

Standardization and Trade Barrier Issues Regarding the ICT Market in China: A Study of the Wi-Fi Industry



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Received 14 December 2015; Revised 1 April 2016; Accepted 9 May 2016

Abstract. This article offers an exploratory analysis of patent standardization in China by examining the use of WAPI and IEEE 802.11 standards in China's telecommunications service industry. Around 2003, SAC and MII mandated WAPI as the national standard for Wi-Fi products in China. This action was brought in with the purpose of promoting standards in the Chinese telecommunications industry through government contracts and domestic market advantages. This article provides observations on the impact of national standardization in China, and would argue that, with regard to technology, the use of political power can achieve significant outcomes in domestic markets, but might also result in a lack of competitiveness in international markets. This article describes the current implications of Wi-Fi standards in China and comes to a solid conclusion: Huawei and IEEE are working together and developing a later series of the IEEE 802.11 standard equipment and this situation demonstrates that the intervention of government bodies provides limited help to the industry. Alternatively, government bodies should perform as intermediators to enable the creation of a number of platforms for transnational cooperation.

Keywords: ICT market, patent, standardization, trade barrier, Wi-Fi

1 Introduction: Standardization in Technologies

In the last twenty years, the battlefield of proprietary technology protections has moved from securing patents to incorporating technical standards. Standardization refers to the establishment of particular technical standards for products that allow the holders of certain patent rights to apply patents to the products. Since these standards indicate an universal application of certain products, the process of establishing standards also leads to strategies in which the stakeholders can attempt to make their patent dominate certain products. If the patented techniques are essential for the standard's implementation, patent holders have a considerable influence over that product industry because other producers are required to be licensed by the aforementioned patent holders.

The fact is, on account of its highly technical nature, the process of standardization is only accessible to a limited group of technicians. Such limitations mean certain stakeholders dominate the essential

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adoption of standards, applying their techniques to shape the scope and contents of the standards during their development. On the other hand, the stakeholders who have not been involved in the standardization process are highly likely to be excluded from the business or supply chains. Therefore, a high number of patent rights disputes have been generated by the standard establishing process, these disputes being raised not only between industrial stakeholders, but also several government bodies involved in international trade. As well as technician groups, government bodies may also try to regulate national standards to ensure the single application of certain products in its territory. Thus, government bodies are vital to the competition involved in creating standards [1].

This article explores the history of the generation of Wi-Fi standards in China, which involves competition between 802.11 and WAPI technologies. Issues regarding wireless security standards are bound up with both political and market factors. In the political sphere, the establishment of WAPI standards is one of China's goals in terms becoming a world technology leader by 2020. Moreover, as the majority of global trade concerned with technologies involves international standards, China is also ambitious to develop its markets via regulating particular standards, through which domestic industries exercise the greatest number of associated patent rights.

This article provides an exploratory analysis of the implications of China's policy regarding wireless networking standards, looking at the creation of the SAC (Standards Administration of China) and the MII (Ministry of Information Industry, China), bodies who have the authority to establish certain standards in both services and technical matters. This paper then discusses the relationship between standardization and patent holders' strategy, standards establishment, and the impact of SAC patent policies. This article will conclude by offering several policy implications regarding national standardization. This paper will suggest that authorities should be aware of the compulsory measures that limit certain specifications in favor of domestic Chinese enterprises as this will not help the international competitiveness of the Chinese telecommunications industry.

2 National Standardization in Telecommunications: Legal and Technological Establishments in China

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Concerning the telecommunications industry in China, the government once attempted to reach a position that ran contrary to the E.U. and U.S. by promoting a mandatory WLAN Authentication and Privacy Infrastructure (WAPI) as the national standard via intellectual property rights. The authorities also dictated that any relevant devices imported or sold in China must comply with the WAPI standard [2]. As a result, this mandatory approach forced foreign industries with WLAN devices to purchase WAPI licenses or make technical switches to be compatible with Chinese industries [3].

Since 1978, the reforms and policies adopted by the Chinese central government have been focused on economic development strategies designed to balance investment and growth across different industries. Nevertheless, service industries were valued by the Decision on Accelerating the Development of Service Industries that was jointly issued by the Central Committee of the CPC and the State Council in 1992. This acceleration project was carried out through market openness and service liberalization. It required regulatory reforms to organize a framework that met industry needs.

In the telecommunications service industry, the legal framework for service improvement requires both provisions to directly measure services, as well as rules for technical practices. The MII and SAC provided a series of regulations. The MII initially enacted the Telecommunications Regulation [4] in 2000 to establish a comprehensive statute to manage the telecoms market. Its structure includes licensing rules, interconnection, number of resources, spectrum management, and QoS (Quality of Service) supervision. [5]

In particular, the MII issued the Telecommunication Service Rules in 2005 to address QoS matters. Article 1 of the Telecommunications Regulation specified its main goals, including improving telecommunication QoS, defending users' legitimate rights and interests, and ensuring standardization

and systematic supervision. These three goals were designed to improve the rules around the establishment and operation of national technical and service standards. Therefore, at the same time in 2005, the SAC issued a proposal for the Administration of Regulations for the National Standards Relating to Patents (SAC patent regulation).

The aforementioned regulation was the initial legal step toward mandating certain national standards in favor of domestic entities. With regard to telecommunications' industrial technologies, since 2001, the MII has devoted the China Broadband Wireless Internet Protocol Standard Working Group (BWIPS) to this matter. The BWIPS exists firstly to endorse comprehensive and healthy developments in telecommunications, as well as promoting the growth of China's WLAN markets. Thus, together with other non-governmental organizations, BWIPS created close cooperation between the authorities in China, including the aforementioned SAC, MII and other R & D (research and development) institutes affiliated with MII. On the other hand, WAPI was developed in China by IWNCOMM Co. Ltd., which was launched by a university research team in 2000. With the BWIPS's supplementary influence, WAPI became the the standard process in telecommunications to be developed and facilitated in both technology and the market.

In 2003, WAPI was approved as the national standard for wireless devices by SAC and AQSIQ (the Administration for Quality Supervision, Inspection and Quarantine). Both authorities also demanded that products with wireless devices must be in accordance with the WAPI standard for QoS matters or the products would not be allowed to be sold or imported into the Chinese market.

WAPI is known for its security technology which utilizes an encryption process which is treated as a state secret and is stated to be owned by these China authorities. Moreover, the core technology regarding its encryption was assigned to twenty-four Chinese firms. In other words, manufacturers must seek to cooperate with one of these twenty-four Chinese firms in order to fit their products to the WAPI standard. Even though the IEEE 802.11 standard was already commonly accepted by wireless devices at the time, Chinese authorities insisted on the necessity of WAPI for standard implementation and claimed that, on account of the WAPI's being a state secret, the market restrictions around WAPI techniques were acceptable under the WTO rules. Nevertheless, WAPI is not compatible with the IEEE's 802.11 standard. Therefore, its associated techniques became barriers to the external industries that planned to access the telecommunications market in China.

The authorities involved in the process of standardization argue that they strive to achieve predictable objectives and that the standardization outcome is outside of the scope of national policy. Thus, the MII expected that the establishment of a national standard would encourage a contribution to and incorporation of technologies, ensure user safety, and accelerate industrial development [6]. However, proper efforts in encouraging standards should be free from the interference of national bodies. As to the WAPI approach, there were efforts to try to take a detour to avoid the necessary steps involved in the standardization process and the authorities' active promotion and interventions raised many controversies concerning international trade. Therefore, it is important that an appropriate government method for promoting standardization is found for both business strategy and public policy.

3 WTO Technical Barriers to Trade

To ensure that the Member States would not put in place unnecessary obstacles to trade, the WTO established the Technical Barriers to Trade (TBT) Agreement to exclude discriminatory approaches, such as technical regulations, standards, and conformity assessment procedures, being taken by governments. As a means to facilitate international trade, the TBT Agreement indicated Member States should generally refer to international standards when taking technical or trade measures in domestic markets. These measures should also provide transparency and be predictable elements of the trade environment [7-8].

Many of these provisions are stated in in Article 2.2 of the Agreement, the opening of which stating that, "technical regulations are not prepared, adopted or applied with a view to or with the effect of creating unnecessary obstacles to international trade". Therefore, unless the technical regulations are fulfilled with a legitimate objective, Member States should not apply any provision of a trade-restrictive nature. On the other hand, the TBT Agreement also recognized measures taken by government bodies to accomplish certain legitimate or policy objectives, including national security requirements, the prevention of deceptive practices, protection of human health or safety, animal or plant life and health, or

the environment [9].

If domestic technical regulations are not in accordance with the content of the relevant international standards and such regulations bring significant consequences to the other Member States, the Member States can undertake certain approaches within the regulations. These approaches are provided by Articles 2.9.1 to 2.9.4 of the TBT Agreement.

- 2.9.1 [The Member State shall] publish a notice in a publication at an early appropriate stage, in such a manner as to enable interested parties in other Members to become acquainted with it, that they propose to introduce a particular technical regulation;
- 2.9.2 [The Member State shall] notify other Members through the Secretariat of the products to be covered by the proposed technical regulation, together with a brief indication of its objective and rationale. Such notifications shall take place at an early appropriate stage, when amendments can still be introduced and comments taken into account;
- 2.9.3 [...] upon request, [the Member State shall] provide to other Members particulars or copies of the proposed technical regulation and, whenever possible, identify the parts which in substance deviate from relevant international standards;
- 2.9.4 Without discrimination, [the Member State shall] allow reasonable time for other Members to make comments in writing, discuss these comments upon request, and take these written comments and the results of these discussions into account.

In brief, whenever domestic technical regulations are in contrast with international standards, the Member States are required to provide certain notices, reports regarding influenced products and proposed regulations, and open a channel of communication to other Member States. As a WTO Member, China proposed to align its national standards with a standardization process in order to compete with international standards. However, they merely complied with the requirements of the TBT Agreement. Firstly, the WAPI standardization process offered very limited channels for taking foreign stakeholders' comments into account. Moreover, several domestic working groups used the WAPI as the condition for technique exchanges, where foreign participants were forced to share technical details of new or developing technologies [10]. Exploiting national standards as an approach to dominate the market thus restricted the participation of foreign entities. Foreign entities also were concerned that the governing body would offer ineffective legal protection for intellectual property regarding technique exchanges. The language gap also became a barrier, as foreign companies also found it difficult to cooperate with the WAPI standard because most technical documents regarding the formulation, revision and deliberation of standards were written in Chinese [11]. Even though national security and QoS matters were the issues China claimed in terms of its TBT Agreement compliance, the measures taken by the authorities were not under the scope of the aforementioned articles, 2.9.1 to 2.9.4, of the TBT Agreement.

Standardization is an outcome strategy between patent holders and interested parties that controls the distribution of specifications for compatibility and market expansion. National standards are strategies with defined policy objectives for particular industries [12]. Therefore, one of the tasks of the authorities (including MII and SAC in China) is to reach a win-win situation between enterprise benefits and end users' interests. Competition is another issue. Although the practice of establishing national standards can be utilized to develop domestic industries and markets, one drawback is its commercial application outside of the domestic territory (i.e. outside the Chinese market). An established standard or specification requires competition between several patent holders or between groups of patent holders (i.e. patent pools) [13]. Consequently, a national standard is essentially a shortcut to skip the internal competition between parties in a nation and this may lead to the affected industries becoming uncompetitive.

4 Stakeholders' Patent Rights and Standardization

As to industry growth, establishing standards should primarily refer to proprietary techniques and intellectual property, thus standards should become cornerstones for comprehensive developments. National standards are also given the task of balancing national interests and the rights of relevant patent holders. Article 1 of the Telecommunication Service Rules of China provided authorities with the right to establish standards and to have a systematic supervisory role over implementing those standards. The

problem occurs when the standard is based on proprietary technologies controlled by local Chinese entities as foreign enterprises incur additional expenses to access these technologies. Although several foreign enterprises would be willing to adopt these standards to gain access to the Chinese market, this does not help the development of the telecommunications industry [14].

A technical standard is an established norm or requirement applied to industrial criteria, methods, processes, or practices. The norm or requirement is a set of technical specifications that unifies a project's design, process, or services. Therefore, the norm or requirement generally refers to a proprietary technique that is protected by intellectual property rights (i.e. a patent). When an enterprise develops a new technique via research and development (R & D), the first choice is whether to patent the technique (thereby, making it publicly accessible) or to keep the technique as confidential and proprietary as possible. If the technique is patented, the enterprise may decide to actively disseminate it to achieve a more competitive market position. As a result, the technique may become standardized and broadly applied in the industry. The standardization process achieves device interoperability and product compatibility. For a variety of industries, standard-setting activities are important strategies in market competition. In most cases, standardization is an outcome of balancing interests among patent holders.

The process of defining a technical standard is also a process for intellectual property rights holders and proprietary technologies, so they can negotiate and shape the scope, content, adoption, and implementation of the standard. By cooperating with different manufacturers to form a unified standard, standardization helps industries to dismantle unnecessary competition regarding the technical specifications of products and services.

The 802.11 standard provides a typical example of the standardization process, as this standard was developed via by including advanced technologies created by various entities. Techniques included in the IEEE standard also indicated the maturity of both practice and marketplace. In order to ensure the successful performance of these standards, the IEEE also requires the standardization process to be transparent and open to participants. Thus, such standards would obtain approval from the majority of the industry. The WAPI program, which the national standardization body sponsored immediately, was created very differently. Due to a lack of transparency, the WAPI standards were surrounded by ambiguous techniques, which made it difficult for external entities to comprehend them.

From a national development perspective, definite standards might not only promote comprehensive products and services, but also safeguard the interests of the state and the people. Therefore, many countries, including China, formulate rules to regulate standards at the national level. These national standards usually evolve into national health and safety regulations (e.g. concerning electrical and fire hazards). Certain national standards may also be implemented for industrial and market development purposes [15]. In fact, the Telecommunication Service Rules' national Qu's standards were implemented to develop the economy, promote technical progress, and improve product quality.

5 The Implementation of Chinese Standardization Policies and Future Solutions

The Standards Administration of China's patent regulation is part of China's long-term standards strategy to emerge as a world leader in science and technology by 2050 [16]. The first step was to establish a legal system that provided a new voluntary technical standards system by 2010 as this would improve the standards' market adaptability. The next step is to promote international applications and develop international access to Chinese standards by 2020. The final goal is to achieve and sustain international pre-eminence for key Chinese technical standards before 2050 [17].

The WAPI case illustrates early Chinese attempts to promote Chinese standards in the telecommunications industry through government contracts and market advantages. However, the WAPI specification applied only to the Chinese domestic market and resulted in a lack of competitiveness in the international market [18]. It also means that the goal of allowing international access to Chinese standards cannot merely rely on authorities' monopolistic licensing power. The authorities should avoid inappropriate convergence between standard setting and patent rights [19]. To ensure international access to Chinese standards, efforts should be made not only toward improving the efficiency and quality of standard-setting, but also toward the acceptance of the standards [20]. This article offers a few observations on Chinese approaches to standards regulation:

5.1 International Synchronization with International Standards Organizations

Since standards are dominated by SAC patent regulations, the SAC should align with the patent policies of international standards organizations. Such standardization systems should offer appropriate policies for dealing with patent rights in the standards development process. Therefore, the SAC should adopt the common standard-setting patent policies used by the ISO, IEC, and ITU [21], which apply a reasonable and non-discriminatory basis to patents associated with standardization.

5.2 International Cooperation in R & D

If the authorities link particular specifications to the national standard, their involvement would not only interfere with technological development, but also harm the competitiveness of the industry. This would also create non-tariff barriers to international trade between developed countries and emerging economies, which would contravene the WTO's TBT Agreement [22].

A better approach is for the authorities to provide guidance to the industries and encourage research and development, allowing industries to contribute the positive results of their research and development activities by safeguarding intellectual property rights. A dense patent policy ensures both the protection of investments and the release of intellectual property resources for broad application across the industry [23].

5.3 Standards for Improving QoS, Rather Than Using Political Means to Impact the Market

Quality of Service standard rules should focus on improving service and safety aspects [24]. Quality of Service policy makers should not involve the development industry, so as not to affect market competition. Although the SAC patent rules granted MII to establish technical standards in QoS matters, the MII should work as a facilitator, rather than as a controller, in setting standards [25].

After the WAPI experience, China has altered its standardization strategy, and now seeks opportunities to cooperate and participate with major industrial entities. One high-profile approach was the cooperation between Huawei and an IEEE working group. Huawei had already collaborated on several projects worldwide, leading forums in an open and transparent way and working jointly on the standardization process, including 3GPP, ETSI, IETF, IEEE, and the Global Forum on Cyber Expertise (GFCE) [26]. The cooperation with IEEE was recognized by the "Excellence in Standards Development Award" for contributions to developing the IEEE 802.1AS standard. This collaboration led to the healthy development of the telecommunications industry chain and involved major global standards research [27].

In the last two decades, there have been disputes between many countries concerning intellectual property rights concerning technical standards [28]. Authorities, when implementing standardization, should consider the condition of technology in their nation, which includes knowledge and technology cycles in the industry; the conditions of the domestic and international markets, in which the authorities plan to sell the technology; and the level of governmental powers to safeguard the rights of stakeholders in the market [29]. In other words, the government should be aware of inadvertently instituting protectionist measures through setting national standards. The WAPI experience demonstrated that that interference of government bodies in the standardization process might achieve an instant outcome for the market, but it is not a proper approach to long-term development and the creation of international connections for the industry.

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