SESEC IV Report

Analysis on Policies and Standards on the Development of AI in China

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The emergence of artificial intelligence (AI) is shaping an increasing range of sectors. For instance, AI is expected to affect global productivity, equality and inclusion, environmental outcomes, and several other areas, both in the short and long term. To keep up with the development of AI, since 2013, China has published several national-level policy documents, which reflect the intention to develop and deploy AI in a variety of sectors.

Introduction

The concept of Artificial Intelligence (AI) was first brought up in 1956 by John McCarthy at Dartmouth College. AI is intelligence demonstrated by machines, compared to the intelligence demonstrated by human and other animals. The technologies of AI include computer vision, machine learning, natural language processing, robotics, and biometrics. And AI can be applied to more fields like agriculture, health care, transportation, and big data, etc.

AI in China

As the core driving force of a new round of industrial reform, artificial intelligence has become a new focus of international competition and a new engine of economic development. At present, artificial intelligence is deeply integrated with the real economy to facilitate industrial transformation and upgrading. After years of continuous accumulation, China has made important progress in the field of artificial intelligence, and the corresponding business model has also continued to evolve. In 2020, the scale of China's AI core industry will reach CNY 325.1 billion.

The number of AI companies in China is expanding, and the number of AI companies in China ranks second in the world. By the end of 2020, the number of AI-related enterprises in China had reached 6,425, up 25.37 percent year on year. Among them, Beijing, Shanghai and Shenzhen each have more than 1,000 AI companies, making them the top three cities in China's AI industry.

In the past decade, the number of applications for artificial intelligence patents in China reached 389,571, accounting for 74.7 percent of the global total. In general, the number of AI-related patent applications in China has been increasing year by year, and the growth rate has been significantly accelerated after 2015.
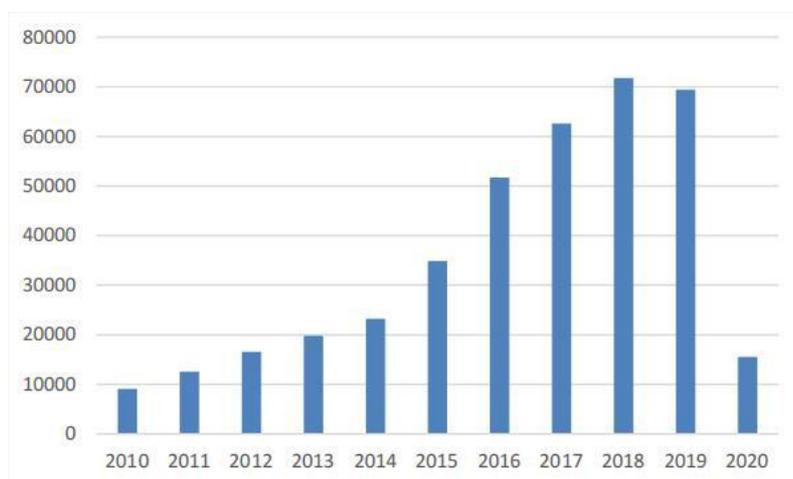
The top 10 institutions with AI patent applications in China, as shown in the figure, include five enterprises and five universities, mainly located in Guangdong, Beijing, Zhejiang and Sichuan. At present, China's innovation in the field of AI patents mainly relies on the joint efforts of high-tech Internet
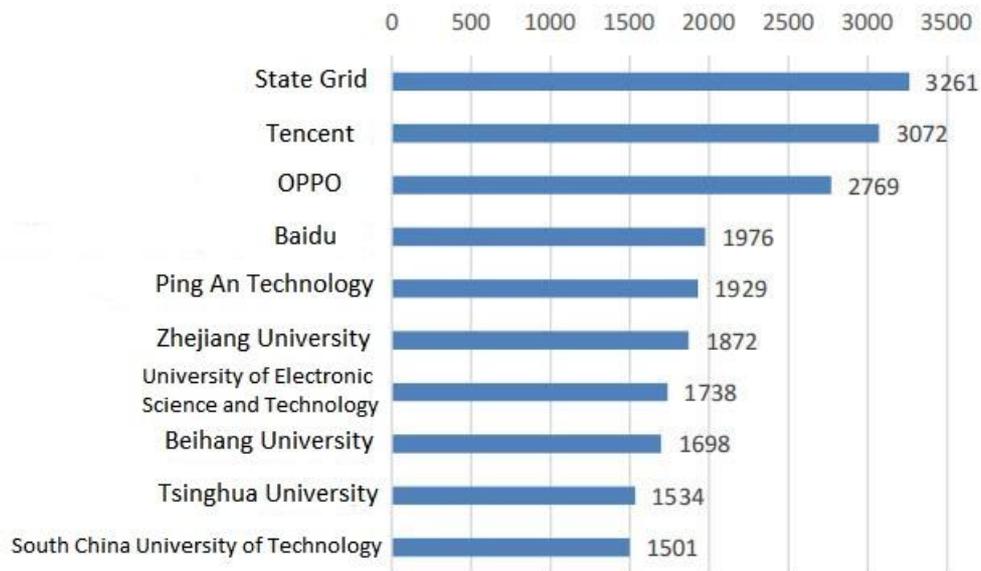
companies and university research institutions.

Laws, Regulations and Policies

In 2015, the State Council released the *Guiding Opinions of the State Council on Advancing the "Internet Plus" Action*, which included artificial intelligence as one of the key tasks for the first time, pushing China's artificial intelligence into a new stage. It sought to integrate the Internet into all elements of the economy and society and clearly stated the importance of cultivating emerging AI industries and investing in research and development.

Since then, China has formulated several regulatory documents to guide the development of AI:

Regulatory Documents of the State Council

■   *Development Plan on the New Generation of Artificial Intelligence (July 2017)*

Released in July 2017 by the State Council (which is the chief administrative body within China), the *New Generation Artificial Intelligence Development Plan* (AIDP) acts as a unified document that outlines China's AI policy objectives and key tasks:

Strategic objectives:
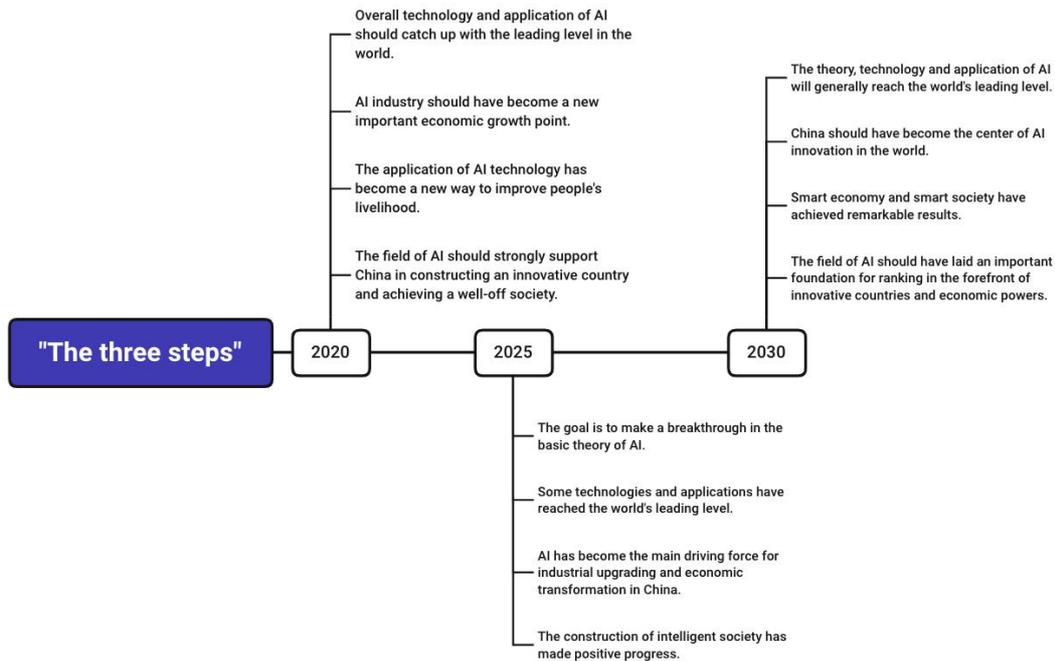
- First step (2020): By 2020, the overall technology and application of artificial intelligence should catch up with the leading level in the world. The artificial intelligence industry should have become a new important economic growth point. The application of artificial intelligence technology has become a new way to improve people's livelihood, and strongly supports China in constructing an innovative country and achieving a well-off society in an all-round way.

- Second step (2025): By 2025, the goal is to make a breakthrough in the basic theory of artificial intelligence. Some technologies and applications have reached the world's leading level. Artificial intelligence has become the main driving force for industrial upgrading and economic transformation in China, and the construction of intelligent society has made positive progress.

- Third step (2030): By 2030, the theory, technology and application of artificial intelligence will generally reach the world's leading level and become the center of artificial intelligence innovation in the world. Smart economy and smart society have achieved remarkable results, laying an important foundation for ranking in the forefront of innovative countries and economic powers.

Key tasks:

- Build an open and collaborative system of artificial intelligence science and technology Innovation

- Cultivate high-end and efficient intelligent economy

- Build a safe and convenient intelligent society

- Strengthen civil-military integration in the field of artificial intelligence

- Build a safe and efficient intelligent infrastructure system

- Prospectively lay out the major scientific and technological projects of new generation of artificial intelligence

- *Guidelines on Promoting the Deep Integration of Artificial Intelligence and Real Economy (20 March*

2019)

To promote deep integration of AI with the real economy, it is necessary to grasp the characteristics of the development of the new generation of artificial intelligence, adhere to the market demand as the guidance, industrial application as the goal, deepen reform and innovation, optimize the institutional environment, stimulate the innovation vitality and endogenous driving force of enterprises, combined with the characteristics of different industries and different regions, explore the path and method of application and transformation of innovation achievements.

Departmental Regulatory Documents

■   *Three-year Action Plan of Promoting a New Generation of Artificial Intelligence (2018-2020) (14 December 2017)*

MIIT proposed that in the period of 2018-2020, the field of artificial intelligence should focus on making breakthroughs in the following product areas: smart network automobile, smart service robot, smart drones, medical-image-assisted diagnosis system, video-image identification system, smart voice interaction system, smart translation system, smart home products. MIIT also made specific requirements on these fields. For example, by the year of 2020, advanced medical-image-assisted diagnosis system in China should be able to diagnose typical disease of brains, lungs, eyes, bones, cardiovascular, and mammary gland at a detection rate over 95%, with a false negative rate under 1% and a false positive rate under 5%.

During the period of 2018-2020, breakthroughs should be made in three core basic technologies: smart sensor, neural network chip and open-source platform. MIIT also made specific requirements on the technologies.

■   *Action Plan of Artificial Intelligence Innovation in Colleges and Universities (4 April 2018)*

The action plan proposes that the basic theoretical research of the new generation of artificial intelligence should be strengthened to support universities to set the direction of artificial intelligence in computer and technology disciplines, thoroughly demonstrate and determine the connotation of the subject of artificial intelligence, construct the system of subjects in artificial intelligence, and promote the development of subject construction and the field of artificial intelligence.

■   *Work Plan for Unveiling the List of Key Innovation Tasks for the New Generation of AI Industry (8 November 2018)*

Local administrative agencies should carry out the work of artificial intelligence unbundling, collect and select a batch of firms that master key core technologies and have strong innovative ability to focus on tackling key problems. The selected firms focus on breaking through a batch of artificial intelligence products, platforms and services with advanced technology, excellent performance, and good application prospects.

■   *A New Generation of Artificial Intelligence Governance Principles - the Development of Responsible AI (17 June 2019)*

The policy emphasizes the eight principles of harmony and friendliness, fairness and impartiality, inclusivity and sharing, respect for privacy, security and control, shared responsibility, open cooperation,

and versatile governance. This is the first time that guiding principles have been put forward for the values and ethics of AI.

■ *Guidelines for the Construction of the National Open Innovation Platform for New Generation Artificial Intelligence (1 August 2019)*

The Open Innovation Platform focuses on the construction of leading enterprises in the field of industry technology. "Opening and sharing" is defined as an important idea of artificial intelligence technology innovation and industrial development in China. More enterprises, teams and personnel should be engaged in the research and development of artificial intelligence technology to achieve the goals of focusing on subdivisions, giving full display of the advantages of enterprises, and integrating technological resources.

■ *Guidelines for the Construction of the National New Generation Artificial Intelligence Innovation and Development Pilot Zone (29 August 2019)*

With cities as the main carrier of construction of the pilot zones, highlighting regional characteristics, about 20 experimental areas will be constructed by the year of 2023. These areas should adopt innovative policies, find the deep integration models of artificial intelligence and social development, build experiment experience, and complete the goals of technology application demonstration, policy experiment, social experiment and infrastructure construction of artificial intelligence.

Standardization

Technical Committee

On 6 August 2020, the kick-off meeting and first plenary meeting of the Subcommittee 42 on Artificial Intelligence of SAC's National Technical Committee 28 on Information Technology (SAC/TC28 SC42), was held in Beijing. More than 70 experts from various artificial intelligence (AI) fields, including production, education, research, and application, attended the meeting in person; they were joined by 300 other experts who participated via online platforms.

SAC/TC28 SC42, as the mirror committee of ISO/IEC JTC 1 SC 42, is mainly responsible for the development and revision of AI-related standards, which cover AI basics, technology, risk management, trustworthiness, governance, products and applications. During the meeting, a general working group was established; four research groups were also established for models and algorithms, chips and systems, products and services, and trustworthiness.

The charter of the subcommittee and its work plan were also reviewed. In 2020, the main activities of SAC/TC28 SC42 will be to:

● Improve organisational building and management, including the establishment of an e-mail account where public comments on the working group will be received; as well as the finalisation of the Subcommittee's online platform, logo, and procedures for recruiting members;

● Continue research and development of AI standards, especially on AI graph and framework. Initiate proposals for standards on AI evaluation models;

● Complete research on new infrastructure, and finalise the first draft of the research report by December 2020;

● Strengthen international cooperation, particularly with ISO and IEC. Accelerate the conversion of

national standards into international standards.

In addition, on 12 October 2019, to meet the development needs of the medical device industry, the National Medical Products Administration has decided to set up a mirror organisation for the standardisation of artificial intelligence medical devices, mainly responsible for developing and revising standards related to artificial intelligence medical devices. The first expert group consists of 51 members and 28 observers, and the secretariat is undertaken by the China Institute for Food and Drug Control. This especially shows that AI standardisation is gradually being integrated with various sectors in China.

Framework of China AI standards

On 4 August 2020, the Standardization Administration of China (SAC), the Cyberspace Administration of China (CAC), the National Development and Reform Commission (NDRC), the Ministry of Science and Technology (MOST), and the Ministry of Industry and Information Technology (MIIT), jointly issued the Guidelines for the Establishment of the New Generation of Artificial Intelligence Standards System.

The document outlines a two-stage strategy to be achieved by the national artificial intelligence (AI) standards system, namely:

- By 2021:
    - Clarify the top-level design nature of AI standardization;
    - Research general rules for the establishment of the AI standards system and for the development of standards;
    - Clarify the relationship between standards;
    - Complete the pre-research of more than 20 key standards, especially on critical general and AI technologies, as well as AI ethics.

- By 2023:
    - Complete the preliminary establishment of the AI standards system;
    - Focus on the development of urgently needed standards such as data, algorithms, systems and service, and promote their application in various industries such as manufacturing, transports, finance, public security, housing, elderly care, environmental protection, education, healthcare, and justice;
    - Establish a test and verification platform for AI standards, thus increasing the provision of public services.

According to the Guidelines, the national AI standards system framework will consist of eight parts: (i) basics; (ii) supporting technologies and products; (iii) hardware and software platforms; (iv) critical and generic technologies; (v) critical AI technologies; (vi) products and services; (vii) industrial application; and (viii) security and ethics.

The Guidelines provide definitions for all kinds of AI standards, and illustrate the key points for their development according to the two-stage strategy for the establishment of the AI standards system. In the annex, the Guidelines provide a detailed list of the development directions and priorities of 63 kinds of AI standards, focusing on technology, industry application and security. However, no lists of standards already issued, currently under research or under planning, is provided in the Guidelines.

Framework of China AI Standards
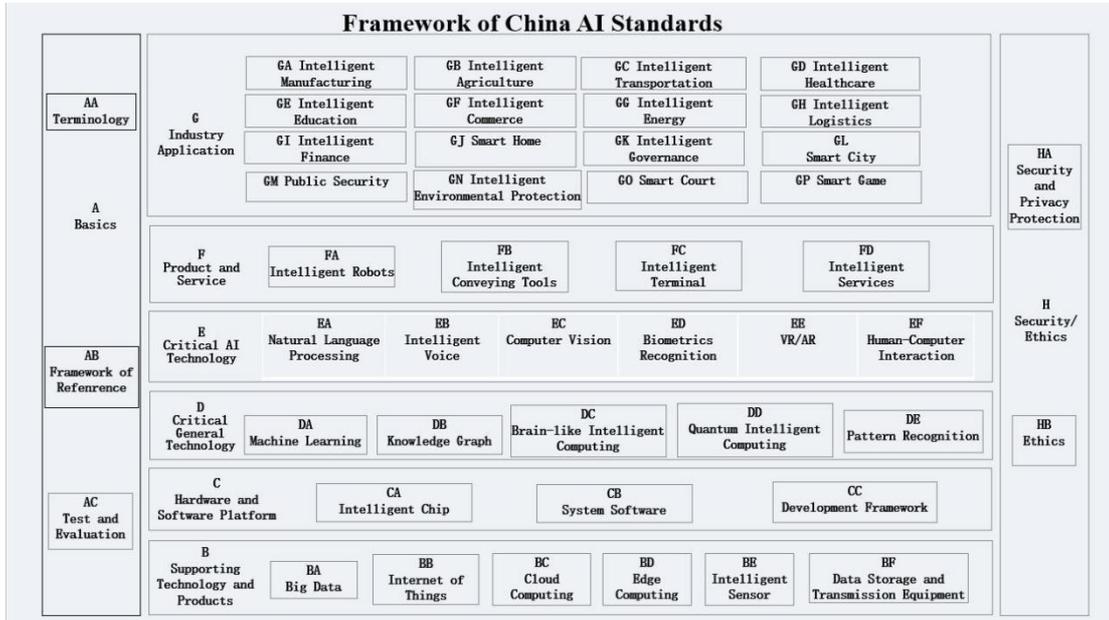
Standards

While China does include ethics in its standards system, but it first develops standards on technology or for industry and social application. However, on 5 January 2021, to further ensure the security and control of artificial intelligence, coordinate the development and security of artificial intelligence, and promote the continuous driving role of artificial intelligence in national economy, society, and ecology, TC 260 published the *Standard Practice Guide for Cybersecurity - Guidelines for Ethical Security Risk Prevention in Artificial Intelligence*. It provides prevention measures for artificial intelligence ethical security risks, and provides guidance for relevant organizations or individuals to carry out artificial intelligence research and development, design and manufacture, deployment and application activities in various fields. It is the first time for China to realize the trustworthiness of artificial intelligence via standards.

Conclusion

AI will play key role in the future economic development in China. As already outlined in the Made in China 2025 strategy, the Chinese government is investing considerable amount of resources to make sure that China emerges as a world leader in AI technology. In fact, AI industrial parks are being established across the country, in the cities of Beijing and Shanghai, and the provinces of Guizhou and Guangdong as the main contenders for the title of AI capital of Asia and perhaps the world. China will continue to formulate more policies to guide and encourage the development of AI, both nationally and industrially. And with the establishment of SAC/TC28 SC42, more standards on AI will be developed not only on the technology, but also on AI ethics. Enterprises in China should take this opportunity to apply artificial intelligence in their businesses and follow up on the regulations, policies and standards in China.

Introduction of SESEC Project

The Seconded European Standardization Expert in China (SESEC) is a visibility project co-financed by the European Commission (EC), the European Free Trade Association (EFTA) secretariat and the three European Standardization Organizations (CEN, CENELEC and ETSI). Since 2006, there has been three SESEC projects in China, SESEC I (2006-2009). SESEC II (2009- 2012) and SESEC III (2014-2017). In April 2018, SESEC IV was officially launched in Beijing, China. Dr. Betty XU was nominated as the SESEC expert and will spend the next 36 months on promoting EU-China standardization information exchange and EU-China standardization cooperation.

The SESEC project supports the strategic objectives of the European Union, EFTA and the European Standardization Organizations (ESOs). The purpose of SESEC project is to:

- **Promote European and international standards in China;**

- **Improve contacts with different levels of the Chinese administration, industry and standardization bodies;**
- **Improve the visibility and understanding of the European Standardization System (ESS) in China;**
- **Gather regulatory and standardization intelligence.**

The following areas have been identified as sectorial project priorities by the SESEC project partners: Internet of Things (IoT) & Machine-to-Machine(M2M) communication, communication networks & services, cybersecurity & digital identity, Smart Cities (including transport, power grids & metering), electrical & electronic products, general product safety, medical devices, cosmetics, energy management & environmental protection (including eco-design & labelling, as well as environmental performance of buildings).

SESEC IV China Standardization and Technical Regulation Bimonthly Newsletter

SESEC IV China Standardization and Technical Regulation Bimonthly Newsletter is the gathering of China regulatory and standardization intelligence. Most information of the Monthly Newsletter was summarized from China news media or websites. Some of them were the first-hand information from TC meetings, forums/workshops, or meetings/dialogues with China government authorities in certain areas.

In this Bimonthly Newsletter

In this Bimonthly Newsletter, some news articles were abstracted from Chinese government organizations. All new published standards, implementation or management regulations and notice are summarized; original document and English version are available.