution and Industrial Transformation is Promoting Mankind's Exploration and Cognition of the Material World and the Life World from "Exploration Era" to "Regulation Era", "Editing Era" and Even "Reconstruction Era", which has Profoundly Changed the Way of Production, Life and Thinking of Human Society, Bringing about many Ethical Problems

With the continuous expansion of basic scientific research to the cosmic development, microscopic depth and extreme conditions to accelerate the deep evolution, the structure of matter, the origin of life, the evolution of the universe and the mechanism of consciousness and other major frontier issues are expected to achieve breakthroughs, so that human exploration and cognition of the material world and the world of life from the "exploration era" to the "regulation era" and "editing era", and even the "reconstruction era". Frontier technology fields such as information, biology, energy, advanced materials and manufacturing show multi-technology cross-fertilization and group leap situation. The boundaries of basic research, applied research, technology development and industrialization are becoming increasingly blurred, and emerging disciplines and fields are constantly generated, generating new technologies and industries. For example, the combination of brain science with mathematics and science, information and other disciplines is giving rise to "brain-computer" interaction technology, which will greatly drive the development of artificial intelligence and complex network technology. The new technology system led by high-speed mobile communication, Internet of Things, artificial intelligence, big data, block chain, quantum computing and other new generation of information technology and intelligent technology is becoming the core driving force of the new round of scientific and technological revolution and industrial change, is accelerating the overall proliferation of economic and social, promoting the development of human-centered human-computer-thing triadic integration, profoundly changing people's production, way of life and way of thinking.

With the deep integration of a new generation of information technology and the real economy, new models and new business formats continue to emerge, and the new economy represented by the digital economy will accelerate development across the board, reshaping global industrial competition and division of labor models, which will bring a series of profound changes to production organization, social division of labor and S&T governance. The most basic element of ethics is life. The development of emerging technologies such as gene editing and brain-computer interface has or is subverting people's cognition of life and nature, blurring the boundaries between life and non-life, natural and

101

artificial. The development of artificial intelligence and big data, on the other hand, challenges people's right to privacy and the right to know and choose information.

2.2 The Ethics of S&T has Contemporary and Cultural Characteristics, and the New Development Pattern has Raised Higher Requirements for the Ethical Governance of S&T, and it will be a Long-term Structural Challenge to Deal with the Ethical Challenges and Security Risks of S&T Arising from the Application of New Technologies

In the 21st century, China's S&T career has undergone significant historical, overall and pattern changes, accelerating catch-up in key areas of S&T, some frontier directions began to enter the parallel, leading stage, S&T strength is in an important period from the accumulation of quantity to a qualitative leap, point breakthroughs to system capabilities to enhance. Entering a new stage of development, the construction of a new development pattern should focus on achieving a high level of scientific and technological self-reliance and self-improvement, integrating development and security, and promoting China's long-term development and long-term peace and security, as well as looking ahead to judge the rule conflicts, social risks and ethical challenges brought about by scientific and technological development, which urgently need to play the role of S&T innovation as a key variable in the major changes and as a support and leader in the overall situation of the strategy for the great rejuvenation of the Chinese nation.   This also puts forward new and higher requirements for the ethical governance of S&T in China. This also puts forward new and higher requirements for the ethical governance of S&T in China.

On the one hand, more and more areas of S&T innovation in China will be "parallel" or "leading" in the future, and these areas will not only enter "no man's land" in terms of technology research and development, but also no longer have international precedents for dealing with the ethical, legal and social issues related to them, and China's position and role in global ethical governance of S&T will become increasingly important, while the original strategy of following the original ethical governance of S&T will encounter difficulties. China faces the dual challenges of an inadequate governance system for ethics of S&T in traditional fields and a gap in the governance of ethics of S&T in emerging frontier fields. On the other hand, domestic public awareness of public participation and reflection on the development of new technologies and ethical demands are gradually increasing, and strengthening ethical regulation and properly handling related ethical issues have become inherent requirements for the development of frontier technologies. Therefore, courageous and pragmatic explorations must be made in the concept, rules and institutional construction of ethical governance of S&T to promote scientific and technological development while ensuring that it is always on a socially acceptable track. This is an inherent requirement for promoting better and more sustainable development of S&T innovation in China (Subject Group, 2019).

2.3 With Intensified International Competition in S&T, the Issue of Ethics in S&T is not only One of the Focal Points of Strategic Games in S&T, but also an Important Area for Accelerating the Construction of a World S&T Power and Strengthening the Open Cooperation in Innovation Capacity

On the one hand, the world is witnessing a great change unprecedented in a century. At present, nationalism, populism, protectionism and counter-globalization are expanding and spreading in the world, the strategic games of major powers are becoming increasingly intense, and the global governance system is encountering challenges. Current emerging technologies such as artificial intelligence, blockchain, synthetic biology, big data, Internet of Things, and others continue to make breakthroughs and begin to proliferate applications to all areas of the economy and society. Digital transformation is accelerating on a global scale. Compared with the industrialization period, a new round of technological revolution characterized by data-driven, scenario-driven, and intelligent leadership has triggered concerns about data protection, personal privacy, and how to harness new technologies and properly handle people. Extensive attention to issues such as the relationship with S&T, and how to harness new technology, proper handling of the relationship between people and technology and other issues of widespread concern. Emerging technologies offer possibilities for human well-being, but also pose serious security and governance challenges (e.g. technology security, research ethics, privacy regulation, data property rights, etc.). Among them, ethical governance of S&T has become a key global issue and the focus of strategic games in S&T, as well as an important factor affecting China's S&T security and international image of S&T.

The construction of a world scientific and technological power should not only stand at the frontier of S&T, but also stand at the "high point" of ethics and morality. Due to the increasing high complexity and uncertainty of S&T innovation, the application of new technologies may further widen the gap between rich and poor and enhance social stratification, which may have significant impact and influence on issues such as employment, social ethics and security. In the future, with the large-scale application of gene editing and artificial intelligence, technological risks and social risks are intertwined, and ethical, legal and social problems caused by cutting-edge scientific research and technological application may enter a high incidence period. This provides space for providing "Chinese solutions" and contributing "Chinese wisdom", and it is necessary to make "Chinese voice and Chinese demands" through the formation of S&T ethics and the formulation of rules in related fields. At the same time, it also helps China to enhance its leadership and voice in international S&T governance rules.

3. Styling Shortcomings and Mistakes to be Avoided in the Ethical Governance of S&T in China

3.1 The Capacity of Ethical Governance of S&T Lags behind the Development of S&T

On the one hand, for a long time, China has not paid enough attention to the possible negative effects of S&T, especially the emerging frontier technologies including revolutionary technologies, and their harmonious development with society in the development of S&T, the lack of ethical dimension in

103

S&T policy and management, and the insufficient education and publicity related to S&T ethics. "China is a lagging catcher, developed countries are the leaders in S&T, and China needs to learn to progress", among such a presupposition, its theory building and institution building focus on tracking and imitation, and the imbalance between S&T development and ethical governance capacity is highlighted. In the future, capacity building in ethics of S&T will be the key to ensure the sound implementation of our national S&T innovation activities and the healthy development of S&T (Zheng, 2021). Third, the ability to participate in global ethical governance of S&T still needs to be improved. China does not yet have the discursive capacity to influence global ethical governance of S&T that it should have with its own scientific and technological strength and the S&T diplomacy of a great power.

3.2 Avoiding the "Industrial Age" Paradigm of Thinking to Address the Challenges of Ethical Governance of S&T in the "Digital Age"

We are in the era of accelerated transformation and change from industrial economy to digital economy, human production and life creation, social governance are developing in the direction of intelligence and green. On the one hand, for a long time, China has not paid enough attention to the possible negative effects of S&T, especially the emerging frontier technologies including disruptive technologies, and their harmonious development with society in the development of S&T, the lack of ethical dimension in S&T policy and management, and insufficient education and publicity related to S&T ethics. The ethical challenges posed by the large-scale application of S&T, especially the current new technological and industrial revolutions, are very different from those of the great industrial age. In the digital era, human interaction with nature and human cognition of society have entered a new stage. Human beings have begun to learn to use numbers to interpret the world, use computing to perceive the world, and use algorithms to control the world, thus bringing about great changes in thinking patterns and learning patterns. The social attributes of S&T innovation are increasingly prominent, and technology for social good has become an important development direction for research and development applications.

In recent years, digital technologies such as big data, artificial intelligence and blockchain have been widely used in social governance fields such as smart cities and public affairs management, accelerating the process of digital transformation of social governance and bringing a series of ethical issues in S&T. For example, data security and personal privacy protection have always been the premise of data intelligence applications, and how to guarantee data security during data sharing and exchange and use is a problem that needs to be solved

3.3 Avoiding Europe and the United States from Holding China Back in the Ethical Governance of S&T

Under the background of great powers' S&T strategic game, the issue of ethics of S&T has also become a tool for some countries to curb China's S&T development. In the field of climate change and dual carbon, developed countries in Europe and the United States, with their scientific and technological advantages and international voice, formulate and publish roadmaps, frame the development lines of green low-carbon transition, guide international low-carbon technology trends,

and influence the roadmaps of developing economies such as China, and carry out scientific and technological innovation and transition path traction. The U.S. uses "climate diplomacy" to unite allies, actively build alliance systems, and collaborate deeply with other "climate democracies" on issues such as technology supply chain adjustment, exchange of scientific and technical personnel, international technology standard setting, and joint research and development and other issues in-depth cooperation, to create a "multilateral system of green technology governance" that will help maintain U.S. and Western technological dominance and conform to U.S. and Western democratic values, thus forming an all-round siege and suppression of China. Similarly, facing the same ethical challenges of artificial intelligence (AI), major countries (regions) have attached strategic importance to the construction of AI ethics system, the formulation of relevant ethical guidelines and ethical risk prevention and control.

4. Adhere to "Talents Oriented" and "People Centered" in S&T Development, and Systematically Promoting S&T Ethical Governance around "Technology for Social Good"

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper; use the scroll down window on the left of the MS Word Formatting toolbar.

4.1 Overall Thinking and Key Tasks

The construction of S&T ethics has become an important part of China's S&T innovation system in the New Era, which is of great practical significance for preventing the ethical risks in the field of S&T and promoting the healthy development of China's S&T (He, 2022). With an eye to safeguarding the healthy development of Scientific and technological innovation in China, the ethical management of S&T needs to establish a systematic thinking, take respect for human rights to life and personal dignity as the bottom-line values of scientific and technological activities, further adhere to and promote the basic concept of scientific and technological talents-oriented and people-centered, and ensure technology for social good (Fang, 2021).

Improving and systematically promoting ethical governance of S&T is an important means for China to achieve its strategic goal of building a S&T power and to safeguard its security and development interests. First, we will highlight the system capacities. Insisting the integration of promoting innovation and preventing risks, promoting the ethical requirements of S&T throughout the whole process of scientific research, technological development and other scientific and technological activities, covering all areas of scientific and technological innovation, and systematically enhance the ethical governance capacity of S&T. Second, highlighting the openness and inclusiveness. In the face of a complex and competitive international landscape, we must participate deeply in global S&T governance, emphasizing coordination, inclusiveness and development, and improve the institutional mechanism of ethical governance that supports the construction of a world S&T power, so that China's

S&T can make a greater contribution to promoting the building of a community of human destiny. Third, highlighting the reform and synergy. We should make the core of the reform should be "promote the comprehensive development of human beings" as the starting point, improve the ethical guidelines and normative system of S&T innovation, and form an ethical governance pattern of common construction, common governance and sharing of S&T. Fourth, highlighting cooperation and dialogue. Through the mechanism and platform of ethical governance of S&T, we will pool our efforts to promote dialogue and cooperation on S&T development among government, research institutions, enterprises, humanities and social scholars, civil society groups and the public. Fifth, highlighting the foresight to lead. We should look ahead and judge the rule conflicts, social risks and ethical challenges brought by scientific and technological development, and improve relevant laws and regulations, ethical review rules and regulatory framework. We should pay attention to the internalization and shaping of ethics on the path and behavior of scientific and technological research and development, and maintain social equity and justice in the process of scientific and technological development.

4.2 Some Suggestions

Headings, or heads, are organizational devices that guide the First, to strengthen the research on the theory of ethical governance of S&T with Chinese characteristics. We will guide the practice of ethical governance of S&T with Xi Jinping thought on socialism with Chinese characteristics for a New Era and General Secretary Xi Jinping's important remarks on S&T innovation, explore the establishment of ethical governance of S&T theory with Chinese characteristics, and strengthen the prospective research on the conflict of rules, social risks, ethical challenges and impacts brought by the development of S&T in the "digital era".

Second, we will deepen the implementation of relevant laws and regulations, and promote establishment of a smoothly functioning governance system for scientific and technological innovation. Strengthen the implementation of the Law on Scientific and Technological Progress (Revision in 2021) and the Guidance on Strengthening Ethical Governance of S&T, further improve the regulatory system of ethical governance of S&T, and perfect the relevant laws and regulations, ethical review rules and regulatory framework.

Third, we will highlight agile governance and establish mechanisms for ethical review and risk research and assessment of major issues, key areas, major projects and projects in S&T. In the national technology forecast, ethics investigation and evaluation should be carried out in key fields, the linkage mechanism between S&T ethics and major S&T projects should be established, and the evaluation and early warning mechanism of S&T risks and ethics should be improved.

Fourth, we actively lead and participate in international governance of emerging technologies. Actively participate in the reform of the global innovation governance system and the formulation of rules for major international scientific and technological cooperation, take advantage of the development practices of artificial intelligence, blockchain, synthetic biology, big data, Internet of Things and other technologies in China, formulate and promote international technology ethics governance programs

106

that meet the interests of all parties with regard to core issues such as technology security, research ethics, privacy regulation and data property rights, and deeply participate in global ethics governance of S&T. We need to make full use of existing mechanisms such as the World Internet Conference, the World Artificial Intelligence Conference and the World Digital Economy Forum to build a high-level international exchange platform for ethical governance of S&T.

Fifth, we attach importance to the dissemination of S&T strategies and education on research ethics. We should tell a good story about China's S&T development and counter the "stigmatization" of technology. We will expand international information dissemination channels, strengthen monitoring and research on international public ethical concerns, and put forward opinions and voices based on China's realities, cultural traditions, and social values. We need to strengthen the construction of teaching and training systems for research ethics courses, use modern media technology to proactively build media platforms for scientific research ethics education (Survey on Scientific Research Ethics Awareness of Science and Technology Workers, 2018), and incorporate S&T ethics education into the academic curriculum of higher education institutions.

Acknowledgment

References

Fang, J. X. (2021). Strengthening ethical governance of science and technology for "systemic" advancement. *Guangming Net*. Retrieved from https://m.gmw.cn/baijia/2021-12/27/35408322.html

He, Z. G. (2022). Adhere to the ethics of science and technology to ensure that the risk of scientific and technological activities can be controlled. *Study Times*, *001*.

Subject Group. (2019). *Study on Ethical Governance in Emerging Science and Technology Chinese* (Vol. 12). Chinese Academy of Science and Technology for Development.

Survey on Scientific Research Ethics Awareness of Science and Technology Workers. (2018). Project Team, Special Report on the Survey on Research Ethics Awareness of Science and Technology Workers (No. 4). *Chinese Academy of Science and Technology for Development* (Vol. 2018, No. 90).

Zheng, X. L. (2021). Preventing emerging ethical risks in science and technology and exploring ethical governance mechanisms in science and technology. *Democracy & Science*, *02*, 68-69.