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How managers protect the intellectual property rights in China using de facto strategies

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Foreign firms trying to protect their intellectual property rights (IPRs) in emerging economies are suffering real pressures because these economies usually offer little or no enforcement of IPR. Foreign firms therefore have to resort to approaches unlike those they use in developed countries. This paper explores what managers of foreign firms in China have already tried in their efforts to achieve effective IPR protection – specifically, they have crafted de facto strategies that can protect IPR without using China's legal system or engaging in lawsuits against imitators. These strategies work, and this paper explains how and why, thus offering a potential template for IPR protection in other economies with weak appropriability systems.

1. Introduction

> Today, there is no cultural mindset by key members of the government in deciding that knowledge that helps China and the country to be competitive against the rest of the world belongs to the respective inventor or innovator. So the question is really: What can you do to reduce the risk to an acceptable level?– Case A, Senior R&D Director China (emphasis by interviewee)

In China, there is a saying that stealing a book is an elegant offense because society values an individual who strives for access to knowledge, which may cause it to pardon the offense (Alford, 1995). Foreign firms that have to protect valuable intellectual property rights (IPRs) in China may adopt a different point of view though.

For example, when the company referred to in this paper as Case I first came to China, filed for Chinese patents and conducted its first business transactions, including the construction of industrial facilities, everything seemed fine. Then, one day, it received a call from a Chinese operator of one of its facilities who wanted to order a spare part. A specialised service technician went to the site only to discover that the whole facility was a counterfeit. Everything was a perfect copy of Case I's facility – including a bogus company logo. The firm had known nothing of the counterfeited facility before visiting. Of course, it did not deliver the spare part, but it was also unable to convince authorities to award it any compensation. Instead, the patents the firm had applied for had given the Chinese imitators a library of technological information that allowed them to undertake a complete reconstruction of the facility. The firm suffered multi-million dollar damages.

However, Case I also learned from this experience and its managers developed countermeasures. It stopped filing patents that disclosed

technological knowledge and by the time Chinese officials approached the firm to offer a seemingly advantageous deal, the managers were well prepared. In this case, the Chinese officials offered to buy industrial facilities for another sector of the economy but only in exchange for the construction know-how, for which they would pay a premium. If the firm would not agree, it would lose the order to a competitor; once the know-how transfer was completed though, the firm would lose the business. Thus, managers used the countermeasures they had developed in the meantime to preserve the outflow of their firm's know-how.

First, they knew that building such a facility demands very specialised and tacit knowledge about how to ensure the desired quality levels and monitor subcontractors in the process of constructing the facility. However, transfer of this knowledge was not part of the deal and so the Chinese buyers would have to undergo a lot of trial-and-error processes before learning how to do it. Second, although they transferred the technical data, figures and results of calculations needed for construction, they did not provide the software that performed all the necessary calculations to arrive at these data, figures and results. The transfer of software was not part of the deal! Thus, the Chinese could not arrive at the results by themselves unless they developed proprietary software, a project that would take years. Third, the transferred know-how mirrored neither the actual state of the art in the field nor the latest technological developments. Although the transferred know-how was usable, it would become obsolete in no time and would have to be replaced with a new generation of technology.

As of 2007, Case I still continued to build industrial facilities in China.

These experiences illustrate the problems that Western firms would face in protecting their IPR in emerging economies if they could only use known appropriation mechanisms, such as patents.[1] At the same time, they illustrate managers' creativity in developing strategies to deal with these problems. Emerging economies often feature a weak appropriability regime such that the country's legal system provides little or no effective protection of intellectual property. This situation especially applies to China, where we undertake this study.

China, despite formal advances in its legislation, still offers very weak enforceability of foreign firms' IPR (European Commission, 2004; United States Trade Representative, 2005). The existing theory about enforcing IPR in an emerging economy appears rather pessimistic; e.g., Teece (1986) predicts that in a weak appropriability system, innovators will probably lose their competitive advantage to imitators.

In such a situation, managers must have instruments in hand to protect their firm's IPR, despite the limitations of the legal system. Foreign firms continue to survive in China, which means that managers must have developed new strategies that safeguard their firms' IPR in spite of the weak appropriability system (see also Anand and Galetovic, 2004; The Swiss–Chinese Survey, 2006).

Such strategies should protect the firm's IPR despite China's weak appropriability regime and despite the fact that neither patents nor other existing appropriation measures can effectively safeguard foreign firms' IPR. We call such strategies de facto protection strategies. Their key characteristic is their ability to provide effective IPR protection without resorting to China's legal system.

They must exist, but we know nothing so far about the rationale and the functionality of such strategies or how they were achieved or how they are implemented in the everyday conduct of business in China or whether their use is contingent on certain firm-level factors or industry characteristics. This paper explores the how and why of such de facto protection strategies in an attempt to provide meaningful guidelines for managers as well as for academics who study such issues.

Managers could benefit from knowing about de facto strategies as a means to prevent the outflow of their firms' IPR rather than merely reacting after IPR infringements occur. Yet, most existing studies discuss only how firms can fight the IPR infringements or the piracy that has occurred (Shultz and Saporito, 1996; Yang et al., 2004), without mentioning pre-emptive measures. Strategies discovered in a Chinese context may also apply to other emerging economies that offer poor enforcement of a foreign firm's IPR. Finally, academics can gain valuable theoretical insights into how and why foreign firms achieve effective appropriability strategies in an emerging economy, whereas extant studies remain largely limited to developed country contexts (Levin et al., 1987; Harabi, 1995; Cohen et al., 2000, 2002; Blind et al., 2006).

We next provide some background about known appropriation mechanisms and why they seem unlikely to work in China (Section 2). We explain the methodology we used for our exploration (Section 3) and highlight the results from interview data that reveal the de facto protection strategies (Section 4). Finally, we note the implications of these findings (Section 5).

2. Background: why known methods of IPR protection are unlikely to work in China

Figure 1 overviews the measures commonly used to protect IPR, which we can group into 'formal' measures (e.g., patents, the most widely used category[2]) and 'complementary' measures.

Neither patents nor complementary measures will probably work in China. China has created various IPR laws, joined all major international IPR-related conventions and become a member of the World Trade Organization, obliging it to abide by The Agreement on Trade-Related Aspects of Intellectual Property Rights regulations.[3] Yet, managers and academics alike know that China actually has a weak appropriability regime (Feng, 1997; Cheng, 1998), including a nonexistent strong legal system, which means that patents are not particularly enforceable. Patents in China instead could facilitate local illegal imitation because a patented or trademark-registered product appears profitable and thus gets targeted for imitation in an environment in which social recognition of IPR is weak (You and Katayama, 2005).

Likewise, complementary measures for IPR protection rely on the assumption of a strong appropriability system and a legal system that threatens imitators and effectively sanctions persons who infringe on treaties. These assumptions are unrealistic in the Chinese context.

First, a firm can move quickly down the learning curve to stay ahead of imitators and exploit lead time advantages, but only if it can hide these advantages from imitators. In China, whole factories get reproduced from illegally transmitted blueprints, as shown in the Case I vignette in the introduction. Products also may be re-engineered without any legal repercussions, and the patents registered with the Chinese State Intellectual Property Office often become the libraries that imitators use for gathering technological information. The local Chinese employees of foreign firms may also have entrepreneurial mindsets, eager to start their own businesses and get rich quick, even if doing so means they unscrupulously infringe on their employer's IPR. Thus, both business and production processes and experience and tacit knowledge may extend to potentially disloyal Chinese employees (Kambil et al., 2006).

Second, using complementary assets, such as superior sales or manufacturing services, seems promising only if innovators and imitators offer different qualities. If Chinese imitators gain knowledge about vital business processes (legally or illegally), knowledge about how to offer complementary services may also be accessible. Over time then, imitators should imitate even complementary assets to the extent that customers might not perceive a quality gap.

Third, secrecy enforced by e.g., nondisclosure agreements works only if the legal system can guarantee effective enforceability. Such guarantees do not exist in China. For the same reason, strategic legal moves against imitators are just as unlikely to work.

3. Methods

These issues motivated us to explore how firms in China might protect their IPR without resorting to patents or complementary measures. To explore how managers come up with their strategies, we observed their work closely. In-depth observa-

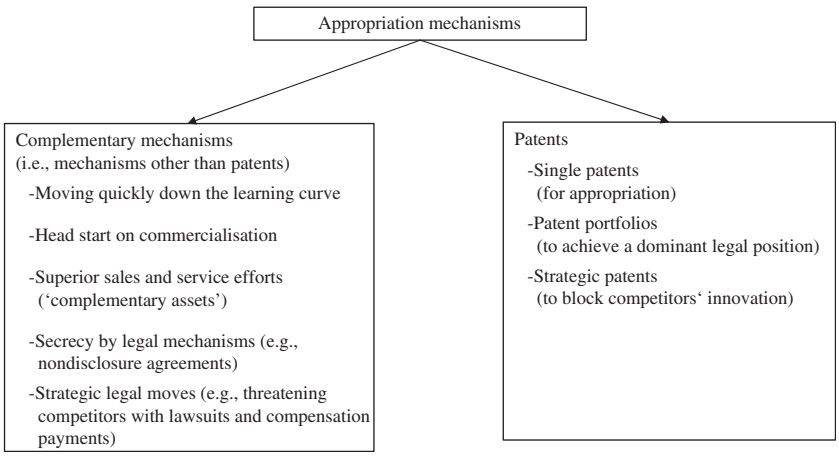

Figure 1. Appropriation mechanisms for Intellectual property rights.

Table 1. Descriptive data

Case ID	Business segment/industry of the firm in China	Elements of the value chain covered by Chinese operations
A	Industrial chemistry, plastics	Production, sales, R&D
B	Power technology, automation technology	Production, sales, R&D, services
C	IT hardware and software	Software development, sales, R&D
D	Nonwovens	Production, sales
E	Fragrance and flavour industry	Production
F	Pharmaceuticals	Production, R&D, sales
G	Textile machines	Production, sales
H	Conveyance, shipping and packaging of fine arts	Logistics, packaging, shipping
I	Industrial engineering, construction of plants	Production, distribution and services
J	Electronics industry	Production, development, R&D, distribution, services
K	Electronics industry	Production, development, R&D, distribution, services
L	IT, software for optimisation of industrial processes	Sales
M	Sanitary technology	Sales, production, localisation modifications

tional studies are valid and important enhancements of typical large-scale strategy performance studies (Johnson et al., 2003). In addition, when we began, we had no basis on which to identify the strategies. Hence, we needed a qualitative, exploratory approach that uses around four to 10 illustrative cases (Eisenhardt, 1989; Yin, 1989).

We travelled to China, collected data about 13 wholly owned subsidiaries of foreign firms and interviewed senior managers of the subsidiaries. Specifically, we inquired into how their original approaches to IPR protection had worked, what kinds of IPR infringements the firms had suffered, how managers came up with de facto protection strategies for IPR protection (if any) and how these strategies worked.[4] The interviews focused on the current actions the managers were taking in their ongoing, daily interactions with the societal context of China during which they continue to craft de facto protection strategies. Thus, we do not have to worry about inaccurate hindsight. In Tables 1 and 2, we provide descriptions of the 13 cases.

4. Findings

In the interviews, we found that managers have indeed developed de facto protection strategies for their firms' IPR. Before analysing them in greater detail, we explain the strategies carefully (Table 3) and show how they were achieved (Table 4).

First, no 'one' or 'best' de facto protection strategy exists. Rather, the firms use a multifaceted spectrum of strategies that are not mutually exclusive and rely on more than one strategy. Second, the extremely aggressive and competitive business environment of China has produced these strategies. All but two firms suffered unexpected IPR infringements almost immediately after they entered China. The managers then used trial-and-error learning to come up with de facto strategies and realized that the planning procedures they performed before they entered the market needed to be adapted.

For example, Case A changed its strategy. It had already built facilities for applied research activities but decided that none of its basic research would originate in China and certain 'sensitive' areas of expertise would not be covered by Chinese operations. Yet, not all firms can change their plans. The managers of Case J reported that they could not always decide on the extent of technology transfer because international competitors often start cut-throat competition to earn contracts and market access from the Chinese government, which rewards those firms that offer the most in terms of technology transfer. The formula 'markets in exchange for technology' is still official government policy. Thus, if a firm will not transfer its technology, the government's major orders will go to its competitor. The managers of Case I report the same problem: their Chinese operations greatly depend on orders from state-owned enterprises. The central strategy planners initially transferred a very limited amount of technology to the Chinese state-owned firms, with the protection of nondisclosure agreements. But this planning policy could not be sustained and managers had to develop new de facto protection strategies to adapt to govern-

Table 2. IPR infringements suffered and de facto strategies employed

Case ID	De facto strategy	IP infringements
A	Technological specialisation, de facto secrecy	Local courts ruled against the firm in favour of counterfeiters: an employee took plans and technology for a plant to the firm's Chinese competitors who copied the entire plant and ruined the business
B	External guanxi	Key technologies copied, competitors using technologies from former licensing agreements despite nondisclosure agreements
C	Internal guanxi	Software counterfeits
D	Technological specialisation, educate the customer	Product counterfeits
E	De facto secrecy	None
F	De facto secrecy, external guanxi	Product counterfeits, abuse of brand names by competitors, outflow of production recipes to competitors (firm presumes they were sold by the firm's own employees)
G	Internal guanxi, educate the customer	Infringement of patents and trademarks, competitors copying the machines and advertising the copied products as 'further developments' or 'next generation'
H	Technological specialisation, de facto secrecy, external guanxi	Competitors name themselves as 'partners' or 'branch' of the firm, pretend to be officially appointed by the government for specific transportation in China
I	De facto secrecy, internal guanxi	Copying of entire plants, intermediates involved in deals with state-owned enterprises offer documentations of plans and processes to the state-owned firm and also sell them to competitors
J	Technological specialisation, de facto secrecy	Technology transferred was secured by nondisclosure and confidentiality agreements but plans and documentation was nevertheless sold to competitors
K	Internal guanxi, external guanxi	Product counterfeits, trademark infringements
L	Technological specialisation	None
M	Educate the customer	Product counterfeits, trademark infringements

IPR,, intellectual property rights.

mental policies that were not clear before Case I's market entry.

We found several de facto protection strategies, which we describe and analyse next. We developed the names we use in the following section from our analysis of the interview data. None of the interviewees used such terms to describe their strategies.

4.1. Technological specialisation (Cases A, D, H, J and L)

With this strategy, managers try to make imitation impossible by increasing the complexity of the product or the process technology. Any imitation would take a long time, be extremely costly or simply be impossible because of this complexity.

Case A provides a clear representation of this strategy:

> In general, the government doesn't do a very good job at protection of IPR in general. However, in the line of chemicals, if the chemical process is relatively complicated, they cannot, you know, its pretty difficult for them to try and copy it. With relatively difficult products, I guess there is a natural barrier [to imitation]. (. . .) The technology that we put into the market in China is technology that we feel can be somehow uniquely tied up only with our product capabilities, so it's a combination of product and service which cannot be easily replicated.

Case D also earns a competitive advantage because its products offer technical expertise combined with experience. Case H uses specialised technologies that are hard to replicate. Finally, Case J's managers offer an extreme example: they do not even attempt to protect their proprietary technology with local patents. Case J's products have hundreds of modularised components, each with great technological complexity. Even if a competitor could copy one component, it could not replicate all other components needed, and manage the interface problems in combining them, and possess the necessary process knowledge to arrive at the final product. Thus, for Case J, IPR protection is 'a nonissue'. If these managers had applied for a local patent for every module, they would have provided the imitators

with all the technological specifications of every module and their interfaces in the publicly accessible texts of the patents (which is a general feature of patent legislation worldwide).

Case L instead uses the specialisation advantage of another firm. Its software applications come in bundles with the specialised products of a large software supplier and an encrypted software 'key', without which the product is useless. The customer gets the key only after purchasing the original software bundle and then the firm receives its royalty payments from the large partner. Therefore, it suffers very low exposure to potential lost-royalty payments due to software counterfeiting. The encrypted key also increases the technological specialisation of the bundled product.

Economic theory similarly states that for complex, high-technology goods (e.g., chemicals, drugs, electronics, machinery), imitation costs average 65% of the innovation costs, which makes them a form of tax on imitation (Glass and Saggi, 2002).

Technological specialisation increases the imitation tax, making imitation, even if technically possible, economically impossible. Our findings also indicate that the tacitness, complexity and ambiguity of a resource prevents its imitation: even if single components might be easy to duplicate, their specific connection requires experience-based, specialised knowledge, which creates another barrier to easy imitation (Reed and DeFillippi, 1990; McGaughey et al., 2000).

4.2. *De facto secrecy (Cases A, E, F, H, I and J)*

The managers who crafted this strategy wanted to stop sensitive IPR from being stolen by local employees and, to do so, they rely on a simple idea: never document any important information in writing. Even when they transfer technology, they do not disclose it in any way that would allow any imitator to benefit. The de facto secrecy strategy attempts to keep all knowledge secret or reserves a 'key' of tacit specialised knowledge, without which the final product will not work.

For example, one version of this strategy keeps the 'big technology picture' hidden, restricting any potential damage to a single module. The managers of Case A state that

> once you are in court against a local company, its almost impossible to win, while the whole process takes up a lot of resources. Now if we are cooperating with local companies on an R&D project, we only give them a small part of the problem, and once they have solved this, we integrate all those parts into a whole solution. This should prevent technologies and innovations to leak out even when we're working together with local companies.

This de facto secrecy also extends to Case A's own subsidiaries in China: *'*Our units in China do not have total access to information, especially not to key data and technology*'*.

Another version avoids disclosing key components of product compounds, just as Coca Cola has done for years with its recipe. Everyone knows the brand name and logo, which are protected trademarks, but the formula for its taste remains in the heads of a very few, select chemists. The managers of Case A, e.g., state: 'whenever formulation is involved in the product, ... tend to try to keep the formulation within a small group of people so we don't exchange information freely. If no formulation is required in the products, we actually make the process information as confidential as possible'. The Case E firm uses a dual approach: it patents individual molecules but never discloses the recipes for the complex compounds (generated by combining individual molecules): 'With gas chromatography and mass spectrometers, formulas can be analysed, but captive chemicals are a good protection against copies.' Case F indicates the same tactic: 'It makes sense to patent the molecules, but not the procedures of making the molecules'. Cases A, E and F all work in chemical and pharmaceutical sectors, but this de facto secrecy strategy is not limited to this industry. For example, Case H possesses extensive technological knowledge about the packaging of fine arts and thus its managers have explicit orders that they may never distribute written information about their technologies outside of Europe. When the company trains local Chinese employees, it flies them to Germany, provides learning-on-the-job and practice lessons and never offers documentation, user manuals or other written materials. According to the managers of Case I, the only way to protect IPR from state-owned firms is to 'release ... results only, no calculations or further explanations; patent applications should be as useless as possible for imitators'.

Theoretical research indicates that 'observability' is the only technology characteristic that increases the hazard of imitation (Zander, 1991). Our interviews bear out this claim. De facto secrecy significantly reduces the threat of imitation because fragmented, undocumented knowledge cannot be observed or copied easily. Of

course, this strategy also has one important limitation: those who know about the secret knowledge need to be trusted.

4.3. Internal guanxi (Cases C, G, I and K)

In China, social interaction takes place within networks of relationships according to the concept of guanxi. Because relationships depend on social connections, many Chinese employees are not particularly loyal to their foreign employers. However, some managers have built up trusting relationships with their employees and others exploit guanxi to exert pressure on Chinese employees. The managers of Case C, e.g., claim that employees need not only legal contracts but also long-term, repeated education and training that continually emphasises key issues. Hence, 'We train and educate employees to really understand why the protection of IP is so important and to respect that if IP is given to third parties, it will hurt the company in the first way, but that it also has a retroaction to every single employee'. Similarly, Case L reveals that 'human resource management is key to the protection of IPR' and the Case J managers use monetary and nonmonetary incentives to cause Chinese employees to feel like important parts of the firm's network, 'feel integrated' into the company, which leaves them with a lesser incentive to reveal the firm's technology to competitors.

In contrast, managers of Cases I and K exploit guanxi as a means to exert pressure. If an employee leads any IPR to competitors, these managers force him or her to threaten those competitors that the company will retaliate. Such an action isolates the 'traitor' from his or her Chinese, personal network – a horrifying prospect to most Chinese, who derive their careers and identities from their networks of personal relationships (Luo, 2000). This awful threat, made known to all employees of the two firms, helps prevent such behaviour.

The first facet of internal guanxi reflects the theory that if employees perceive the firm as appreciative of their relationship, they will display more loyal behaviour (Weldon and Vanhonacker, 1999; Child and Möllering, 2003). Managers who use an internal guanxi strategy understand the importance of social relationships in China and use it to protect their firm's IPR. The second facet instead exploits a sense of mistrust (which makes it a classic example of a principal-agent relationship). Personal threats to employees seem questionable from an ethical perspective, but the managers of Case K call it effective in preventing IPR leaks.

4.4. External guanxi (Cases B, F, H and K)

By establishing good relationships with external official bodies and institutions – which seemingly may have little to do with IPR – these strategies exploit the de facto power of official bodies. If they can win the status of an 'old friend' of the official bodies, the firms may be treated as protégés, deserving of (IPR) protection.

For example, firms that adopt this strategy might offer workshops and seminars, such as Case B's 'legal commerce community' or Case K's free 'IP academies' and seminars. Through these local meetings, open to legislators, government officials and customs officers, the firms gain better recognition and 'networking' in the local government. Similarly, for Case F,

> In case an IP violation or counterfeits are detected, we alert the government. Ideally, the governmental agencies will take over the matter and handle the violation. It is in the interest of the firm as well as of society to collect the counterfeits and withdraw them from the market, as they can do harm to potential customers of the company. In general, Chinese authorities seem to invest much effort to tackle the problem of counterfeit products for the safety of customers.

Case H faces indigenous firms that pretend to be its subcontractors and abuse its corporate logo, brand names and trademarks. However, because the works of art in which this firm deals arrive either at airfreight centres or harbours, and because the firm has developed relationships with high-ranking Chinese customs officers, customs intercepts indigenous firms directly – and at little cost to the firm. This highly efficient strategy avoids the uncertain outcome of a lawsuit and prevents the loss of an entire shipment to a fraudulent competitor.

However, Case I highlights some serious limitations of this strategy. State-owned enterprises still play an important part in China's economic system, even in its transition to a free market. Because these state-owned enterprises are the main customers of Case I, the managers pessimistically characterise themselves as 'powerless',

because the government has an interest in technology transfers, which would make any attempts at external guanxi useless.

Again, the importance of social relationships in China becomes clear: the traditional and preferred means to resolve disputes include consultation, mediation and arbitration rather than confrontation. These processes tend to be less complex than judicial routes, help repair relationships between the parties and, compared with litigation, are more flexible and less costly (Bosworth and Yang, 2002).

Our findings also reflect the greater power of the administrative arm of China's legal system compared with its judicial arm. Chinese customs can act immediately against IPR infringements without lengthy or uncertain court trials. The order of protection of IP, issued in May 1994, provides Chinese customs officials with the power to protect the IPR of articles imported into and exported from China, including patents, trademarks and copyrights. Furthermore, a firm may record its rights with relevant customs authorities (for the role of Chinese customs, see Asia Law & Practice, 1995). Customs, thus, is an especially powerful agent in the Chinese legal system, but external guanxi with customs makes sense only for firms that engage in trade, shipment and sales activities. They cannot be of use if competitors or disloyal employees simply steal technological knowledge

4.5. Educate the customer (Cases D, G and M)

Imagine not doing anything at all about counterfeits – not suing counterfeiters nor attempting to make them stop their activities. The managers of Case D explain the rationale behind such seemingly irrational behaviour: 'the quality of similar or copied products is often minor, and customers normally do not buy the cheaper product more than once. (...) There is no real threat to our business as long as local companies offering similar products are small. However, concentration processes of local companies are very carefully monitored'. That is, the poor-quality counterfeits quickly teach Chinese customers that the more expensive, high-quality original product better meets their demands. In addition, buying an original product benefits the consumer further because, in Case G, 'To ensure that customers do not buy imitations, we restrict our services exclusively to original machines. We also give quality guarantees to satisfy the customers of original products. We do not actively search for copied products, usually the sales and service people get feedback from customers that counterfeits exist.'

Case M makes and sells cleaning products for individual households, relying on a competitive advantage based on design and quality. Counterfeits show up on virtually every street corner. Thus, pursuing counterfeiters would not only be economically absurd but also practically impossible. After buying a poor-quality counterfeit on the street corner, annoyed customers suffer from a lack of functionality, which emphasises, or advertises for, the original product. That is, the counterfeits spread Case M's brand name and demonstrate, by contrast, the quality of its products.

This strategy is viable as long as competitors are small and produce poor-quality counterfeits. Customers who buy the counterfeit will do so only once because they quickly recognise its bad quality and turn to the original instead. However, if a counterfeiter achieved similar quality, the strategy would fail because customers could not perceive the difference between the counterfeit and the original. It also works only if the marginal damage from each counterfeited product is minimal. In dangerous contexts, such as counterfeit pharmaceuticals, the company cannot rely on this strategy.

5. Implications

We explore ways to protect IPR in emerging markets characterised by weak appropriability systems. The de facto protection strategies we identify represent a third group of appropriation mechanisms in addition to the two known groups of patents and complementary measures (Figure 1). As our findings show, emerging economies characterised by weak appropriability regimes need different approaches to safeguard appropriation.

In a developed country, IPR strategies assume a strong legal system that gives both formal and complementary measures 'threat credibility' – the laws can and will be enforced by the courts, which gives the corresponding measures force. In contrast, in China, neither patents nor complementary measures provide effective protection and so de facto strategies offer an approach for achieving effective protection that the legal system cannot or will not provide.

Table 3. De facto protection strategies

De facto strategy	Cases	Rationale and functionality	Suitable for . . .	Benefits	Risks	Contingencies and limitations
Technological specialisation	A D H J L	Keep products complex and hard to understand. Modularise components, if possible, and restrict knowledge of how to combine modules to expats. Install technological 'keys' without which products are useless even if copied	High-tech firms, state-of-the-art-technology, complex, knowledge-intensive goods	Almost perfect production because imitators' costs are risen beyond the cost of buying the original. Very unlikely that imitator can learn about every module's technology and about how to combine modules	Processes must be kept secret, knowledge must not be concentrated in the heads of a few engineers: maximum distribution and fragmentation of knowledge is critical, such that even a partial leakage of knowledge is useless for imitators	If the pace of China's learning curve continues, indigenous innovative high-tech may soon be able to compete with foreign technology, rather than imitating it
De facto secrecy	A E F H I J	Keep valuable knowledge in the heads of expats. Never use legal means to assert secrecy (such as nondisclosure agreements or contractual clauses for employees). These will not be enforceable in China. Do not implement knowledge-sharing databases in China	Products and processes that require highly tacit knowledge	Almost perfect protection, unless imitator can access critical knowledge. The use of such knowledge should be restricted to expats or kept out of China	Staff entrusted with the tacit knowledge need to be absolutely reliable. The strategy is similar to keeping the Coca Cola formula a secret	Need for reliable staff. Geographical dissemination of knowledge may need to be restricted, firm-wide knowledge sharing may prove counterproductive
Internal guanxi	C G I K	Make use of China's societal context and culture to fight in-house disloyalty of Chinese staff. Make use of the importance of personal networks for the Chinese. Integrate them in the firm's 'family'	Basically every firm, but excellent understanding of China's societal context needed	Can fight potential in-house disloyalty at low cost. Very good chance to get long-term commitment and loyalty from Chinese staff	May not always be ethical. If performed wrongly, employees might feel offended and behave disloyally despite your efforts	Makes sense only for firms with a high proportion and importance of indigenous staff
External guanxi	B F H K	Make use of China's societal context and culture to convince Chinese decision makers that your IPR is worthy of being protected because you are 'an old friend'. Team up with key Chinese officials in the state and party administration and in the customs	Basically every firm, but excellent understanding of China's societal context needed. Willingness, investments and time to groom long-term relationships are crucial	Very robust means for protection. Unlike courts, China's administrative and party officials and the customs are very powerful and protect the firm's IPR if it is 'an old friend'	Chinese officials may be ousted by rivals so that the relationship is lost. Some officials may pursue hidden agendas or may defect. Can never be completely sure	Need to show good citizenship and to safeguard a good reputation to be awarded the status of 'an old friend'. Requires considerable cultural competence and patience

Table 3. (Contd.)

De facto strategy	Cases	Rationale and functionality	Suitable for ...	Benefits	Risks	Contingencies and limitations
Educate the customer	D G M	Turn counterfeits into your primary marketing device: spread your logo and brand name while demonstrating the poor quality of imitators' counterfeits	Firms that produce for mass markets and firms whose customers are private individuals	Free advertisement, increase of your brand's reputation. The Chinese are 'educated' that to buy counterfeits does not amortise in the long run	Works only as long as there is a large quality gap between original and counterfeited products	Not suitable for every firm, of little use if counterfeiting is not the primary problem

The de facto protection strategies are not mutually exclusive. Some firms use more than one. IPR,, intellectual property rights.

Figure 2. Managerial actions needed to implement de facto protection strategies.

These strategies enable firms to protect their IPR through preventive measures, although not every de facto protection strategy is necessarily pre-emptive. For example, the educate the customer strategy uses passivity towards counterfeits, which cannot be pre-empted, even though the firm still suffers no damage from counterfeits.

Concrete managerial actions undertaken to implement and enforce IPR protection in China thus appear very different from 'Western' methods. We elaborate in Figure 2 three interrelated areas that we believe define key aspects of this 'new' IPR management.

The three areas are not intended to be prescriptive. Rather, managers might use them as input for their own strategy-crafting efforts or as tools to benchmark their own efforts.

In weak appropriability regimes, IPR protection is dynamic and ever changing, in contrast with static, stable, reliable, long-term patents. The actions of Chinese competitors and imitators are also dynamic and so must be the management of a firm's IPR. De facto protection strategies appear to emerge from continual trial-and-error processes, dynamically adapted to specific situations. Therefore, managers must address the constant 'creative pressure' to adapt their IPR protection efforts, including a willingness to replace a de facto protection strategy if it becomes no longer viable.

We wonder whether the de facto strategies we identify also function in other contexts. Our sample includes firms from diverse industries. Thus, the strategies should not be specific to any one industry. We also wonder whether they might

Table 4. How de facto strategies were achieved: Learning Processes

	Transfer of extant practises	Pre-entry planning	Trial and error
Strategy content	Extant practises for IPR protection used in the home country were applied identically in China. There was no new strategy crafting due to the specific exposure to the Chinese context	Before entering China, the firms systematically anticipated possible risks and measures of how to reduce these. The thus-devised strategies were a mixture of known and new approaches	On entry in the Chinese markets, firms were immediately confronted with IPR infringements and had to figure their own way out. Managers crafted completely new strategies
Cases	E, F, L – Central chemical compounds of the product are never documented, but kept secret, similar to Coca Cola's strategy (Case E)	A, I, J – The firm performed a systematic risk assessment of which technologies were most prone to copying and counterfeiting. Activities that were judged to be too risky (e.g., basic research) were not brought to China (Case A)	A, B, C, D, F, G, H, I, J, K, M – Risk assessment proved only partially realistic. Products that were thought to be low-risk suffered IPR infringements. The list of what to bring and what not to bring to China had to be changed (Case A) Without cooperation of Chinese administrative bodies and the customs, effective IPR protection was unachievable. Firms had to groom relationships over a long time to be considered 'an old friend' and thus to be protected (Cases B, F, H and K) Firms had to learn to neutralise the threat of disloyalty of Chinese staff and ways of winning their commitment to not give away the firms' IPR (Cases C, I, J and K) Firms had to learn to use counterfeits as a weapon rather than to engage in futile attempts to pursue imitators (Cases D, G and M)
Details	Individual molecules are patented but production processes are not disclosed. These processes are so complex that imitation cost is prohibitively high (Case F) A physical memory key to the product is retained and given only on proof of purchase of original product. Each key is unique, without it the software cannot be used (Case L)	Before going to China, the management decided to bring only extremely complex, modularised high-tech products to China in order to make fragmentation of knowledge and interface problems an effective hurdle for imitators (Case J)	

The learning processes are not mutually exclusive. Some firms experienced more than one process. IPR, intellectual property rights.

be specific to China or if they exist in the various emerging economies that are characterised by weak IPR enforcement and high rates of product piracy (e.g., Thailand, Vietnam).

We believe that de facto protection strategies developed by firms in China carry over at least partially to other emerging economies. On the one hand, China is a very extreme example that cannot be compared easily with other emerging economies. Before the 1970s, China never confronted any legal systems based on Roman right or British common law. Instead, it was dominated solely by Confucian philosophy. Such attitudes, combined with cultural barriers, highly contextual communication and a prioritisation of relationships over formal law makes China a unique context. On the other hand, because of the extremely aggressive environment and rather unscrupulous attitude of domestic imitators, China also is a 'learning environment' in which only 'proven' or 'working' de facto protection strategies survive. Such robust de facto protection strategies should be able to transfer to emerging economies in which firms experience similar problems. For example, many Asian societies consider social and personal relationships more important than formal laws. Thus, in principle, the two guanxi-related strategies should be applicable in such contexts.

Granted that the de facto strategies are unlikely to transfer perfectly to other emerging economies, they nevertheless provide some fundamental insights into which measures may work best in an emerging economy. If managers can relate these findings to their personal experience and develop them according to the specific needs of their firm, they are very likely to craft de facto strategies that 'work'.

The use of de facto strategies should not necessarily be limited to emerging economies. In a developed country with a strong appropriability regime, maintaining and enforcing patent portfolios becomes very costly and a specific patent might not generate enough economic benefits to amortise these costs. By using de facto strategies developed in aggressive environments in strong appropriability regimes, managers may achieve effective IPR protection but minimise the resources needed to uphold and enforce patents. By saving resources, these firms should gain a competitive edge over competitors.

Finally, our findings result from an incomplete sample of possible strategies rather than a complete portfolio of all existing strategies. We cannot comment on de facto strategies that might have failed. Other firms, perhaps those that chose not to cooperate with our research, may have developed other de facto strategies. In turn, managers must recall that there is no 'single', 'one' or 'best' strategy. The de facto strategies we identify are neither exhaustive nor mutually exclusive. Tables 3 and 4 also show that they depend on both internal and external factors. Most firms use more than one de facto protection strategy, depending on their situation.

More research might explore the range of possible de facto protection strategies more deeply, including those that have failed, and thus perhaps determine why one de facto strategy performs better (in terms of providing effective IPR protection) than another. Perhaps favourable combinations of de facto strategies provide superior IPR protection.

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Notes

1. Throughout this paper, we use the term IPR in accordance with the definition of the World Intellectual Property Organisation, i.e., as a construct covering the two branches: copyrights and industrial property. Copyrights comprise rights resulting from literary, artistic and scientific work. Industrial property comprises rights resulting from inventions, industrial designs, trademarks, service marks, commercial names and designations and protection against unfair competition. See WIPO (2005).
2. Formal measures also include trademarks, industrial designs, utility patents and copyrights. It is beyond the scope of this paper to provide a detailed discussion of all of these measures.
3. The major Chinese laws on IPR are the Trademark Law (created in 1982), the Patent Law (1984) and the Copyright Law (1991). China has joined the Paris Convention for the Protection of Industrial Property (in 1985), the Madrid Agreement on the Registration of Marks (1989), the Berne Convention for the Protection of Literary and Artistic Works (1989), the Universal Copyright Convention (1992) and the Patent Cooperation Treaty (1994).
4. The detailed description of our approach to sampling and data collection, as well as our methods to ensure the reliability and validity of the interview data, are available from the corresponding author.

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