The History and Functions of Science and Technology Ethics Committees

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Abstract

Technology Ethics Committee; Ethics Committee; Procedural Ethics

Full Text

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Abstract

China has formally established a mandatory science and technology ethics review system, in which science and technology ethics (review) committees play a crucial role. Examining the historical development of ethics committees reveals that this organizational form first emerged in the fields of life and medical ethics before gradually expanding into the broader domain of science and technology ethics. Science and technology ethics committees bear the dual function of safeguarding substantive ethics and procedural ethics.

Keywords: Science and Technology Ethics Committee; Ethics Committee; Procedural Ethics

The *Measures for the Administration of Science and Technology Ethics Review (Trial)* (hereinafter referred to as the "Review Measures"), jointly issued by ten departments including the Ministry of Science and Technology, Ministry of Education, and Ministry of Industry and Information Technology, took effect on December 1, 2023. This marks the formal establishment of a mandatory science and technology ethics review system designed to regulate scientific research, technological development, and other scientific and technological activities, representing the latest governance mechanism for strengthening risk prevention and control in science and technology ethics and promoting responsible innovation.

The Review Measures stipulate that universities, research institutions, medical and health institutions, and enterprises are the responsible entities for managing science and technology ethics review within their organizations. Units engaged in scientific and technological activities in life sciences, medicine, artificial intelligence, and other fields involving ethically sensitive domains must establish science and technology ethics (review) committees, while other units with needs for such review may establish committees according to their actual circumstances.

1.1. Application and Development in the Life and Medical Fields

The ethics committee mechanism was first applied in the life and medical fields. Following World War II, the Nuremberg Military Tribunal tried medical personnel who had used concentration camp prisoners as subjects for medical experiments, resulting in the *Nuremberg Code*—a milestone document in bioethics that proclaimed ten fundamental ethical principles including informed consent for medical human experimentation. In June 1964, the World Medical Association adopted the main principles of the Nuremberg Code and issued the *Declaration of Helsinki*. The 29th World Medical Assembly in October 1975 introduced the first revision of the Declaration, which incorporated the concept of oversight by an "independent committee": "The design and execution of each experimental procedure involving human subjects should be clearly formulated in an experimental protocol and submitted to a specially appointed independent committee for consideration, comment, and guidance." In 2000, the World Health Organization promulgated the *Operational Guidelines for Ethics Committees That Review Biomedical Research*, which established the basic organizational form of ethics committees.

The United States was among the earliest countries to implement the ethics committee system. In the 1970s, numerous committees were established in the U.S. to determine priority access to hemodialysis machines amid resource scarcity. Medical ethics committees began to emerge in the 1980s, and by 2001, 90% of hospitals had established such committees [1]. According to scholarly research, as of 2016, countries in North America and Europe—notably the United States, Canada, and the Netherlands—had made significant progress in establishing hospital ethics committees, whereas many countries in the Eastern Mediterranean and Southeast Asia regions were only beginning to set up such committees in hospitals [1]. In China, the Chinese Medical Association' s Medical Ethics Society was established in 1988, and in 1994 it issued a proposal for establishing hospital ethics committees while recommending the *General Principles for Hospital Ethics Committees* as a reference document for hospitals [2]. Since the mid-1990s, China' s life and medical ethics committee system has gradually matured, with relevant legal and regulatory documents being issued successively.

As shown in Table 1, the legal hierarchy of the ethics committee system has gradually elevated, and its scope of application has progressively expanded. In 2021, the concept of science and technology ethics review was proposed, unifying

ethics review for scientific and technological activities in life sciences, medicine, and artificial intelligence.

1.2. Application and Development in the Science and Technology Domain

Law often lags behind the pace of technological innovation, a reality determined by their essential nature. As law is backed by state coercive power, it must undergo democratic procedures, strictly observe the boundaries between public authority and private rights, and be formulated through careful deliberation to maximize citizen welfare. Whether in civil law or common law countries, a legal system that can predict and regulate all social behaviors does not exist; law always evolves alongside social life development. Words associated with people's expectations of law include: restraint, calmness, conservatism, stability, and firmness. Meanwhile, the speed of technological development never fails to amaze, profoundly transforming our lives. The so-called fourth industrial revolution based on digital technology possesses unprecedented speed, breadth, depth, and systemic impact [3]. As a rational activity for understanding nature, an advanced productive force, or a tool for achieving a better life, scientific and technological activities are encouraged to innovate, revolutionize, disrupt, and take risks.

Law and technology have been metaphorically compared to a tortoise and a hare [4]. Using law to regulate technology creates a "Collingridge dilemma": either regulation is too strict due to limited understanding of technology, thereby stifling innovation, or by the time technology is fully understood, it has become impossible to regulate. This dilemma becomes increasingly prominent in the era of emerging technologies such as big data, artificial intelligence, genetic technology, synthetic biology, brain-computer interfaces, and autonomous driving. Ethics, as a form of "soft law" that can prevent risks while remaining flexible, has begun to serve as a pre-emptive supplementary norm.

In April 2019, the European Union released the *Ethics Guidelines for Trustworthy AI*, proposing ethics committees as a non-technical method for achieving trustworthy AI. On November 24, 2021, the UNESCO General Conference adopted the *Recommendation on the Ethics of Artificial Intelligence* at its 41st session, which recommended ethics committees as a viable monitoring and evaluation mechanism and suggested establishing national AI ethics committees to conduct international cooperation.

In early 2019, China's National New Generation Artificial Intelligence Governance Professional Committee was established [5], and in September of that year released the *New Generation Artificial Intelligence Ethics Code*, introducing the concept of "agile governance." In December 2021, the revised *Law of the People's Republic of China on the Promotion of Science and Technology* proposed establishing a national science and technology ethics committee and establishing a sound science and technology ethics review mechanism. In March 2022, the

General Office of the Communist Party of China Central Committee and the General Office of the State Council issued the *Opinions on Strengthening Science and Technology Ethics Governance*, proposing the science and technology ethics (review) committee system. In September 2023, the Review Measures were released, formally establishing the science and technology ethics review system covering scientific and technological activities in life sciences, medicine, artificial intelligence, and other fields, along with the supporting science and technology ethics (review) committee system.

2. Functions of Science and Technology Ethics Committees

Article 5 of the Review Measures lists seven main responsibilities of ethics committees [1]. However, these specific duties do not fully answer the question of the functional positioning of ethics committees as an institution. As the name suggests, ethics committees are first and foremost about ethics; they are not science and technology committees that discuss scientific and technical issues, nor are they compliance committees that consider only legal issues, nor are they enterprise management committees that discuss market competition, shareholder returns, or financial data. Examining the historical development of ethics committees allows us to summarize their functions as follows.

2.1. Safeguarding Ethics and Preventing Risks

Various uncertain social risks threaten our ethical values. The governance concept of "risk prevention," which originated in environmental protection, has gradually been applied to science and technology governance [6]. The role of ethics committees lies in providing ethical supervision of scientific and technological activities at the front end—rather than waiting until risks become reality or until laws arrive belatedly—thereby achieving agile governance that balances innovation and risk.

If we compare ethics committees to judicial adjudication committees, then the cases truly requiring their decisions are all difficult cases that cannot be directly resolved by applying legal rules. Committees must rely solely on ethical principles and even meta-ethical concepts, leaving considerable room for discretion. Ideally, cases reviewed by ethics committees should first undergo legality screening; illegal actions need not waste the committee' s resources, as from a practical operational perspective, what is illegal is inevitably unethical [2]. Cases with legal validity [2] are the appropriate subjects for ethics committee review.

[Figure 1: see original paper]

What, then, does ethics review actually entail? When we speak of "ethics," we generally mean focusing on what is "good," what constitutes a "good life," human meaning, value, and dignity, using reason to establish universal normative principles—norms governing person-to-person, person-to-society, and person-to-nature relationships. Meta-ethical concepts such as virtue ethics, deontology, consequentialism or utilitarianism, contractarianism, Confucian "benevolence,"

and Daoist "Dao" provide our compass and guide for thinking. This is a difficult-to-define concept that remains permanently open. However, when handling cases, in most situations it suffices to apply certain ethical principles that have developed over time and become consensus. Some of these principles have already been written into laws and various normative documents . It should be noted that Table 2 merely presents a reference list of ethical principles, which may be important but is by no means complete.

2.2. Procedural Transparency and Democratic Deliberation

The risk prevention approach to governance requires transparent decision-making procedures that can only be legitimized through democratic voting, thereby enhancing public trust [7]. Ethics committees are generally composed of multidisciplinary experts. The Review Measures stipulate that committees should include peer experts with relevant scientific and technological backgrounds, as well as experts with backgrounds in ethics and law. They should also include members of different genders and members from outside the organization, and ethnic autonomous regions should have members familiar with local conditions.

Although ethics committees represent an institutional embodiment of ethical consideration for scientific and technological activities, in actual operation, highly theoretical ethical debate is largely unnecessary. The goal of ethics committees is to form an inclusive judgment rather than to establish an ethically superior position through argumentation. This reduction in the intensity of substantive ethical discussion is exchanged for the guarantee of procedural ethical value [8]. Moreover, the answer to ethical questions may not come from ethics itself but from stakeholders' responses, negotiations, and compromises regarding the situation [9]. "The ethics committees advocated by applied ethics are important venues where people form moral consensus on specific issues through extensive democratic dialogue and meticulous professional consultation" [9]. Prioritizing procedural ethics over substantive ethics and emphasizing pragmatic negotiation over theoretical discussion can be said to characterize the operation of ethics committees.

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Note: Figure translations are in progress. See original paper for figures.