

Protecting local R&D in the BRICs

Western multinationals face particular challenges and risks when it comes to protecting intellectual property based on R&D carried out in Brazil, Russia, India and China

By Florian Homann and Martin A Bader

Carrying out R&D in foreign markets is an important business strategy for multinationals of all sizes in all industries and markets. The economic and technological potential of large emerging markets such as Brazil, Russia, India and China (collectively known as the 'BRICs') is frequently underrated. Contrary to popular belief, reducing R&D costs is not the main driver for locating R&D in emerging markets: the far more strategic goal is to succeed in local markets by understanding local customers. In addition, industrial enterprises can benefit from improved market access, access to highly skilled labour and higher growth through more innovations (H Ernst, A Dubiel and M Fischer, *"Industrielle Forschung und Entwicklung in Emerging Markets: Motive, Erfolgsfaktoren, Best-Practice"*, Wiesbaden: Gabler, 2009)

Recent data on the R&D activities of the global top 500 R&D spenders in China shows the importance of R&D in emerging markets. A study of the distribution of development sites (Zinnov, "Crossing the Value Chasm", 2013) reveals that in 2013, 385 of the top 500 R&D spenders had R&D activities in China (up from 195 in 2009; see Figure 1), making China the most popular global location for the top 500 R&D spenders to set up an R&D centre. In comparison, the San Francisco Bay Area hosted 220 and India hosted 228 of the top 500 R&D spenders in 2013. Overall, the

BRICs are the most important emerging markets with regard to the R&D activities of Western multinationals.

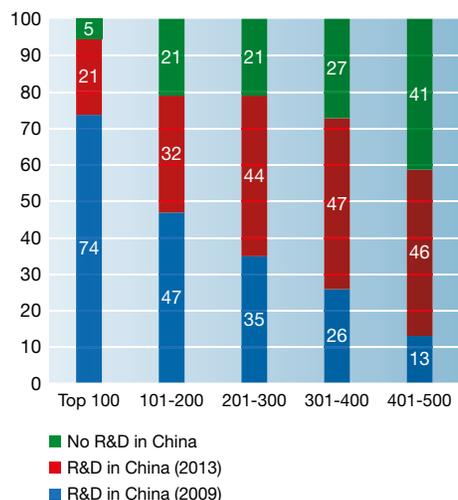
Despite the high growth of R&D activities in emerging markets, IP protection remains a significant issue for Western multinationals. The balance between knowledge sharing and knowledge spillover is important, especially in R&D partnerships or alliances. This article is based on a study carried out by the Institute of Technology Management at the University of St Gallen.

Brazil

The total value of all greenfield foreign direct investment projects conducted in Brazil between 2005 and 2014 was \$309 billion, making it the third most important developing country with regard to foreign direct investment inflow (UNCTAD, "World Investment Report 2015: Reforming International Investment Governance", Geneva: United Nations Publication, 2015). A recent example of Brazil's R&D potential is Volkswagen, which in March 2014 announced plans to invest more than \$4 billion in developing new vehicles and technologies in its Brazilian operations (H-P Elstrodt *et al*, "Connecting Brazil to the World: A Path to Inclusive Growth", 2014). However, the automotive industry is also a prime example of Brazil's protectionist strategies, with high import duties, delayed imports due to excessive bureaucracy and subsidies for local companies designed to protect the domestic market and force activities to be localised within the country (R Atkinson, "Designing a Global Trading System to Maximize Innovation", *Global Policy*, 5 (2014)).

Brazil has made significant advances in IP protection in recent years. In the late 1990s patent protection was extended to previously unprotected areas of food, pharmaceuticals, biotechnology and computer programs.

Figure 1. R&D presence in China of the global top 500 R&D spending companies in 2009 and 2013



Source: Zinnov, 2013

However, the government has overturned several pharmaceutical patents in order to open the market to cheaper generic versions manufactured in India. As a protective mechanism, holders of Brazilian patents are required to produce a patented product at latest three years after the patent is granted. Otherwise, a compulsory licence may be granted to interested parties by the Brazilian National Institute of Industrial Property (The Economist Intelligence Unit, “Country Commerce Brazil”, New York, 2013).

Russia

Russia has attracted a great deal of investment from foreign multinationals, although this has dipped slightly since the Ukraine crisis. Greenfield foreign direct investment projects carried out between 2005 and 2014 were worth \$263 billion (UNCTAD, 2015). To attract more investment, Russia currently has 28 special economic zones, of which six are industrial and production zones and five are technology and innovation zones. These special economic zones feature lower tax rates, modern infrastructure and reduced administrative barriers to attract foreign multinationals (Ministry of Economic Development of the Russian Federation, “Special Economic Zones”, 2013).

Russia joined the World Trade Organisation (WTO) in 2012, which should lead to improved enforcement of IP rights protection measures and the implementation of a rules-based system to improve transparency (Ernst & Young, “Ernst & Young’s Attractiveness Survey Russia 2013”, 2013). Before Russia acceded to the WTO, its judicial system underwent many changes to

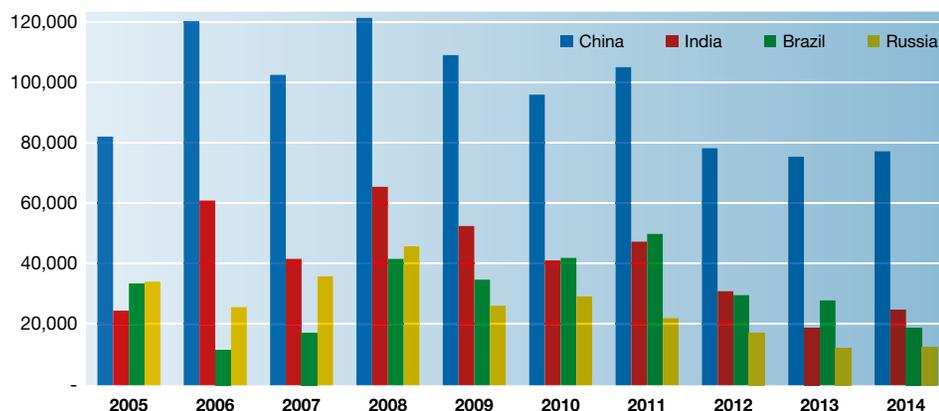
comply with the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights, including setting up a specialist IP court in 2013 (The Economist Intelligence Unit, “Country Commerce Russia”, New York, 2013). However, corruption remains a significant problem. Transparency International (“Corruption Perceptions Index 2013”, 2013) rates corruption in Russia as being significantly worse than in Brazil, India and China. Given that a corrupt environment promotes piracy and counterfeiting, corruption is also likely to affect the enforcement of IP rights (J Green, “The Russian IPR Problem: How Accession to the WTO Is Not the Magical Solution, Rather a Step in the Right Direction”, *Intellectual Property Brief*, 3, 2012).

India

The value of all Indian greenfield foreign direct investment projects conducted between 2005 and 2014 is \$410 billion (UNCTAD, 2015), making India the second most popular R&D destination among developing countries. Foreign direct investment in R&D is promoted and incentivised by the Indian government, which allows 100% of foreign direct investment in R&D services to proceed automatically and has established significant tax breaks for expenditure incurred on in-house R&D, as well as on payments for scientific research (R Basant and S Mani, “Foreign R&D Centres in India: An Analysis of Their Size, Structure and Implications”, Ahmedabad, 2012). Currently, India has 202 operational special economic zones (Ministry of Commerce and Industry India, “List of State-Wise Exporting SEZs as on 31.3.2015”, 2015). In some industries, India has strict localisation barriers to trade. For example, the Preferential Market Access imposes a local content requirement on the purchase of electronic products by the government and by certain private sector entities (S Ezell, “Forced Localization Policies Threaten Global Trade in Innovative Industries”, *Bridges Vol 38 / Innovation Matters*, Washington DC, 2013).

Since the Patent Act was implemented in 2005, product patents have been granted in all areas of technology. However, patents must be used within three years of grant; otherwise, a compulsory licence may be granted if the patent is for a food or pharmaceutical product or is otherwise being abused (The Economist Intelligence Unit, “Country Commerce India”, 2013). Compulsory licences were recently upheld by a judgment of the Intellectual Property Appellate Board in a case where

Figure 2. Value of announced greenfield foreign direct investment projects, by destination, 2005-2014



Source: Mio USD, UNCTAD World Investment Report 2015

the foreign innovator failed to 'use' the patent by importing the products instead of manufacturing them in India. Patent enforcement in India is weak, principally because of corruption (Transparency International, 2013), a lack of enforcement officials and an overburdened court system (The Economist Intelligence Unit, 2013).

China

China attracts the highest amount of inward foreign direct investment of all developing countries – the value of all greenfield projects conducted in China between 2005 and 2014 was \$968 billion (UNCTAD, 2015). China's foreign direct investment regulations encourage Western companies to import high-tech products, but also require foreign investors to conduct R&D locally. Today, there are seven special economic zones in China. To promote indigenous innovation, China supports domestic enterprises assimilating foreign technology into the current domestic market (Q Cao, "Insight into Weak Enforcement of Intellectual Property Rights in China", *Technology in Society*, 38, 2014). China imposes limitations on Western multinationals when they enter the market. For example, there is a centralised policy whereby industries and industry sectors are categorised as 'encouraged', 'restricted' or 'prohibited' with regard to foreign investment. In 38 industry sectors (eg, the automotive industry), Western multinationals must form a joint venture with local companies (Ministry of Commerce, "Catalogue for the Guidance of Foreign Investment Industries (Amended in 2015)", 2015). When entering into joint ventures, Western multinationals must also take the risk of IP infringement into account (ECOVIS China, "Doing Business in China Guide", 2014; InterChina Consulting, "Establishment of a Joint Venture (JV) in China", 2011).

While the government has significantly improved the IP legislation in recent years, China remains protective towards domestic companies and IP rights enforcement remains ineffective. Both the courts and the administrative authorities are responsible for enforcing IP rights, which increases the complexity of the legal framework. Local government offices operate as quasi-judicial authorities and can issue injunctions and even task the police with assisting in enforcement. However, the courts have jurisdiction over appeal procedures and awards of monetary damages. This division of authority leads to a high need for communication and coordination between different government agencies (Cao, 2014;

USTR, "2014 Special 301 Report", 2014; T Ross, "Enforcing Intellectual Property Rights in China", 2012; The Economist Intelligence Unit, "Country Commerce China", New York, 2014).

Knowledge spillover

External knowledge is a major influencing factor for innovation in subsidiaries of multinationals – in general, the link between a foreign subsidiary and a domestic firm has a positive impact on innovation (P Almeida and A Phene, "Subsidiaries and Knowledge Creation: The Influence of the MNC and Host Country on Innovation", *Strategic Management Journal*, 25, 2004). However, foreign direct investment in R&D also carries the risk of knowledge being lost to local companies. The literature (M Blomstrom and A Kokko, "Multinational Corporations and Spillovers", *Journal of Economic Surveys*, 12 (1998); J Spencer, "The Impact of Multinational Enterprise Strategy on Indigenous Enterprises: Horizontal Spillovers and Crowding out in Developing Countries", *Academy of Management Review*, 33 (2008); N Park *et al*, "Reverse Knowledge Diffusion: Competitive Dynamics and the Knowledge Seeking Behavior of Korean High-Tech Firms", *Asia Pacific Journal of Management*, 31, 2013) describes four major channels of knowledge spillover:

- the demonstration effect;
- the local linkage effect;
- the employment effect; and
- reverse knowledge diffusion.

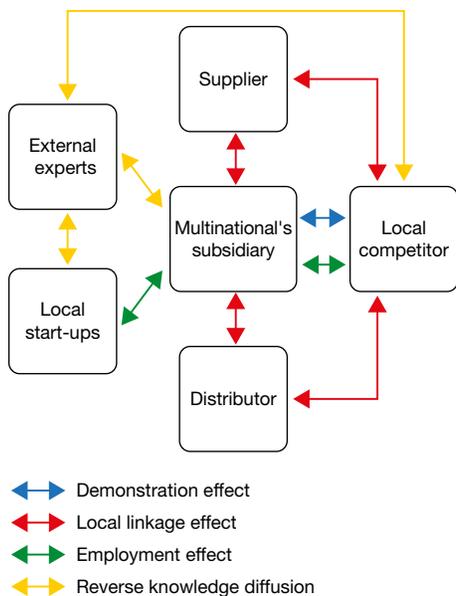
Demonstration effect

This enables domestic firms to learn from foreign firms through exposure to their activities and observation of their technologies, management practices and strategy. Domestic firms can absorb this knowledge, imitate these techniques and integrate them into their own operations (Blomstrom and Kokko, 1998; Spencer, 2008). A real-world example of this are the first foreign investments of Western multinationals in China's special economic zones. These showcased Western technology and management practices were quickly transferred to domestic firms and other regions in China. This in turn strengthened the Chinese economy and increased competition for multinationals (S Chang and D Xu, "Spillovers and Competition among Foreign and Local Firms in China", *Strategic Management Journal*, 29, 2008).

Local linkage effect

This occurs when foreign firms build vertical links with suppliers and distributors

Figure 3. Channels and mechanisms of knowledge spillover



or other firms in a different position in the value chain. Vertical cooperation with domestic firms encompasses a spillover of knowledge to competitors, as these firms also have relationships with local competitors and act as mediators for knowledge transmission (Spencer, 2008).

Employment effect

This relates to knowledge spillover as a result of human mobility. When skilled and well-trained managers or workers leave a company, knowledge spillover may occur and details about strategy, operations or technology can be lost. This effect is most severe in countries with high employee turnover, such as China, where turnover was 19% in 2010, of which 15% was voluntary. It may also have a strong impact in countries with lower employee mobility – for example, when an employee leaves a company to start his or her own enterprise in the host country (X Liu *et al*, “Returnee Entrepreneurs, Knowledge Spillovers and Innovation in High-Tech Firms in Emerging Economies”, *Journal of International Business Studies*, 41, 2010; Spencer, 2008; Roland Berger Strategy Consultants, “HR in China”, Hamburg, 2012).

Reverse knowledge diffusion

Knowledge spillover sometimes occurs when external ties, originally established for knowledge inflows, promote channels of knowledge outflows. The positive potential of these external ties lies in the need for diverse, new and valuable ideas for knowledge recombination. Interpersonal external ties are necessary, because often critical knowledge is tacit and not codified, and its transfer requires direct interaction with other individuals. However, these channels can also cause serious negative effects and economic damage to knowledge-seeking companies by becoming a channel of unintended knowledge outflow. One main enabler for this is the fact that external knowledge is most valuable when it is on a similar level to the firm’s own internal knowledge. To find similar external knowledge, firms disclose their internal knowledge to external

experts, thus inadvertently promoting reverse knowledge diffusion and leaking critical knowledge. Reverse knowledge diffusion is therefore a critical by-product of the search for knowledge outside the company (Park *et al*, 2013).

Formal protection strategies

Companies can use both formal and informal protection strategies to protect their know-how and intellectual property. Formal protection strategies include legal mechanisms such as patents, copyrights and trademarks, and are based on national legal systems. In emerging markets, these protection strategies are often severely hindered due to peculiarities in the legal systems. For example, in India or Brazil, if a patent holder does not start to produce a product, it may be forced to grant a compulsory licence to a competitor. In China, multinationals face problems due to the weak enforcement of patents and trademarks.

Although weak IP rights pose a great challenge to companies, the R&D conducted in emerging markets often exceeds that required for a mere presence in the local market or to fulfil local government requirements for technology transfers (M Zhao, “Conducting R&D in Countries with Weak Intellectual Property Rights Protection”, *Management Science*, 52, 2006). Thus, multinationals carrying out R&D in countries with weak IP rights must develop alternative mechanisms – informal knowledge protection strategies – to protect their intellectual property.

Informal protection strategies

In many countries and industries, informal protection strategies are more important than formal ones. They can prevent knowledge spillover in the first place or mitigate the negative effects of such spillover.

Secrecy

This is the simplest mechanism for protecting knowledge, but it can still be highly effective. Rules to ensure secrecy might include restrictions on transfers of specific issues or to specific recipients, on physical access to certain areas of a company or on social interactions between certain groups of persons. *De facto* secrecy is more specific to emerging markets: it relies on the simple strategy of never documenting any important information in written form in order to keep all important know-how secret or to make it contingent on additional tacit knowledge. In addition, *de facto* secrecy can be established by not giving subsidiaries in emerging markets full access to information

Figure 4. Overview of informal knowledge protection strategies

Preventative protection strategies:

- Secrecy
- Complex design
- Loyalty of employees
- Location choices
- Governance structures of alliances

Remedial protection strategies:

- Cultivate relationships with official bodies
- Prepare exit strategies for when employees leave
- Monitor former employees

from the home country (P de Faria and W Sofka, "Knowledge Protection Strategies of Multinational firms—A Cross-Country Comparison", *Research Policy*, 39, 2010; M Keupp, A Beckenbauer and O Gassmann, "How Managers Protect Intellectual Property Rights in China Using de Facto Strategies", *R&D Management*, 39, 2009).

Complex designs

Companies can use complex designs or technological specialisation so that it becomes too expensive or time consuming, or simply impossible, for a competitor to produce an imitation. This strategy is especially useful for multinationals working with less developed domestic firms in emerging markets (Keupp *et al*, 2009).

Employee loyalty

This is an important protection strategy which is especially useful in mitigating the employment effect. Today, many companies use a variety of measures to build trust and motivation by creating a comfortable environment and by making employees feel valued (eg, through training and regular evaluation meetings). Companies show their local employees the options available for promotion and advancement, and try to introduce Western corporate culture to local subsidiaries by organising staff exchanges. In China, *guanxi* – meaning 'connections' or 'relationships' – plays an important role in improving employee loyalty. It can be used by companies to help protect their intellectual property by making employees feel valued and thus more loyal. In addition, a company can intimate that if an employee leaks know-how to competitors, it will retaliate by isolating the employee from his or her personal network – although this option is ethically questionable (Keupp *et al*, 2009).

Location choices

Proximity is a major factor affecting knowledge spillover between companies, so where a firm chooses to locate its subsidiary is crucial. Firms tend to choose their locations based on an area's knowledge activity, the firm's own capabilities and the anticipated behaviour and actions of competitors. A firm will likely make different location choices depending on its technological position: less technologically advanced firms usually locate in areas with high industrial R&D activities, whereas technologically advanced firms choose locations with high academic activities and avoid areas where competitors are present (J Alcácer and W Chung, "Location Strategies and Knowledge Spillovers", *Management Science*, 53, 2007).

Governance structures

In R&D alliances, it is crucial to strike the right balance between knowledge sharing and knowledge spillover. Mutual trust and interaction, as well as individual relationships between alliance partners, are important for maintaining this balance. However, in multilateral R&D alliances it is more difficult to directly monitor the partners' behaviours than in bilateral R&D alliances (P Kale, H Singh and H Perlmutter, "Learning and Protection of Proprietary Assets in Strategic Alliances: Building Relational Capital", *Strategic Management Journal*, 21, 2000; D Li *et al*, "Governance in Multilateral R&D Alliances", *Organization Science*, 23, 2012). Mutual trust through governance structures can reduce concerns about knowledge loss and therefore boost knowledge sharing and help alliances to achieve their development goals. Equity-based governance structures, although typically more expensive, help to encourage knowledge exchange and to reduce the partners' concerns about knowledge spillover (Li *et al*, 2012).

Relationships with official bodies

In China, it is worth cultivating relationships with official bodies and institutions to make use of external *guanxi* in case of IP infringement. However, this strategy is specific to the country and is of little or no use if the opposing party is a state-owned enterprise (Keupp *et al*, 2009).

Employment exit strategies

Companies must assess the risk that departing employees might take valuable knowledge with them. Preparing exit strategies can help to mitigate the damage of this. Firms need to set up the necessary agreements with their employees about IP ownership, non-disclosure agreements and a review of actions. When an employee leaves, the firm should identify the knowledge accessible by him or her and the activities that he or she carried out, and inform all affected departments and responsible persons within a set timeframe before the employee's departure, to balance the costs of the review against the risk of losing the intellectual property (A Moore *et*

“ In many countries and industries, informal protection strategies are more important than formal ones ”

Action plan

A

Western multinationals carrying out R&D in emerging markets need to strike a balance between knowledge creation and knowledge spillover:

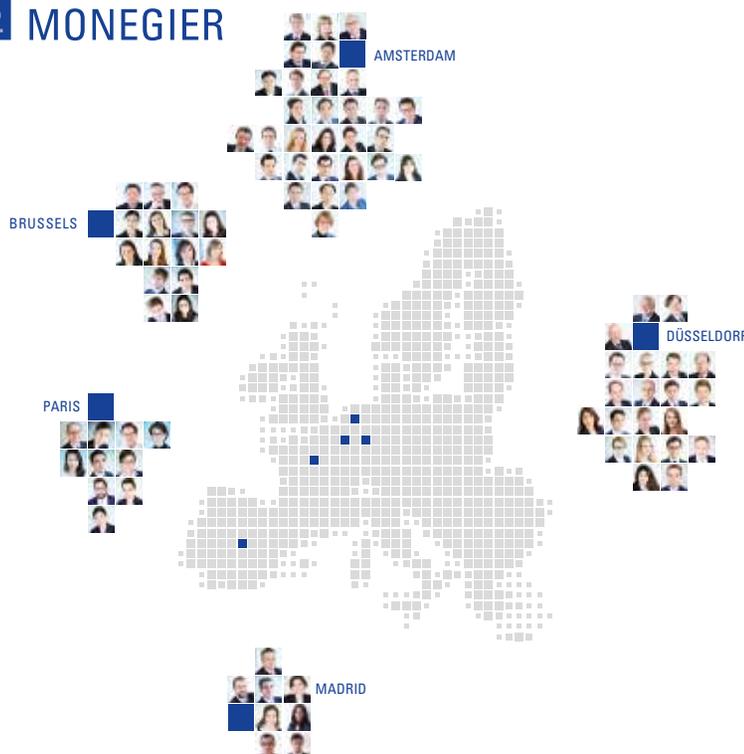
- Create a high awareness level and keep employees engaged and invested with the company. Let employees know that you will not tolerate any know-how transfer to competitors, both during and after the term of their employment.
- Keep your know-how secret and restrict knowledge transfer. Carefully consider possible negative effects before entering into partnerships with domestic companies or before locating R&D near competitors. Utilise the full capacity of the best local suppliers and distributors, and request non-compete agreements to create a strategic advantage.
- Consider equity-based governance structures in multilateral R&D alliances to encourage knowledge exchange while reducing partners' concerns about knowledge spillover.
- Take legal measures by registering patents, designs, trademarks and copyrights where possible, and put in place agreements with your employees about IP ownership, non-disclosure and consent to review of actions.
- Build a reputation for aggressively enforcing your patents – this is especially useful in markets with weak employment laws.

al, "Justification of a Pattern for Detecting Intellectual Property Theft by Departing Insiders", 2013).

Monitoring the activities of departed employees to detect possible IP rights infringements can help to reduce the effects of knowledge spillover to competitors. Aggressive patent enforcement can be used to build a reputation for being tough on IP rights violations, thus helping to discourage infringements from ever taking place. This strategy is especially useful in markets with weak employment laws (R Agarwal, M Ganco and R Ziedonis, "Reputations for Toughness in Patent Enforcement: Implications for Knowledge Spillovers via Inventor Mobility", *Strategic Management Journal*, 30, 2009). **iam**

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