



Preliminary Exploration of Legislation in the Domestic AI and Robotics Sector and Legislative Recommendations for Guangdong Province

Taoye Wang, Huan Wang*

Industrial Technology Research Center, Guangdong Institute of Science and Technology Information, Guangzhou, 510000, China

523016172@qq.com, *wanghuan6@email.szu.edu.cn

Abstract. Against the backdrop of the rapid development of global artificial intelligence and robot technologies and the increasingly fierce international competition, it is urgent for China to accelerate legislation in related fields. At present, relevant policies have been introduced at both the national and local levels in the fields of artificial intelligence and robotics in China. Achievements have been made in areas such as algorithm service filing, algorithm recommendation management, and the implementation of robot products. However, there are also problems such as legislative lag, a fragmented legal system, and difficulty in balancing industrial development and risk control. Based on this, combined with the actual situation of Guangdong Province, suggestions are put forward, including focusing on industry pain points, strengthening risk prevention and control, constructing an innovation incentive mechanism, removing obstacles to Guangdong-Hong Kong-Macao collaboration, and joint legislation in the fields of artificial intelligence and robotics. The aim is to promote legislation in the fields of artificial intelligence and robotics, balance the relationship between industrial development and risk control, and enhance international discourse power.

Keywords: AI, robotics, legislating

1 Introduction

Currently, the rapid development of artificial intelligence and robotics worldwide has become a core driver of economic growth and social transformation. Faced with the ethical challenges and governance needs brought by the rapid evolution of technology, major economies have accelerated the construction of regulatory systems. The EU's AI Act^[1], set to be enacted in 2024, is the world's first comprehensive AI law, outlining rules for companies, governments, and other organizations to develop and use AI responsibly. This act not only applies to all AI users within the EU but also extends to suppliers of AI system software and hardware located outside the EU, with broad extraterritorial effects. It will have significant impacts on both the EU and its regions. The United States released the "AI RMF 1.0" in January 2023. It aims to guide organizations

in reducing security risks and avoiding biases and other negative consequences when developing and deploying AI systems, thereby enhancing the credibility of AI. Compared with the EU's AI legislation, the "AI RMF 1.0" does not have legal force; it is a non-mandatory guiding document that can be used voluntarily by organizations designing, developing, deploying, and using AI systems. However, whether it is the EU's "hard" regulation or the U.S. 's "soft" governance, both provide valuable references for China's AI legislation.

China places high importance on the innovative development of the AI and robotics industry, and in recent years, a series of policies and regulations have been introduced at both the national and local levels, providing institutional safeguards for industrial growth. However, as technology rapidly iterates and application scenarios expand, the existing legal system faces new challenges in terms of standardization, foresight, and international competitiveness. Against the backdrop of accelerating international legislative practices such as the EU's Artificial Intelligence Act and the U.S. AI RMF 1.0, expediting the improvement of legislation in China's AI and robotics sector has become an urgent necessity to balance technological innovation with risk management and to enhance the discourse power in international rule-making. This paper analyzes the necessity and feasibility of legislation in the field of artificial intelligence and robotics, systematically sorts out the legislative basis, current achievements and existing problems in China, and puts forward specific suggestions for the next step of legislation work based on the actual situation of Guangdong province, aiming to provide support for promoting the legislation work in the field of artificial intelligence and robotics in Guangdong province.

2 Necessity and Feasibility of Legislation

2.1 Necessity

Under the dual backdrop of rapid advancements in AI and robotics technologies and profound changes in the international competitive landscape, accelerating legislative work in this field in China is imperative.

Strategic Need to Address International Rule Competition.

The international competition surrounding AI has extended to the governance rule system. International practices show that countries that establish regulatory frameworks first often gain significant rule spillover effects^[2]. Currently, the introduction of the EU's Artificial Intelligence Act and the U.S. Framework to Advance AI Governance and Risk Management in National Security has imposed institutional constraints on the global development of Chinese AI enterprises. For example, DeepSeek's technological breakthroughs have triggered asymmetric regulations in some Western countries under the guise of data privacy and national security. The U.S. National Aeronautics and Space Administration, Congress, and Navy have successively banned the use of DeepSeek,

while Italy's Data Protection Authority required DeepSeek to submit data usage explanations within 20 days for compliance reviews. These cases highlight the real pressure of international rule competition.

Urgent Need to Address Technological Risks.

With the rapid development of AI and robotics technologies, the existing legal system has shown significant gaps and lags in key areas such as data governance and algorithmic accountability. There is an urgent need to establish a corresponding legal system and restraint mechanism to cope with the rising technical risks and challenges.

Institutional Safeguards for Industrial Development.

Factors such as the lack of data-sharing rules and insufficient coordination of computing resources have become bottlenecks. Legislation is needed to establish unified standards, break down "data silos," and provide legal guarantees for the high-quality development of the AI and robotics industry.

2.2 Feasibility

In recent years, China's AI legislative process has steadily advanced. The Draft AI Law was included in the State Council's legislative plans for 2023 and 2024, preparing for submission to the Standing Committee of the National People's Congress for review. During this year's National People's Congress sessions, many representatives emphasized the necessity of enacting a comprehensive AI-specific law. The Ministry of Science and Technology recently stated in response to a political proposal that it is orderly advancing relevant legislative work^[3]. After years of practical exploration and institutional accumulation, China's AI legislation is now timely and feasible: On the one hand, the relevant foundational legal framework has gradually taken shape. China has established a core legal framework centered around the Data Security Law, Personal Information Protection Law, and Cybersecurity Law, providing institutional continuity for legislation in the fields of artificial intelligence and robotics. On the other hand, social consensus continues to solidify, with leading tech companies promoting ethical guidelines through industry self-regulation conventions. Organizations such as the China Artificial Intelligence Industry Development Alliance have released multiple legislative recommendation reports; the academic community has also produced a wealth of research on core issues such as the legal status and responsibility allocation of AI entities.

3 Legislative Basis, Current Results, and Existing Problems

3.1 Domestic Legislative Basis

In recent years, at the national level, China has issued a series of policy documents focusing on artificial intelligence and robotics, forming a relatively complete top-level design and institutional system. At the local level, pilot projects have been initiated,

with Shenzhen and Shanghai each enacting specific legislation for artificial intelligence, providing rich practical experience and valuable references for other cities, provinces, and the national level(See Table 1 for details).

At the national level, relevant departments have issued top-level design documents such as the Development Plan for the New Generation of Artificial Intelligence and the Guidelines for the Construction of the National New Generation of Artificial Intelligence Innovation and Development Pilot Zone to plan and layout for seizing the major strategic opportunities for the development of artificial intelligence; they have also issued regulations like the Provisions on the Management of Deep Synthesis Services for Internet Information Services and the Provisions on the Management of Algorithmic Recommendation Services for Internet Information Services, which specifically regulate the behavior of entities such as technology providers and service users in specific AI application scenarios, including content generation and algorithmic recommendation services.In 2023 and this year, the National Internet Information Office, in collaboration with multiple departments, issued the Interim Measures for the Management of Generative AI Services and the Labeling method for content generated by artificial intelligence, forming a coordinated regulatory system with existing regulations, laying a solid foundation for the realization of systematic and specialized AI legislation in China. Additionally, China is actively preparing specialized laws for the AI sector, and the AI Demonstration Law 3.0 was recently released as the country's first systematic legislative proposal addressing rapid AI technological iterations.

At the local level, some regions have established systematic norms for the AI and robotics sector through local regulations. In September 2022, Shenzhen issued the Regulations on the Promotion of Artificial Intelligence Industry in Shenzhen Special Economic Zone, which is the first local regulation in the field of artificial intelligence in China, and has formed replicable experience in algorithm filing and scene opening. In the same month, Shanghai enacted the Shanghai Regulations on Promoting the Development of the AI Industry, which established an "innovation tolerance" and tiered classification regulatory system, creating a comprehensive governance framework covering technology R&D, application promotion, and risk prevention. This provides a legislative model for balancing AI innovation and security governance. In terms of intelligent robots, Futian District of Shenzhen released the Interim Measures for the Administration of Government-Service Assistant Intelligent Robots in September 2024, marking the birth of the first management measures for government assistance robots in China and providing strong support for the orderly promotion of legislation in the field of robots.

Table 1. Main Governance Policies and Regulations in the Field of Artificial Intelligence and Robotics in China (Since 2018)

Serial Number	Policy / Regulation	
	Name	Release time
1	Regulations on the Governance of Online Information Content Ecosystem	December 2019
2	Data Security Law of the People's Republic of China	June 2021

Serial Number	Policy / Regulation	
	Name	Release time
3	Personal Information Protection Law of the People's Republic of China	August 2021
4	Tianjin Regulations on Promoting the Development of Intelligent Manufacturing	September 2021
5	Provisions on the Management of Algorithmic Recommendation Services for Internet Information Services	December 2021
6	Regulations on the Promotion of Artificial Intelligence Industry in Shenzhen Special Economic Zone	September 2022
7	Shanghai Regulations on Promoting the Development of the AI Industry	September 2022
8	Provisions on the Management of Deep Synthesis Services for Internet Information Services	November 2022
9	Interim Measures for the Management of Generative AI Services	July 2023
10	Measures for the ethical review of science and technology (trial)	September 2023
11	Implementation Measures for the Management of Industrial Robot Industry Standard Conditions (2024 edition)	July 2024
12	Network data security management regulations	September 2024
13	Interim Measures for the Administration of Government-Service Assistant Intelligent Robots in Futian District	September 2024

3.2 Current Achievements

After years of exploration and practice, China has made initial progress in the supervision of artificial intelligence and robotics.

Completion of Filing for Multiple Generative AI Services.

Multiple generative artificial intelligence services have been registered, providing strong support for the healthy development of artificial intelligence technology. China Internet Information Network released data on January 8, 2025, showing that, in accordance with the requirements of the Interim Measures for the Management of Generative AI Services, by December 31, 2024, the National Cyberspace Administration had completed the filing work for 302 generative AI services. For generative AI applications or functions that directly invoke registered model capabilities through API interfaces or other means, local cyberspace administrations have also strengthened supervision and registration efforts. According to statistics, a total of 105 such applications or functions were registered with local cyberspace administrations in 2024^[4], further standardizing market order and protecting users' legitimate rights and interests.

Refined Implementation of Algorithmic Recommendation Regulations.

The implementation and refinement of algorithm recommendation management regulations will promote the upward and positive application of algorithms. During the 2025 Spring Festival travel season, "no more difficulty in buying tickets" became a consensus for many passengers, thanks to the precise scheduling enabled by big data analysis and intelligent algorithms. This achieved efficient matching of train schedules, ticketing, and passenger flow, realizing a "soft acceleration" for the Spring Festival journey home^[5].

Accelerated Market Entry for Robotics Products.

Relevant regulations will be introduced to accelerate the implementation and application of new robot products. For example, Shenzhen's 2022 regulations encouraged medical institutions to establish mutual recognition mechanisms for ethical reviews of clinical trials for registered medical devices. This allowed reliance on test reports from third-party inspection agencies recognized by the National Certification and Accreditation Administration and the National Medical Products Administration, improving the efficiency of clinical trials for AI medical devices and accelerating the market entry of high-end surgical robots.

3.3 Existing Problems and Challenges

Although China has made some progress in building the legislative framework for artificial intelligence and robotics, it still faces many challenges.

First and foremost, legislation lags behind technological development. The rapid iteration of AI and robotics technologies contrasts with the lengthy legislative process, making it difficult for the legal system to keep pace^[6]. Emerging issues such as liability determination for autonomous driving accidents, AI deepfake fraud, and algorithmic discrimination lack clear legal foundations.

Furthermore, the legal system is relatively scattered and lacks systematicity. Current AI-related regulations are scattered across laws such as the Cybersecurity Law, Data Security Law, and Personal Information Protection Law, lacking a unified AI foundational law. This fragmented legislative model has a certain negative impact on the coordination and effectiveness of legal application.

Moreover, it is difficult to balance industrial development and risk management. Existing legislation has yet to establish an effective balance between promoting AI industrial development and mitigating technological risks, often resulting in trade-offs during implementation.

4 Recommendations for Future Legislation

Legislation in the AI and robotics sector is complex and long-term, with core challenges lying in balancing individual rights protection, national security, and industrial development. It requires consideration of ethical boundaries, international rule coordination,

and integration with the existing legal system. Based on the actual conditions of Guangdong province, the following recommendations are proposed.

4.1 Targeted Measures Addressing Key Industry Pain Points

Develop compliance guidelines for segmented fields such as intelligent manufacturing and smart healthcare in Guangdong province, and solve the problem of responsibility allocation in the "human-machine collaboration" scenario. Strengthen the research and development of key technologies such as data encryption and privacy computing, carry out product development for attack behavior recognition, event tracing, and disposal, and accelerate the improvement of data security supervision and governance capabilities; Promote the construction of high-quality industry datasets and provincial-level industrial data trading platforms to ensure secure and controllable data circulation; Establish a data sharing incentive mechanism, set up a special fund, and provide tax deductions or rewards to manufacturing enterprises that provide industrial data.

4.2 Strengthen Tiered Risk Prevention

Implement a tiered regulatory system for AI products with differentiated access reviews. For high-risk applications like facial recognition and autonomous driving, adopt a "licensing + continuous monitoring" approach, requiring algorithm safety certification and ethical reviews before product launch. Establish a "dual-track monitoring" mechanism, mandating explainability modules and compulsory liability insurance to ensure traceable decision-making and quantifiable risks. For moderate-risk applications like intelligent customer service and industrial quality inspection, adopt a "filing + random inspection" approach to reduce compliance burdens on enterprises. Regularly update risk assessment standards to ensure regulatory evolution alongside technological advancements.

4.3 Build Innovation Incentive Mechanisms

By legislating to establish a scientific research exemption clause, explore the exemption of administrative liability for issues such as non malicious algorithm bias and data bias caused by technological limitations, while complying with ethical review. Pilot the "Innovation Fault Tolerance List", which is developed and dynamically updated by relevant departments, allowing research teams to temporarily break through existing technical specifications within the scope of the list, implementing a "filing system+post evaluation", and accommodating exploratory errors that have not caused actual harm. Relaxing the threshold for algorithm registration for small and medium-sized enterprises, stimulating market entities' innovation vitality by reducing compliance costs, better grasping the development opportunities brought by DeepSeek, and realizing the role transformation from "pursuer" to "rule maker" as soon as possible.

4.4 Break Down Barriers to Data Flow Between Guangdong, Hong Kong, and Macao

Promote the implementation of a "negative list" system for cross-border data flow in the Qianhai-Shekou Free Trade Zone. In addition to piloting cross-border data transmission between Shenzhen and Hong Kong in fields such as healthcare, finance, and education, accelerate the expansion of service scenarios in more areas, including cross-border livelihood services, cross-border finance, and cross-border healthcare. Gradually extend these measures to Hong Kong-Macao cooperation zones such as Hengqin and Nansha, providing critical support for facilitating the secure, compliant, and efficient circulation of data elements. A pilot mechanism for a "white list" of cross-border data flows will be established on the four major cooperation platforms, with priority given to key areas such as artificial intelligence, biomedicine and fintech. Qualified research institutions and enterprises will be selected to be included in the "trusted data flow list", allowing them to cross-border access to non-sensitive data. Establish a "Cross border Legal Service Center" and introduce international arbitration institutions to provide efficient channels for resolving legal disputes that may arise from data flow, financial innovation, and other related issues.

4.5 Joint Legislation for AI and Robotics

Intelligent robots are embodied carriers of artificial intelligence that move from the virtual world (text, video) to the physical space (perception environment, human-computer interaction). They apply new generation artificial intelligence technologies such as multimodal perception, multi-sensor fusion, and end-to-end big models, enhancing their ability to perform autonomous tasks and generalize scenes. The breakthrough of artificial intelligence technology greatly promotes the development of intelligent robots, and the widespread application of intelligent robots promotes the realization of general artificial intelligence. The two have formed a deep coupling relationship. To avoid regulatory overlap caused by separate legislation, it is recommended to establish a cross disciplinary joint legislative mechanism: form a cross disciplinary joint legislative task force composed of technical experts in the fields of artificial intelligence and robotics, legal scholars and ethics experts, representatives of industry leading enterprises, and relevant department heads; Establish unified legal standards and principles, and strengthen the connection and coordination with existing laws such as the Cybersecurity Law and the Data Security Law; Build a full stack and full lifecycle regulatory system, with the direction of artificial intelligence covering technology research and development, data usage and protection, algorithm management, etc., and the direction of robotics covering design, production, sales, use, recycling, and other aspects, forming a joint legislative framework of "legislative mechanism-legal principles -legislative connotation".

5 Conclusions

The rapid development of artificial intelligence and robotics technology is profoundly restructuring the global industrial ecosystem and governance system. This study is based on the legislative experience of the European Union and the United States, as well as the practice of central and local governments in China. It systematically analyzes the three core contradictions faced by China's legislation: technological advancement and legal backwardness, the fragmentation dilemma of the legal system, and the difficulty in balancing industrial development and risk control. As a major economic, manufacturing, and technological innovation province, Guangdong Province needs to leverage its own advantages, focus on industrial pain points, implement precise policies, accelerate the elimination of barriers to data circulation in Guangdong, Hong Kong, and Macao, encourage innovation, and solve the contradiction between development and governance through the "hierarchical supervision+joint legislation" model. This study innovatively proposes a flexible governance plan that adapts to the characteristics of Guangdong, but further research is needed on the practical design of the localization implementation path.

Acknowledgment

This work was supported by the Guangming Laboratory Open Collaborative Research Project (No. GML-KF-24-03) and Guangdong Provincial Science and Technology Program Project (No. 2024B0808010001).

References

1. European Commission, "AI Act enters into force," 2024. [Online]. Available: https://commission.europa.eu/news/ai-act-enters-force-2024-08-01_en.
2. Zhou Xiang, Hong Tao, "The promoting position and norm definition of China's AI legislation," *Journal of Truth-seeking*, vol.52, no.02, pp.110-122, 2025, doi: 10.19667/j.cnki.cn23-1070/c.2025.02.010.
3. Southern Metropolitan Daily, "Ministry of Science and Technology: Proceeding with the legislative work on artificial intelligence in an orderly manner," 2025. [Online]. Available: <https://baijiahao.baidu.com/s?id=1825000406973377441&wfr=spider&for=pc>.
4. China Internet Information Network, "Announcement of the State Internet Information Office on the release of the information on the filing of generative artificial intelligence services in 2024," 2025. [Online]. Available: https://www.cac.gov.cn/2025-01/08/c_1738034725920930.htm
5. People's Forum Network, "People's Forum Network review | The journey is poetic, and China is full of vitality," 2025. [Online]. Available: <http://www.rmlt.com.cn/2025/0115/721589.shtml>
6. S. Lohsse et al., *Liability for Robotics and AI: Legal Challenges and Solutions*. Hart Publishing, 2023.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

