The Development of China's Intellectual Property Law over the Past Forty Years of Reform and Opening Up

Wu Handong & Liu Xin*

Abstract: Over the past forty years of reform and opening-up, China has experienced vigorous development of Intellectual Property Law. During this period, it has successively enacted and promulgated a range of basic laws, among which are the Trademark Law of the PRC, the Patent Law of the PRC, the Copyright Law of the PRC and the Anti-Unfair Competition Law of the PRC; and many other related laws and regulations, such as the Regulations of the PRC on the Protection of New Varieties of Plants, Regulations on Protection of Integrated Circuit Layout Design and Provisions on the Protection of Geographical Indication Products. In this way, China has gradually established a relatively sound and complete intellectual property law system. Since the beginning of reform and opening-up, China's practice of intellectual property legislation has adhered to its institutional positioning of being subject to its civil law, safeguarding effective market competition and ensuring the implementation of national strategies. It has followed the development rules of relying on scientific & technological progress, targeting economic and social development and adjusting public policies for guiding purposes. Thanks to this, China has formed multiple coordinating mechanisms to settle conflicts of interests between the protection of intellectual property rights (IPR) and the protection of basic human rights, public health, genetic resources, traditional knowledge, etc. In the future development of China's intellectual property law, a trend of codification will emerge, which will primarily "include intellectual property law in the civil code" or "enact an intellectual property code." The modernization of China's Intellectual Property Law will be manifested in the changes of the defining standard of Intellectual Property Rights (IPR)subjects, the utilization patterns of IPR objects and the protection models of intellectual property. This internationalization will center on creating a new order for international IPR protection.

Keywords: Reform and opening-up; intellectual property law; codification; modernization; internationalization

* Wu Handong, professor, Center for Studies of Intellectual Property Rights, Zhongnan University of Economics and Law.
Liu Xin, PhD candidate, Center for Studies of Intellectual Property Rights, Zhongnan University of Economics and Law.

China's intellectual property law can be traced back to the Constitutional Reform and Modernization in the late Qing Dynasty. Due to historical restrictions, however, it did not witness substantial development until the initiation of reform and opening-up in the late 1970s. The 1980s and 1990s saw the formation of China's intellectual property law framework. In the early years of the 21st century, its intellectual property law system gradually took shape. It is fair to say that the development of China's intellectual property law has been in step with the advancement of reform and opening-up. Over the past forty years, China's reform and opening-up has not only facilitated rapid economic and social development, but also continuous improvement of the intellectual property law system. The past forty years has seen increasingly improved intellectual property law of the PRC, which serves as a powerful legal safeguard and institutional support for China's technological progress and economic & social development. Based on the existing legislative achievements and operational experience accumulated in the period of reform and opening-up, China's intellectual property law is expected to experience even more significant development through codification, modernization and internationalization.

1. The development of China's intellectual property law since the beginning of reform and opening-up

In the early years of the People's Republic of China, affected by long-term conflicts and war, there were numerous sectors waiting for rejuvenation. Under such circumstances, social transformation was steadily pushed forward; yet, only a few intellectual property-related legal norms were established. In the 1960s and the 1970s, the deviation of China's socialist exploration prevented its already slowly developed intellectual property law from further development. *The 1950 Interim Measures on Manuscript Remuneration* was among the few legal documents concerning copyright protection. It protected an author's right for remuneration in two patterns, i.e. "payment on term" and "one-off payment"[①]. As for other property rights in work and copyright-related personal right, no legal protection was provided. *The 1950 Interim Regulations on Protecting Inventors' Patent Right* is China's first legal norm concerning patent issues. Adopting a former Soviet Union-style model, the *Interim Regulations* introduced a double-track protection mechanism for inventions and creations[②]. The double-track here refers to patenting and rewarding. In 1963, with the introduction of the *Regulation of the People's Republic of China on Awards for Inventions*, the patent protection of inventions and creations no longer existed, with rewarding being the only form of protection. The 1950 *Interim Regulations on Trademark Registration* is China's first legal norm of protecting trademark rights. It specified the principles of protecting the exclusive right to use trademarks

intellectual property

① Chen, 2006
② Feng & Liu, 2013

and introduced a unified system of trademark registration nationwide. The 1963 *Regulations on Trademark Management*, however, shifted the focus of trademark work from protecting the exclusive right to use trademarks to supervising commodity quality. It abolished previous procedures of trademark review and approval and avoided such issues as trademark rights and corresponding legal protections[①].

Since reform and opening-up, China has accelerated its intellectual property legislation, successively introducing a series of intellectual property-related laws and regulations, including the *Trademark Law of the PRC* (1982), the *Patent Law of the PRC* (1984), the *Copyright Law of the PRC* (1990) and the *Anti–Unfair Competition Law of the PRC* (1993). Thus, a relatively sound and complete IPR framework gradually came into being.

In the 1980s and the 1990s, the advancement of reform and opening-up as a basic state policy brought China to the stage of transition from a planned economy to a market economy. Echoing domestic demand and referencing relevant international conventions and foreign laws, China successively promulgated a range of IPR legal norms. To fulfill the demand of economic and social development, China enacted and promulgated the *Trademark Law of the PRC* in 1982. This law prioritized the protection of the exclusive right to use registered trademarks, attached great importance to trademark management to better supervise product quality, and specified the procedures of trademark application, review & approval and registration[②]. In 1984 China promulgated the *Patent Law of the PRC*, building a patent system which could fulfill China's domestic demand and at the same time was aligned with international conventions, and creating a favorable environment for its patent-related economic exchanges overseas[③]. Also in that period, China started its copyright legislation. It turned out that the first draft triggered significant disputes, for which there were 11 years of extensive consultations and discussions before the *Copyright Law of the PRC* was eventually promulgated in 1990. This law specified the authorship of a work, the ownership of copyright, the object of copyright, the content of copyright, as well as the protection and restriction of copyright[④].

Thanks to the deepening of domestic reform and expansion of the opening-up scope, China established a socialist market economic system in 1992 and amended its *Patent Law and Trademark Law* respectively in 1992 and 1993. The amended *Patent Law of the PRC* enhanced the protection of patented imports, extended the scope of patent protections by including chemical substances, drugs, food, drinks and condiments, and added domestic priority and a range of procedural specifications[⑤]. By contrast, the amended *Trademark Law of the PRC* mainly made the following four changes: enlarging the scope of trademark protection by having service trademarks included; banning the registration of geographic terms as trademarks; streamlining and improving the procedures of trademark registration and cancellation; and increasing the punishment of counterfeiting registered trademarks[⑥]. To safeguard the healthy development of the socialist market economy, China enacted the *Anti–Unfair Competition Law of the PRC* in 1993. This law specified general principles of market competition in Chapter One—General Provisions,[⑦] and prohibited 11 types of unfair

① Liu, 1999
② Deng & Yuan, 1983; Geng,1983
③ Huang,1984; Tang, 1984; Zheng, 1986; Wu, 2014
④ Wei, 1990; Liu, 1989
⑤ Wu, 1992; Wen, 1992
⑥ Wang, 1994; Yang, 1994
⑦ 6Article 2, the Anti–Unfair Competition Law of the PRC (1993).

competition, including false propaganda, infringement upon business secrecy, fabrication or spreading of false facts to damage the business reputation or commodity fame of the other competitor.[①] Thus, China completed its building of a basic intellectual property law framework.

At the end of the 20th century, to better integrate into global economic and trade systems, China successively amended a number of intellectual property-related legal norms. By the time China officially joined the World Trade Organization (WTO) in 2001, it had amended a series of intellectual property-related laws and regulations, including the *Patent Law of the PRC* (amended in 2000), the *Copyright Law of the PRC* (amended in 2001) and the *Trademark Law of the PRC* (amended in 2001). More specifically, after the amendment in 2000, the *Patent Law of the PRC* was added with clauses concerning offering for sale, adoption of provisional pre-litigation measures, provision on tort damages calculation, redefinition of the scope of on-duty inventions, rewarding of on-duty inventions, and streamlining of the procedures of patent reviewing, approval and safeguarding. By doing so, China aligned its patent system with the *Agreement on Trade–Related Aspects of Intellectual Property Rights* (TRIPs)[②].After the amendment in 2001, the *Copyright Law of the PRC* increased the number of protected objects; enlarged the scope of protection by including acrobatics, architectural works and original databases; added three work-based property rights, i.e. rental rights, screening rights and network communication rights; introduced textbook-related statutory licensing; specified the legal status of copyright collective management agencies; and added provisions concerning statutory damages and other tort remedies[③]. After the amendment in 2001, the *Trademark Law of the PRC* enlarged the scope of trademark applicants; increased the number of protected objects; enhanced the protection of famous trademarks; introduced provisions against malicious registering; and increased punishment for infringement. In this way, China also aligned its trademark system with the *Agreement on Trade–Related Aspects of Intellectual Property Rights* [④]. In addition, other intellectual property-related laws and regulations (*Regulations of the PRC on the Protection of New Varieties of Plants*, *Regulations on Protection of Integrated Circuit Layout Design* and *Provisions on the Protection of Geographical Indication Products*) were successively introduced in 1997, 2001 and 2005. Thus, China had its intellectual property law system established.

In the 21st century, China further strives to align its intellectual property law system with the international standards. Especially with the implementation of the *Outline of the National Intellectual Property Strategy* in 2008, the safeguarding of intellectual property has been raised to the height of national strategy. Echoing the call of innovation-driven development, China further amended the *Patent Law of the PRC*, the Copyright Law of the PRC, the *Trademark Law of the PRC* and the *Anti–Unfair Competition Law of the PRC* respectively in 2008, 2010, 2013 and 2017, providing legal protections for the construction of an innovation-oriented country. The amended *Patent Law of the PRC* increased punishments of patent infringement; expanded the applicable scope of autonomy of will; introduced special provisions on the use of genetic resources and added a compulsory system of patent licensing[⑤]. The amended *Trademark Law of the PRC*

① 7Article 5–15, the Anti–Unfair Competition Law of the PRC (1993).
② Zhang, 2000; Wen, 2000; Wang, 2001
③ Shen, 2001; Liu, 2001
④ Li, 2001
⑤ Guo, 2009; Tao, 2009

included "sound" into its scope of protection; specified the approach to the application of "one trademark for multiple categories;" improved the objection system for trademark registration; strengthened protections of both famous trademarks and unregistered trademarks; introduced a system of punitive damages; and increased the amount of statutory tort damages. By doing so, China further improved its trademark law system[①]. The amended *Anti–Unfair Competition Law of the PRC* also improved its "General Provisions" and introduced special provisions on "anti-unfair competition online"[②]. This amended *Anti–Unfair Competition Lawof the PRC*, though not perfect, was indeed more sound and complete and could better fulfill actual needs. Echoing the call of innovation-driven development, the amended *Copyright Law of the PRC* (2010) included a provision on copyright-pledging registration. This amendment of the *Copyright Law of the PRC* was made after a WTO's panel of experts concluded in 2009 that Article 4 of the *Copyright Law of the PRC* did not meet the requirements of *Berne Convention for the Protection of Literary and Artistic Works* and the *Agreement on Trade–Related Aspects of Intellectual Property Rights* (TRIPs)[③]. In the amended version, Article 4 "works the publication or distribution of which is prohibited by law shall not be protected by this Law" was supplemented with "prohibited works enjoy certain copyrights, the exercise of which is under strict restriction"[④]. At present, the fourth amendment of the *Patent Law of the PRC* and the third amendment of the *Copyright Law of the PRC* are still under way, with relevant draft amendments already released for public debates. China is sure to further improve its intellectual property law system to provide institutional support for its entry, as a major player, in the global intellectual property industry.

2. The exercise of China's intellectual property law since the beginning of reform and opening-up

China's intellectual property law in a modern sense has in fact gradually developed since the beginning of reform and opening-up. Over the past forty years of reform and opening-up, China has managed to transform its intellectual property law from a law category to a law system, which is of historic significance. With intellectual property-related laws and regulations (*Copyright Law of the PRC*, *Patent Law of the PRC* and *Trademark Law of the PRC*) increasingly improved, the prospect of China's intellectual property development is quite optimistic. China is now in an age of an innovation-driven knowledge economy. To give full play to intellectual property law in economic and social development, it is imperative to summarize and conclude China's exercise of intellectual property law since the beginning of reform and opening-up. This can help explain China's corresponding institutional orientation, law of development and approach to coordinating conflict of interests, and subsequently offer references to the future development of China's intellectual property law.

2.1 The primary institutional orientation of China's intellectual property law

Over the past forty years of reform and opening-up, China has kept building and improving its intellectual property-related system and rules. Against such a backdrop, intellectual property law has become a key part of China's socialist law system. intellectual property law is an important constituent of civil legal norms, is closely related to market competition, and serves as a legal protection of the advancement of

① Wu & Wang, 2013; Jin, 2013
② Zheng & Wang, 2018
③ Su, 2010
④ Cong, 2011

national innovation strategy[①].

2.1.1 intellectual property law is an important part of the civil legal norm.

The origin of intellectual property law can be traced back to the "res incorporales" theory in Roman law and is a vital product of the "revolution of materialized knowledge." Given the nature and category of IPR objects, intellectual property is universally accepted as a civil right among scholars. It is true that intellectual property rights, as opposed to traditional civil rights like real rights and creditors' rights, feature non-material objects. However, both real rights (over tangible properties like movables and immovables) and intellectual property rights (over knowledge products like literary & artistic works, inventions & creations and commercial signs) are in nature property rights and share common characteristics of civil rights. According to the *Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)*, "Intellectual property rights are private rights." In *Chapter V Civil Rights of General Principles of the Civil Law of the PRC 1986*, intellectual property rights were specified in Section 3 and were placed in parallel with property ownership and related property rights (Section 1), creditors' rights (Section 2) and personal rights (Section 4). According to *Article 123, General Provisions of the Civil Law of the PRC 2017*, "Civil subjects shall enjoy intellectual property rights according to law," which is a definitive statement of intellectual property rights' legal attribute of civil rights. Thus, intellectual property law, aiming to coordinate IP legal relations, falls into the category of civil legal norms. It is true that part of intellectual property norms concern criminal law and administrative law. But this does not overthrow the fundamental fact that intellectual property law belongs to civil legal norms. That is because all adjustments of IP legal relations, whether they concern intellectual property acquisition, licensing, transfer, or tort remedy, are based on the primary principles of civil law.

2.1.2 intellectual property law is closely related to market competition.

Intellectual property law originates from the early development of the modern capitalist commodity economy and therefore is closely related to market competition. As Japanese scholar Tomita Tetsuo(2000) put it, "the marketization of intellectual achievements is a major goal of the intellectual property system."An intellectual property right is an exclusive right over intellectual property enjoyed by a particular subject, which means an intellectual property right is exclusive to its obligee. To some extent, intellectual property law can be understood as a law system that ensures obligees' legal monopoly of their own knowledge property. In market competition, knowledge products can legally monopolize the market in accordance with intellectual property law and thus gain a competitive edge. In the era of a knowledge economy, intellectual property gradually rises as a decisive factor of market competition, and intellectual property law plays an increasingly important role in regulating market competition. In practice, however, to secure greater market strength, IP owners tend to expand the power of their IP monopoly, which can lead to IP abuse and unfair market competition. Under such circumstances, anti-unfair competition laws and anti-monopoly acts need to be introduced to regulate the market order and even impose sanctions against monopolies. In the context of market competition, intellectual property law cannot reach full potential without the "miscellaneous protection" from anti-unfair competition laws to ensure benign interactions between the system of intellectual property law and the mechanism of market competition[②]. In the 21st

① Wang, 2008
② Zheng, 2003; Yang, 2003

century, the development of Internet technology brings about a new issue concerning Internet intellectual property and also gives rise to numerous unfair online competitions. Consequently, how to leverage intellectual property law to effectively regulate online market competition becomes a new academic focus[②].

2.1.3 intellectual property law is a basis for the effective implementation of relevant national strategies.

As a key law that stimulates and protects innovation, intellectual property law lays a basis for the effective implementation of China's intellectual property-related strategies. In 2008, the release and implementation of the *Outline of the National Intellectual Property Strategy* marked China's promotion of intellectual property from a law system to a national development strategy. This move highlighted intellectual property law's attribute as a policy instrument and was a key strategic decision and an important policy arrangement for China to advance its economic and social development and to support its national strategies of "reinvigorating the country through science and education,""strengthening the nation through human resource development" and "sustainable development." Over the past decade, China has steadily advanced its intellectual property strategy, improved its strategic planning and ensured effective implementation of relevant strategies. Thanks to this, it has made a range of remarkable achievements in intellectual property creation, application, protection, management and servicing. The intellectual property law, as a basis and guarantee of relevant strategy implementation, plays an important role in the advancement of China's intellectual property-related strategies, lays a legal basis for the strategic planning of intellectual property development, and provides legal protections for the effective implementation of strategies related to intellectual property innovation, application, protection, management and servicing. With the enactment of the *Several Opinions of the State Council on Building a Powerful Intellectual Property Nation under New Conditions* in 2015 the advancement of China's intellectual property-related strategies has entered a new stage, in which legal protection and support is even more crucial to China's construction of a major IP country. Hence, it is necessary to give more play to intellectual property law's function as a policy instrument, further advance intellectual property-related national strategies, and complete China's transformation into a country that is strong on intellectual property rights"[①].

2.2 The development and operational rules of China's intellectual property law

Everything follows its own rules for development; and intellectual property law is no exception. Over the past forty years of reform and opening-up, China's development of intellectual property law has been driven by three aspects, i.e. scientific & technological progress, economic & social development, as well as public policy adjustments.

2.2.1 intellectual property law evolves along with scientific & technological progress

Intellectual property law came into being against the backdrop of a technological revolution and has evolved along with technology's advancements. Its history of development is a process of constant interaction between law system innovations and technological innovations. From its forming stage in the 17th century until now, there have been four technological revolutions (the first, second, third and fourth industrial revolutions), each of which directly shaped a corresponding major change in intellectual property law[②]. It is fair to say that the 300-400 years of intellectual property development is a process of law system perfection that goes along with the

① Shen, 2016; 2017
② Wu, 2001

advancement of technology. In the 1980s and the 1990s, China established its intellectual property law system, which coincided with a new round of technological advancement characterized by Internet technology, genetic technology, etc. The emerging technologies triggered a series of social reforms and imposed new challenges on China's intellectual property system, which required prompt legal responses. Take Internet technology as an example. From Web 1.0 to Web 4.0, information sharing has been increasingly enhanced in terms of interactions, immediacy and integration; yet, the benefit structure among subjects has witnessed huge changes, where a variety of Internet technology-related intellectual property disputes over Internet copyrights and unfair online competition were highlighted. China actively responded to these legal challenges by successively introducing a series of laws, regulations and judicial interpretations (*Regulation on the Protection of the Right to Communicate Works to the Public over Information Networks*, etc.) to regulate Internet copyrights. It added "anti-unfair online competition provisions" into the newly amended *Anti–Unfair Competition Law 2017*[①].

2.2.2 intellectual property law changes with economic and social development

The formulation and development of intellectual property law is to a large extent subject to the economic context to which it is related. Once its economic context changes, the institutional design of that intellectual property law inevitably changes[②]. The development of intellectual property law in developed countries reveals that at different stages of economic and social development, their institutional designs of intellectual property laws varied greatly. intellectual property law emerged with the development of a commodity economy; in its early development stage, affected by some underdeveloped industries and sectors, they tended to offer weak intellectual property protection in such areas and even prioritize natives over foreigners to ensure the rapid development of the domestic economy and society. As the domestic economy further grew, they gradually offered stronger intellectual property protection and enforced higher intellectual property legal norms to ensure sustained development of the economy and society. As a latecomer in this regard, China did not truly establish its intellectual property law until the era of reform and opening-up. For this reason, it missed the historical opportunity to gradually raise its IPR protection standard in step with its economic and social development. And the pressure from the international community forced it to offer ultra-level protection, which was in fact beyond the demand of economic and social development. However, this does not mean that China's development of intellectual property law has deviated from the universal law of economic and social development. In the beginning of reform and opening-up, China adopted an IPR protection standard higher than its then economic and social development. To protect its disadvantageous domestic industries, however, it still left some room in many areas when it came to specific institutional designs. For example, in the eight years from the promulgation of the *Patent Law of the PRC* in 1984 to its amendment in 1992, no patent was granted to chemical substances, drugs, food, beverages or condiments[③]. With the establishment of a socialist market economy system, China has accelerated its economic and social development and kept raising its IPR protection standards. Consequently, intellectual property law becomes a legal protection and institutional support of China's economic transformation and upgrading, and

① Zheng & Wang, 2018; Tian & Zhu, 2018
② Tomita Tetsuo, 2000
③ Wu, 1992; Wen, 1992

social reform and development.

2.2.3 intellectual property law changes with public policy.

Intellectual property law is an important legal norm that stimulates technological innovation and economic growth; and is also an intellectual property policy in the public policy system. It is formulated, introduced and advanced with national support. The government, in the name of the country, guides and regulates the creation, attribution, application and management of knowledge resources through institutional allocation and policy arrangement so as to achieve the benefit goal of intellectual property sharing[①]. According to consideration theory, intellectual property law is in nature a combination of law and policy. "Whether to protect or not is a legal issue;" while "what (not) to protect" and "how much to protect" concern national public policy[②]. Given that, it can be understood that the specific design of intellectual property legal norms is determined by national public policies. The value orientation exhibited in the operation of the intellectual property system highlights China's national IP policy direction. China's reform and opening-up has witnessed the enactment and several amendments of intellectual property-related laws. This process fully demonstrates the adjustments and evolution of China's intellectual property policies. More specifically, in the 1980s and the 1990s, China successively enacted the *Trademark Law of the PRC*, the *Patent Law of the PRC* and the *Copyright Law of the PRC*. From a policy perspective, these legislative activities corresponded with China's real need to advance its reform and opening-up and build a socialist market economy. At the end of the 20th century, China amended the *Trademark Law of the PRC*, the *Patent Law of the PRC* and the *Copyright Law of the PRC* and enacted a range of new intellectual property legal norms, among which were the *Regulations of the PRC* on the *Protection of New Varieties of Plants*, *Regulations on Protection of Integrated Circuit Layout Design* and *Provisions on the Protection of Geographical Indication Products*. These moves were arguably part of China's policy preparations for joining the WTO. Ever since the enforcement of the *Outline of the National Intellectual Property Strategy* in 2008, China has completed a new round of amending relevant intellectual property legal norms, explicitly echoing the call of national policies like "the innovation-driven strategy" and "building a country that is strong on intellectual property rights."

2.3 The conflict-settlement mechanism of China's intellectual property law

As a law system specializing in protecting individuals' intellectual creations, intellectual property law is prone to conflict with relevant public interests, which need to be settled by a corresponding settlement mechanism. When exercising the intellectual property law, China must settle conflicts of interests between the protection of intellectual property rights and the protection of basic human rights, public health, generic resources and traditional knowledge. Under the "balance of interests" principle, all such conflicts are coordinated and settled, thus ensuring the orderly operation of intellectual property law.

2.3.1 The conflict and coordination between intellectual property law and basic human rights protection

Intellectual property law aims to inspire innovation and protect creators' interests, which is basically in line with the freedom of literary and artistic creation and the freedom of scientific and technological invention found in basic human rights. By empowering literary & artistic creators and scientific & technological inventors with property

① Wu, 2006
② Xu, 2013

rights, intellectual property law ensures the realization of corresponding human rights values. However, as more protection is given to intellectual property rights and as the protection scope keeps expanding, modern intellectual property law places undue emphasis on the protection of obligees while overlooking public interests, which subsequently triggers its conflict with the protection of basic human rights concerning life-and-health, knowledge acquisition, environment and privacy[①]. In China's actual operation of the intellectual property law, conflict between intellectual property law and the protection of basic human rights occurs from time to time. To settle such a conflict, China has explored a series of feasible and effective coordination mechanisms which are based on the *Universal Declaration of Human Rights and the Agreement on Trade–Related Aspects of Intellectual Property Rights (TRIPs)* under the principle of "preferential protection of legal interests" and in accordance with the value-determined rights protection order[②]. Subject to its intellectual property restrictions, exception system and anti-monopoly regulations, these mechanisms strive to coordinate and balance creators' legal interests and public interests, and integrate intellectual property law's private rights protection with human rights protection[③].

2.3.2 The conflict and coordination between intellectual property law and public health protection

The conflict between intellectual property law and public health protection is increasingly highlighted with the significant enhancement of international IPR protection in *TRIPs*. Prior to the introduction of *TRIPs*, there had been no mentioning of drug or process patenting in any international treaty. Not obliged to shoulder any international obligation, most developing and the least developed countries (LDCs) preferred to produce or import generic drugs to satisfy their citizens' demand for cheap drugs[④]. *TRIPs*' stipulation of higher-level drug patent protection substantially prevented people in developing and the least developed countries (LDCs) from accessing essential drugs and even provoked public health crises. Against such a backdrop, through relentless efforts made by many developing and the least developed countries, the WTO initiated the Doha Round (trade negotiations) and concluded the Doha Declaration, allowing *TRIPs* members to take measures to protect public health[⑤]. China, being the world's largest developing country, lags far behind the USA and other developed countries in terms of drug research and development. And the TRIPs-triggered public health problem was particularly highlighted in China. To settle the conflict between intellectual property law and public health protection, China introduced a compulsory system of patent licensing in the amended *Patent Law of the PRC* in 2008 to ensure the supply of essential drugs[⑥]. In the meantime, many scholars in this area proposed to introduce a pharmaceutical patent linkage system, allowing quick market access to generic drugs to cut drug prices and coordinate the relations between drug patent protection and public health protection[⑦].

2.3.3 The conflict and coordination between intellectual property law and genetic resource protection

The conflict between intellectual property law and genetic resource protection emerged after the inclusion

① Wang & Ma, 2008
② Wang & Ma, 2008; Wu, 2011; Huang, 2008
③ Gao, 2014
④ Zhou, 2005
⑤ Wei, 2004
⑥ Tao, 2009; Zhang & Zhang, 2008
⑦ Liang, 2017; Liu & Zhu, 2014

of genetic resources into the IPR protection scope. Genetic resources (GRs) refer to genetic material of actual or potential value (genetic material: any material of plant, animal, microbial or other origin containing functional units of heredity), as well as knowledge, innovations and practices concerning their diversity protection and sustained utilization and demonstrating region-specific traditional lifestyles[①]. Genetic resources are basic resources of technology research and development. As bio-technology further develops, the commercial values of such genetic resources, particularly those in scarcity, are on the rise. However, bio-technology is restricted to developed countries, while most genetic resources are in developing countries. Such a reality gave rise to the conflict of interests between developed countries and developing countries. The former required IPR protections for bio-technology, while the latter called for necessary protections of genetic resources[②]. To settle such a conflict, the *Convention on Biological Diversity* was introduced to confirm relevant states' sovereignty over genetic resources within their territories and to establish a principle of prior informed consent for the development and utilization of genetic resources. China is a large country with vast territory and abundant resources, including genetic resources. Yet, when it comes to bio-technology, it lags the developed countries in Europe and North America. Thus, China also suffers the conflict between intellectual property law and genetic resource protection. To protect genetic resources, China added special provisions on the utilization of genetic resources in the amended *Patent Law* in 2008[③]. For full protection of genetic resources and effective coordination between intellectual property law and genetic resource protection, a more comprehensive legal coordination mechanism needs to be developed.

2.3.4 The conflict and coordination between intellectual property law and traditional knowledge protection

The conflict between intellectual property law and traditional knowledge protection emerged with the application of traditional knowledge to a knowledge product. Traditional knowledge covers all knowledge, expertise, skills and experience developed and accumulated by time-honored tribes in their long-term production and living. In current China, traditional knowledge in extensive application mainly falls into the two categories of folk literature and art, and traditional medicine. In practice, the creation of literary and artistic works is often based on widely-circulated traditional folk literature and art. The same is also true of the research and development of Chinese patent drugs, which is based on relatively well-developed traditional Chinese medicinal knowledge. Such a context gives rise to the conflict between the IPR

Traditional medicine

① Dou & Hao, 2010
② Pan, 2007
③ Sun, 2009; Guo, 2009

protection of the abovementioned works, creations and inventions and the protection of traditional knowledge concerning folk literature and art, traditional Chinese medicine, etc. To better coordinate the intellectual property law and traditional knowledge protection, China explored the IPR protections of traditional knowledge both in theory and in practice. Regarding the IPR protection of folk literature and arts, there are mainly two approaches, i.e. the copyright protection approach① and the Sui Generis protection approach②. Legislators prefer the former. At present, China has already released its *Regulations on Protecting the Copyrights of Folk Literary and Artistic Works (Draft)* for public opinions and advice. Regarding the IPR protection of traditional medicinal knowledge, a variety of protection approaches, including patent protection③, geographical indication protection④ and Sui Generis rights protection⑤ have been proposed by relevant scholars to serve as important references for future coordination between intellectual property law and the protection of traditional Chinese medicine.

3. Vision for future development of China's intellectual property law

Since the beginning of reform and opening-up, China has experienced rapid development of intellectual property law and made remarkable achievements in this regard. With innovation being the major driver of future development, intellectual property law shall play an even more active role in China's economic and social development. To fulfill needs of future development, China must ensure its intellectual property law can keep up with the times, strive to push forward the codification, modernization and internationalization of intellectual property law, and provide a legal guarantee and institutional support for its innovation-driven development.

3.1 The codification of China's intellectual property law

As China's intellectual property law improves, the voice of intellectual property codification arises. Currently, regarding intellectual property codification, there are mainly two approaches advocated by scholars in the legal community. One is "code inclusion;" the other is "code enactment." To be specific, the term "code inclusion" here means the inclusion of IPR-related laws into a civil code, which can be exemplified by Section 4 of *General Provisions of Russia Federation Civil Code vvv*⑥; the term "code enactment" here refers to the enactment of a specialized intellectual property code, such as the *Intellectual Property Code*⑦ (*Code de la Propriete Intellectuelle*, *Partie Legislative*) and the *Intellectual Property Code of the Philippines* (Republic Act No. 8293)⑧. By comparison, "code inclusion" is rational in theory; while "code enactment" is feasible in practice. This "either-or" choice concerns the future institutional structure and development direction of China's intellectual property codification.

3.1.1 intellectual property law's approach to "code inclusion"

Intellectual property's essential attribute of being a civil right forms the theoretical basis for its "code inclusion." As the general civil code of China, the *General Provisions of the Civil Law of the PRC* specifies in Article 123 that "civil subjects enjoy

① Guan, 2016; Wang, 2004
② Huang, 2009; Yan, 2009
③ Zhou& Xu, et, al., 2017; Chen, 2015
④ Wang & Song, 2014
⑤ Huang, 2005
⑥ Zhang, 2012
⑦ Huang & Zhu, 2017
⑧ Yang & Yang, 2014

intellectual property rights according to law," which is a fundamental confirmation of intellectual property's attribute of being a civil right. Based on this, most IP scholars promote separate compilation of intellectual property law in the civil code and general provisions of intellectual property[①]. The separate compilation of intellectual property law in the civil code is a rational choice because it fulfills the requirement of the times and echoes the call for restructuring. First, the separate compilation of intellectual property law in the civil code highlights an epochal character. In today's information society, intellectual property is increasingly important. It is imperative to echo the call of this new era by including the intellectual property law into the civil code and compile it separately[②]. China's separate compilation of the intellectual property law as part of the civil code is also a crucial reform of its civil code in this era of a knowledge economy. Second, the compilation of intellectual property law is a key structural supplement to the civil code. As the general civil code of China, the *General Provisions of the Civil Law of the PRC*, carrying on the legislative tradition of the *General Principles of the Civil Law of the PRC*, added an IPR-themed clause (Article 123) in "Chapter V Civil Rights," making it in parallel with the property rights-themed clause (Article 114), the creditor's rights-themed clause (Article 118) and the inheritance rights-themed clause (Article 124). Moreover, the General Provisions explicitly recognizes the intellectual property law to be an inseparable part of the civil law and thus lays a logical basis for the separate compilation of the intellectual property law in the civil code[③]. Yet, regarding the legislative model of the "compilation of intellectual property law" in the civil code, there are different opinions among legal scholars. According to some, "general provisions"

Innovation is the major driver of future development

① Wu, 2016; Zhang & Wang, 2005
② Guan, 2016
③ Zhang & Wang, 2005

should be concluded from relevant IPR legal norms and then be included in the civil code as the "compilation of intellectual property law"[①]. Others hold that only the general IPR provisions of a private law nature, and IPR-related laws and regulations (copyright law, patent law, trademark law, etc.) should be included in the civil code as the "compilation of intellectual property law," and that other relevant procedural regulations, which are not suitable for being included into the civil code, should be identified as supplementary provisions in the form of special laws or regulations[②]. There are also scholars against the separate compilation of intellectual property law in the civil code. According to them, the procedural content of the intellectual property law can affect the stability of the civil code, while the paradigm of the civil code can hamper the independence of the intellectual property law[③].

3.1.2 intellectual property law's approach to "enactment"

The separate "code enactment" of intellectual property law refers to the systematic compilation of specific IPR-related laws (copyright law, patent law, trademark law, etc.) into a specialized intellectual property code. The enactment of an "intellectual property code" was first proposed in the *WIPO Convention* (formally, *the Convention establishing the World Intellectual Property Organization*) in 1967. Following this, four countries, namely, Sri Lanka, France, the Philippines and Vietnam enacted their intellectual property codes and thus realized intellectual property codification respectively in 1979, 1992, 1997 and 2005[④]. Given the hierarchical differentiation of intellectual property legislation and the diversification of administrative management in current China, integrating all specialized IPR-related laws and compiling them into a unified intellectual property code is arguably an effective coping strategy. The feasibility of enacting an "intellectual property code" mainly relies on two aspects, i.e. cutting the costs of intellectual property legislation and achieving unified management of all intellectual property rights. First, the enactment of an "intellectual property code" can significantly reduce the costs of intellectual property legislation. Although a code's legislative costs can be far higher than those of a specialized law, legislative costs are almost once and for all[⑤]. In addition, as the core legal norm in this era of a knowledge economy, relevant IPR-related laws require amendments to keep up with China's social and economic development. The amendment of a unified intellectual property code is undoubtedly much less time and material-consuming than the separate amendments of specialized laws and regulations. Second, the enactment of an "intellectual property code" can pave the way for the unified management of all intellectual property rights. Given the hierarchical differentiation of intellectual property legislation and the diversification of administrative management in current China, it is imperative to integrate all specialized IPR-related laws and compile them into a unified "intellectual property code." This is conducive to integrating different IPR legislative patterns with different legislative principles, ensuring relevant administrative authorities' adoption of a unified standard on law execution, laying a basis for comprehensive intellectual property management (i.e. the coordination of relevant administrative authorities), and promoting the integration of

① Wu, 2016
② Yi, 2014
③ Li, 2017
④ He & Xiao, 2017
⑤ Li, 2005

intellectual property legislation, execution and judicature.

3.2 The modernization of China's intellectual property law

As the latest technological revolution advances, the emerging scientific technologies keep benefiting human society while initiating a series of profound social changes. In the early years of reform and opening-up, China strove to channel its intellectual property legal norm in the right direction, which coincided with the initiation of a new technological revolution worldwide characterized by Internet technology and gene technology. Due to these emerging innovations and technologies, China's intellectual property law has been constantly faced with new challenges in the process of modernization. The continuous development of scientific technology requires its intellectual property law to follow up and its legal modernization to accelerate. Judging from current applications of Internet technology, gene technology and artificial intelligence (AI), the modernization of China's intellectual property law will be completed through reforms in the defining standard of IPR subjects, the utilization patterns of IPR objects and the protection models of intellectual property.

3.2.1 Change in the defining standard of IPR subjects in a modern context

In terms of IPR subjects, the latest technological revolution-triggered legal modernization is mainly manifested as the change in their defining standards. With the development of scientific technology, the subjects of future intelligent creations will no longer be restricted to natural person and legal person in a traditional sense; rather, virtual human, robot or even "clone man" can engage in intellectual activities (creation, invention, innovation, etc.) and become IPR subjects. Nevertheless, the rapid development and extensive application of Internet technology brings about "virtual man" and "virtual organization" which will surely enrich the representations of IPR subjects and at the same time complicate the identification of IPR subjects[①]. As online information sharing further popularizes, the scope of work creation has been extended from traditional manual creations to Internet-based creations, which directly transforms the operation models of the copyright system and the copyright industry[②]. The development of artificial intelligence will change or even subvert existing human patterns of production, work and communication. Robots are becoming more and more "smart," capable of playing chess, solving problems, computing, deep learning, visualizing scenarios, diagnosing diseases, reasoning, etc, to say nothing of literary & artistic creation and technological planning. Under such circumstances, two issues arise[③]. The first concerns the artificial intelligence's eligibility for being an IPR subject; the second concerns the IP ownership of AI achievements[④]. Furthermore, the development of gene technology is likely to foster "clone man," who may engage in intelligent creation and subsequently generate intelligent results. Whether they can be identified as IPR subjects and whom their intelligent results should belong to will become new challenges facing relevant authorities in executing the intellectual property law.

3.2.2 Breakthrough in the utilization patterns of IPR objects

In terms of IPR objects, the latest technological revolution-triggered legal modernization is mainly

① Wang & Hu, 2010
② Xiong, 2014
③ Yu, 2016
④ Wu, 2017

manifested as the breakthrough in their utilization patterns. In practice, such a breakthrough is demonstrated in two aspects. First, driven by advanced technology, existing utilization patterns of IPR objects were transformed. For example, the growing Internet technology brings about new utilization patterns like online literary and music creations, and new commercial practices of copyrights①. Second, advanced technology helps to foster new IPR objects and corresponding new utilization patterns. Also, the booming online gaming industry gives rises to issues concerning the copyright protection and operation of new objects such as game software and game graphics②. The prosperous online streaming industry triggers issues concerning the legal protection of live sports events and live online games as copyright objects③.The actual application of gene detection, gene therapy, etc. enables the protection of gene technology as a patent object. And this can be best exemplified by the sensational Myriad's gene patenting case in the USA in 2011. The Supreme Court's differentiation of natural genes from synthetic genes led to its ruling that naturally isolated DNA is not patentable, but that synthetic DNA (such as the cDNA for the BRCA1 and 2 genes) is patentable④. In addition, AI technology is more and more applied to intellectual activities such as news writing, provoking heated debates among scholars over whether AI-generated works should be under the protection of copyright law⑤. As scientific technology progresses, intellectual property law-protected new IPR objects keep emerging; so do new utilization patterns of existing IPR objects. Given this, China will continue to modernize its utilization patterns of IPR objects.

3.2.3 Modern development of IPR protection models

In terms of intellectual property protection, the latest technological revolution-triggered legal modernization is mainly manifested as the development of rights protection models. The development and popularization of Internet technology has brought mankind to a network era which features rapid information sharing, mass storage and an online copyright boom. Given the unique nature of online sharing and storage, the IPR protection scope further extends from conventional rights of publication, reproduction, etc. to newly emerged rights of Internet-based information sharing, database accessing, etc⑥. Accordingly in the age of the Internet, the accountability mechanism of IPR infringement also changes significantly. Given that online service providers play a crucial role in the operation of online copyrights, they are held liable for secondary infringement under Internet circumstances in order to effectively safeguard the legal rights and interests of copyright holders⑦. Meanwhile, relevant standards of online copyright infringement (e.g. "server standard") are introduced to reasonably define copyright liability⑧. The development and application of genetic technology substantially drives the progress of the bio-pharmaceutical industry. Yet, genes should not be understood simply as an "object" and it bears corresponding genetic information, as well as life potential⑨. Therefore, it is necessary to

① Mei & Jiang, 2014
② Cui, 2016; Ling, 2016
③ Wang, 2016; Cong, 2015; Feng, 2017; Zhu, 2017; Li, 2017
④ Zhao, 2012; Liu, 2016; Zhao, 2014
⑤ Yi, 2017; Wang, 2017
⑥ Qiao, 2004;Jiao, 2013; Li, 2003;Kong, 2011
⑦ Feng, 2016; Wu, 2011; Cao, 2012
⑧ Liu, 2017; Wang, 2016; Cui, 2016;Liu, 2017
⑨ Yan, 2006

build a system of informed consent, and access and benefit-sharing among gene providers. According to this system, collection of genomic DNA cannot be done without the providers' consent and certain financial compensation; the gene providers are entitled to share corresponding benefits generated from the research results[①]. Moreover, given the high correlation between genetic technology and life health, the scope of genetic drug-related IPR protection should be under strict restrictions; a gene patent pool should be built when needed so as to gradually develop an IPR model geared to the characteristics of genetic technology[②]. As scientific technology further advances, there will be more and more technological achievements and China will further deepen and extend its modernization of IPR protections.

3.3 The internationalization of China's intellectual property law

Benefiting from economic globalization, China's intellectual property law is increasingly aligned with the international standards. Ever since reform and opening-up, China has made relentless efforts to build an intellectual property law system and improve rules, thus gradually localizing the intellectual property law. Joined the WTO at the beginning of the 21st century, China only took a little over five years in aligning its intellectual property law system with the *TRIPs*, acquiring membership in major international IPR treaties and conventions, and completing the transformation of its homeland-rooted intellectual property law to an international community-orientation[③]. In the future, China's intellectual property law is sure to be further internationalized. China should make its voice heard in the formation of intentional IPR rules, expressing its own reviews of IPR internationalization, and making its own decisions in this regard.

3.3.1 Opportunities and challenges brought about by the internationalization of intellectual property law

The internationalization of intellectual property law means that the primary principles and main rules of China's IPR legal norms are generally applicable in the international community and that these IPR legal normsare assimilated to and integrated with those of other countries. However, this should not be understood as the unification of IPR legal norms across the world. Western capitalist countries have long been advocating for the international protection of intellectual property, which in nature is to capitalize their technological achievements and theorize their economic development through intellectual property monopolies[④]. For China, the internationalization of intellectual property law means a development opportunity, as well as an institutional challenge. As Prof. Zheng Chengsi (2006) put it, "We should see the negative side of increased IPR protection in the process of globalization and, more importantly, the important role of IPR protections in China's building an innovation-driven country." More specifically, the internationalization of intellectual property law mainly creates the following challenges for China. First, the protection from international conventions like *TRIPs* is beyond China's actual economic need at the time of accession. Excessive pursuit of IPR internationalization and adoption of an over-protective IPR protection model unavoidably restricts the development of our local industrial economy. This was particularly true in the early 1990s, when China wanted to join the *Universal Copyright Convention* without timely amending its *Copyright Law*, which

① Huang, 2002; Shang, 2005; Zheng, 2009
② Zhou& Jiang, et al. 2012
③ Wan, 2007
④ Qu, 2010

included phenomena of "super-national treatment"[①] and "super-international standards"[②] (e.g. the copyright protection of works of applied art shall only apply to foreigners, not natives). This was undoubtedly discrimination against native authors and thus severely dampened their passion for artistic creation. Nevertheless, one must never overlook the fact that the internationalization of intellectual property law means more opportunities than challenges for China. At the end of the 20th century, China joined the *TRIPs* by amending its IPR-related legal norms (*Copyright of the PRC*, *Patent Law of the PRC*, *Trademark Law of the PRC*, etc.). Thus, it managed to align its intellectual property law with the international standard, created a favorable environment for itself to join the WTO and integrate into the global economic and trade system, and provided legal and institutional support for its rapid economic and social development in the 21st century. Enhancing IPR protections also echoes the inner call of sustainable economic development and rapid technological progress. In the face of all these opportunities and challenges during the internationalization of intellectual property law, China should formulate development stage-specific strategic measures and give consideration to both practical interests and future prospects. It should follow relevant international conventions, protect the intellectual property rights of high technologies from abroad, promote international cooperation and at the same time safeguard its traditional knowledge.

3.3.2 Achievements and prospects of the internationalization of intellectual property law

The internationalization of intellectual property law is a basic need and an important guarantee of the development of a knowledge economy. The intellectual IPR protection rules are determined by the nature of a knowledge economy's globalization, which inevitably requires respecting and protecting intellectual property. As China's economy and society keep developing, the internationalization of intellectual property law evolves from an "admission ticket to an international market" to a "protective umbrella" for Chinese products and culture to "go global." China now attempts to adapt international IPR rules to China's conditions while internationalizing its intellectual property law. In the past, China was not legally represented in major intellectual property-related international organizations, could only attend relevant treaty/agreement negotiations and signing ceremonies as an observer, and was not allowed to directly participate in the formulation of intellectual property-related international rules. Through long-term efforts, China now enjoys legal representative status in the international IPR community, has direct channels to participate in the formulation of intellectual property-related international rules, and can voice its interest concerns in IPR internationalization[③]. To follow the trend of regional economic integration and build a new international system of IPR protection, China proposed the Belt and Road Initiative, further enabling Chinese products and brands to go global and participate in international competitions in key market segments and new areas. China is now advancing the Belt and Road Initiative and promoting regional economic integration and harmonious development, which requires support from a better developed intellectual property system. The latter can help build a more rational and equitable international order of IPR protections and realize regional integration of IPR systems. Thus, regarding the internationalization of intellectual property law,

① The so-called "super-national treatment" here means providing foreign authors with extra-copyright protection.
② The so-called "super-international standard" here means some existing IPR protection rules which do not meeting local demand and are beyond relevant international standard.
③ Pan, 2015

China will base this cause on its domestic conditions and actively promote the establishment of a new international order of IPR protections. In this new approach to the internationalization of intellectual property law, it will participate in global competition, enhance its comprehensive strength, and lay a solid foundation for the realization of the Chinese Dream, i.e. the great rejuvenation of the Chinese nation. In conclusion, over the past forty years of reform and opening-up, China has successively introduced a series of IPR-related laws and established a sound and completed law system, which significantly supports its technological innovations and economic development. Based on this, China's intellectual property law system is sure to experience more vigorous development in the new era. Featuring a codified structure, a modernized rule design and an internationalized institutional stance, China will take the initiative to rise to future challenges and respond to possible changes in a bid to better facilitate its economic and social development and transform into a country strong on intellectual property, science and technology, and economy.

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