Introduction

Patents, Innovation and "One Country, Two Patent Systems"

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I.1 BACKGROUND AND QUESTIONS

In 2015, China topped the world in invention patent applications, exceeding one million within a single year.[1] Its patent grants also scored a historical high of 359,000, ranking number one in the world.[2] However, its ranking of 25th in the Global Innovation Index (GII) is far from impressive.[3] In comparison, Hong Kong, China's special administrative region (SAR), is placed at 14th in the GII 2016, while ranking 16th in patent applications with 12,212, of which only 239 are from local residents.[4] The figures show that Hong Kong's ranking in patent applications is much lower than that in Mainland China, but its innovation status is 11 ranks higher. The reversing ranks raise interesting questions: what has made Hong Kong more "innovative" than its mainland counterpart with its incredibly low patent filing rate, particularly from local residents? What does "innovation" really mean in the context of Hong Kong and Mainland China having two distinctive patent systems within one country? Can the two regions learn from each other, given that one seems to be doing better in patenting and the other in innovation?

As a latecomer of economic and technological modernization, China has developed a sense of urgency in catching up with the Western countries. In the more than 30 years since 1984, China has built a comprehensive patent system from scratch, brought patent protection level to international standards with several patent law amendments, and formulated a series of patent and

[1] To be exact, 1,101,864 applications, of which 968,252 are from local residents. See WIPO, "World Intellectual Property Indicator 2016" (Economics & Statistics Series, 2016), p. 5, www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2016.pdf.
[2] Ibid.
[3] The Global Innovation Index 2016, www.globalinnovationindex.org/gii-2016-report#.
[4] WIPO, "World Intellectual Property Indicator 2016," p. 67.

innovation plans with specific numerical targets, which have been proven to be effective in making China a world leader in patenting in less than one decade. Recently, China has realized that the "great leap forward" in boosting patent numbers and getting top scores in the world patent scoreboard will not turn China into a truly innovative country, and hence it has shifted its strategic focus from being a "big" IP country to a "strong" IP country, with a more holistic view in patent law reform, including promoting patent commercialization and trading, as well as effective patent protection. However, the question is, can China's innovation status be moved up by merely perfecting patent system without a broader reform in other innovation indicators used in GII such as a political system, education infrastructure, and business environment that are conducive to innovation?

On the other hand, as a former British colony and presently China's SAR, Hong Kong has been struggling to find its own identity and the right balance between dependence and independence. Such an identity-seeking mentality is demonstrated not only in the recent uproar in opposing the Central Government's political intervention into the chief executive election and other political freedom, but also in the process of its patent law reform. After about 150 years of colonial history, Hong Kong finally had its own patent system in 1997, but it was only a "registration system," allowing Hong Kong patents granted by other patent offices to be registered in Hong Kong. Although this "registration system" had been effective in accommodating the low patent filings in Hong Kong, the SAR government changed it to an "original grant patent" (OGP) system in June 2016 to allow SAR patent office to examine and grant patents. The rationale for this change, according to the SAR government, is to "facilitate the development of Hong Kong into a regional innovation and technology hub."[5] The question is, however, can this grand mission be achieved through reforming the patent system? Will the new system further enhance the connection between the two different patent systems, one from common law tradition and the other civil law, within one country so that they could function together to promote innovation in each side, and in one country ultimately? Or on the contrary, will it further alienate the already estranged two sides to harm innovation of each other?

The above questions had never been comprehensively and seriously discussed inside and outside of Mainland China and Hong Kong. The reality is that many people do not even know that Hong Kong, although returned to its

[5] Hong Kong Legislative Council, Panel on Commerce and Industry, "Updated Background Brief on Review of the Patent System in Hong Kong," April 21, 2015, p. 2, www.legco.gov.hk/yr14-15/english/panels/ci/papers/ci20150421cb1-743-4-e.pdf.

motherland almost 20 years ago, has maintained its own distinctive patent system that was inherited from the UK but has been operated under a registration system that does not provide substantive examination to its own patent applications. Even fewer people know that the majority of applications for Hong Kong patents had been substantively examined by the SIPO, and such practice will be continued under the new OGP system, only under the different name of "outsourcing." It is thus imperative to fill the gap by having a comprehensive academic and practical investigation into this unique arrangement of "one country, two patent systems." This study is also timely in the midst of vast confusion and uproar surrounding Hong Kong's role and identity within China, an authoritarian state with amazing speed in economic growth while striving to transform itself from an imitation-oriented nation to an innovation-oriented nation. Is Hong Kong willing to, or can it, play a role in this transformation? Or is its OGP designed to make the SAR more independent or alienated from this transformation process? Furthermore, can Hong Kong become a "regional innovation and technological hub" without the participation of the Mainland's patent system and technological innovation?

This introduction intends to address some, if not all, of the above questions by first taking the readers through the historical development of patent systems in Mainland China and Hong Kong respectively, and then by empirically examining how patents and innovation interacted in China and Hong Kong, and lastly focusing particularly on future interplay of the two distinctive patent systems in Mainland and Hong Kong under the unique political arrangement of "one country, two systems" (OCTs). This introduction also identifies and links the essential points of each subsequent chapter in this book. It is hoped that, through reading this book, the audiences will have a better understanding that, although hailed as a genius design of China's chief architect for economic reform, Mr. Deng Xiaoping, the OCTS could be very complicated and difficult in implementation, not only politically but also legally, and that the complication could have either a negative or positive impact on innovation in both Mainland China and Hong Kong, depending on how the two sides respond and interact with each other.

I.2 THE TWO SYSTEMS IN ONE COUNTRY: ORIGIN AND DEVELOPMENT

Before tackling the more challenging issue of patents and innovation in China and its SAR, it would be helpful to have a historical survey of the origin and development of the two patent systems. Since a whole chapter of this book,

Chapter 7, has been devoted to the development of Hong Kong's patent system, but no chapter is on that of the mainland, this section will fill the vacuum by giving a relatively detailed account of the historical development of the patent system in Mainland China.

I.2.1 *The Origin, Development and Reform of PRC Patent System*

Prior to 1903, there had been no legal regulation of intellectual property rights (IPRs) in imperial China. The 1903 US and China trade treaty provided limited patent protection only to US citizens in China,[6] which were made available beginning in 1912 and yielded less than 700 patents in the subsequent 30 years.[7] The Nationalist government, with a vision to modernize China's IP system after taking power in 1928, issued a provisional patent measure in 1932[8] and enacted a patent law in 1949 which was abolished immediately by the Chinese Communist Party when it established the People's Republic of China (PRC) in the same year.[9]

The PRC did not enact a formal patent law until 1984. During the 30-year gap, the government issued a few regulations governing patent matters. For instance, a *Provisional Regulations on the Protection of the Invention Right and the Patent Right* was issued in 1950, adopting the former Soviet Union's two-track system, under which either the state owned the patents while inventors received modest rewards, or inventors owned patents from five to 15 years. In 1963, the PRC government adopted the *Regulations to Encourage Inventions and the Regulations to Encourage Improvements in Technology*, which changed the former two-track system to a one-track system under which only the state enjoyed exclusive patent ownership.[10]

The first PRC Patent Law was enacted in 1984, a few years after the end of Cultural Revolution. It was drafted based on extensive study of western patent

[6] The limited term of patent protection is provided "to citizens of the United States on all their patents issued by the United States, in respect of articles the sale of which is lawful in China, which do not infringe on previous inventions of Chinese subjects, in the same manner as patents are to be issued to subjects of China." The 1903 Treaty between the United States and China, Art. 10, reprinted in J. V. A. MacMurray (ed.), *Treaties and Agreements* (New York: Oxford University Press, 1921).

[7] W. P. Alford, *To Steal a Book Is an Elegant Offence: Intellectual Property Law in Chinese Civilization* (Stanford: Stanford University Press, 1995), p. 42, note 79; some estimated 360, while others put the figure at 692.

[8] "Measures to Encourage Industrial Arts."

[9] See Yahong Li, "Transplantation and Transformation: 30-Year Development of China's IP System," in G. H. Yu (ed.), *The Development of the Chinese Legal System: Change and Challenges* (London and New York: Routledge, 2010), pp. 138–156.

[10] Ibid.

laws, but the following aspects were criticized by the West as nonconforming to international standards: *inter alia*, the 15-year patent protection term for regular invention patents (five years for utility model patents and design patents); the lack of protection for chemical and pharmaceutical products and process patents; and the state designated patent agents handling all patent applications. Therefore, in 1992, a "Memorandum of Understanding on the Protection of Intellectual Property" (MOU) was signed by the United States and China requiring the latter to raise its IP protection standards. Pursuant to the MOU, China amended its Patent Law in 1992 to (1) expand protection to include pharmaceutical products, food and beverages, flavorings and substances obtained via a chemical process; (2) extend the protection term for invention patents from 15 years to 20 years, for utility models and designs from five to 10 years; (3) narrow the grounds under which a compulsory license may be granted; and (4) specify the burden of proof in litigation relating to method patents and adding a provision for domestic priority.

The second amendment to the PRC Patent Law came in 2000 when China was trying to gain entry into the WTO. Major changes were made in accordance with the minimum requirements of the Trade-Related Intellectual Property Rights (TRIPS) Agreement, which include: ownership of "service invention" can be decided by agreement; the "offer for sale" of a pirated product can be deemed as an act of infringement for inventions and utility models; judicial review of decisions in re-examination and invalidation processes is allowed; preliminary injunctions and property preservation are permitted; more conditions are imposed on using compulsory licensing; and damages can be calculated by multiplying the royalties of licenses.[11]

To implement national IP strategies formulated by the government in the 2006–2008 period, which aimed at promoting China's indigenous innovation,[12] PRC Patent Law was amended for the third time in 2008 and the following changes were adopted: (1) replacing the mixed test to an absolute novelty test for all patent examinations;[13] (2) imposing higher standards for granting patents to industrial designs;[14] (3) requiring a security check for filing foreign patents for the inventions completed in China; (4) adding

[11] Ibid.

[12] China's State Council issued the Outlines of National Intellectual Property Strategies in 2008.

[13] Previous publication anywhere in the world and use of the invention within China prior to the filing date constitute "prior art" and destroy novelty, which was called a mixed test of novelty. Under the amended law, prior art (publication and use) found anywhere (in/out of China) will destroy novelty.

[14] Industrial design: (1) no patent for 2-dimensional printing matter; (2) "clear difference" from "prior art."

a requirement to disclose the genetic resources used for an invention in patent applications; (5) adopting an exception similar to the US Bolar exception to patent infringement, that is, using a patented invention without authorization for marketing approval; (6) allowing parallel importation; and (7) increasing the statutory damage up to one million RMB.

In 2013, the State Intellectual Property Office (SIPO) drafted the Fourth Patent Law Amendment with an objective of further strengthening the enforcement of patent rights in China.[15] The draft amendment includes the following proposed changes: giving the patent administrative agencies a semi-judicial power to handle the patent disputes; holding ISPs jointly liable for patent infringement over the Internet; imposing legal obligation on local patent bureaus to promote patents' marketization; allowing the inventors of a state-funded project to negotiate a right to use the invention; and increasing punitive damage awards to five million RMB.[16]

All of the above patent law reforms are aimed at promoting indigenous innovation by strengthening patent protection. Whether this goal has been achieved is a question to be further explored in Section I.3 of this chapter and subsequent chapters of this book.

I.2.2 The Origin, Development and Reform of Hong Kong's Patent System

Under the British ruling from 1843 to 1997, Hong Kong did not have an independent patent system, although it had a Registration of Patent Ordinance (Cap 42) (1932, amended 1977) allowing UK or European patents to be registered in Hong Kong. Those patents were not Hong Kong patents and were not enforceable in Hong Kong courts.[17]

The Sino-British Joint Declaration concerning Hong Kong's handover to China, which was signed in 1984, allows Hong Kong to maintain its own legal system under the unique political arrangement of "one country, two systems."[18] Hence, after 1997, Hong Kong has established its own independent patent system under the Patent Ordinance (Cap 514) that is totally separated from the patent system in Mainland China. This new patent system covers two

[15] At the time of this writing, the draft amendment is still pending for the approval from the State Council.

[16] See "Draft Amendment of the Patent Law of the P.R.C." (Draft for deliberation), www.chinalawtranslate.com/scpatentdraft/?lang=en#oldnew.

[17] For details, see Chapter 7 of this book.

[18] Paragraph 3.3 of the Joint Declaration on Question of Hong Kong provides, "The [HKSAR] will be vested with executive, legislative and independent judicial power, including that of final adjudication. The laws currently in force in Hong Kong will remain basically unchanged."

types of patents: short-term patents with an eight-year duration that are subject to only formality examination; and standard patents with a 20-year duration that are subject to substantive examination. The standard patents are examined and granted by one of the three designated patent offices: China's SIPO, UK Intellectual Property Office (UKIPO) and European Patent Office (EPO), and then registered in Hong Kong. The registered patent is a Hong Kong patent that is enforceable in Hong Kong courts.[19]

The registration model was adopted largely because Hong Kong did not have sufficient resources and expertise in conducting patent examination at the time. Although the system has been functioning very well since its inception, the SAR government initiated the patent law reform in 2011, recommending the establishment of an original grant patent (OGP) system that allows Hong Kong patents to be granted by Hong Kong's Intellectual Property Department (HKIPD). After four years of public consultation and deliberation, the Patent (Amendment) Bill 2015 was passed by Hong Kong Legislative Council (LegCo) on June 2, 2016.

The new OGP system is to coexist with the registration system, which means that, while some standard patent applications are locally examined and granted, some can still be examined and granted by the three designated patent offices. This is deemed necessary because Hong Kong lacks manpower and expertise in conducting patent examination. In fact, even for those patents examined and granted locally, the examination will be outsourced to other patent offices such as the SIPO. In addition, the HKIPD signed a cooperative agreement with the SIPO in December 2013, under which the SIPO will provide technical assistance to IPD in patent examination and manpower training.[20]

The short-term patent system has also been reformed to solve the low-threshold and easy-to-get problem that had led to the abuse of the system. Under the new system, substantive examination of short-term patents are required in cases where (1) an enforcement action is commenced; and (2) the patent holder is concerned about the validity of his patent. It is also required that the person threatening to sue for infringement of a short-term patent shall furnish all particularities to the alleged infringer.[21]

[19] For the constitutional foundation of the 1997 Patent Ordinance, see Chapter 7 of this book.

[20] "Legislative Council Brief," Patents Ordinance (Chapter 514), File Ref.: CITB 06/18/23, p. 4, www.ipd.gov.hk/eng/intellectual_property/patents/Patents(Amendment)Bill_2015_LegCo_Brief.pdf.

[21] Ibid., p. 5. For discussion of abuse of the short-term patent system, see Yahong Li, "Hong Kong's Short Term Patent through the Lens of the Case *SNE Engineering Co. Ltd.* v. *Hsin Chong Construction Company Ltd*," in Kung-Chung Liu (ed.), *Annotated Leading Patent Cases in Major Asian Jurisdictions* (City University of Hong Kong Press, 2017).

The purpose of introducing the OGP system is to help develop Hong Kong into a "regional innovation and technology hub."[22] However, very little, if any, theoretical justification and empirical evidence has been provided to explain why there is a link between the OGP system and innovation, and how the adoption of the OGP system can help Hong Kong become more innovative. The discussion below and in Chapters 6, 7, 8 and 9 in this book intend to fill this gap.

I.3 THE ROLE OF PATENTS IN INNOVATION: TWO SYSTEMS COMPARED

As mentioned above, in 2015, China topped the world in both patent applications and grants, while it scores fairly low (25th) in the Global Innovation Index (GII). On the other hand, in the same year, Hong Kong ranked fairly low in patents (16th and 15th in applications and grants respectively), but its innovation status ranked 14th, which is 11 ranks higher than China.[23] These data seem to suggest that patents are not very relevant, or at least not too crucial, to innovation. On the other hand, as a comparison, the US ranked high in both patents and innovation in 2015 (2nd for both patent applications and grants, and 4th for innovation),[24] and has been consistently leading in both patents and innovation for several centuries, which indicates a strong correlation between the two. These data raised the following questions: what is the true relationship between patents and innovation? What are other factors behind or in addition to patents that affect innovation in a given jurisdiction? What lesson, if any, can China and Hong Kong learn from the US in making patents a genuine tool for promoting innovation?

I.3.1 From a "Big" to a "Strong" IP Country

Before answering the above questions, we first examine the implications and possible causes for the disparity in China's patent scores and its innovation status, as well as the recent policy changes in government's patent strategies.

From 2006, the Chinese government has adopted a series of initiatives in an attempt to transform China into an innovation-oriented country. In the first few years, the government's main strategy and top priority was to boost patent

[22] "Legislative Council Brief," p. 1.
[23] See www.wipo.int/edocs/pubdocs/en/wipo_pub_943_2016.pdf and www.globalinnovationindex.org/gii-2016-report#.
[24] Ibid.

numbers, making China a "big" IP country. To achieve this goal, the government set specific numerical targets for patent filings and grants, e.g. ranking China in the top five in the world in invention patents and SCI papers,[25] increasing the numbers of overseas patent filings,[26] ranking China in the top two in annual patent number for inventions granted to domestic inventors, bringing the total patent applications to two million in 2015, and increasing the number of invention patents owned per 10,000 habitants from four in 2013 to 14 in 2020.[27] Guided by these targets, China has experienced an exponential growth, or a "great leap forward," in patent filling and granting, and has been leading the world in patents for six consecutive years since 2010.[28] However, as the number one patent country, China ranks only 25th in GII in 2016. How to explain the discrepancy? What other factors in addition to patents have dragged China down in innovation?

I.3.1.1 Quality of Patents and Government Subsides

To answer the above questions, we may use the US as a reference point, as it has been leading in both patents and innovation scoreboard. Although the US had been surpassed by China in the total numbers of patent applications and grants in recent years, it still leads in other categories such as the number of patentees per 10,000 people, foreign patents, PCT filings, the number of top 100 global innovators, and patents in high tech fields, which are normally

[25] Article II(2) of the National Medium and Long Term Plan for Science and Technology Development (2006–2020), www.google.com.hk/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=National%20Medium%20and%20Long%20Term%20Plan%20for%20Science%20and%20Technology%20Development%20(2006–2020).

[26] Article II.2(7) of the Outlines of National Intellectual Property Strategy 2008 (IP Strategy Outlines) states that "China will rank among the advanced countries of the world in terms of the annual number of patents for inventions granted to the domestic applicants, while the number of overseas patent applications filed by Chinese applicants should greatly increase." www.wipo.int/edocs/lexdocs/laws/en/cn/cn021en.pdf.

[27] Article III of the National Patent Development Strategies (2011–2020); see http://graphics8.nytimes.com/packages/pdf/business/SIPONatPatentDevStrategy.pdf.

[28] Specifically, the number of its patent applications (including invention, utility models and designs) increased from 573,178 in 2006 to 3,464,824 in 2016 (2,798,500 in 2015, exceeding the target in patent development strategy); see www.sipo.gov.cn/tjxx/tjyb/2016/201701/P020170124439120249793.pdf. Patent grants increased from 268,002 in 2006 to 1,753,763 in 2016; invention patent applications from 130,384 in 2004 to 1,101,864 in 2016 (more than US and Japanese invention patent applications combined); see www.wipo.int/edocs/pubdocs/en/wipo_pub_943_2016.pdf. Resident patent applications increased from 470,342 in 2006 to 1,628,882 in 2016, and PCT applications from 3,910 in 2006 to 29,846 in 2015; see "PCT Yearly Review 2006," www.wipo.int/pct/en/activity/pct_2006.html#P58_3586, and "PCT Yearly Review 2016," www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2016.pdf.

considered to be indicators of high patent quality and genuine innovation. For example, in 2012, out of 10,000 people, 35.6 American, but only 2.4 Chinese, own patents;[29] American filed 98,617 patents abroad, while Chinese filed only 13,258;[30] the US is the biggest PCT user (57,121) while China comes in 3rd (29,837);[31] in 2016, among top 100 global innovators, there are 49 US companies, but only one Chinese company (Huawei);[32] and vast majority of US patents are filed in high and emerging technological fields such as medical, computer and digital communication, in which Chinese patents have a very small share.[33] A study found that China's PCT applications achieve only 34 percent of the quality level of international PCT applications, and that "China's expansion of international filings was achieved to the detriment of quality."[34]

One of the factors causing the inflation of low-quality patents in China is the explosion of utility model patents, which are granted to trivial inventions without going through substantive examination.[35] Prud'homme found in Chapter 1 of this book that the over-filing of utility model patents were caused by the easy-to-get procedure, low cost and government subsidies:

> China's patent subsidies have encouraged behaviour that maximizes patent quantity at the cost of quality, namely: repeated patent applications; splitting inventions into smaller inventions just to boost the number of applications; filings for products that are already published or otherwise disclosed (in some cases for a significant amount of time) and thus are not patentable; and filing applications only to get an application number in order to claim subsidies but not even paying official patent fees.[36]

[29] SIPO, "Patent Statistics," No. 17, 2012, p. 6, www.sipo.gov.cn/tjxx/zltjjb/201509/P020150911515335919602.pdf; but this figure increased to 6.3 out of 10,000 Chinese in 2016, p. 3, www.sipo.gov.cn/tjxx/zltjjb/201601/P020160122404593275916.pdf.

[30] SIPO, "Patent Statistics," No. 17, 2012, pp. 6–7.

[31] WIPO, "WIPO IP Facts and Figures 2016," p. 16, www.wipo.int/edocs/pubdocs/en/wipo_pub_943_2016.pdf.

[32] Clarivate Analytics, "2016 Top 100 Global Innovators Report," http://top100innovators.stateofinnovation.com/sites/default/files/content/top100/L178%20Cvt_Top%20100%20Innovators%20Report_FA_20.01.2016.pdf.

[33] WIPO, "World Intellectual Property Indicator 2016," p. 51.

[34] Philipp Boeing and Elisabeth Mueller, "Measuring Patent Quality in International Comparison – Index Development and Application to China," Discussion Paper No. 15-051, July 2015, p. 26, http://ftp.zew.de/pub/zew-docs/dp/dp15051.pdf.

[35] Utility model patents constitute about 50 percent of all patent applications and grants in China. For example, 1,475,977 utility model patents out of 3,464,824 total patent applications and 903,420 out of 1,753,763 total patent grants, in 2016, respectively, www.sipo.gov.cn/tjxx/tjyb/2016/201701/P020170124439120249793.pdf.

[36] See Chapter 1 of this book, p. 50.