Cui Yadong   *Editor*

Blue Book on AI and Rule of Law in the World (2022)

上海人民出版社

Springer

Artificial Intelligence and the Rule of Law

Artificial intelligence is an important driving force of the new round of technological revolution and industrial change. Artificial intelligence and blockchain have risen to the level of national policy. While the rapid development of AI brings convenience to people's lives, it also poses challenges to global changes and the development of human society, social governance and legal regulation, such as the leakage of personal privacy, frequent data security problems, and prejudice and discrimination caused by algorithms. AI is profoundly changing the world, and it is necessary to think about how to promote the construction of responsible AI from the perspective of global governance in the future.

In response to these issues, this series aims to explore and study the new situations and new issues at the intersection of AI, law and political science all over the world, to provide a legal basis for the development of AI-related frontier fields and to limit the development of AI within the framework of law to promote the harmonious and orderly construction of AI and legal systems. Based on the above purpose, this series is selected and integrated with multidisciplinary strengths to strengthen the research on legal, ethical, and social issues related to AI, focusing on laws, regulations, institutional systems, and ethics for the healthy development of AI. The authors of this series are all top authoritative experts and scholars in AI, law, political science, and other disciplines in China, and they have already made considerable achievements and social reputations in this field of research.

This series has a clear awareness of the problem and proposes specific solutions for the implementation and implementation of AI governance from a multi-disciplinary and multidisciplinary perspective, covering AI, blockchain, algorithms, digital currency and other specific segments closely related to law, with cutting-edge, academic and theoretical value, and filling the gap of similar research in China.

Cui Yadong
Editor

Blue Book on AI and Rule of Law in the World (2022)

上海人民出版社

© Springer

Editor
Cui Yadong
Shanghai Law Society
Shanghai, Shanghai, China

Translated by
Shu Jingyi
School of Economic Law
Shanghai University of Political
Science and Law
Shanghai, China

Editorial

Participating Writers (Listed by Surname Stroke Order): Yu Xin, Yu Jiameng, Wang Zhonghao, Wang Houxue, Wang Keqiang, Wang Chaoyi, Wang Yini, Fang Le, Zhu Yan, Zhu Wenjing, Zhu Ningxin, Zhu Qiaochu, Liu Liu, Liu Yin, Xu Duanrong, Zou Qi, Wu Tianxing, Shen Zhitao, He Zehao, Li Ruoying, Zhang Junyi, Zhang Haibin, Zhang Yiqun, Zhang Yuxin, Lu Chenying, Zhou Xun, Zhou Xueni, Zheng Zhenyao, Xu Aijing, Xu Yanan, Huang Qian, Huang Yu, Gong Sihan, Zhang Yichen, Pan Hao

Preface

In 2021, there was another major breakthrough in the field of Artificial Intelligence ("AI"), "AI tool predicted protein structure" was named as one of the most important discoveries in 2021, and Science even listed it as the first of the "Top 10 scientific breakthroughs in 2021".[1] The year 2021 is also called "the year of the metaverse", since the "metaverse" with artificial intelligence technology as the underlying support is approaching reality from the concept. In the ongoing struggle with the coronavirus, humanity has accelerated the process of informationization and promoted the innovation and application of new technologies such as AI. The rapid development of high technology has promoted digital transformation and given rise to new social forms such as digital economy, digital government, and digital society. In the digital era, intelligent social governance has attracted much attention. China and many countries around the world attach great importance to the construction of intelligent social governance, and actively promote legislation and regulations in the field of artificial intelligence and other new technologies to provide legal protection and institutional supply for the governance of intelligent society. In the context of such a background, the *Blue Book on AI and the Rule of Law in the World* (2022) ("Blue Book (2022)") has been released to the public.

Back in September 2018, President Xi Jinping stressed in his congratulatory letter to the 2018 World Artificial Intelligence Conference that "a new generation of artificial intelligence is booming around the world, injecting new momentum into economic and social development, and is profoundly changing people's production and lifestyle. Grasping this development opportunity and handling the new issues raised by AI in law, security, employment, ethics and government governance require deepening cooperation and joint discussion among countries".

How to deal with the possible risks and challenges possibly carried out by the development of AI and deal with this new topic?

The AI rule of law has come into being.

---

[1] On December 15, 2021, Nature released "The science news that shaped 2021: Nature's picks"; on December 17, Science released "2021 breakthrough of the year". Both Nature and Science regarded the "AI tool predicted protein structure" as the most important discoveries of the year.

In the digital era, the law cannot be absent; in an intelligent society, the rule of law shall accompany it.

In order to promote the prosperous AI rule of law research and serve intelligent social governance, at the beginning of 2019, Shanghai Law Society put forward the proposal of preparing the Blue Book on AI and the Rule of Law in the World,[2] which was actively supported by relevant experts and scholars, inviting Shanghai Law Society, Yangtze Delta Research Institute of Tsinghua University, Zhejiang, East China University of Political Science and Law, Shanghai University of Political Science and Law as the main editorial, Zhang Wenxian (Director of the Academic Committee of China Law Society, famous jurist, professor, doctoral advisor), Xue Lan (Dean of Schwarzman College at Tsinghua University, Director of the Institute for AI International Governance, professor, doctoral advisor) as academic advisor, Cui Yadong as the editor-in-chief, Ye Qing (President of East China University of Political Science and Law), Liu Xiaohong (President of Shanghai University of Political Science and Law), Wang Tao (President of Yangtze Delta Research Institute of Tsinghua University, Zhejiang), Shi Weidong (Full-time Vice President of Shanghai Law Society) as associate editor; furthermore, invited a number of experts and scholars to form the Editorial Committee of the Blue Book of World AI Rule of Law ("Editorial Committee of the Blue Book"), and established a special Editorial Department of the Blue Book of World AI Rule of Law ("Editorial Department of the Blue Book") which is responsible for the editorial work.

Guided by Xi Jinping Thought on the Rule of Law, Blue Book on AI and the Rule of Law in the World has been compiled through systematic collection, collation, and analysis of cutting-edge developments in the AI rule of law evolution strategies, policies, laws, theoretical research, practical applications, and judicial cases in China and the world, the book is edited into an objective, impartial, and accurate annual analysis report for public distribution, thus providing quality services for the prosperous AI rule of law research and intelligent social governance, promoting the establishment of a legal system, policy system, ethical norms, and technical standards that are compatible with the innovative development of AI, helping the implementation of the new generation of national AI development strategies, guaranteeing the safe, credible, reliable, controllable and healthy development of AI, and providing Chinese wisdom to promote the global governance of intelligent society.

The preparation of the Blue Book on AI and the Rule of Law in the World is a new exploration and a new path. In order to prepare the Blue Book, Shanghai Law Society, together with Yangtze Delta Research Institute of Tsinghua University, Zhejiang, East China University of Political Science and Law, and Shanghai University of Political Science and Law, has continuously strengthened the editorial committee and editorial department of the Blue Book. With the care and support of relevant experts and scholars in the legal and scientific fields, all the editorial staff have

---

[2] At the beginning of 2019, Cui Yadong, Party Secretary and President of the Shanghai Law Society, Chief Expert Researcher of the Rule of Law and Social Governance Research Center of Yangtze Delta Research Institute of Tsinghua University, Zhejiang, proposed to prepare Blue Book on AI and the Rule of Law in the World.

overcome difficulties and actively explored, completed therefore a series compiling and publishing, including Blue Book on AI and the Rule of Law in the World (2019), Blue Book on AI and the Rule of Law in the World (2020), and Blue Book on AI and the Rule of Law in the World (2021). Through the past 3 years of practice, the writing ability has been continuously improved, and the quality of Blue Book on AI and the Rule of Law in the World has been enhanced and has become more and more influential. First of all, in 2019, the Blue Book was included in Shanghai's overall strategy to build Shanghai into AI highland, and was listed as one of the "seven actions" in the *Action Plan on Building the Shanghai Highland of Artificial Intelligence and Constructing First-class Innovation Ecology*, becoming one of the iconic brands of Shanghai AI "first-class innovation ecology". Second, the Blue Book has played an active role in leading, prospering, and promoting AI rule of law research. Blue Book on AI and the Rule of Law in the World brings together the latest information on strategies, policies, laws, major theoretical studies, practical application projects, typical judicial cases, and other aspects of the development of AI rule of law in China and abroad in the current year, which provides an important reference for building AI rule of law system, leading, regulating, and guaranteeing the safe, reliable, controllable, and healthy development of AI. Third, Blue Book on AI and the Rule of Law in the World creatively formulated the "AI Rule of Law Development Index" (the first in the world), which reflects the development of AI rule of law in a quantifiable and visualization form and has received continuous attention and high evaluation from experts and scholars in the legal and scientific fields and the public at home and abroad. Fourth, the release of Blue Book on AI and the Rule of Law in the World has had a positive impact at home and abroad. On July 9, 2021, Shanghai Law Society, Shanghai People's Publishing House, and Springer Nature signed a strategic cooperation agreement on the publication of the English version of Blue Book on AI and the Rule of Law in the World, and jointly published Blue Book on AI and the Rule of Law in the World (English Version). The English version of Blue Book on AI and the Rule of Law in the World (2021) will be published in the near future.

We would like to express our heartfelt thanks to the experts, scholars, and staff who contributed to the preparation of the Blue Book as well as their comments and suggestions. We would like to express our heartfelt thanks to the entrepreneurs who cared for and supported the preparation of the Blue Book!

Blue Book on AI and the Rule of Law in the World is in its fourth year of preparation and publication, although the quality of the Blue Book has been improving year by year, the rule of law of artificial intelligence is still a new thing and the preparation work is still in the exploration stage, suggestions for improvement will be gratefully received.

Shanghai, China   Cui Yadong

Contents

Chapter 1
Overview of the Development of Artificial Intelligence Rule of Law

Cui Yadong

In recent years, artificial intelligence, driven by new theories and technologies such as mobile Internet, big data, supercomputing, sensor networks, brain science, etc., has been developing rapidly and has a great and far-reaching impact on economic and social development as well as international political and economic pattern, accelerating to become the principal driving force for building a modern digital economic system and promoting high quality economic and social development. The rapid development of AI has given rise to the new topic of "intelligent social governance". The *Shanghai Initiative on Artificial Intelligence and the Future Rule of Law Construction* was released at the High-Level Symposium of "Artificial Intelligence and the Rule of Law" in 2018 World Artificial Intelligence Congress (renamed as "World Artificial Intelligence Conference Rule of Law Forum" in 2019), which has put forward 14 proposes in four aspects, namely, the conceptual framework for AI and the construction of future rule of law, the route of rule of law concerning the promotion and guarantee of the AI development, the strengthening of teaching research and practice in the aspect of AI law, and the promotion of international cooperation and exchange in the future rule of law of AI. It has promoted the theoretical research and the systematic construction on the rule of law of AI, as well as the intelligent social governance. With the rapid development of AI technology and theoretical research on AI rule of law, it has become the consensus of the legal and scientific communities to use the rule of law thinking and method to lead and ensure the safe, reliable, controllable and healthy development of AI, thus creating a better ecological environment for the development of AI and making AI better serve economic and social development for the benefit of mankind.

In 2021, there was another new and major breakthrough in the field of AI. In "The Science News that Shaped 2021: Nature's Picks" and "2021 Breakthrough of the Year" published by the top global journals *Nature* and *Science*, "artificial intelligence

---

C. Yadong (✉)
Shanghai Law Society, Shanghai, China
e-mail: hrx058@163.com

to predict protein structure" was named as the most important discovery in 2021, *Science* even listed it as the first of the "Top 10 Scientific Breakthroughs of 2021".[1] With the help of AI software programs, the problem of protein folding, which has plagued the life sciences for nearly 50 years, has been solved. The application of this new technology will not only serve the global fight against epidemics—simulating the impact of Omicron variant spike protein mutations,[2] but also change the rules of future structural biology in the long run and enhance the development of life sciences. Along with the rapid development of new AI technologies and applications, in June and September 2021, China promulgated the *Data Security Law of the People's Republic of China* ("Data Security Law") and the *Personal Information Protection Law of the People's Republic of China* ("Personal Information Protection Law") to strengthen the protection of personal information and privacy by promoting the standardized use and safe flow of data, so as to provide a "Chinese solution" for intelligent social governance. Landmark events in the field of AI are emerging around the world. On November 25, 2021, UNESCO adopted the first global agreement on the Ethics of Artificial Intelligence, which 193 member states can apply. This standard defines common values and principles for AI technologies and its applications, which can be used to orient the establishment of the necessary legal framework to ensure the sound development of AI, to promote the technology to serve for human beings, society, environment and ecosystem, and to prevent potential risks.

1 Artificial Intelligence Development (2021)

On July 8, 2021, *2020 Global AI Innovation Index Report*, a study conducted by the Institute of Science and Technical Information of China and Peking University, was published during the 2021 World Artificial Intelligence Congress (WAIC 2021). According to the statistics (see Fig. 1), the top 10 countries in the Global AI Innovation Index are the United States, China, Korea, Canada, Germany, the United Kingdom, Singapore, Israel, Japan and France. The overall score of the United States is 66.31, and the score of China is 50.6.[3] In terms of global AI research and development (R&D) and application, both the U.S. and China are currently recognized

---

[1] On December 15, 2021, Nature released "The science news that shaped 2021: Nature's picks"; on December 17, Science released "2021 breakthrough of the year". Both Nature and Science regarded the "AI tool predicted protein structure" as the most important discoveries of the year. See China Science Daily, *Nature Top 10 Science News in 2021*, https://news.sciencenet.cn/htmlnews/2021/12/471074.shtm; stdaily.com, *Science Published the Top 10 breakthroughs of 2021*, https://www.cas.cn/kj/202112/t20211220_4818842.shtml.

[2] Scientists have used "AlphaFold" to predict the effects of Omicron variant spike protein mutations. By inserting a larger amino acid into the protein, the mutation changes its shape, which perhaps enough to cause a reduction in binding affinity, so as to prevent the virus from escaping antibody-mediated neutralization.

[3] From January to July 2021, the number of patent applications and patents granted in the global AI industry were 12,663 and 789, respectively, with a grant ratio of 6.23%. As of July 15, 2021, the number of patent applications in the global AI industry was 228,000.

as the first spot of in the list of countries. China performs well in aspects of infrastructure, innovation resources and environment, R&D, industrial application, and ranks in the top 10 in all four main indicators; the AI innovation capability of China is steadily improving. In respect of comprehensive scores, China already outperformed South Korea, Canada, Germany, the United Kingdom, Singapore and other developed countries. The Al Index Report Measuring Trends in Artificial Intelligence (2021), released by Stanford University in March 2021, shows that China (20.7%) slightly overtook the United States (19.7) in terms of the highest share of AI journal citations. However, the United States still holds the lead in the AI conference publications, and the United States has significantly more cited AI conference papers than China, with 40.1% over China's 11.8%; the latter indicator is considered to better reflect a country's leading international achievements and quality of AI research.[4]

1.1 Development of Artificial Intelligence in China

1. High-Speed Development of Artificial Intelligence Industry

The year 2021 was the first year of the *Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035* ("14th Five-Year Plan"), China's AI industry is developing rapidly. As the essential point of driving the innovation and development of digital China and Scientific and technological powerhouse, and targeting the global science frontiers, AI has opened up a new image of development. In line with the data released by the IDC China, the overall AI market size of China during the first half of 2021 reached $2.18 billion, representing a growth rate of 42.2% compared with the same period last year. Based on the industrial and commercial registration data, there were more than 678,000 new AI-related enterprises in China in 2021, representing an increase of 64% over the same period last year (see Fig. 2).[5] According to the 14th Five-Year Plan, China is actively promoting the integration of AI with industry, increasing the number of AI pilot areas, and enhancing the construction of computing infrastructure. By December 2021, three to five 5G fully-connected factories were built as benchmarks, the construction of National Industrial Internet Big Data Center was essentially completed, 5G industrial Internet dedicated frequency bands were planned, and pilot sites for industrial 5G networks were launched.[6] Aiming at frontier

---

[4] Stanford University, *The AI Index Report Measuring Trends in Artificial Intelligence (2021)*, https://aiindex.stanford.edu/ai-index-report-2021/.

[5] See Huanqiu, *IDC: The Overall Market Scale of Artificial Intelligence in China Reached US $2.18 billion in the First Half of 2021, a Year-on year Increase of 42.2%*, https://smart.huanqiu.com/article/46BUCGgkekO.

[6] See Industrial Internet Special Working Group, *Work Plan for the Industrial Internet Special Working Group of 2021*, https://www.miit.gov.cn/zwgk/zcwj/wjfb/txy/art/2021/art_a02effb156344a408e8ca5d60d0442de.html.
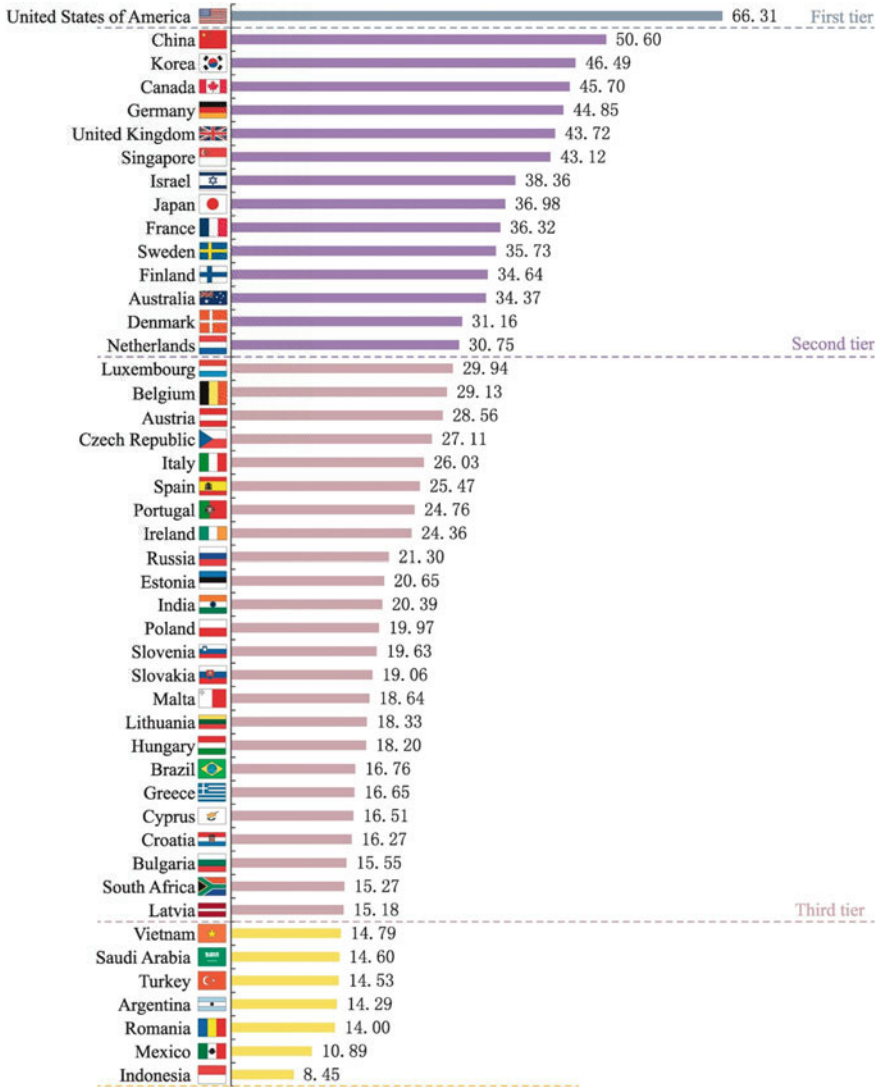
Fig. 1 Ranking of the global AI innovation index (*data source* 2021 World Artificial Intelligence Congress)

areas such as AI, China has implemented a series of pioneering and strategic national projects.

2. **The Development of Artificial Intelligence Technology Has Been Significantly Enhanced**

Unit: Number of enterprises
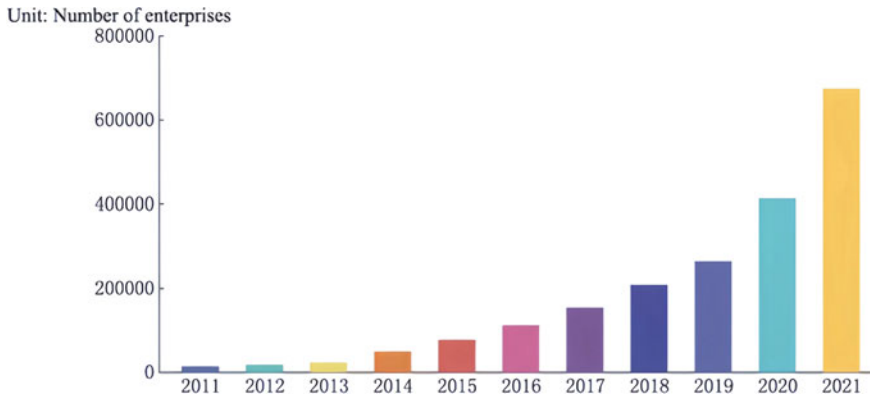
Fig. 2 Annual registered AI-related enterprises of China (*data source*: TianYanCha.com)

In 2021, China had taken advantage of its state systems, talents and market to overcome difficulties and continuously improved core technologies in AI chips, frameworks, platforms, algorithms, etc., the overall technologies and applications in the field of AI had been synchronized with the world's advanced level. On the one hand, the development of AI industry was supported by national policies and the investment has increased significantly. On the other hand, the application of AI was booming, thus talents and enterprises were rapidly gathering. Driven by both policy guidance and industrial development, the software and hardware infrastructure and application ecosystem in the field of AI had ushered in a golden period of development, especially in the robotics and driverless cars, computer vision, natural language, virtual assistants, machine learning five areas, AI research and applications continued to make new progress.

3. **Artificial Intelligence Innovation to Empower the Digital Economy**

In 2021, AI will become an important driver for the development of digital economy and intelligent economy. The combination of data and AI—data intelligence—has become the core of digital transformation, the use of AI technology to create a new engine of the digital economy is the key of the current development. Focusing on the healthy development of AI, the Chinese government has been improving policies and optimizing services to strengthen the necessary institutional supply for the development of AI from data governance, privacy protection, market access and other levels. At the same time, all sectors of society have accelerated the exploration and development of new AI technologies, new ecosystems, new business models, new talents and other aspects, so as to provide strong development momentum for industrial transformation and upgrading.

4. **Artificial Intelligence and Metaverse**

In 2021, the Metaverse, supported by frontier technologies such as AI, became the focused area of the year. The appearance of the Metaverse promoted the innovation

and application of AI, Blockchain, Internet of Things and other technology, and there was once a wave of investment. As the strongest investment trend of the year, some experts suggested that risk bubbles existed in the Metaverse. The concept of Metaverse that some companies are currently hyping is different from the real Metaverse, therefore it is necessary to remove the false and retain the true, and judge carefully. "Capital manipulation. There are still many uncertainties in the Metaverse in its embryonic period, thus both the industry and the market need to return to rationality. We shall be on the alert for the profit-seeking inertial operation of the capital through creating new concepts, hyping the new big thing, and attracting new investment".[7]

1.2   Artificial Intelligence Development in Several Foreign Countries and Regions

1.   U.S.: Maintain Artificial Intelligence Leadership

In January 2021, the United States announced the establishment of the National Artificial Intelligence Initiative Office.[8] In March, the National Security Commission on Artificial Intelligence of the U.S. reported to the Congress that the federal government should prioritize accelerating the pace of innovation in this field, invest $40 billion to promote the development of this field, and vigorously cultivate skilled talents.[9] In June 2021, the U.S. and the United Kingdom signed the new *Atlantic Charter* to strengthen cooperation in areas such as the security of critical supply chains, battery technologies, and future technologies including artificial intelligence, establishment of digital technical standards, explore potential of quantum technologies and 6G.[10] In September of the same year, the U.S. established the National Artificial Intelligence Advisory Council (NAIAC), which will advise the President and the National Artificial Intelligence Initiative Office (NAIIO) on a range of issues related to AI, including the National AI Initiative.[11] In November 2021, the AI field had a "highlight moment". A team of researchers from the University of Vermont and Tufts

---

[7] Guan Xiaopu, Li Yunshu, *Metaverse, In-depth Concern: How Metaverse Rewrites Human Social Life,* Official Website of the Central Commission for Discipline Inspection of the Communist Party of China, https://www.ccdi.gov.cn/toutiao/202112/t20211223_160087.html.

[8] *The White House Launches the National Artificial Intelligence Initiative Office*, https://trumpwhitehouse.archives.gov/briefings-statements/white-house-launches-national-artificial-intelligence-initiative-office/.

[9] NSCAI, *Final Report: National Security Commission on Artificial Intelligence*, https://www.nscai.gov/wp-content/uploads/2021/03/Full-Report-Digital-1.pdf.

[10] DCMS press office, *UK and US Agree to Strengthen Ties in Science and Technology*, https://www.gov.uk/government/news/uk-and-us-agree-to-strengthen-ties-in-science-and-technology.

[11] National Institute of Standards and Technology, Department of Commerce Establishes National Artificial Intelligence Advisory Committee (NAIAC), https://www.commerce.gov/news/press-releases/2021/09/department-commerce-establishes-national-artificial-intelligence.

University created Xenobots 3.0, the world's first AI-designed biological robots that can self-repair and self-replicate.[12]

2. **EU: Establish Uniform Rules on Artificial Intelligence Technologies**[13]

On April 21, 2021, the European Commission unveiled a proposal for *Artificial Intelligence Act*. The proposal not only sets limits on the application of AI technology in a range of daily activities such as autonomous driving, bank loan, and social credit scoring, but also regulates the use of AI in the EU's internal law enforcement and judicial systems, promotes the use, investment and innovation in AI across the EU, and establishes uniform rules on AI technology.

3. **Russia: Vigorously Foster the Development of Artificial Intelligence**[14]

On January 17, 2021, the Ministry of Economic Development of the Russian Federation issued a draft resolution stating that the Russian government would invest $217 million in AI development from 2021 to 2023. The Ministry intended to disperse funding to several nonprofit organizations, which will construct platforms for national AI pilot projects and fund small enterprises working on AI.

4. **UK: Release of *AI Roadmap* to Stimulate Technological Innovation**[15]

On January 6, 2021, the UK AI Council released the *AI Roadmap* to help the UK government develop a strategic direction for AI.[16] The report proposed 16 recommendations for the UK to develop AI, which focused on four directions including research and development, social work, hardware and software infrastructure, and national and cross-sector collaboration. In June of the same year, the UK government and IBM unveiled a five-year, £210 million collaborative research program in AI and quantum computing.

5. **Germany: Launch the Research Initiative on 6G Technology**[17]

In March 2021, Free State of Bavaria launched the Thinknet 6G initiative, a collaborative platform that intends to create an agile ecosystem of industry players, research institutions, associations, innovators, startups and incubators. In April, the German

---

[12] Forbes, *AI Just Designed The World's First Living Robot That Can Make Babies*, https://www.forbes.com/sites/andreamorris/2021/11/29/ai-just-designed-the-worlds-first-robot-organism-that-can-make-babies/?sh=4722b1066345.

[13] European Commission, *Regulating Artificial Intelligence, European Commission Launches Proposals*, https://www.jonesday.com/en/insights/2021/04/regulating-artificial-intelligence-european-commission-launches-proposals.

[14] RAUIE, http://rauie.cn/company/partnery-i-chleny/ministry-economy-rf/.

[15] *AI Roadmap*, https://www.gov.uk/government/publications/ai-roadmap.

[16] Office for Artificial Intelligence, Independent report AI Roadmap (6 January 2021), https://www.gov.uk/government/publications/ai-roadmap.

[17] Pressemitteilung. *Karliczek: 6G wird unsere Kommunikation revolutionieren-rund 700 Millionen Euro für die Vernetzungstechnologievonübermorgen*, https://www.bmbf.de/bmbf/shareddocs/pressemitteilungen/de/karliczek-6g-wird-unsere-kommu-ngstechnologie-von-uebermorgen.html.

Federal Ministry of Education and Research launched the first German research initiative on 6G technology and published corresponding funding guidelines. 6G technology is expected to succeed 5G technology in communication networks from around 2030. The goal of the first funding measure ("6G Research Centers, Future Communication Technologies and 6G Platforms") is to establish the basis for an innovation ecosystem for future communication technology related to 6G.

6. **France: Release New Plan to Promote "National Strategy for Artificial Intelligence"**[18]

In November 2021, France presented the second phase of its *National Strategy for Artificial Intelligence*: The €2.2 billion investment over five years would be particularly focused on three main goals: first, to improve national technological capabilities; second, to make France a leader in embedded AI, responsible and trusted AI; and third, to transform AI into economic benefits.

7. **Canada: Invite Businesses to Develop an Artificial Intelligence Decryption Service**[19]

In November 2021, in order to effectively answer the challenge of the Royal Canadian Mounted Police in accessing encrypted data seized during the course of criminal investigations, the Government of Canada invited businesses to come up with a new innovative product, service or solution that can help the police develop an AI decryption system, this system can process the seized data files.

8. **Japan: Develop New Applications of Artificial Intelligence by Using Supercomputers**[20]

In 2021, Japanese scientists began developing a modern "mind-reading" project based on AI technology. Tokyo Institute of Technology of Japan has developed a method to reproduce the sounds heard or thought by attaching electrodes to the head and measuring brainwave. Riken national research institute of Japan has made full use of the world's fastest supercomputer *Fugaku* to develop AI, such as new material development and autonomous driving. Riken national research institute also planned to use the full computing power of *Fugaku* for technological innovation, and was scheduled to use *Fugaku* to develop the world's largest AI system by 2022.

9. **Korea: Promote Information and Communication Technology and Release Semiconductor Development Strategy**[21]

---

[18] People.cn, *France Launched Plans to Promote the Development of AI*, http://hb.people.com.cn/n2/2021/1228/c194063-35070499.html.

[19] Innovation, *Science and Economic Development Canada, Government of Canada Invites Small Businesses to Develop an Artificial Intelligence Decryption Service*, https://www.canada.ca/en/innovation-science-economic-development/news/2021/11/government-of-canada-invites-small-businesses-to-develop-an-artificial-intelligence-decryption-service.html.

[20] People.cn, *Japan's Supercomputer "Fugaku" Captured the 4th Consecutive Title as the World's Fastest Supercomputer*, http://japan.people.com.cn/n1/2021/1117/c35421-32284523.html.

[21] People.cn, *No Less than the United States, South Korea Wants to be the Leader of the Semiconductor Industry*, http://korea.people.com.cn/n1/2021/0507/c407366-32096406.html.

In 2021, information and communication technology (ICT) in Korea was growing vigorously, with statistics from the Ministry of Science and ICT showing that Korea's ICT exports reached $21.49 billion in November 2021, a 30% increase from a year earlier. In addition, data from the Korean Intellectual Property Office showed that Korea ranked second in the world in terms of patent applications for digital holography in the field of virtual reality. Concerning the AI, Korean researchers have developed a "neuromorphic" semiconductor that mimics the synapses structure of the human brain which is capable of processing information in a manner similar to human brain performance and is able to implement AI with ultra-low power.

10. **Israel: Prosper Artificial Intelligence Companies and Ready to Embrace Digital Currency**[22]

In April 2021, CB Insights released *AI 100: The Most Promising Artificial Intelligence Startups in the World*, 11 companies from Israel, with a population of less than 10 million, were featured in this list, and many of them were valued at more than $1 billion. The Israeli government plans to invest $1.6 billion to further promote research and development of AI technology by building supercomputers, strengthening the training of AI skilled talents, establishing appropriate regulatory measures for the development of AI and so forth.

11. **Brazil: Improve the National Innovation Network**[23]

Brazil is one of the leading countries in Latin America in terms of AI technology. In 2021, Brazil continued to promote the construction of AI lab, as well as the improvement of the national innovation network, created as the result of the cooperation of the Brazilian Ministry of Science, Technology and Innovations and the Brazilian Industrial Research and Innovation Company. The goal of the network is to encourage use of AI technology in various productive sectors and increase the production capacity and competitiveness of domestic companies.

2 Development of AI Rule of Law (2021)

2.1 Development of AI Rule of Law in China

1. Continuous Improvement of AI Legislation

In 2021, China has formulated and introduced a series of policy measures and a number of laws and regulations, ethics, and standards to motivate the depth application of AI in multiple scenarios.

---

[22] Stdaily.com, *Digital Technology Helps Countries in the World Open up New Technological "Battlefields"*, https://baijiahao.baidu.com/s?id=1721334387266619007&wfr=spider&for=pc.

[23] *Publicada a Estratégia Nacional de Inovação*, https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/noticias/2021/07/publicada-a-estrategia-nacional-de-inovacao.

The first is to comprehensively strengthen rule of law in the intelligent society through legislation. On March 13, 2021, the Fourth Session of the 13th National People's Congress adopted the "14th Five-Year Plan", which pointed out the overall layout of the AI development direction during the "14th Five-Year" period: realize breakthroughs in critical technologies, build new advantages in the digital economy, create favorable digital ecology; at the same time it is required to promote the coordinated and supporting construction of systems, standards and ethics during the process of development. The *Civil Code*, *Data Security Law* and *Personal Information Protection Law*, approved by the National People's Congress (NPC) and implemented successively, have constituted a system of laws with Chinese characteristics, providing legal protection for intelligent social governance. On December 12, 2021, the State Council issued the *"14th Five-Year Plan" for the Development of the Digital Economy*. It is required to promote the intelligent upgrading of infrastructure in an orderly manner and promote the integrated development of cloud-network collaboration and computing-network; accelerate the promotion of digital industrialization and enhance the competitiveness of core industries; as well as strengthen the government's digital governance capabilities. At the national level, the *Plan for Building a Law-based China (2020–2025)* issued by the CPC Central Committee in early 2021, called for efforts to strengthen legislation in the field of information technology, and promptly follow up on and study relevant legal schemes on issues such as AI, to make up for shortcomings without delay; make full use of AI and other modern technological means to build a "smart rule of law".

The second is the adoption of legislation to guarantee the healthy development of the digital economy. The Civil Code, which entered into force on January 24, 2021, establishes the basic principles for the protection of personal information and privacy in the civil context, and draws boundaries for the application of AI. The Data Security Law, which came into effect on September 1, 2021, provides the highest level of special protection for the *compliance* use and flow of data in the iteration of AI. The Personal Information Protection Law, which took effect on November 1, 2021, strengthens the top-level design of personal information protection, further specifies and refines the regulation of personal information processing, and prevents the misuse of personal information. The latter two, together with the Cybersecurity Law, jointly form "troika" governing data governance in the legal sense, marking the legal framework of data security in China has been initially established, and also provide a legal basis for intelligent social governance. In this respect, China focuses on data security in key industries and emerging technologies, and so on.

The third is to promote the development of new business types and new models through legislation. In response to the new requirements of infrastructure construction, transportation and logistics, and intelligent manufacturing in the field of AI, new policies and measures have been introduced at the national and local levels to lead and guarantee the development advantages. The *"14th Five-Year Plan" for the Development of the Digital Economy,* released on December 12, 2021, indicates that it is necessary to vigorously promote AI and enable intelligent manufacturing with digital technologies, develop modern service industry and other new business types and new models, and establish relative standard system. In February 2021,

the General Office of the CPC Central Committee and the General Office of the State Council issued the *Action Plan for Building a High Standard Market System* to promote the implementation of demonstration projects for the development of smart markets; on October 31, 2021, the State Council published the *Opinions for implementing the Pilot Program of Business Environment Innovation*, emphasizing that AI and other technologies shall be used to empower supervision, the construction of a national integrated online supervision platform shall be accelerated, and exploration shall be made for forming a chain of custody for the full life cycle of market participants, and further enhance the business environment.

In 2021, the NPC, central and local governments at all levels have intensively issued a series of relevant laws and regulations, policy, standards, ethical guidelines and other norms, fully demonstrating China's foresight, innovation and leadership in intelligent social governance. The introduction of these laws, regulations, policies and norms has laid a solid institutional foundation for accelerating the cultivation of data element market, the in-depth application of AI, and ensuring the healthy development of the digital economy.

2. **Further Research on AI Rule of Law**

In 2021, China's AI rule of law research focused on the development of AI "good intelligence and good governance" and the promotion of AI rule of law system construction.

First is the concern around the AI ethics for good. In 2021, the release of the *Ethical Norms for the New Generation Artificial Intelligence* generated concern and discussion in academia about the trustworthiness and controllability of AI. Related research points out that crisis of ethics generated by AI needs to be dealt with through more responsible AI R&D and application; moreover, the study stresses that the ethical norms shall focus on safety, transparency, fairness, personal data protection, accountability, trustworthiness, human autonomy, human dignity and other aspects, so as to lay a solid foundation for its good governance.[24]

Second is the concern around the accuracy of algorithm regulation. In 2021, focusing on the goal of credible and controllable development of AI, the academia paid more attention to theoretical research related to AI algorithm regulation. The academia generally believes that, with the continuous enrichment of algorithm application scenarios in the era of AI, for the sake of safeguarding citizen' algorithm freedom and algorithm security, it is necessary to accurately identify and judge the risks and uncertainties of AI algorithms.[25] At the same time, further detailed research should focus on improving the transparency of algorithms in all aspects, such as data collection, transmission and application; clarifying the privacy protection policies and the primary responsibility concerning data security; implementing

---

[24] World Artificial Intelligence Conference, *China Published "Ethical Norms for the New Generation Artificial Intelligence" to Integrate into the AI Whole-life Cycle.* https://baijiahao.baidu.com/s?id=1711955705044385203&wfr=spider&for=pc.

[25] Yang Rong, "From Information Security, Data Security to Algorithm Security—Cyber Law Regulation under the Perspective of the Overall National Security Concept", in *Law Review*, No. 1, 2021.

dynamic monitoring and supervision of algorithms in complex scenarios; improving comprehensive governance capabilities of algorithm and so on.

Third is the concern around data governance compliance. In 2021, theoretical research focused on making data governance as the driving force in opening up application channels, removing industry barriers and resolving information island. The academia actively advocates the principle of "ethics first and agile governance" for data compliance, reflecting the full-cycle digital justice values of active prevention rather than passive remedy, and positive-sum and win–win rather than zero-sum game.[26] In this regard, through a series of antitrust enforcement and look-through measures that go deep into the platforms, the depth, range and strength of data governance compliance is moving from "fragmentation" to "integrality", leading the global data compliance wave.

Fourth is the concern around the AI rule of law system construction. In 2021, along with the introduction of the Data Security Law and the Personal Information Protection Law, the academia conducted comprehensive discussions on issues such as personal information protection, data security, platform responsibility, social digital governance and intelligent justice, and believed that the systematic construction of AI-related legal system should be vigorously carried out to provide legal support and intellectual support for AI rule of law, special attention should be paid to the whole process governance model in data ownership, processing and circulation, regulate and guide the development and application of AI, achieve all-round protection of science and technology, so as to contribute "Chinese Solution" to the international digital rule of law.[27]

3. **Accelerated Integration of AI Rule of Law Application**

In 2021, China's AI rule of law application made new progress in various areas such as legislation, administration of justice, law enforcement, and legal services.

First, the application of AI appears in the whole process of legislation. The form of AI application in legislation is diversified and the participation is convenient. The database of national laws and regulations established and operated by the Standing Committee of the National People's Congress (NPCSC) together with relevant state organs has been launched, providing free legal search, and inquiry services to the public. The local legislative outreach offices under the Legislative Affairs Commission of NPCSC held a consultation forum on draft amendments to relevant legislation, and for the first time realized "live legislation, interactive legislation", transmitting the voices of all parties to the legislative authority of the NPC in the form of live video.[28]

---

[26] Tang Linyao, "Risk Prevention and Legal Regulation of Comptech", in *Oriental Law*, No.1, 2022.

[27] Xu Ke: "Freedom and Security: The China Plan for Cross-border Data Flow", in *Global Law Review*, No. 1, 2021.

[28] Npc.gov.cn, *The Local Legislative Outreach Offices under the Legislative Affairs Commission of the Standing Committee of the National People's Congress First Realized "Live Legislation, Interactive Legislation"*, http://www.npc.gov.cn/npc/kgfb/202111/ace83b3b9d56425bb4de460c170386a0.shtml.

Second, the application of AI integrates and expands in the judiciary platform. In 2021, AI judicial application platform gradually integrated and expanded, and made new breakthroughs. The Supreme People's Court and the Supreme People's Procuratorate accelerate the construction of the national judicial big data blockchain platform to enhance the intelligent level of judicial work. The evidence standards built by the intelligent criminal case handling assistance system provides operable and data-based standards and guidelines for case handlers to collect and fix evidence, so as to reduce the arbitrariness of the judiciary. The National Unified Business Application System for Procuratorial Organs 2.0 has basically achieved whole coverage and all-round support for procuratorial case handling operations, and has achieved greater development in case handling like the public interest litigation.

Third, the application of AI in the law enforcement demonstrates three-dimensional tendency. In 2021, the integration from single application scenario to the upper level of multi-application platform, intelligentization of the entire city, standardization of the entire process of law enforcement, and digital supervision of non-violent crimes became a development trend. The digital transformation of cities has led to a significant improvement in the intelligent level of the modernized urban governance. For example, the "management via a single website" of Shanghai has built a data-driven urban decision-making mechanism, which can comprehensively allocate and control city's public resources based on real-time data and various types of information.[29] The Public Security Bureau of Meishan City, Sichuan makes use of the "Tianyan on the chain 2.0" platform developed by Ouke Cloud Chain to regulate digital currencies by means of blockchain technology, realizing at the same time the integration of data monitoring, analysis and governance.[30] The tax department of Zhejiang Province carries out tax management based on the identification and analysis of big data, and has discovered a number of illegal acts of tax evasion by live-streamers through taxation big data analysis technology.[31]

Fourth, the application of AI in the legal services becomes more perfect. In 2021, the construction of AI legal service application perception layer was more complete, the development pattern was more and more sound, and the characteristics of equal emphasis on construction and application was increasingly obvious. Public legal services are further integrated into the overall construction of smart cities, and a coordinated work system with government leadership, departmental coordination and social participation has been established within the region. The construction of platforms such as "one-stop online services" and "cross-provincial government services" has been extended to the judicial notary. For example, Shanghai continues to deepen the reform of "one visit at most", basically realizing full coverage of

---

[29] Ling Chao, "The Digital Transformation of Shanghai City Driven by Data", in *Zhangjiang Technology Review*, No. 1, 2021.

[30] The Paper, *Beating Magic with Magic: How on the Chain 2.0 Can Help Solve Cryptocurrency Crime*, https://m.thepaper.cn/baijiahao_16324947.

[31] The Paper, *Law Popularization and Education, Viya Was Fined 1.341 Billion Yuan for Tax Evasion. What Are the Facts of the Violation*, https://m.thepaper.cn/baijiahao_16005116.

notarization matters about non-controversial facts and certificates.[32] Enterprise legal services basically realize the whole process recording of electronic data and the credibility of the whole chain. The blockchain-based electronic evidence traceability system developed by Shenzhen Fadada Network Technology Co., Ltd. is capable of conducting active, real-time notarized preservation of evidence.[33]

4. **Artificial Intelligence Judicial Cases Show New Features**

In 2021, judicial cases in China involving AI showed subjects diversity, wide range of fields, novelty, and other new characteristics.

First, the number of cases involving AI decreased in 2021. On the one hand, due to the epidemic, the decrease in litigation is synchronized with the overall decrease in the number of cases received by the courts. On the other hand, because of the intensive introduction of AI- related policies and regulations in China in recent years, AI market behavior has been gradually regulated and thus achieved positive results.

Second, cases involving artificial intelligence were distributed in a broad region. In Jiangsu, Chongqing and Sichuan, where the cases are most concentrated, cases involving AI accounts for about 32.85% of the total cases in China. In comparison, Shandong, Guangdong and Chongqing, where cases are most concentrated in 2020, cases involving AI accounted for nearly 80% of the total cases.

Third, the scope of subjects of litigation involving artificial intelligence has expanded. The trend of diversification of litigation subjects reflects that the influence of AI technology applications gradually penetrates into the smallest market unit, and gradually develops to the whole society.

Fourth, the complexity of AI technology has brought new challenges to judicial trials. According to the facts of new algorithmic cases, judicial practice in China has gradually formed a standard for judging the prudential duty of care of "recommendation algorithms" operators.

5. **Steady Improvement of "Discipline Construction of Artificial Intelligence Law"**

In 2021, the discipline construction of AI law in China focused on serving the national strategy, stressed the importance of basic research and talent training, innovating a new model for training AI law professional talents.

The first is to insist on the strategy of demand-oriented, application-driven, and serving national. According to *Several Opinions on the Construction of "Double First-Class" Universities to Promote the Integration of Disciplines and Accelerate the Cultivation of Postgraduates in the Field of Artificial Intelligence* published jointly by the Ministry of Education, National Development and Reform Commission and Ministry Finance in January 2020, Tsinghua University, Southwest University

---

[32] Shanghai Municipal Bureau of Justice, *Shanghai Municipal Bureau of Justice Held a Series of Press Briefings on the Practical Activities of "Do Practical Things for the Public"*, https://sfj.sh. gov.cn/xwfb/20210918/ff33102c320f4ad7a41e315a5c8541f8.html.

[33] Sohu News, *Fadada "Real Hammer" Selected in the "2021 Global Blockchain Innovation Application Demonstration Case Collection"*, http://biznews.sohu.com/a/477378065_120932824.

of Political Science and Law, Shanghai University of Political Science and Law and other universities continue to improve the dynamic management system of discipline structure based on the basic theories of AI and the needs of industrial development, allow the independent establishment of AI interdisciplinary curricula in accordance with the needs of economic and social development and talent cultivation through advanced and pilot policies with leading and exploratory role.

The second is to improve the AI law course and its discipline construction. In 2021, AI law, the interdisciplinary curricula combined AI and law, was flourishing. In order to cultivate talents who can adapt to the legal demand in the AI era, promote the deep integration of law, computer and other disciplines, and realize the balanced development of technology, theory and practice, institutes of higher education actively explore the development path of AI law. For example, the Law and Big Data Research Center of Tsinghua University Law School, the Peking University Law Artificial Intelligence Laboratory and other "AI + Law" interdisciplinary research program created by famous universities in recent years continue to be promoted. In order to cultivate high-end compound talents of "Law + Internet", "Law + Big Data" and "Law + AI", Law School of Southeast University focused on the national AI strategy plan, and updated Course of Legal Big Data and Artificial Intelligence Introduction.

The third is to explore a new model and mechanism for training AI talents. In 2021, the development of intelligent technology and big data called for an increasing number of "technology + law" compound talents. In order to achieve the goal of cultivating interdisciplinary talents, all countries are actively exploring new training models and methods. The government has clarified the general direction of talent cultivation and increased the investment in this field; universities also have actively cooperated with the policy, on the basis of specifying the talent cultivation goal, they make specific plans according to the actual situation and characteristics of their own universities. For example, Shanghai University of Political Science and Law, combined with the actual requirements for the training of AI law professionals, and appropriately referred to the curriculum arrangement of top foreign universities in this field, innovatively divided the AI law course system into three parts: main law course, AI course and AI law course. The Law School of Beijing Institute of Technology held a summer camp with the theme of "Artificial Intelligence and Rule of Law Talent Cultivation" to cultivate high-end compound talents who are proficient in intelligent technology and legal rules, and to enhance the communication between students of law schools of various universities.[34]

---

[34] Beijing Institute of Technology Law School, *2021 Artificial Intelligence and Rule of Law Talent Cultivation Summer Camp Admission Guide*, https://law.bit.edu.cn/tzgg/c9aeb4aa98ce441db3483 27c7145a6cf.htm.

2.2 The Development of AI Rule of Law in Some Foreign Countries and Regions

1. **AI Legislation in Some Foreign Countries and Regions**

In 2021, countries successively revised and established laws and regulations to enhance the institutional supply for intelligent social governance from both regulatory and incentive aspects.

One is to encourage in-depth applications of AI in more areas. The United States through congressional legislation, federal policies, some state legislation and other means promotes the deep application of AI in different industries and fields such as defense and military, healthcare and online platforms. On July 16, 2021, the U.S. introduced the *AI for Agency Impact Act*, which specified strategies, goals, and objectives and metrics for AI. EU legislation is exploring ways to use AI to improve working conditions, fight against corruption and enhance competitiveness in the post-epidemic era. France has upgraded its *National AI Strategy*, which will increase funding to enhance technology research and application. On September 22, 2021, the UK released its National AI Strategy, which assumes to use 10 years to position itself as the "Superpower of AI in the World".

Second is to regulate the widespread use of AI within a secure and controllable framework. Every country is exploring regulatory paths that better satisfy their needs in the application of AI. In October and November 2021, the U.S. successively promulgated *Government Ownership and Oversight of Data in Artificial Intelligence Act of 2021* (GOOD AI Act)[35] and *Advancing American Artificial Intelligence Innovation Act*, which clarifies the definition of AI, principles and policies of the government's use of AI, meanwhile emphasizing the protection of privacy, rights and freedom of citizens. On April 21, 2021, the European Union adopted a new *Regulatory Framework Proposal on Artificial Intelligence* (AI Act), which proposed to build a "risk-based approach" to classify and manage AI systems with different requirements and obligations.

Third is to support intelligent applications in dominant fields. On May 20, 2021, the U.S. launched the *Artificial Intelligence for the Military Act*, which promoted the in-depth application of AI in the military field and ensures military deterrence. On 28 July, 2021, *the Act Amending the Road Traffic Act and the Compulsory Insurance Act Road Traffic Act and the Compulsory Insurance Act* came into force in Germany, allowing motor vehicles with certain autonomous driving capabilities to operate on the public roads, further maintaining Germany's advantage in the automotive industry, also promotes the development of autonomous driving.

2. **Theoretical Research on Artificial Intelligence in Some Foreign Countries and Regions**

---

[35] *The Government Ownership and Oversight of Data in Artificial Intelligence Act (GOOD AI Act)*, https://www.govinfo.gov/content/pkg/BILLS-117s3035is/pdf/BILLS-117s3035is.pdf.