

Comments and Reflections on China's National Standardization System

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Abstract—The standardization process plays an important role in the industry interconnection and digital economy in the current global scale. The national standardization system has played an important role in promoting China's economic growth from the 1990s to the 13th five-year plan period. It has promoted the progress and change of industrial technology and adjusted and optimized the social structure. By reviewing the historical role of standardization system in China, this paper describes the opportunities and challenges faced by the current national standardization system. This paper summarizes the orderly implementation and remarkable achievements of the *Standardization Law of the People's Republic of China* and the *Construction and Development Plan of National Standardization System (2016-2020)* to explore and strengthen the linkage and cooperation with industries and localities, strengthen the promotion and implementation of standardization, establish the method of standardized annual monitoring system and obtain meaningful experience from it.

Keywords: *standardization construction, standardization system, sustainable development, intellectual property rights*

I. INTRODUCTION

China joined the International Organization for Standardization (ISO) in 1978. In December 1988, China promulgated the *Standardization Law of the People's Republic of China*, which came into force on April 1, 1989. The act establishes compulsory State standards (GB) and recommended standards (GB/T) to mark compliance with relevant standards. Articles 6 and 7 of Chapter 2 point out that national standard shall be formulated for technical requirements that need to be unified nationwide. Industrial standards shall be abolished immediately after the publication of national standards. National standards and industry standards are divided into mandatory standards and recommended standards. The standards for the protection of human health, safety and property, as well as standards for compulsory execution stipulated by laws and administrative regulations, are mandatory standards, while other standards

are recommended standards. [1] In the initial stage of the implementation of the Standardization Law of the People's Republic of China, the main challenge is the way international standards and industry standards are integrated. There are many standards for enterprise and industrial production. It is necessary to eliminate industry standards, local standards and enterprise standards to improve product quality, eliminate seconds and protect the rights and interests of consumers. As "Fig. 1" shows, the initial effort was successful. In the adjustment of the overall national economy, the GDP growth rate dropped to 4.24 per cent in 1989 and bottomed out at 3.93 per cent in 1990, but quickly climbed to 9.36 per cent in 1991. From January 18 to February 21, 1992, following Deng Xiaoping's southern speech, China entered a new stage of reform and opening up. China is moving at full speed along the path of building socialism with Chinese characteristics, and its economic growth is fast peaking at 14.34 percent. Institutional reform has promoted the rapid growth of China's economy, but there is no denying that the construction of the national standardization system has contributed greatly to the country's development. The "standardization +" effect is increasingly prominent. The main task of the national standardization system construction is to provide technology and soft-base facilities to support mass production and promote export trade in the context of China's rapid economic growth. As of the end of 2016, the national standardization system has made outstanding contributions to substantially reducing price increases and maintaining rapid economic growth in China's economic operation by further optimizing energy use and management models, improving standardized services and resource development mechanisms. Judging from the steady progress in the development of the new standards system, more than 13,000 mandatory standards and planned projects have been reviewed and evaluated, nearly 100,000 recommended standards have been reviewed, 204,048 enterprise standards have been made public, and more than 600 group standards have been fostered.

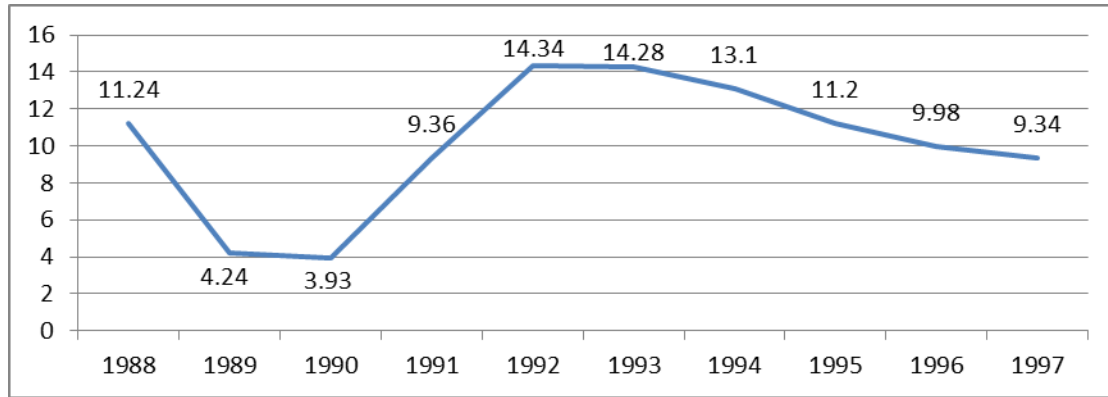


Fig. 1. GDP growth rate fluctuation curve (1988-1997).

In December 2015, the General Office of the State Council issued the *Construction and Development Plan of National Standardization System (2016-2020)* (hereinafter referred to as the "Plan"). [2] It is worth mentioning that the "Planning" outlines the blueprint for the development of China's standardization industry during the "Thirteenth Five-Year Plan" period. The implementation of the standardization strategy will play an important role in the subsequent industrial and economic reform.

The thirtieth meeting of the Standing Committee of the Twelfth National People's Congress of China passed and issued a further draft revision of *Standardization Law of the People's Republic of China* on November 4, 2017, which will take effect on January 1 of the following year. The promulgation and implementation of the newly revised standardization law has significantly improved the effectiveness of China's standardization system: When adopting a group standard, an enterprise needs to pay attention to the issuing organization of the group standard, and understand whether there are restrictive provisions in the management method of the group standard issued by the organization, and to obtain authorization for adoption when necessary. [3] It can be considered that without restrictive conditions, enterprises can develop products according to standards, and the development process can be faster. In order to meet the potential needs of developing information systems in agriculture, industry, service industry, and social undertakings, the state will expand the free publicity of the text of recommended standards for public welfare to the society to basically achieve full free disclosure of national standards by 2020. By promoting free disclosure of national standards, China's national standardization system is expected to support China's existing and emerging industry norms and high-quality services while ensuring safety and reliability. Mandatory industry standards and mandatory local standards have existed in the old act for a long time, and the implementation of both has to some extent protected the trade associations and local enterprises. But the new draft amendment makes clear the scope of mandatory standards: only mandatory national standards are allowed. This provides a strong legal basis for the future implementation of the *Standardization Law of the People's Republic of China*. A unified statutory approach will strengthen the management

of various fields. When national standardization systems related to development and services are matched with growing national and international needs, and the Standardization Law of the People's Republic of China ensures transparency, fairness, and objectivity, China's agriculture, industry, service industry and social undertakings can be developed to meet the needs expressed by stakeholders.

II. SIGNIFICANCE OF STANDARDIZATION SYSTEM: SUPPORTING THE SUSTAINABLE DEVELOPMENT OF GLOBAL ECONOMY

Obviously, China's standardized system cannot ignore or be completely independent of the world economy or global economic integration. In 1995, the World Trade Organization (WTO) promulgated the *Agreement on Technical Barriers to Trade*, which aims to protect the domestic market of the importing country and set up trade barriers to the entry of foreign commodities by formulating various technical regulations, technical standards, technical specifications and certification systems. However, unnecessary obstacles can be avoided by ensuring that technical regulations, standards and conformity assessment processes are non-discriminatory. [4] With China's accession to the World Trade Organization in December 2001, a considerable number of China's traditionally superior products have frequently encountered foreign technical barriers. Among them, some developed countries often use environmental protection and technological progress as a pretext to cause export obstruction, and some enterprises subject to export restrictions are even forced to withdraw from the market. In 2009, the direct economic loss of China's export trade caused by technical barriers was as high as 35.92 billion US dollars. At that time, *Agreement on Technical Barriers to Trade* became the biggest obstacle to Chinese enterprises' export.

The agreement has a dual effect: The implementation of technical measures has a rational and positive aspect and the introduction of international standards and certification systems can eliminate the differences in technical standards between countries. While improving the efficiency of product operation, improving the environment of industrial

production and promoting the development of international trade, it can reasonably protect human health, safety and ecological environment. Developing countries can also be urged to improve production technology, pay attention to the scientific and technological content of products, improve commodity structure and enhance the competitiveness of export commodities. However, on the other hand, in order to curb the rapid rise of the developing countries, the developed countries deliberately create difficulties for their exports, making technical trade barriers a natural barrier hindering the development of international trade. Therefore, with the continuous development of science and technology and the constant update of production equipment, China should actively promote the implementation of international standards in China in terms of trade, and establish a reasonable and strict quality evaluation system. In this way, *Agreement on Technical Barriers to Trade* and the strict foreign standards of developed countries will no longer become the "stumbling block" hindering China's export trade. In order to protect the health and ecological environment of people, non-export commodities should also follow this standard.

III. NATIONAL STANDARDIZATION ACTIVITIES INSIDE AND OUTSIDE CHINA

As global economy booms, the importance of international standardization is becoming more and more obvious. At the 31st International Standards Organization Conference in October 2008, China officially became a permanent member of ISO. As an active member of ISO, Standardization Administration of China plays a key role in policy-making. In 2016, the 39th Conference of International Organization for Standardization (ISO) was successfully held in Beijing. In the same year, China's participation in the formulation of international standards exceeded 50% of the total number of new international standards for the first time in a year. It has caught up with and even surpassed the United States, Japan and other developed countries in formulating international standards. The ISO Secretariat undertaken by China ranks fifth in the world. China's activity and say in international standardization activities have significantly improved. China is gradually improving its international reputation and influence through multiple efforts and substantial work. In 2016, China has undertaken 5 new chairs and 3 secretariats of the technical bodies of the international standards bodies, and submitted 160 new proposals for ISO/IEC international standards. China has greatly increased its participation in the formulation of international standards, actively assuming the duties required by the international organization for standardization, and international cooperation in standardization has been gradually deepened.

Due to the importance of standardization research and development, in order to promote innovation and permeate standardization into every aspect of daily life, China has begun to gradually attach importance to standardized education at the university level. For example, China Jiliang University has set up a standardized engineering major, and

other universities have also added standardized training directions in their respective majors. Tsinghua University has offered standardized courses in the master of engineering management program since 2015. These initiatives are designed to increase people's awareness of standardized research and development, promote innovation, and support development. In addition, China recognizes the continuing need for experts who have the ability to set standards. It is most important to maintain and improve the ability to formulate new projects to participate in international standardization work in terms of quantity and quality, and human resource development is the key to ensure China's sustainable development in the international standardization work. In order to further improve the basic capability of standardization, China has adjusted and supplemented the second session of the China Standardization Expert Committee were adjusted and added, and the Articles of Association of the China Standardization Expert Committee were modified accordingly. During the 39th session of the International Organization for Standardization (ISO), a letter of appointment was issued for foreign consultants, and all parties were actively involved in the work of the Standardization Committee. Continuous standardization education, talent recruitment, and appointment systems are particularly important for the improvement of national standardization system in the future. As of November 2016, 128 academicians of the Chinese Academy of Sciences and Chinese Academy of Engineering have served as members or consultants on 161 technical committees. The results of these human resource development efforts may not be obvious in the short term, but they will be significant in the long run.

Participation in national standardization activities and promotion of regional or bilateral cooperation are mutually reinforcing. China attaches great importance to regional cooperation in standardization. China is a member of the Pacific Regional Standards Conference (PASC). In 1979, China sent its first representative to the 6th PASC. Since then, China has hosted the PASC Annual Conferences in Beijing and Shanghai in 1991 and 2008, respectively. On April 8, 2019, the Chinese delegation introduced China's proposal for a new international standard for laboratory design at the 42nd Pacific Area Standards Congress (PASC) held in Wellington, New Zealand. China participated in three round table discussions and was selected as a representative to report on the results. In addition, as a representative of the conference on standards cooperation in northeast Asia, China has put forward suggestions on strengthening regional cooperation on standardization, especially in the field of technology standardization. The ISO was established to provide advice and exchange of information among national standards bodies and organizations interested in standardization and conformity assessment, and take the necessary action to ensure that international standardization activities are properly coordinated on a consensual basis in order to meet the development needs of the world and to promote international trade and commerce. China also participates in the Asia-Pacific Economic Cooperation (APEC)/Standards and Consensus Subcommittee (SCSC).

APEC was established in 1989 to help reduce the negative impact of different standards and conformity assessment procedures on trade and investment flows in the Asia-Pacific region. China plays an important role in policy making and has made positive contributions to the goal of internationalizing the standards.

As an important mechanism for China, Japan, and South Korea to carry out standards cooperation, the Northeast Asia Standard Cooperation Forum has been held once a year since 2002, with the aim of strengthening cooperation among the three in standardization activities and promoting specific cooperation in some fields. China has also explored bilateral cooperation in the field of information exchange, cooperation and collaboration in the field of international standardization to promote information exchange and cooperation in the field of international standardization. This relationship, including the completion of mutual recognition of standards between China and France and between China and the UK, has yielded fruitful results. China has signed cooperation agreements with more than 10 countries to comprehensively promote the Belt and Road Initiative. China will establish further bilateral and multilateral global networks in the field of mutual recognition of standards, and international cooperation in standardization is deepening, which will promote the development of standardization in China.

IV. NEW VISION OF INTERNET OF THINGS ERA AND ITS RELATIONSHIP WITH IPRS

In recent years, standardization strategy has been exerting more and more profound influence on product innovation at the enterprise level and the national policy level. With the rapid development of Internet technology, many digital devices are connected by networks and standardized interfaces. Such change in production concept has led to the increase of standards-oriented production and patented embedding standards. There has been an international debate about the protection of intellectual property rights (IPR). However, with the integration of the world economy, the debate on intellectual property rights has become a global issue. The United States, the European Union, Japan and other developed countries have actively promoted the implementation of "western" intellectual property laws around the world. Unlike the *Paris Convention for the Protection of Industrial Property* and the *Berne Convention for the Protection of Literary and Artistic Works*, which have considerable flexibility in their applicability, the TRIPs (*Agreement on Intellectual Property Rights*, agreement on trade-related intellectual property rights) establishes a common framework for intellectual property rights for all WTO members. It is by far the most important international agreement to set up an intellectual property regime. It is also the most controversial, challenged by countries such as South Korea, Brazil and India. As a result of these tensions, the implementation of intellectual property legislation has varied considerably around the world. But there is a growing trend towards globalization that extends the new standardization to management, services and social institutions. In the Internet of things era, the role of

standardization extends to ensuring its interoperability, enabling computer systems or software to exchange information seamlessly across borders. For China, this is clearly a new challenge that requires the broad participation of stakeholders to properly address convergence between multiple technologies and cross-sectorial standardization.

The conflict between developed and developing countries stems from whether TRIPs has strong restrictions on intellectual property rights for emerging countries. That's because countries like the United States in the 19th century, Japan and South Korea in the 20th century [5], and China and India in the 21st century have made great progress through imitation and learning. These countries have also made many innovations after copying others' inventions. In terms of R & D spending, the top three are the United States, China and Japan. The cost of research and development depends on the efficiency of the research and development process, which is traditionally more efficient in advanced economies. Assuming that imitation does not incur research and development costs, it could potentially have significant indirect costs, because companies that infringe intellectual property rights and the products they produce cannot legally export copies to the countries to which they are being copied. At the same time, complainant governments have the right to impose trade sanctions in the form of punitive tariffs if WTO members are found to have violated their intellectual property obligations. Even without trade sanctions, advanced economies monitor their imports to block goods suspected of infringing intellectual property rights. On January 1, 2014, the European Union came into force new regulations on the enforcement of customs intellectual property rights, which states that customs can destroy suspicious goods without initiating legal procedures to determine whether intellectual property rights have been violated. The U.S. Customs and Border Protection have taken similar measures, cracking down on imported counterfeit and generic products and imposing bans on goods that infringe patents. Intellectual property protection is a "natural barrier" for competitors to enter their markets. Stricter intellectual property rights would reduce real innovation by indigenous companies in developing countries and increase it in developed countries, but only through intellectual property protection can developing countries ensure their products can be exported smoothly. Therefore, the relationship between *Standardization Law of the People's Republic of China* and *Patent Law of the People's Republic of China* should be mutually beneficial. The relevant competent administrative departments under the state council must, in accordance with their functions and duties, conduct an effective patent search before proposing, organizing and drafting projects of compulsory national standards, soliciting opinions and conducting technical reviews. During the project, public consultation should be conducted on the draft standards, and relevant patent information should be required from institutions or enterprises.

On October 18, 2017, Comrade Xi Jinping pointed out in his report to the 19th National Congress of the CPC to accelerate the construction of an innovative country. China

should aim at the frontiers of world science and technology, strengthen basic research, achieve forward-looking basic research, and lead major breakthroughs in original research. [6] Intellectual property is an important part of dealing with the problem of national standard system. To become an innovative country and increase the relative scale of export, China has a clear motive and purpose to protect intellectual property.

V. CONCLUSION

At present, the national standardization system has played an important role in China's economic and social development in history, but it is still changing constantly to adapt to the new environmental needs in the context of globalization. Historically, the national standardization authority has approved the issuance of compulsory national standards (GB) and recommended national standards (GB/T) and promulgated and revised the *Standardization Law of the People's Republic of China* to support the development of small and medium-sized enterprise. In addition, with the development of society, the country needs to set new standards to meet people's needs for a better life and safe production. Therefore, standards are also a kind of dynamic information. The standardization administration department under State Council supplements the standards and norms with new projects by compiling plans, coordinating the division of labor, organizing the formulation, unified approval, numbering and release. In order to promote regional and bilateral cooperation, China has been cooperating closely with standardization institutions and experts of international standardization projects in other countries, and has opened educational programs for standardization engineering majors and standardization courses in Chinese universities. China will review and expand these initiatives to address new challenges, particularly new trends in the convergence of multiple technologies and cross-sectorial standards. China can, through top-level design, formulate development plans led by the national standardization system and with the participation of multiple departments to protect people's health and safety and the ecological environment, and coordinate national, local and industrial integration to accelerate the development of green cities, smart cities and healthy cities. The handling of intellectual property rights in the standard remains an important issue, and there is still a lot of discussion going on inside and outside China.

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