

Introduction

Patents, Innovation and “One Country, Two Patent Systems”

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1.1 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 GI 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.

1.2 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.

1.2.1 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 1932⁸ 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 Offense: 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 1.3 of this chapter and subsequent chapters of this book.

1.2.2 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](http://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.

1.3 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?

1.3.1 *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?

1.3.1.1 Quality of Patents and Government Subsidies

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&ie=2&ie=UTF-8#q=National%20Medium%20and%20Long%20Term%20Plan%20for%20Science%20and%20Technology%20Development%20\(2006-2020\)](http://www.google.com.hk/webhp?sourceid=chrome-instant&ion=1&ie=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/zltjyb/201509/P020150911515335919602.pdf; but this figure increased to 6.3 out of 10,000 Chinese in 2016, p. 3, www.sipo.gov.cn/tjxx/zltjyb/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 993,420 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.

In addition, the explosion of utility model patents might have also been caused by the “dual filing”³⁷ strategy allowing the inventions to be protected earlier by utility model patent, and then by invention patent when it is granted later. Prud’homme argued that, although many studies show utility models can be used as an “accessible instrument of appropriability” in innovation, particularly incremental innovation in developing countries,³⁸ “the proliferation of low-quality utility models can hamper innovation.”³⁹

Chinese government has recently come to realize the harmful effects of the proliferation of the low-quality patents and has adopted measures to tighten the use of subsidies in utility model applications.⁴⁰ Notably, the State Council issued an Action Plan for Further Implementation of the National Intellectual Property Strategy (2014–2020) (hereafter, “Action Plan”) in December 2014, shifting the focus of building a “big” IP country to building a “strong” (or “powerful”) IP country.⁴¹ The Action Plan declares that the state “will place more focus on IP quality and benefits, optimize industrial layout, guide industrial innovation and accelerate the quality/efficiency enhancement and upgrading of industries.”⁴² It is hoped that the trend of proliferating the patent numbers can be halted by these initiatives, and the numbers of patents will represent true status of China’s innovation.

1.3.1.2 Capacity in Patent Commercialization

Another possible factor affecting China’s innovation status is its weak capacity in IP commercialization. Innovation means how many patented inventions are commercialized into useful products, not how many inventions are patented.⁴³ In this respect, the US has been the world model. To promote technology transfer and commercialization, the US congress passed

³⁷ Under Article 9 of the Chinese Patent Law, one invention can be filed for both invention patent and utility model patent simultaneously.

³⁸ See Chapter 1 of this book, p. 39.

³⁹ See Chapter 1 of this book, p. 40–42.

⁴⁰ For example, SIPO issued Several Opinions of the State Intellectual Property Office on Further Improving Quality of Patent Applications on December 18, 2013. See Chapter 1 of this book, p. 52.

⁴¹ Article 1(1), entitled “Guideline,” mentioned, “. . . carefully plan the development path for China to build a powerful nation of IP, . . .”

⁴² Action Plan for Further Implementation of the National Intellectual Property Strategy (2014–2020), Art. 2(1).

⁴³ Marshall Leaffer states that innovation “involves a multifaceted effort: the discovery, development, improvement and commercialization of new processes and products.” Marshall Leaffer, “Patent Misuse and Innovation,” 10 *Journal of High Technology Law* 142–167, p. 142 (2010); See generally Richard R. Nelson and Sidney G. Winter, *An Evolutionary Theory of Economic Change* (Harvard University Press, 1982).

Bayh-Dole Act in 1980, allowing federally funded research institutions to retain patent rights and to commercialize the inventions through exclusive licensing. In 1986, the Federal Technology Transfer Act was passed to make technology transfer a responsibility of federal laboratory scientists and engineers, and a part of their performance evaluation. Before the Bayh-Dole Act, the commercialization rate in the US was fewer than 5 percent,⁴⁴ and only about 1,000 licenses were granted by American universities in the period of 1974–1984. After the Bayh-Dole Act, 10,510 licenses were granted in the period of 1989–1990, indicating that more patents being commercialized after universities using federal funds were given patent ownership.⁴⁵ In comparison, patent commercialization rate in China has always been fairly low. A *Rule of law Blue Paper* published by China Academy of Social Science in March 2017 disclosed that only 2 percent of patents had been licensed during the period of 2012–2014.⁴⁶ A 2015 statistic reveals that only 2.1 percent, 1.5 percent and 1.7 percent of university patents were licensed, transferred or resulted in marketable products, respectively.⁴⁷ The low rate of patent commercialization in China indicates a need for a Bayh-Dole style legislation since most research in Chinese universities is state-funded and their patents are owned by the state.⁴⁸ In 2006, a provision drawing on the Bayh-Dole Act had been included in the draft of Patent Law Amendment, but it unfortunately disappeared from the passed 2008 Amendment.⁴⁹ In the 2013 Patent Law amendment draft, “promoting and encouraging” IP commercialization is imposed as a responsibility on patent administrative authorities;⁵⁰ however, no specific scheme has been formulated to enforce this responsibility. On the other hand, the above study focuses mainly on IP patent licensing, rather than other types

⁴⁴ Relecura, “Insights from Successful IP Commercialization Activities in Academia,” p. 2, www.relecura.com/reports/Relecura%20Whitepaper%20-%20MIT.pdf.

⁴⁵ Yahong Li, *Imitation to Innovation in China: The Role of Patents in Biotechnology and Pharmaceutical Industries* (Edward Elgar, 2010), p. 138.

⁴⁶ “High Number but Low Utility Rate of Chinese Patents in Comparison with Other Countries,” *China News Net*, April 5, 2017, www.chinanews.com/cj/2017/04-05/8191587.shtml.

⁴⁷ SIPO, “2015 China Patent Investigation Statistic Report,” pp. 11, 13 and 14, www.sipo.gov.cn/tjxx/hjcg/201607/P020160701584633098492.pdf.

⁴⁸ Article 14 of the PRC Patent Law.

⁴⁹ For the thorough discussion of the history of Patent Law amendment and its conflict with the Science and Technology Advancing Law on the Bayh-Dole style articles, please see Yahong Li, *Imitation to Innovation in China*, pp. 138–140.

⁵⁰ Article 79 of the Patent Law Amendment draft 2013 provides, “Patent administrative departments at all levels *shall* (emphasis added) promote the implementation and application, encouraging and regulating the marketization of patent information and patent application activities.” www.chinalawtranslate.com/scpatentdraft/?lang=en#oldnew.

of commercialization such as self-implementation, which is predominantly adopted by Chinese enterprises. According to a report by SIPO, the rate of IP “industrialization,” that is, transferring patents into marketable products, has reached about 40 percent, which is comparable with the US, Europe, and Japan.⁵¹

I.3.1.3 Scope of Patentable Subject Matter

Statistics show that majority of Chinese patents have not been filed in the strategic and world competitive technology areas such as medical, digital communication, optics, semiconductor, engine, and audio and video technologies.⁵² China is particularly weak in medical and digital technology.⁵³ Besides the fact that China is a latecomer to economic modernization, the problems of patent law itself, that is, the restricted patent scope and incompatibility between patent criteria and innovation characteristics, may have also contributed to low filing in those areas. Unlike the US, which allows virtually “anything under the sun that is made by man” to be patentable,⁵⁴ Chinese patent law excludes the following subject matter from patent protection: computer program and business methods as such,⁵⁵ transgenic animals and plants, methods of diagnosis and treatment of human diseases, inventions against public interest and social morality. This is exactly the subject matter allowed to be patentable in the US and the technological areas in which the US has become a world leader. The denial of these areas from patent protection may stifle the innovation of the technologies in these fields because inventors will not invent, and investors will not invest, in the

⁵¹ The Intellectual Property Development and Research Center, SIPO, “Summary of the Study on Patent’s role in Business Strategies: Research on Chinese Companies’ Patenting Motives, Patent Implementation and Patent Industrialization,” p. 1, www.wipo.int/meetings/en/doc_details.jsp?doc_id=273436.

⁵² Statistics show that foreign inventors filed 1.5 times the patents for optics and engine technologies in China than their Chinese counterparts. See SIPO, Patent Statistic Report, 2016, No. 1, p. 4, www.sipo.gov.cn/tjxx/zltjtb/201601/PO20160122404593275916.pdf.

⁵³ The top three technology areas in which patents filed at the SIPO are (1) electrical machinery, apparatus, energy; (2) computer technology; and (3) measurement. In comparison, the top three technology areas in which patents are filed at the USPTO are: (1) computer technology; (2) medical technology; (3) digital communication. WIPO, “IP Facts and Figures 2016,” p. 15.

⁵⁴ *Diamond v. Chakrabarty*, 447 US 303, 309 (1980). For a more detailed discussion of the scope of patentability under US patent law, see Yahong Li, “Intellectual Property and Innovation: Case Studies of China’s High-Tech Industries,” *Oregon Review of International Law*, 13, 2 (2012), 263–304, p. 279.

⁵⁵ Article 25 of the PRC Patent Law. But under Section 2, Chapter 9, § 2 of SIPO’s Guidelines for Patent Examination, a computer program consisting of technical features or solutions that can solve technical problems and achieve technical effects can be patentable.

areas that are not protected by patents.⁵⁶ As I argued earlier, and I believe that the argument still hold true, “whereas that US patent system has become too aggressive and has created so-called ‘the tragedy of anti-commons’ and the impediment of public access to medicine, the patent system in China is comparatively still young and has hardly reached its full potential.”⁵⁷ One of the potentials is to consider allowing the excluded subject matter to be patentable. Unfortunately, this seems to be the most ignored issue in all of China’s patent law amendments. As a consequence, China has been lagging behind in the area of computer hardware and software, pharmaceuticals and medical treatment methods and equipment, and biotechnologies, among others. Without breakthrough technologies in the strategic high-tech areas, China will not be considered as an innovative country no matter how many patents are filed.

I.3.1.4 Compatibility between Patentability Criteria and Technology Characteristics

Another problem with Chinese patent law is the compatibility between patentability criteria and innovation needs of specific industries. Although this is a universal problem without a universal solution, it is particularly acute in China due to its more rigid construction of the law and the inflexibility of the patent prosecution and litigation system. Chapters 2, 3 and 4 of this book are the effort of multiple years of research devoted just to finding the cause and solution to this problem. Specifically, Gao in Chapter 2 discovered that, being the world’s top manufacturer of solar panels and wind turbines, China actually lacks some core technologies and therefore bottlenecks the sustainable development of its green-tech industry.⁵⁸ Gao proposes to stimulate green-tech innovation through the “greening” of the Chinese patent law, that is, “to offer better incentives to green technological change by preventing the patenting of the environmentally harmful inventions and giving the environmentally beneficial inventions priority over others.”⁵⁹ In Chapter 3, Chen found that traditional Chinese medicine (TCM) has not been well accepted and protected in the Western world, which is not beneficial to TCM innovation.⁶⁰ He proposes to introduce an industry-tailored patent policy to make the patent practice more compatible with TCM invention, such as adopting product-by-process claims and the doctrine of equivalence to remedy the problem in identifying and constructing TCM patent claims; allowing secret TCM

⁵⁶ Yahong Li, *Imitation to Innovation in China*, pp. 104–105. ⁵⁷ *Ibid.*, p. 177.

⁵⁸ See Chapter 2 of this book, pp. 80. ⁵⁹ *Ibid.* ⁶⁰ See Chapter 3 of this book, pp. 107.

formulae to be patentable without requiring a full disclosure.⁶¹ In Chapter 4, Yu argues that, Chinese patent law offers broad discretion to be applied to the characteristics of Chinese telecommunications industry (CTI), however, these discretions have been overlooked by the rule-makers, patent examiners and judges in formulating CTI-related rules, examining CTI-related patent applications and deciding CTI-related patent disputes, to the extent that innovation of CTI has been seriously affected.⁶² Yu proposes to enhance patent prosecution and litigation procedure to allow a greater discretion for examiners and judges to interpret the concepts such as prior art and persons skilled in the art, and allow such judicial interpretations to bind future decisions.⁶³

1.3.1.5 Patent Prosecution and Litigation System

Indeed, China's patent prosecution and litigation system are in want of further reform to foster technological innovation. China's patent prosecution system is fairly rigid in procedure but relaxed in substantive standards. For example, on one hand, China does not have inventor-friendly patent prosecution processes such as US' one-year grace period and provisional patent application providing inventors more chances of filing patents and additional time to further develop their inventions, determine the marketability, acquire necessary funding, and seek licensing and manufacturing opportunities.⁶⁴ On the other hand, the high number of patents granted might mean relaxed and speedy examination, which renders many immature and low-quality patents. As to patent litigation, China has made great strides in reforming its court system, particularly in creating three specialized IP courts, which has resulted in a remarkable growth in patent litigations in recent years, e.g. 13,000 cases reported in 2015, witnessing a 22 percent increase from a year before.⁶⁵ Research shows that foreign companies filed 10 percent of the patent lawsuits in China and won 70 percent of the actions.⁶⁶ China is now being perceived as "a reasonable and fair place to resolve patent disputes"⁶⁷ and has increasingly

⁶¹ Ibid. ⁶² See Chapter 4 of this book, pp. 129. ⁶³ Ibid.

⁶⁴ For the discussion of the benefits of US patent prosecution and litigation systems, please see Yahong Li, "Intellectual Property and Innovation," p. 279.

⁶⁵ Steven Brachmann and Gene Quinn, "China Increasingly a Preferred Venue for Patent Litigation, Even for US Patent Owners," *IPWatchdog*, November 10, 2016, www.ipwatchdog.com/2016/11/10/china-increasingly-preferred-venue-patent-litigation/id=74585/.

⁶⁶ Brian Love, Christine Helmers and Markus Eberhardt, "Patent Litigation in China: Protecting Rights or the Local Economy?" *Santa Clara Law Digital Commons*, February 23, 2016, 1–25, p. 25, <http://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1920&context=facpubs>.

⁶⁷ Steven Brachmann and Gene Quinn, "China Increasingly a Preferred Venue."

become a preferred venue for foreign patent holders due to the low court costs and fast return of verdict.⁶⁸ For example, in November 2016, a Canadian company, WiLAN Inc., sued Tokyo-based Sony Mobile Communications in Nanjing, signaling a trend of foreigners using China as a new venue for IP litigations.⁶⁹ However, is this a healthy development for China's innovation? In other words, does filing more patent litigations have an effect of promoting technological innovation? To some extent, the answer might be "yes," because more patent litigations, particularly those brought by foreign plaintiffs, may force Chinese companies to stop copying and to start innovating.⁷⁰ More patent litigations may also mean higher awareness of rights protection among Chinese citizens, and more confidence of foreign litigants in the Chinese judicial system. However, the explosion of patent litigations may also stifle those genuine incremental innovations, particularly when the lawsuits were brought by patent trolls or patent assertion entities (PAE) who profit mainly from asserting patents. The situation might be worsened by the inexperience of the specialized IP courts that function as the first instance courts on all IP matters, rather than an appellate court specializing in patent lawsuits like those in the US, the UK and Japan.⁷¹ With 13,000 patent cases a year,⁷² it is hard to be optimistic about the quality of the court judgments,⁷³ particularly when there is no specialized appellate patent court exercising quality control.

The Chinese government is aware of the importance of the enforcement of patent rights to national innovation, and it has tried to find different solutions. For example, the fourth patent law draft amendment increases the statutory damage to RMB 5 million, and gives administrative agencies semi-judicial

⁶⁸ The average time from filing the suit to verdict at Beijing IP Court is 125 days. See Cao Yin, "Foreign Disputes Surge at Capital's IP Court," *China Daily*, April 15, 2016, http://europe.chinadaily.com.cn/business/2016-04/15/content_24583017.htm. In early November 2016, Canadian IP licensing firm WiLAN filed a patent lawsuit in Beijing against Tokyo-based Sony Corp. alleging that smartphones marketed by Sony infringed WiLAN's wireless communication technology. See Steven Brachmann and Gene Quinn, "China Increasingly a Preferred Venue."

⁶⁹ "Sony Sued in China for Patent Infringement," *Financial Times*, November 6, 2016, www.ft.com/content/f7e8690a-a3e8-11e6-8b69-02899e8bd9d1.

⁷⁰ Similar view concerning pharmaceutical innovation was expressed in Yahong Li, *Imitation to Innovation in China*, p. 90.

⁷¹ For example, US Court of Appeals for the Federal Circuit (CAFC); UK's patent court within the Chancery Division of the High Court; and IP High Court in Japan.

⁷² See note 63 above.

⁷³ According to personal interviews conducted by the author, some Chinese IP courts' judges have to deal with four patent cases a week, and a growing number of judges are resigning from their post due to the work pressure.

power in handling patent infringement disputes and in deciding damages.⁷⁴ On November 29, 2016, the SIPO published “Opinions on Tightening Patent Protection,” which calls for a holistic improvement of the patent enforcement system including building online trading platforms to curb patent infringement and counterfeits, and improving the rules in the mediation and arbitration of patent disputes.⁷⁵ In practice, courts have also adopted other civil law principles to deal with the growing patent disputes involving foreign patent trolls. For example, the case *Huawei v. IDC*⁷⁶ discussed by Lee in Chapter 5 of this book demonstrates that Chinese courts have adopted a flexible approach in handling patent disputes by applying civil law principles such as good faith that suit China’s own innovation needs. Specifically, the court in *Huawei* held that the patent troll (or PAE) company, InterDigital Communications Corp. (IDC), is bound by the good faith principle under the Chinese General Principle of Civil Law and Chinese Contract Law to provide a FRAND (fair, reasonable and non-discriminatory) rate for Huawei to license IDC’s SEPs (standard-essential patents).⁷⁷ Lee concludes that, “In the long run, good faith doctrine may become an important part of China’s innovation policy that fits its own needs because the application of this doctrine will reflect local business practices, norms, or even moral standards.”⁷⁸

1.3.2 From Re-registration to OGP System: More Innovation in Hong Kong?

As mentioned above, Hong Kong’s landscape for patents and innovation is opposite to that of Mainland China in the sense that Hong Kong ranks relatively low in patents but fairly high in innovation. Hong Kong ranked 15th, 15th and 16th in 2008, 2012 and 2015, respectively, for patent applications, but ranked 12th, 8th and 14th in the same years in the GII, which are very impressive considering Mainland China ranked only 37th, 34th and 25th in GII in those years. These rankings may not be consistent with the popular perception about Hong Kong, an international financial center and a city dominated by service and real estate sectors without much technological innovation. The question arises then: What does “innovation” mean in the

⁷⁴ Article 61 of Patent Law Amendment Draft (2014), www.chinalawtranslate.com/scpatentdraft/?lang=en#oldnew.

⁷⁵ “SIPO Proposes to Tighten Patent Right Protection Comprehensively,” https://hk.lexisn.com/latest_message.php?id=205347.

⁷⁶ *Huawei Tech. Co. v. InterDigital Communications, Inc.*, No. 305, Guangdong High People’s Ct. 2013.

⁷⁷ See Chapter 5 of this book, p. 172. ⁷⁸ *Ibid.*

context of Hong Kong? What has made Hong Kong more “innovative” than the mainland? Or in other words, what is Hong Kong’s major strength that Mainland China lacks? Is that strength sufficient to make Hong Kong an “innovation hub”? In the discourse of patents and innovation, what, if anything, can Hong Kong learn from its mainland counterpart?

In its 2016 exercise, GII used, the following factors to assess innovation: (1) political situations; (2) education; (3) ICT access; (4) business environment; (5) knowledge intensive employment; (6) patents; and (7) trademarks and copyright industries.⁷⁹ It is obvious that the GII’s criteria of “innovation” stretches beyond “technology” to encompass political, social, economical and cultural aspects of a society. It is in this sense that Hong Kong has been rated more “innovative” than its mainland counterpart. According to Wan, who provides an overview of Hong Kong’s economic development in Chapter 6 of this book, Hong Kong has a strong IP system, an independent judiciary, effective law enforcement, a clean government, high business integrity and ethical standards, a well-established financial system and capital market, an advanced technology and information system, and excellent research universities and institutions.⁸⁰ However, when assessing “innovation” in relation to patents, the focus is normally on technological advancement. In this respect, Hong Kong has not been faring very well. In fact, a commentator remarks that in Hong Kong “so few companies here foster innovation or technology-oriented. Hong Kong’s economy remains reliant on its traditional pillar industries of retail, property, financial services and shipping.”⁸¹ Taking biotech as an example, a study conducted 15 years ago shows that Hong Kong was lagging behind not only Western countries but also its neighbors such as Singapore, Taiwan, Mainland China and India, even though biotech was identified by the HKSAR government as a significant industry.⁸² The situation with the biotech has remained unchanged today. Digital technology and e-commerce have also been significantly dwarfed by the remarkable development in Mainland China, despite the SAR government formulated the Digital 21 Strategies as early as 1998 and last updated in 2013,

⁷⁹ The GII 2016 Indicator, www.globalinnovationindex.org/gii-2016-repor.t#.

⁸⁰ See Chapter 6 of this book, pp. 178 and 188.

⁸¹ Jesse Friedlander, “Four Ways for Hong Kong to Become a Leader in Technology, Instead of Always Playing Catch-Up,” *Insight & Opinion*, *South China Morning Post*, February 21, 2017, www.scmp.com/comment/insight-opinion/article/2072634/four-ways-hong-kong-become-leader-technology-instead-always.

⁸² Yahong Li, “An Overview of Patent Protection for Biotechnology in Hong Kong,” *Law Lectures for Practitioners* (Hong Kong: Sweet & Maxwell Asia, 2003), 27–47, p. 28.

which called for establishing a world-class information and communication technology (ICT) infrastructure.⁸³

Hong Kong's disappointing performance in technological innovation is reflected in its very low patent applications from local residents. For example, in 2015, out of 12,212 patent applications, only 239 were from local residents.⁸⁴ In addition, patent litigation is also very rare. Only a handful of patent cases has been litigated in Hong Kong since 1996.⁸⁵ "This demonstrated a sad reality in Hong Kong, that is, patent system has not been well developed largely due to the underuse and misconception of the system."⁸⁶ Misconceptions of the system include the situation that the short-term patent is used as a tactical measure, or "troll," to fend off any business competition. For example, in *SNE v. Hsin Chong* case, SNE registered the patent after the claimed method had already been disclosed to the public, merely for the purpose of preventing other parties from using its method after discovering that its contract with the defendant might be terminated.⁸⁷ The low patent filings and litigation may be also attributable to the lack of education about patent protection in Hong Kong. As *SNE v. Hsin* case demonstrated, the SNE patent was invalidated due to its own "prior art," that is, its disclosure of the patented method to other parties prior to the date of filing.⁸⁸

⁸³ IBM China/Hong Kong Limited, "Smarter Hong Kong, Smarter Living, Consultancy Services for the Digital 21 Strategy Review for the Office of the Government Chief Information Officer, Strategy Report," September 2013, p. 8, www.digital21.gov.hk/eng/relatedDoc/download/IBM-ConsultancyStudyReport_eng.pdf.

⁸⁴ WIPO, "World Intellectual Property Indicators 2016."

⁸⁵ *SNE Engineering Co. Ltd. v. Hsin Chong Construction Company Ltd* [2014] 2 HKLRD 822; *Octopus Cards Ltd v. ODD HK Ltd* HCMP 104/2007 [CFI: validity of short term patents for electronic purse and chip protection case]; *Koninklijke Philips Electronics NV v. Orient Power Holdings Ltd* HCA 945/2005 [CFI: patents: CD and DVD machines: infringement: conspiracy: inducing breach of contract]; *Re Wing Yick Bamboo Scaffolders Ltd* [2004] 2 HKLRD 28 [*Tanashin Denki Co Ltd v. King Long Industrial Ltd* [1997] 4 HKC 217 [CFI: patents: infringement and validity: cassette tape recorder]; *Canon Kabushiki Kaisha v. Green Cartridge Co (Hong Kong) Ltd* [1996] 1 HKLR 69 [CA: patents: infringement and validity: toner cartridges: personal liability of director for company's tort].

⁸⁶ Yahong Li, "Hong Kong's Short Term Patent."

⁸⁷ As Judge Lok said, "In my judgment, the application was a tactical move by SNE to protect its interest under the Sub-Contracts after the circulation of the rumour about the possible termination of the Sub-Contracts." See *SNE Engineering Co. Ltd. v. Hsin Chong Construction Company Ltd.* [2014] 2 HKLRD 822, at para. 269. For the detailed discussion of the case, see Yahong Li, "Hong Kong's Short Term Patent."

⁸⁸ The court stated in its ruling: "SNE, and before its incorporation its partners, had done nothing to protect the secrecy of the invention. The facts suggest that they did not regard the method itself as confidential. They waited for a long time before the relationship between the parties turned sour, and only by then SNE considered to apply for the Patent in Hong Kong and not in Japan." *SNE Engineering Co. Ltd. v. Hsin Chong Construction Company Ltd.*

What has stifled innovation in Hong Kong despite of all its favorable conditions? In Chapter 6, Wan attributes it to government's "positive non-interventionism" policy, which prevents the government from subsidizing research in the private sector; Hong Kong's investment culture of "high return from a short-term investment with limited risk"; and the weak tie between research institutions and industries.⁸⁹ A commentator observed that the failure to attract intellectual talents to Hong Kong is another major factor, because "it takes more than infrastructure, data connections and a favorable business climate to attract a critical mass of entrepreneurial and intellectual talent",⁹⁰ and suggested the following strategies to solve the problem: fostering a vibrant venture capital community by using Hong Kong's role as a global financial center; encouraging multinational corporations to set up research centers in the city; supporting universities in their research with potential commercial applications; and improving SAR's primary and secondary education system.⁹¹

In addition to economic, social and educational factors, the patent system has also been considered as a factor blocking Hong Kong in its path of becoming an innovation hub. From Shay's comprehensive account of Hong Kong's patent system in Chapter 7 of this book, we can see that the SAR government considers the old re-registration system a "second-grade" patent system which "does not facilitate Hong Kong in promoting innovation or developing itself into a premier intellectual property-trading hub," and that adopting an original grant patent (OGP) system would change this situation.⁹² In fact, the idea of establishing an OGP system in Hong Kong had been proposed 15 years ago by scholars and practitioners,⁹³ and the arguments for having it then is similar to those presented today, that is, to promote technological innovation and turn Hong Kong into a "regional innovation and technology hub."⁹⁴ The rationale is that a local original grant patent system may boost confidence of inventor and investor in Hong Kong and attract them to file patents locally. Theoretically speaking, a full-fledged OGP system is more suitable for a region that has high technological capability and a strong demand for patent protection. The call made 15 years ago for an OGP system was based on the perspective that Hong Kong might acquire such a capability and become an innovation hub in Asia. However, after 15 years of development, this perspective has proven to be a mission impossible, and Hong Kong

⁸⁹ *Ibid.*, p. 189. ⁹⁰ Jesse Friedlander, "Four Ways for Hong Kong to Become a Leader."

⁹¹ *Ibid.* ⁹² See Chapter 7 of this book (Section 7.3.1).

⁹³ See Yahong Li, "An Overview of Patent Protection," p. 45.

⁹⁴ 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.

has still yet to acquire such a capability because many technology and manufacturing companies have moved away from Hong Kong. Without a strong technological and manufacturing base, there would be no invention worthy of patent protection, how can the OGP system incentivize inventors to invent and apply patents in Hong Kong? Will the OGP system bring more problems than solutions to Hong Kong's patent system as it has to bear its own costs in patent examination related matters such as training patent examiners?

The last two chapters of this book, Chapters 8 and 9 may offer some answers to the above questions. Although the OGP system has already been adopted in June 2016 (effective date pending), the discussion of its pros and cons may still shed some light to the discourse of patent and innovation, and to the successful implementation of the new system. In Chapter 8, Mclean and Yue identified and discussed five advantages and 11 disadvantages for establishing an OGP system in Hong Kong. In summary, it is speculated that the OGP system would promote technological innovation, job opportunities, efficiency of patent prosecution, and cooperation with the mainland. On the other hand, the new system may fall short of the expectation of attracting R&D and patent filings, as there are many disincentivizing factors such as insufficient demand, priority concerns, lack of technical expertise and the quality of the patent granted and cost to the applicants and to the public.⁹⁵

Chapter 9 of this book compares Hong Kong and Singapore in building their OGP systems (called "positive grant patent," system in Singapore).⁹⁶ Yu argues that, although Singapore's new system has strengthened its credential as an IP hub, created more job opportunities for IP professionals, and extended its impact to ASEAN countries, the success has not been translated into the increase in the patent numbers, particularly from local residents.⁹⁷ He argues that, by substantially outsourcing patent examination to the SIPO, Hong Kong may not be able "to reap the benefits from such local capability,"⁹⁸ and that "while Singapore's new patent search and examination (S&E) capability has won it some plaudits, it is too early to assess its full impact on the country's overall IP ecosystem in terms of new job creation, additional numbers of patents, more patent filings by local entities, or other indicators of increased innovative activity."⁹⁹

⁹⁵ See Chapter 8 of this book. ⁹⁶ See Chapter 9 of this book, p. 232. ⁹⁷ *Ibid.*, p. 240.
⁹⁸ *Ibid.* ⁹⁹ *Ibid.*

I.4 THE ROLE OF PATENTS IN INNOVATION WITHIN THE OCTS FRAMEWORK

I.4.1 The History and Perspective of Patent Cooperation under the OCTS

The legal systems of Mainland China and Hong Kong had been developing in parallel, without much connection and interaction until 1997, when China resumed its sovereignty over Hong Kong. After 1997, China and Hong Kong continued to maintain two separate legal systems under the OCTS framework.¹⁰⁰ While China's legal system has been influenced mainly by continental European civil law tradition with some socialist flavor, Hong Kong's legal system has maintained the British common law tradition.

However, it is particularly important to place Hong Kong within the context of China because, in addition to the fact the Hong Kong is a part of China, the two sides have been closely connected or integrated economically and technologically. Many innovation ideas conceived in Hong Kong's universities and research institutes are being developed and manufactured in China, and there are countless joint research projects being carried out across the border. Discussing the reform of Hong Kong's patent system without bringing it into a bigger picture of the Mainland is like studying the ecosystem of a tree without placing it in the forest.

In fact, the link between the two patent systems has been stronger than many people would have imagined. As mentioned, prior to 1997 and starting in 1986 when the Sino-British Joint Declaration was formulated, Hong Kong's patent system had already been brought into the political arrangement of OCTS in the sense that Hong Kong Patent Steering Committee had chosen the patent system that allows China's SIPO to examine Hong Kong's patent applications. In fact, in the past, among the three designated patent offices, the SIPO examined more than half of Hong Kong patents annually,¹⁰¹ and patent professionals in Hong Kong and Mainland China have developed very strong

¹⁰⁰ Article 8 of the Basic Law provides, "The laws previously in force in Hong Kong, that is, the common law, rules of equity, ordinances, subordinate legislation and customary law shall be maintained, except for any that contravene this Law, and subject to any amendment by the legislature of the Hong Kong Special Administrative Region."

¹⁰¹ According to Shay, "In 2016, out of the 14,092 applications for a standard patent filed in Hong Kong, 58.8 percent, 38.0 percent and 1.8 percent were based on patent applications filed with SIPO, EPO and UKIPO respectively. Among the 5,698 standard patents granted in Hong Kong in the same year, 68.1 percent, 30.2 percent and 1.7 percent were based on patents granted by SIPO, EPO and UKPO respectively. These percentages have remained relatively stable over the last five years." See Chapter 7 of this book, p. 203.

working relationships. For example, they share the IP databases,¹⁰² and have regular training sessions for IP professionals based on the cooperative agreement entered between the SIPO and HKIPD.¹⁰³

As to future collaboration of the two sides, in addition to SIPO's continuation of patent examination, though called "outsourcing" now under the new OGP system, and personnel training for HKIPD, parallel filing of invention patents and utility models in the Mainland and Hong Kong was also suggested.

1.4.2 Patents and Innovation within the Context of OTCS

The statistics of the World Intellectual Property Organization (WIPO) show that among the 10 patent offices receiving the most patent applications in 2015,¹⁰⁴ only two countries rank in the top 10 of the GII, US (4th) and Germany (10th); the other eight are either low or very low in the GII ranking.¹⁰⁵ It is clear that patents are more about "invention" rather than "innovation,"¹⁰⁶ because patents filed and granted for certain inventions only represent how many new ideas have been discovered and generated at the early stage of innovation, rather than how many of them have been developed into commercial products.

The academic circle has also been divided on the role of patents in innovation.¹⁰⁷ Some believe that patenting is a driver or an engine of innovation, as it provides incentive to invent, invest in, and develop new technologies.¹⁰⁸ Others believe that patents are largely irrelevant and are

¹⁰² HKIPD, "Intellectual Database for Guangdong, Hong Kong and Macau," www.ip-prd.net/main_e.htm

¹⁰³ "Legislative Council Brief," p. 4.

¹⁰⁴ The top 10 offices are China, the US, Japan, S. Korea, the EU, Germany, India, Russia, Canada, and Brazil. See WIPO, "World Intellectual Property Indicators 2016," www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2016.pdf

¹⁰⁵ For example, China ranks 25th, Russia 43th, India 66th and Brazil 69th. See the GII 2016, Indicator.

¹⁰⁶ BusinessDictionary.com defines invention as a "new scientific or technical idea, and the means of its embodiment or accomplishment. To be patentable, an invention must be novel, have utility, and be non-obvious. To be called an invention, an idea only needs to be proven as workable. But to be called an innovation, it must also be replicable at an economical cost, and must satisfy a specific need. That's why only a few inventions lead to innovations because not all of them are economically feasible." See "Invention" definition, www.businessdictionary.com/definition/invention.html.

¹⁰⁷ For the detailed discussion on this issue, see Yahong Li, *Imitation to Innovation in China*, pp. 8–14.

¹⁰⁸ John H. Barton and Ezekiel J. Emanuel, "The Patents-Based Pharmaceutical Development Process: Rationale, Problems, and Potential Reforms," 294 *JAMA* 2075 (2005); Dan L. Burk and Mark A. Lemley, "Policy Levers in Patent Law," 89 *Virginia Law Review*, 1575–1696, p. 1576

sometime even obstacles to innovation because of its monopolistic nature.¹⁰⁹ Between these two opposite views, some argue that the role of patents in innovation is industry-specific and varies by context. For example, while patent has been viewed as an insignificant incentive in innovation of some industries, such as software, it is considered indispensable in R&D in industries such as medical and IT hardware, and particularly biotechnology and pharmaceuticals.¹¹⁰

In the context of Mainland China and Hong Kong, as mentioned above, the rankings of patents and innovation for the two regions are completely opposite – with the mainland leading in patents but lagging in innovation, and Hong Kong leading the mainland in innovation but being dwarfed by the mainland in patents¹¹¹ – both of which show relatively weak link between patents and innovation. This result should serve as a reminder to both Hong Kong and Mainland China that “patents are important for innovation because they are crucial for further commercialization in some technology sectors, but they are not the sole indicator of innovation.”¹¹² Therefore, over-emphasizing the role of patent system, either in promoting patent numbers, improving patent quality, or reforming patent system without taking into account of a holistic reform in political, social, economical, technological and educational systems will not lead to true innovation. It is also unrealistic to hope that a nominal change of a patent system without underlying technological base, innovation demand and professional resources to support the new system will turn a city into an innovation hub. As Cornish and Llewelyn observed, “it is very difficult to measure or assess the effect (if any) that a patent system is producing,” although they recognize that “there is no

(2003); See also “American Innovation at Risk: The Case for Patent Reform,” available at <http://judiciary.house.gov/hearings/February2007/jaffe07215.PDF>.

¹⁰⁹ Klaus Boehm and Aubrey Silberston, *The British Patent System*, p. 37 (Cambridge University Press, 1967); Eric Schiff, *Industrialization without National Patents: The Netherlands, 1869–1912; Switzerland, 1850–1907*, p. 124 (Princeton University Press, 1971); Dugie Standeford, “Intellectual Property Regime Stifles Science and Innovation, Nobel Laureates Say,” *Intellectual Property Watch Blog*, July 7, 2008, www.ip-watch.org/weblog/2008/07/07/intellectual-property-regime-stifles-science-and-innovation-nobel-laureates-say.

¹¹⁰ Burk and Lemeley, “Policy Levers in Patent Law,” p. 1575; Pamela Samuelson, “Why Software Startups Decide to Patent . . . Or Not: Berkeley Patent Survey Finds First-Mover Advantage Trumps Patents for Some,” *O’Reilly Radar*, July 21, 2010, <http://radar.oreilly.com/2010/07/why-software-startups-decide-t.html>; Stuart J. H. Graham et al., “High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey,” *24 Berkeley Technology Law Journal*, 1255–1327, p. 1262 (2009); The Rt. Hon. Sir Robin Jacob, Patents and Pharmaceuticals: A Paper Given on 29th November at the Presentation of the Directorate-General of Competition’s Preliminary Report of the Pharma-Sector Inquiry (Nov. 29, 2008), <http://ec.europa.eu/competition/sectors/pharmaceuticals/inquiry/jacob.pdf>.

¹¹¹ See Section I.3, p. 8. ¹¹² Yahong Li, “Intellectual Property and Innovation,” p. 266.

clear evidence that corporations are not influenced in their research and development decisions by their chances of securing and taking advantage of patent protection.”¹¹³

Through comparing Mainland China and Hong Kong, we can see more clearly that the former lacks what the latter has, that is, political and economic freedom as well as independent judiciary that guarantees effective enforcement of IP rights. To be a true innovative country, Mainland China must start to reform its political and economic systems, although this is too broad an issue to be explored in this book. Mainland China’s weakness in IP commercialization indicates the need to strengthen the confidence of venture capitalists in a long-term investment in an uncertain political and economic environment. On the other hand, Hong Kong, despite the favorable political and economic environment, has been doing badly in technological innovation, as is indicated by the extremely low patent filings from local residents. What Hong Kong lacks is exactly what Mainland China has: that is, a robust technological capacity and a comprehensive government innovation strategy with significant funding support. However, it is not feasible for Hong Kong to compete with Mainland China or any other technologically advanced nations in technological innovation and it is also not advisable to do so, because of its “high return on a short-term investment with limited risk” investment culture, its path-dependence on finance, service and real estate sectors, and its lack of a technologic and manufacturing base, which cannot be changed overnight.

Hong Kong’s best route for future development might be finding its own niche and trying to be more integrated into the mainland’s framework of patents and innovation, rather than moving away from it. In fact, it is mutually beneficial for both Hong Kong and Mainland China to be more integrated economically and technologically because their respective strengths and weaknesses could be complimentary. For example, although both sides have a large pool of high-tech talent and impressive research institutions, neither has been able to translate these advantages into commercial success due to the lack of funding – from private venture capitalists in the mainland, and from government in Hong Kong – as well as other factors such as the lack of sophisticated financial system and professional trading services in the mainland, and the lack of manufacturing basis in Hong Kong. When two sides collaborate, one could provide the other with what is needed most. In reality, all kinds of collaborations between the two sides have already been

¹¹³ William Cornish and David Llewlyn, *Intellectual Property: Patents, Copyrights, Trademarks and Allied Rights* 6th ed. (Sweet & Maxwell, 2007), p. 135.

happening.¹¹⁴ Who reviews or grants Hong Kong patents should be the least concern at the moment, particularly when the old system had been working efficiently, there is no urgent need and necessary resources to install a new system, and it is more beneficial for Hong Kong to be integrated into China's technological development in the grand scheme of the Belt and Road Initiative.¹¹⁵

The political design of OCTs, after 20 years of practice, should draw Hong Kong and its mainland closer and make the two sides more integrated without tarnishing their own distinctiveness. Specifically as to patent systems, there should be more collaboration with an aim to promote innovation on both sides, particularly when the world trend is toward more patent integration.¹¹⁶ It is encouraging to see that the HKSAR government has made IP service and trading as its strategic focus, has kept the registration system in parallel with the OGP system, and has established close collaboration with the SIPO on patent-related matters in spite of the adoption of the OGP system.

¹¹⁴ For example, Hong Kong researchers can apply for the funding support from the mainland's National Nature Science Foundation for collaborative research; see www.nsf.gov.cn/nsfc/cen/xmzn/2017xmzn/10/index.html. Hong Kong is building R&D centers, research bases, and hospitals in Mainland China to use the local incentive schemes to facilitate the Hong Kong research projects.

¹¹⁵ It is also called "The Silk Road Economic Belt and the 21st-century Maritime Silk Road."

¹¹⁶ For example, the establishment of the European Unified Patent Court.