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China's Technical Standardisation Framework

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Executive Summary

This paper analyses China's National Standardisation Development (NSD) Outline released in October 2021. The NSD outline consolidates the goals of the "China Standards 2035" (中国标准 2035) project and is one of many documents which supplement existing national level strategies. The NSD Outline highlights the importance of standards for domestic economic development for fuelling technological innovation and improving domestic industry standards. It also highlights the Chinese government's view of standardisation as an opportunity to increase international influence and an opportunity to increase Chinese participation in international organisations and standard setting organisations. Although the goals set out in the NSD outline are lofty, the Chinese government's standardisation ambitions might face challenges of interoperability, over-standardisation, and geopolitical pushback.

I. Background

The process of standardisation in China has evolved over the last 30 years. In recent years, the People's Republic of China (PRC) has endeavoured to strengthen its presence in the standard-setting domain by setting up institutions and formulating policies to improve the efficiency of the standard-setting process by the state.[1]

Institutional Structure

Standards in the PRC are coordinated by the Standardisation Administration of China (SAC), an organisation under the State Administration for Market Regulation (SAMR). The body is directly under supervision of the State Council. Several standards research institutions have been set up with over 277 of these institutions already established by the year 2017. Among these standards organisations, China National Institute of Standardisation (CNIS) plays a pivotal role in research and development of national technical standards. The Ministry of Industry and Information Technology (MIIT) also plays an important role in spearheading the process of standardisation in high technology areas like Artificial Intelligence (AI) and Electric Vehicles (EV) through subordinate organisations.[2]

Legal Reforms

The original standardisation law of the People's Republic of China (PRC) was formulated in 1989 and remained the official legislation for over two decades.[3] The law was complex, bureaucratic, and resulted in almost 150,000 standards being created. The process of getting approvals for standards hinged on the discretion of the central government, which also introduced and set technical standards. Most of these accepted standards became outdated and redundant by the turn of the millennium. Some were contradictory to each other, going against the tenet of a technical standard. Consequently, these standards did not serve the objectives of China's economic transformation.

In 2015, the State Council of PRC decided to reform the standardisation processes. This resulted in a new Standardisation Law which sought to streamline the technical standard-setting process. The new Standardisation Law was adopted in 2017 and came into effect in 2018. While the original intention of standards to boost innovation remained, the new law also sought to combine state control and market initiative in driving forward the technical standard-setting process.[4]

Despite the many types of standards in the country, the 2017 Standardisation Law categorically states that only the national standards developed by the SAC remain mandatory and other types of standards continue to remain voluntary for industries operating in the country. Guidelines issued by the SAC, in conjunction with the National Development and Reform Commission (NDRC) and the Ministry of Commerce, also allowed foreign-invested companies to indulge in standardisation work in China.

II. Drivers of China's Standardisation Policies

There are two key motivating factors for the Chinese government pursuing standard-setting drive: economic returns and geopolitical ambitions.[5]

First, standardisation will allow China to optimise its manufacturing industry and improve economic returns. Though a manufacturing powerhouse, China's exports as a share of GDP are declining. Technical standards can provide better economic gains through licenses and royalties for the already established manufacturing sector in the country. Moreover, with the emergence of new technologies, China will need to remain relevant in development and applications of critical technologies. The Chinese government is now banking on technical standards to achieve technical competence and excellence in critical technologies which will be integral to global economy in the coming decades.

Second, the drive for standardisation is motivated by Beijing's geopolitical ambitions. Technology is at the heart of major power competition and controls many future drivers of economic growth. Since the standardisation process is essentially about making global rules and norms; creating benchmarks through technical standards and paying attention to high value-added sectors can help reinforce China's role in the international arena. China's private sector is an important part of Beijing's geopolitical ambition. The private sector in China has a complicated relationship with the state. The 2020 "Opinions Concerning Strengthening New Era United Front Work in the Private Economy" (关于加强新时代民营经济统战工作的意见) laid down a framework for closer cooperation between private companies and the CPC.[6] Hence, even if the private companies have operational freedom, they must work under a larger framework of goals of CPC. Moreover, as more Chinese private firms gain influence around the world, more countries will be influenced by Chinese technology in international standard setting bodies. For example, the International Standards Organisation (ISO) has a one country one vote system that decides on matters related to adoption of standards. As more

countries get accustomed to technology by Chinese private companies, they will more likely back the Chinese proposal for standards.

To streamline the process of standard setting and goals of "China Standards 2035" (中国标准 2035) project, the Central Committee of the Communist Party of China and the State Council of China released 'National Standardisation Development Outline' (国家标准化发展纲要) (NSD) in October 2021.[7] NSD serves as the guideline for the Chinese government's plan for standardisation in different sectors.[8]

This document analyses the NSD outline document and offers a peek into China's aspirations in the standard-setting domain.

III. National Standardisation Development Outline

The National Standardisation Development Outline (国家标准化发展纲要) (NSD) is the first major document in the public domain on China's standardisation strategy.[9] The NSD visualises a standardised system that promotes high-tech innovation and "opening up" of the technology sector, while also leading to high-quality development. This document provides a glimpse into the Chinese state's strategic approach towards technical standards.

1. GOALS

The first section of the NSD highlights the guiding ideology and goals. A key takeaway is the aim of building a national system by 2035 that is compatible with international standards. The "standardisation management system with Chinese characteristics", as mentioned in the document, will be "market-driven, government-led, enterprise-oriented." The goals mentioned in the NSD outline in this regard are:

- **Develop global standards in different sectors:** This includes agriculture, service industry, emerging industry, health and safety, environment, etc.
- **Improve level of standardisation:** Improve the level of standardisation such that "economic, social, quality, and ecological" benefits of standardisation are demonstrated. The outline mentions following ways to achieve this:
    - Optimise the structure of government promulgated standards and independent market standards.
    - Shorten the average national standard formulation cycle to less than 18 months.
    - Increase the degree of standards' digitisation.
- **Improve the degree of standardisation and openness:** The aim is to improve transparency in the formulation of standards and foster greater cooperation with international actors. The outline mentions that the conversion rate of standards

should reach over 85% - meaning over 85% of standards should align with international standards.

- **Build a strong base for standardisation development:** This refers to building a strong ecosystem with research institutes, laboratories, certification and accreditation institutions, inspection, and testing systems, etc.

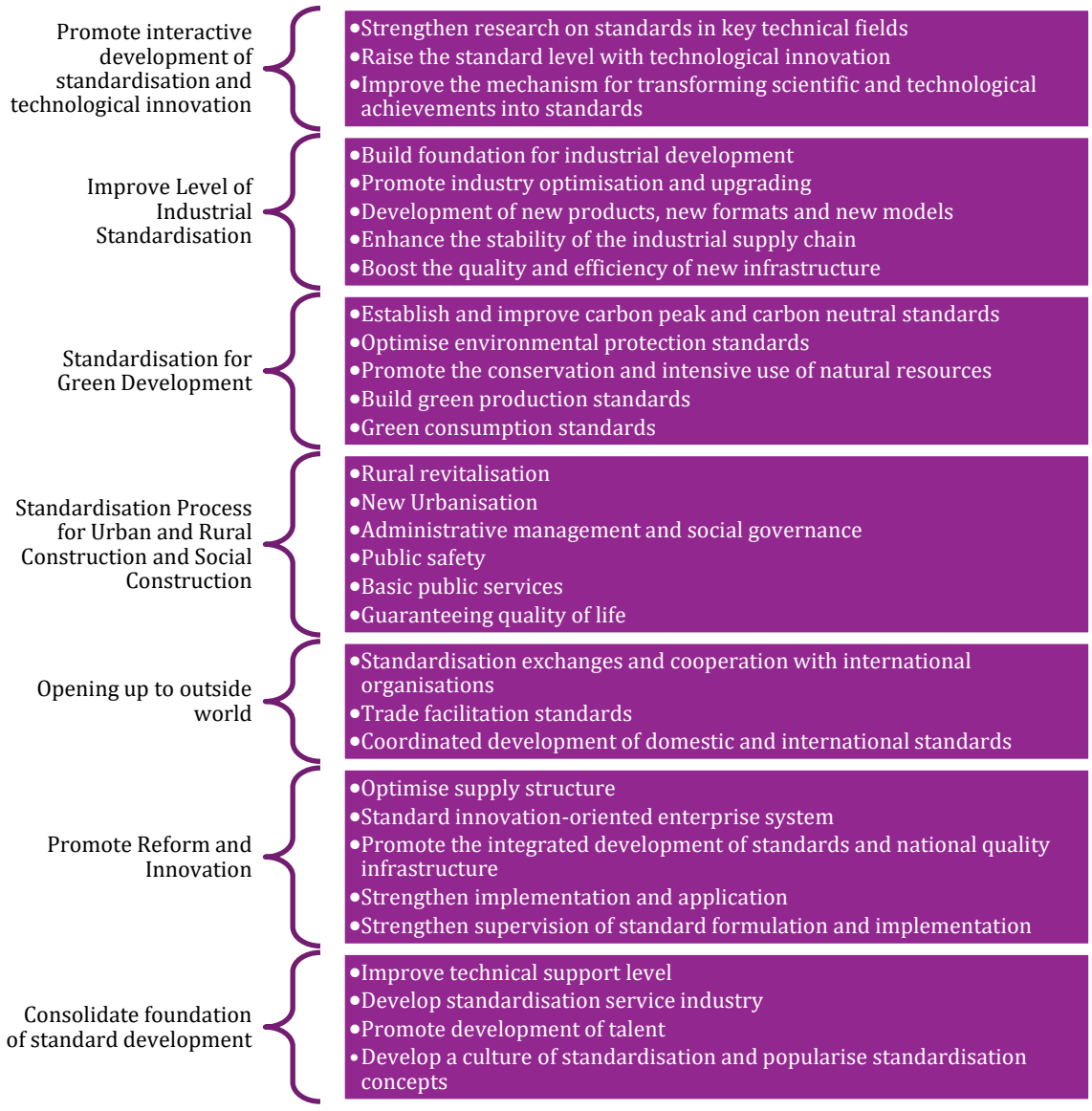

Figure 1: Highlights of National Standards Development Outline

2. PLAN OF ACTION

The NSD outline is ambitious with guidelines for intended actions at both the domestic and international level. The Chinese government's plan to execute the project can be looked at from both the international and national perspectives.[10] Some key highlights of the outline are given below:

National Level

- Role of government and government agencies
    - The tasks in NSD are to be implemented at both central and provincial levels ensuring that the standardisation processes reach the local governments. Both government and private sector actors are to be involved in the implementation of the standards. According to the outline, provincial-level governments will link the main tasks articulated in the NSD outline with the national economic and social development plans.
    - All important matters and issues related to the standardisation processes are to be reported to the Party Central Committee and taken up by the State Council.
    - The NSD outline document encourages the application of standards while formulating policies and regulations, certification and accreditation, inspection and testing, government procurement, bidding, and other activities. The Outline states that a separate mechanism will be established to evaluate the applications and implement these standards.
- The NSD outline document emphasises the role of large enterprises in the standard-setting process and advocates giving freedom to such enterprises in shaping standards through the establishment of 'Enterprise Standards' in the country.
- The focus is also on the statistical methods to collect data and link standards with the development indicators. The NSD outline mentions that the statistical survey system will be improved, and standardised national economic and social development statistics be linked to relevant indicators. There will be an evaluation mechanism to monitor the implementation of the Outline.

- The NSD outline mentions the construction of several national quality standard laboratories, national standard verification points, and national product quality inspection and testing centres.
- The NSD outline mentions the establishment of a national digital standard library and a standardised public service platform. This will help in national-level coordination and division of labour across the country.
- The NSD outline also emphasises the establishment of a standard copyright system, a deposit system, and a standard trading system. This is to increase the protection of standard copyrights, improve traceability, supervision, and error correction mechanisms through third-party assessment of standard quality and implementation.
- Focus is also on creating a team of professionals who are proficient in international standards, rules, and technology. This will be done through the incorporation of standardisation into general higher education, vocational education, and continuing education, a multi-level training system for practitioners, and standardised professional training.
- The NSD calls for a reinforcing mechanism set in place using group standards to ensure survival of the fittest firms in the domestic market. The Outline also mentions to "incorporate the compliance of corporate products and services into the construction of the social credit system." Moreover, public participation in supervising the implementation of standards is encouraged.

International Level

- The NSD outline document mentions the need for cooperation and partnership in international standardisation activities along with the promotion of setting standards for tackling global issues like climate change, sustainable cities, clean drinking water, and green financing. The Chinese government has included the provision of incentives for Chinese firms for bringing proposals of technical standards to international standard-setting bodies such as the International Organisation for Standardisation (ISO). The promised incentives are mostly financial in nature with firms being provided economic benefits for each standard adopted nationally and representing the country at international standards forums.[11] However, the specifics of these incentives are not known.

- The NSD outline document also stresses on encouraging Chinese enterprises, social organisations, and scientific research institutions to actively participate in various international professional standards organisations as well as indulge in the standard-setting processes at the global level. This is part of the endeavour to increase Chinese footprint in international standard-setting bodies. This is evident in the Chinese government's pursuit to acquire leadership positions in key working groups and technical committees responsible for finalising the standards process.[12]

3. KEY TAKEAWAYS

The NSD outline covers a wide range of topics where standardisation will play an important role in governance, economic, and geopolitical returns. Rural revitalisation, social governance and other areas also feature in the document. However, this assessment is only limited to standards related to critical and emerging technologies, industrial innovation, and technology-driven climate-friendly practices.

Although it seems like a brand-new plan, the NSD outline must be read together with the goals of the "China Standards 2035" (中国标准 2035) project. The NSD outline also supplements goals of various existing national-level strategies (like National Strategic Emerging Industries Initiative ((战略性 新兴产业)) and individual tech development goals (like New Generation AI Development Plan (新一代人工智能发展规划)). For example, the Outline advocates the use of technologies like AI, blockchain, and big data to improve quality of the tech as well as quality management. Similarly, one of the goals of the 2017 New Generation AI Development Plan issued by the State Council is to promote the adoption of AI in various sectors to improve quality and efficiency.[13] The Outline also consolidates what China's government and private sector are already attempting to do. For example, Chinese private companies are exporting their technological products in African markets and are encouraged to do so via Beijing's Digital Silk Road initiative under BRI. These same companies are also attempting to shape standards in international bodies, like the UN.[14] Hence the NSD outline, while ambitious, is an attempt to streamline existing policies towards standardisation.

Intersection of Standards Development and Technological Innovation

China views standardisation to strengthen its research and development in critical and emerging technology areas like artificial intelligence (AI), quantum computing, and biotechnology.[15] The NSD outline offers a clear objective for Chinese companies to improve their technical capabilities and raise the level of technical standards. that can be adopted domestically and exported internationally.

Improving Industrial Standards' Level

China's pursuit of effective standardisation processes is an extension of its Made in China 2025 (知道"中国制造 2025) plan which aims to strengthen its manufacturing industry and advance industrial development as a whole.[16,17] As per the NSD outline, the Chinese state views technical standards as a mechanism for the promotion of industry optimisation and upgrades.[15] This is critical for Chinese companies involved in setting norms in the manufacturing processes of high-end equipment. Moreover, the Chinese government also aims to utilise technical standards for the integration of big data and industry to promote the industrial digitisation process in the country.[18]

The focus on technical standards helps in the rapid development of new industrial products. This can in turn help in the improvement of scientific and effective regulatory mechanisms. With China striving for the optimisation of the industrial supply chains (production, distribution, circulation, and consumption), the government believes technical standards will play an important role in raising the competitiveness of industries and helping key industrial sectors in establishing efficient industrial supply chains.

Base for Green Development

China views technical standards through the lens of green and sustainable development. The NSD outline document mentions the carbon-neutral standards which are instrumental in energy-saving processes, regulating large-scale energy consumption, and maintaining the energy efficiency of different types of equipment. This is in line with other greenhouse gas emission standards and carbon footprint standards that account for China's support for renewable energy and sustainable development practices.[19]

The Chinese government also aspires to conserve and protect natural resources by bringing the processes of registration, evaluation and monitoring the use of natural resources under regulation using specific standards. The NSD outline document details the commitment of China towards reducing pollution, regulating industrial discharge, and protecting biodiversity while advocating for sustainable development at the same time.

Going Global with Standards

Another key objective of the government of China with the standardisation reform is its attempt to open standardisation to the outside world. The NSD outline document clearly underlines the scope of China's role in the international technical standards ecosystem with its commitment to deep exchanges and cooperation of standards. Active participation in international standards organisations such as the ISO and initiating technical standards dialogues at multilateral institutions like BRICS and SCO remain China's priorities in relation to its standardisation programme.

There is now a global competition for leadership positions at international standards development organisations.[20] The rapidly rising influence of Chinese firms, especially Huawei, has seen the affiliates of these firms compete for leadership positions at key working groups. Individuals are appointed to these positions solely based on their experience and qualifications. Increasing representation from Chinese firms at these technical committees and working groups buttresses the objective of the government to ensure global presence in the standardisation domain.

With China looking to increase its presence in the global trade networks, the Chinese state also supports trade facilitation standards along with the objective to promote mutual recognition of Chinese and foreign standards.[21] An example of this is the China Compulsory Certification (CCC) mark which is the country's national safety and quality standard for any product that can be sold in the domestic market or exported internationally. This is in line with the ISO certification that determines the basic quality tests for products that can be traded. The use and enforcement of such standards help in improving the trade volume between states.

Furthermore, the government believes in the need to improve consistency between the Chinese and international standards which help in the bulk trade of commodities and securing contracts for projects in foreign countries. China, as per the NSD outline

document, envisions a global role for itself in coordinating the development of domestic and international standards.

IV. Potential Challenges

The standardisation efforts of the central leadership reflect China's confidence in their industry and their own capabilities to be a driver of international standards. However, China might face certain hurdles in its pursuit of becoming the dominant technical standard-setting state. These difficulties might push China's standardisation project beyond 2035.

1. The Interoperability Dilemma

Interoperability is one of the basic requirements of an international technical standard. Standards act as global frameworks to advance growth and allow easier cross-border dissemination. For example, in the telecommunication domain, the creation of a 4G/5G standard ensures an open communication network that would allow users access to other global networks.[22]

China's attempts to influence the standard-setting process can be seen with respect to the 5G standards. This has been done through Huawei and other state-supported telecommunication firms. With Huawei demonstrating exemplary technological advancements in the field of 5G, the company now owns the largest share of 5G related patents.[23] This has enabled the Chinese companies to effectively control the growth of 5G technology across the globe.

However, threats of state-sponsored surveillance have made other countries wary of Chinese equipment in their networks. The United States, which has been in a major trade war with China and is one of the largest telecommunication markets, has now introduced a new programme to replace the existing Huawei and ZTE equipment. The United States Federal Communications Commission (FCC) recently offered to reimburse local telecom carriers for removing network equipment made by Chinese companies citing threats to national security.[24] While the FCC had already declared the two Chinese companies, Huawei and ZTE, as national security threats the previous year and had placed them on the blacklist, this development ensures the complete removal of Chinese equipment and technology from the US market.

Sanctions and restrictions are crippling Huawei and other Chinese companies' revenues'.[25] Influence of Chinese firms on the global 5G infrastructure has also reduced. Similar actions taken by the US and other countries can eliminate the possibility of the world adopting Chinese-backed standards. Additionally, with considerably lesser presence, the standards set by Chinese firms can bifurcate the world into states following Chinese backed standards and states against them. Interoperability between the two can become arduous. Strict responses to the usage of Chinese products, services, or technologies, like bans and restrictions, can result in China-backed technical standards becoming null and void.

2. Geopolitical Limitations

The Chinese government may have ambitions of becoming the sole leader in setting global technical standards in certain fields. But China backed technical standards will face a lot of scrutiny before becoming global standards. This is a huge limitation to both Chinese government and Chinese companies looking to spearhead the standards development in crucial technologies.

The Chinese government has used its premier foreign policy project, the Belt and Road Initiative (BRI), as a method to export locally developed technologies to countries that have signed deals with China on infrastructure and technology projects and is normalising adoption of Chinese technologies. With BRI steaming ahead in regions like Central Asia and Africa, the project has been cardinal in increasing China's presence and leverage in often neglected regions of the world. The Chinese get to increase their investments as well as sign pacts with the BRI countries for using their standards. For example, the Chinese government is actively pushing adoption of the Beidou Navigation Satellite System (BDS) in Africa. China organised the First China-Africa Beidou System Cooperation Forum in Nov 2021 which was reportedly attended by representatives from at least 50 African countries.[26] If adopted, BDS has the potential to become a standard navigation system in many African countries. Since adoption of technology is linked with the standardisation process, BRI is effectively normalising adoption of Chinese technology and standards.

However, this strategy has its own limitations regarding China's geopolitical influence. The US and its allies remain at the helm of affairs at international standard organisations like International Electrotechnical Commission (IEC) and International Telecommunications Union (ITU). Chinese government backed standards might still

face a lot of hurdles due to the intensification in geopolitical rivalry between China and the other countries.

3. Over-Standardisation as a Barrier

With the emphasis on standardisation processes by the Chinese government, there is also a possibility of imposing excessive compliance protocols. This can lead to over standardisation by the state towards its private sector. While technical standards are envisioned to build on existing expertise and competence, overemphasis on adhering to standards can result in stifling innovation and growth.

The NSD outline document clearly emphasises the importance that will be given to the process of standardisation in the country. The use of standards for driving technological innovation and vice versa is one of the key objectives of the NDS project. But, instead of incentivising innovation, this focus on standardisation can result in disincentivising technological growth. Standards may lead to additional costs of compliance for Chinese companies that may deter economic and technological development.

Lastly, China's vision for the utilisation of standards for economic and geopolitical gains can backfire on its own domestic industry. It can act as an entry barrier for up-and-coming firms. The Chinese standardisation authorities will have to define the standards in a manner that they don't become a deterrent for new and small firms. The government has the arduous task of regulating the use of these standards for economic and political good.

V. Conclusion

The NSD outline document underlines the Chinese government's approach towards the standardisation sphere. It emphasises on the importance of technical standards for the country's development and economic growth. It also details the aspirations of the Chinese government in utilising technical standards to reach its lofty geopolitical goals.

However, the Outline is a framework with no concrete details on how the Chinese government plans to achieve their goals. The goals in the Outline are based on China's ambitions for the next decade. The Outline read together with other strategy documents and the larger goals set for the "China Standards 2035" (中国标准 2035) project has the potential to create ripples in the international arena. However, only time will tell if the CPC or Chinese companies will succeed in their pursuit to control emerging and critical technologies by setting international technical standards.

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