Protection of Intellectual Property in China

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Yet, there still is a dark side to innovating in China: the protection of intellectual property. The phenomenon of counterfeits originating from China has increased constantly over the past two decades. Moreover, within the past 10 years the scale of intellectual property theft has risen exponentially in terms of its sophistication, its volume, the range of goods, and the countries affected (ICC 2006). China's output of imitations was almost developed in parallel with legitimate manufacturing, producing and distributing an estimated 65–70 % of globally all fake goods (ICC 2007).

In 2009 EU customs seized more than 118 million counterfeited and pirated products leading to the assumption that the production of fakes in large quantities is likely to continue (EUC 2009). The range of goods has also extended to various industries. For example, although textiles remain the most intercepted counterfeit product, the manufacturing and industrial goods industries constitute an increasing threat with regards to pirated products. According to a 2007 survey of the German Engineering Federation (VDMA), 67 % of the respondents (manufacturing and industrial goods firms) claimed to have suffered from product piracy. In 60 % of the cases entire machines were the targets of imitation, while in 42 % of the cases spare parts had been copied.

Globally, three quarters of all imitations originate from China. But counterfeits in China go even further, only recently an entire group of 'fake Apple stores' was discovered. These stores did not only sell fake goods, they imitated the entire look and feel of the original stores. Store layouts matched those of the original stores, so did the employee outfits and the promotional posters on the walls. The same happened to IKEA. In Kunming in the southwest of China an IKEA store can be found—only it is not IKEA. The counterfeiter copied every aspect of an IKEA store, the layout, the small pencils, the products and even the yellow shopping bags. The store is called 'Shi Yi Jiaju' IKEA's Name in China is 'Yi Jia-Jiaju', one has to look twice to see the difference.

In this context, the protection of intellectual property and their associated rights remains a challenging task for any industrial firm. The development and elaboration

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of effective and solid protection strategies, including legal and factual protection means, need to receive careful managerial consideration.

With its entry into the WTO in 2001, China triggered the enforcement of several intellectual property laws to comply with the obligations of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). However, firms still face risks concerning intellectual property when developing and manufacturing in China due to the lack of transparency within the legal system and the weak enforcement of intellectual property rights.

China currently ranks among the fastest growing economies in the world. According to a Goldman Sachs study (2004), China's Gross National Product (GNP) will exceed that of the United States by 2040. Harvard professor and well-known historian Niall Ferguson goes even further. In his current book 'Civilization—The West and the Rest' (Ferguson 2011). Ferguson claims that China's Gross Domestic Product (GDP) will surpass that of the U.S. within the current decade. Everywhere on the planet, companies embrace this opportunity by entering the Chinese market, either through wholly owned subsidiaries or by joint ventures. Concurrently, the Chinese government attempts to build its economic cornerstones not only on its low-cost manufacturing capability, but also on technology- and knowledge-focused industries. In 2011 these efforts to promote innovation and protect intellectual property have been intensified by the Chinese government.

In a survey conducted in 2004, the Delegate Office of German Economy interviewed 243 companies regarding their reasons to invest in China. Among the companies consulted, 94 % named 'future market access' to be the main motivation behind their investments. An additional 46 and 42 % indicated low production costs and the necessity of following major customers as motives for investing in China respectively.

Depending on the branch, the supplier relies on its clients' supporting market access. In the textile industry, for example, all major players are located in China or other emerging markets—very few international companies are still to be found in Europe. The electronics industry—as well as the biotechnology and pharmaceutical industries—anticipates similar developments. With an enormous capacity of low cost workers, China has literally become the world's shop floor.

Due to the attraction of direct foreign investments, the strategy of exchanging technology for market share has been established and supported by the Chinese government during the past two decades. Innovations in China are no longer exceptional cases but increase as a result of China's R&D spending. Today, China is already the worldwide leader in number of people engaged in science and technology. In 2009 the country accounted for 6 % of all scientific articles published (up from 1.6 % in 1995) and thus ranks at the number five spot globally (EIU 2009). University graduates with degrees in science and engineering represent 40 % of all Chinese graduates. That is almost twice the OECD average and it drastically exceeds the 15 % recorded in the U.S. (EIU 2009). The innovation index of the Economist Intelligence Unit (2009) predicts that China's innovation performance has and will outpace other emerging economies, improving by 11 % and jumping

from 54th to 46th place comparing 2004–2008 and forecasted data 2009–2013. In comparison to other BRIC countries, India will rise up four places; Brazil and Russia remain unchanged (EIU 2009).

With the building of modern production and distribution, the imitation of goods has become far easier. Subsequently, the market for imitations has developed an organized criminal dimension.

The success formula for product and technology pirates is simple and follows a rationale:

Economic success of violators	= low costs
	+ high margins
	+ large markets
	+ low quality standards
	+ soft IP defense

As long as the domestic demand for intellectual property protection remains relatively low, the effective legal protection of a firm's intellectual property will most likely remain weak (Fuchs 2006). However, as long as market access outweighs the potential risks, investments in Chinese production and R&D sites will continue to increase in the future.

International firms are setting up production as well as R&D sites in China, such as the German consortium of Thyssen Krupp and Siemens. They developed the first commercial magnetically levitated train (maglev) for a line between the Shanghai International Airport and the city's financial district. In 2003 the project of the Transrapid train was established by Thyssen Krupp and Siemens conjointly with a Chinese consortium, whose leadership was connected with the Shanghai city government. Three years later, the Chinese Aviation Industry Corporation (CAC) introduced a maglev prototype on a track at the Tongji University in Shanghai. The short development cycle raises the question of intellectual property and know-how transfer or leakage. In that case the fundamental patents had already expired; however, the drainage of know-how remained. Thus, the effectiveness of patents, trademarks, utility, and design models may offer a protection of R&D efforts but depend on their duration and on their enforcement in case of an infringement.

Another example of increasing R&D efforts in China is ABB. In 2007 ABB announced that it would be delivering automation and electronic systems to 74 vessel cranes in China, an order totaling USD 65 million. The vessel cranes will be built by the Shanghai Zhenhua Port Machinery Company Ltd. (ZPMC). ABB is responsible for the entire project management, engineering, costumer training and commissioning. During the past decade, ABB has been considerably engaged in the Asian region, seeing a growth in its Asia sales from 14 to 23 % over the period from 2002 to 2005. In 2005 ABB established two R&D centers, one in Beijing and the other—the new ABB Robotics headquarters—in Shanghai. Local human resources

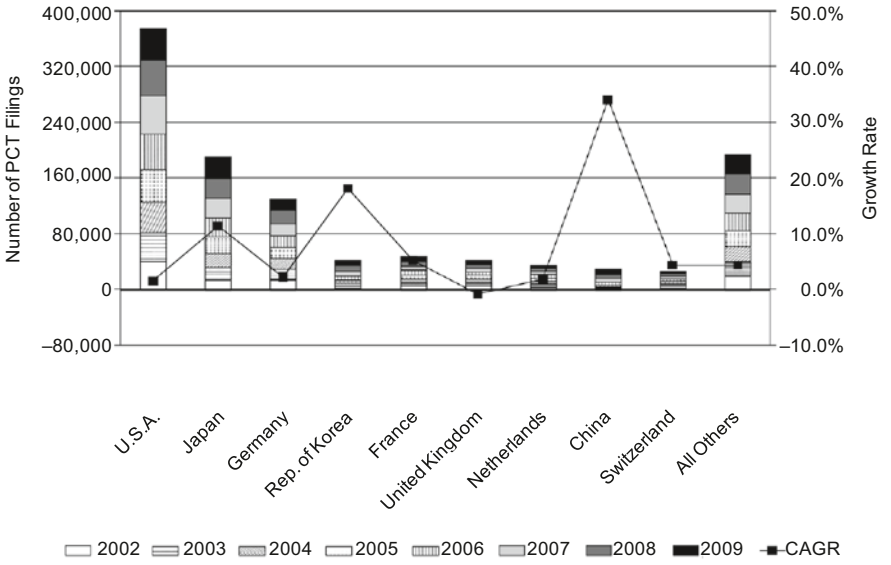

Fig. 2.1 PCT applications 2002–2009 with the highest compound annual growth rate of applications by Chinese firms

and the immense market have been the main drivers for investments by ABB. With 366 patents granted in China in 2006, ABB follows an active intellectual property rights management in China. However, due to the weak enforcement of rights, the firm's key strategy of protection relies on their service, business and innovation capacities. ABB's low tension switch that lacks legal protection by ABB is a common target for infringers. ABB actively forestalls and combats imitations supported by its production, distribution and sales team.

But, the Chinese patenting behavior is changing. Today, China ranks after the U.S., Japan, Germany and Korea on the 5th position globally. The Chinese telecommunication equipment firm Huawei, was the top patent filer in 2008 (and the number two in 2009 trailing Panasonic). While most countries (and the world on average) registered decreases in patent filing in 2009, China's rate of patent growth remained around 30 % last year. China is filing ten times more patents than its emerging market competitor India.

The application of IPRs is vital to safeguard own developments. The relevance of patents as the strongest intellectual property protection right has been recognized by Chinese firms represented in the highest CAGR increase of 34 % of PCT applications (Fig. 2.1).

Case Example IKEA

Chinese companies not only plagiarize unique products. IKEA is facing the threat of entirely fake stores. The Chinese furniture store '11 Furniture' (which in Chinese sounds roughly like IKEA) looks and feels almost exactly like the Swedish brand. The store is designed around a maze of furniture. Small wooden pencils are provided to help you write down what you want to pick up later. Blue shopping bags with yellow handles (see picture) can be used for all smaller items.

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Once you made it through the maze of furniture you enter a second maze. Kitchen utensils, boxes, carpets, decoration objects and much more are presented in the exact same way as in original IKEA stores. Even the price tags and the shopping carts are the same (see picture below).

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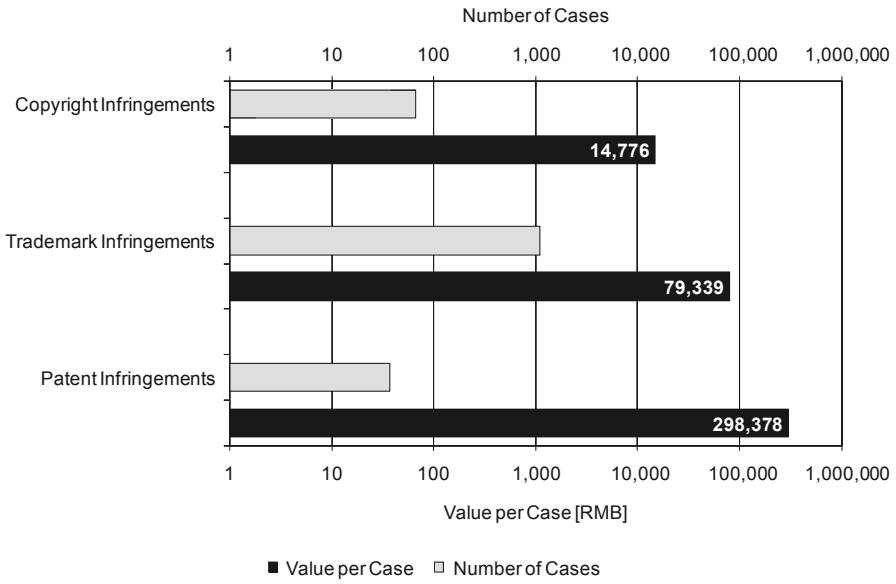


Fig. 2.2 Infringement cases registered by Chinese customs. (Source: Data from GAD (2005))

Chinese technology leaders such as Lenovo, ZTE, Haier and Huawei increasingly apply patents in China and abroad. They have a vital interest in an enhanced protection and enforcement of intellectual property rights. According to the Patent Protection Association of China (PPAC), the three Chinese firms ZTE, Huawei and Hongfujin have applied the highest amount of patents in 2009. The telecommunication firm ZTE increased their patent applications by 20 % compared to 2008 and ranks first with 5,719 patent applications. The firms' foreign patent applications increased by 200 % or respectively 1,164 patent applications. In contrast to the high amount of Chinese utility model applications applied by local firms, more than 90 % of ZTE's applications account for patents. ZTE's strategy for the next years is to increasingly invest in R&D and its protection by means of keeping the level of 10 % of revenues investments for R&D and its protection.

Despite the growth of intellectual property rights in China, the imitation of goods remains a challenge for domestic and foreign firms alike. The complexity in terms of the professionalization of illicit production of goods has increased considerably. According to Chinese Customs, registered infringement cases have increased from 193 to 1,210 between 1997 and 2005. Trademark infringement has increased from 557 to 1,106 cases between 2002 and 2005 (Chinese Customs 2007). Similarly, copyright infringements increased from 2 to 67 cases and patent infringement increased from 14 to 37 cases during that same timeframe. Although trademark infringement constitutes the largest amount of cases, patent infringements have accounted for the highest value per case (see Fig. 2.2).

A study of the German Engineering Federation (VDMA) notes that Germany has become home to the second largest machinery and industrial goods industry worldwide with exports reaching a record high of EUR 123 million in 2006. Concurrently, product piracy has been ranked as the largest threat to the industry.

Seventy six percent of the respondents (manufacturing and industrial goods firms) claimed to suffer from product piracy. The need for a fresh approach is necessary for European firms to take advantage of China's explosive domestic market while not exposing its intellectual property to continued losses. Legal and factual protection means may enable a better protection, but the question remains how to derive an effective protection strategy to preserving one's intellectual property while prospering in the world's largest marketplace.

2.1 Enforcement of IP-Rights in China

IPR litigation is generally lengthy, complicated and costly. In China the patent system is relatively new. Litigation and enforcement is based on the Civil Procedural Law that governs the procedures for patent litigation, the Patent Law and the Implementing Regulations of the Patent Law. The legal system does not have any case law but statutes, which are binding. Judges make their decisions on a case-by-case basis according to their interpretations of the law.

This system can result in unpredictable trials, especially within courts with little experience. Moreover, the only recognized binding precedents are the so-called judicial interpretations from the Supreme People's Court, the highest of the four courts (Cheong 2006). These decisions provide guidance to lower courts and the Supreme People's Court follows its previous decisions. Furthermore, the Lower Courts cannot deliver judgments that are obviously contrary to a previous judgment of the Supreme People's Court. Thus far, several judicial interpretations on IP laws have been issued; in addition, some responses to requests for clarification by lower courts have been established by the Supreme People's Court for important guidance.

The **judicial system in China** has four tiers of courts:

1. The Supreme People's Court
2. The High People's Court
3. The Intermediate People's Court
4. The Basic People's Court

The Supreme People Court is the highest judicial authority of the state. It is located in Beijing. Its interpretations are legally binding although there is no formal rule of stare deceases. A High People's Court is located in every province, autonomous region and municipality directly under the central government. Furthermore, there is at least one Intermediate People's Court in each medium-sized city directly under the central government as well as one Basic People's Court in each county.

Concerning IP matters, there is no specialized IP Court but specialized divisions for IP cases. The first specialized division was established in Beijing in 1993. Three years later, the Supreme People's Court set up an IP division, and by 2001, every high court and many intermediate courts in major cities followed suit. Generally, the court of first instance for a patent infringement is the Intermediate People's Court. By the end of 2007 64 Intermediate People's Courts had exclusive jurisdiction over patent cases. Due to the established two-instance procedure, the decisions of the court of first instance can be appealed to the next higher court, which has the final

decision. In addition, if material is proven incorrect by evidence, the higher-level court or even the Supreme People's Court can retry the final case, where both issues of fact and law will be reviewed (Jian 2007).

The enforcement of infringed legitimate rights can be enforced by means of a so-called 'administrative track' or 'judicial track'. The judicial track includes the civil and the criminal, although the latter is of negligible meaning in most cases. The choice of track depends on the various types of cases. Both tracks can be initiated yet not simultaneously. Thus, a concluded administrative track can be followed by the civil track.

Globalization, in particular the emergence of China as a formidable competitor on the global stage, means that companies across the world increasingly find themselves entangled in complex 'webs' of relationships (Pisano 2006). In the context of China, appropriability regimes are weak and innovation draws rapid imitation (Pisano 2006). A profiting from innovation (PFI) framework helps organizations to systematically deliberate the kinds of assets they need to foster internally and those that they can safely outsource (Pisano 2006). Nature of knowledge, intellectual property protection, and asset structure of a firm impact upon the business enterprise's ability to capture value from innovation. Appropriability mechanisms reflect the embedded ability to return profits from innovations.

2.2 Appropriability Regimes and Their Mechanisms

Appropriation of returns from technical innovations is very important for individual inventors and innovators as well as for technical change in individual markets and the economy as a whole (Harabi 1995). The appropriability regime has become a recognized concept in strategy (Teece 2006). In 1986 Teece's framework for profiting from innovation—the most cited article in the leading journal 'Research Policy' of all times—introduced the hypothesis that appropriability, and success at innovation in general, is related not so much to the innovator's ex ante market share but to the complementary asset structure of the innovator, the management's market-entry timing decisions and the contractual structures employed to access missing complementary assets. Choices with respect to the latter should depend on the asset positioning of other market participants and on the intellectual property protection available. Profits from innovation depend upon the interaction of three preeminent factors, namely appropriability regimes, complementary assets and the presence or absence of a dominant paradigm. Importantly, Teece (2006) represents intellectual property protection as just one among many barriers to imitation. He also refers to the nature of knowledge—especially the degree to which it is tacit—and its inherent duplicability as another imitation barrier.

Harabi (1995) reveals the difference between appropriability ex ante and appropriability ex post. The ex ante notion emphasizes the potential capability of an innovator or the organization which owns the innovation to fully, or at least partially, appropriate the returns from innovation. Having a critical mass of appropriability capabilities acts as a market-entry barrier and, therefore, as a protection from competitors.

Harabi (1995) groups the major **means of appropriability** into three subcategories:

1. Patents
2. Secrecy
3. Lead-time and related advantages
   (so-called first-mover advantages)

Lead-time could be used to strive for further advantages in manufacturing by achieving and securing learning curve advantages and in marketing by means of building up superior sales and service efforts. Lead-time could also be used to either hinder or at least delay the imitation by competitors of a firm's own innovation (for example by increasing cost and imitation time). Conversely, patents are considered on average as ineffective in securing licensing fees (Harabi 1995). Furthermore, the effectiveness of patents in preventing duplications was identified as being low (Harabi 1995) for both process innovations and product innovations.

Limitations on the effectiveness of patents for protection are well known:

1. Not all new and improved products are readily patentable
2. If challenged, patents can lose their validity
3. Firms do not attempt to enforce patents
4. Competitors can legally invent around patents
5. Technology is moving so rapidly that patents become irrelevant
6. Patent documents require disclosure of too much information
7. Legal limits on licensing
   (mandatory registration, compulsory licensing, etc.)
8. Cooperation in R&D projects, also between competitors
   (see Levin et al. 1987)

Firstly, Harabi's (1995) studies indicate that the ability of competitors to invent around patents is the most important limit to the effectiveness of patents as a means of protecting competitive advantage of innovations. Secondly, legal restrictions on licensing and cooperation with competitors are the least important constraints on the effectiveness of patents.

Yet, further means of patents include:

1. Disrupting R&D or the product lines of competitors
2. Evaluating the performance of R&D employees
3. Achieving/maintaining desirable negotiating positions with other firms
4. Entering foreign marketsa
   (either through direct investment and production or indirectly through granting a licensing agreement)

Harabi (1995) identified secrecy as a relatively effective means of protecting process innovations against imitation with the exception of the construction and watch-

making industries. On average, however, experts within the Harabi survey rated secrecy as a relatively weak means of appropriability.

Furthermore, capturing and protection cost advantages as well as superior sales and service efforts were identified as relevant to process innovations but only if these are relevant for product innovations and can be marketed as such. Generally, this method of appropriability was assessed in all industries as being very effective.

The importance of inter-industry differences was reflected in the effectiveness of the different means of appropriability. Complex product industries, in which a product is protected by a great number of patents, generate and use patents to rival use of components and acquire bargaining strength in cross-licensing negotiations. In contrast, discrete product industries, in which a product is relatively simple and therefore associated with a small number of patents, use patents primarily to block substitutes by creating patent fences (Gallini 2002; Ziedonis 2004).

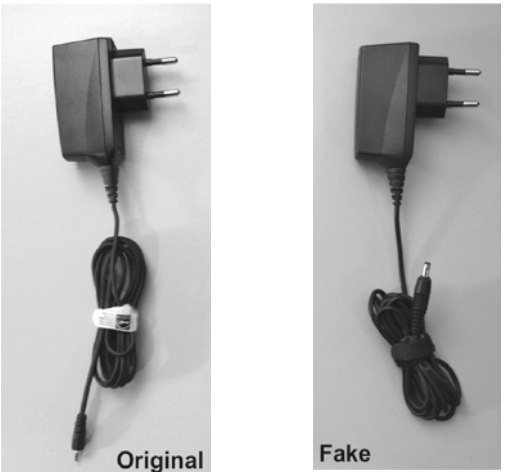
Harabi (1995) recommends that firms, which in market economies are the main actors in the innovation process, implement a strategy capable of protecting their innovations. They are advised to design a patent policy that takes into account the technical nature and life cycle of their products, as well as existing market conditions and structures (Teece 1986). Mansfield et al. (1986) expound first that patents entail significant imitation costs. A firm's intellectual property portfolio cannot be managed independently of its business strategy and that business strategy formulation requires an appreciation of intellectual property issues (Teece 2006). The 'Profiting from Innovation' framework is a robust framework for helping to explain why firms and individual entrepreneurs are supposed supporters of strong intellectual property while certain large firms may be indifferent or possibly even opposed to intellectual property protection. Larger firms are likely to have established processes to protect their own intellectual property. Alternate strategies for capturing value from their own and other's innovations are more likely to be embedded.

Although this framework has initiated the concept of appropriability regimes and appropriability mechanisms, the challenge of strategy is to develop appropriate vertical integration and complementary asset positions given the existing appropriability regime (Pisano 2006). The understanding and evolution of appropriability regimes has not been the subject of deep strategic management yet and poses the question about how much firms can proactively shape an appropriability regime in their favor (either by weakening or strengthening it) and what the mechanisms are that firms can use to shape an appropriability regime (Pisano 2006). The proposed thesis endeavors to elaborate on mechanisms that firms can use to strengthen their protection and appropriation.

Innovators and imitators share similar search processes—doing, hiring, reverse engineering and other forms of search (McKendrick 1995). Imitators are not bound by the same constraints of innovation. For imitators, the solutions to analogous problems or opportunities will have already been discovered elsewhere and the successful routines of innovators can be observed, albeit imperfectly. For imitators the target is more visible and the direction of search more certain. Imitators draw on a variety of already-developed external sources such as competencies embedded in consultants or other firms and information in the public domain. Thus, imitators seem to have

Case Example: Accessories

The main threat of Chinese counterfeits often comes not in the form of the actual product but in the form of its accessories. Chinese companies sell accessories that resemble the original ones to a degree that makes it challenging for customers to tell them apart. Phone manufactures see this as a major challenge. The fake accessories are mostly labeled as "originals". In many cases their poor quality casts a shadow on the original manufacturer as customers complain about quality issues. The following picture shows two almost identical Nokia phone chargers. Both chargers are rated 5.0 V/890 mA. However, the counterfeited charger has an actual output that fluctuates between 5.0 and 9.5 V. It basically fries the cellphone circuitry. Yet, the customer did not even know that he was buying a counterfeit. The more standards are designed, the easier and more attractive it is for imitators to break into the business. The standardization of chargers might be the right thing for the customers, but it is also a great opportunity for counterfeits.



Even more daunting is the situation in the machine building industry. Chinese companies offer after-sale services or spare parts at far lower rates than the original products. However, these spare parts often do not meet the needed quality standards. In many cases the use of these spare parts has a critical effect on the entire machine. In one case for instance a Chinese firm (under the label of SIEMENS) sold gear wheels for gearboxes. The gear wheels were made of low quality steel and not carburized. After only a couple of weeks they broke and wrecked the entire gearboxes. The customer was stunned when he found out that he had bought counterfeits. The damage was many times as high as the price for original accessories.

the potential to tap a greater multiplicity of sources in their search to replicate or approximate know-how. Therefore, the increase of imitation barriers is essential for IP protection.

Mansfield (1981) suggested raising the imitation costs and time for a stronger appropriation of innovations. McKendrick's study (1995) discovered that professionals in the banking industry carry their knowledge from company to company, which improved the managerial and technical capabilities of Indonesian firms. Informal sources such as training or hiring staff from other firms are identified as effective means for accumulating process know-how.

2.3 Patents as an Indicator of R&D Capabilities

A singularity about China's IP system is the 'Indigenous Innovation Program', which entitles Chinese (but not foreign) firms to receive tax credits and premiums for each patent they register at the SIPO (Zhang et al. 2009). Many firms emphasize that this policy has a side effect: patents are seen as an indicator of the R&D capability of a firm, be it foreign or domestic. Thus, two effects for foreign firms can result:

- *Firstly*, firms report that signaling the status as a high-tech company by filing patents helps to attract domestic business partners when collaboration is needed.
- *Secondly*, and perhaps more importantly, not having patents indicates that a firm is not involved in high-tech. Firms explained to us that patents are seen far more often as an indicator of R&D capabilities as that is the case in western countries. It is unlikely that Chinese firms will consider a western firm as R&D intensive if that very firm has no patents in China.

Some R&D managers we interviewed even explained to us that this signaling quality of patents still is their main reason to patent in China at all. High-tech simply cannot afford not to have patents in China, the R&D managers pointed out. The Chinese Patent Office currently encourages PCT patents (more than five countries) with 65,000 €. In the following paragraphs we will explain the tax credits and premiums Chinese firms can apply for in order to provide western R&D managers with an overview.

Scope of **funding**:

1. Application Fee, substantive examination charge and service charge for domestic patent, utility and design model filing,
2. Other charges that the fund management body deems to be funded,
3. Partial filing charge of patent filing in foreign countries via PCT or other channels,
4. Any service charges for patent filing, which are included in the Government projects, shall not apply for the fund again.

Scope of **Standard**:

1. Patent filing in foreign countries via PCT, funding can be made on different phases respectively: RMB 10,000 per case for international phase and RMB 10,000 per case for the national phase.
2. Patent filing in foreign countries via other channels will be funded with RMB 20,000 per case and country.
3. When filing in multi-countries, fund can be made for filing in max. five countries. Each unit can obtain max. RMB 500,000 as filing fund.
4. From Jan. 1st to Dec. 31st of a year, for unit applicants, who filed more than ten patents in foreign countries (including ten cases), extra RMB 10,000 will be funded to each granted patent.

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