GLOBAL IP RULES HAVE ENCOURAGED INDIA'S BIOPHARMACEUTICAL COMPANIES TO ENTER INTO OVERSEAS ALLIANCES AND BECOME MORE INNOVATIVE.

TRIPS KICK-STARTS CROSS-BORDER ALLIANCES AND INNOVATION IN THE INDIAN BIOPHARMACEUTICAL SECTOR

By Dr. Federica Angeli

- *Some Indian biopharmaceutical companies have responded to the higher IP standards introduced by TRIPS by becoming more innovative.*
- *These companies are engaging in more cross-border alliances to gain access to the human and financial capital needed to become more innovative.*
- *Drug pricing in emerging economies is complex. The effect of TRIPS on drug prices may not be as dramatic as initially feared.*

The stronger domestic intellectual property framework introduced into India in 2005 to meet its commitments under the WTO Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPS) was an institutional shock to Indian biopharmaceutical companies, which entirely disrupted the industry business model.

India's biopharmaceutical industry is now moving to a research and development-based model. Until

INNOVATIVE OUTPUT OF THE INDIAN BIOPHARMACEUTICAL INDUSTRY SHARPLY INCREASED DURING THE TRIPS TRANSITION PERIOD.

recently it was focused entirely on reverse-engineering patented compounds and producing cheap generic medicines.

Contrary to scepticism about the inherent inertia of India's industry, intellectual property reform under TRIPS may have actually encouraged biopharmaceutical innovation.

Closer inspection of the patenting and alliance activity of 123 Indian biopharmaceutical firms between 1999 and 2009 reveals two important insights.

First, innovative output of Indian biopharmaceuticals sharply increased during the transition to TRIPS-compliant regulation.

Second, biopharmaceutical firms with cross-border alliances with foreign partners have been particularly successful at enhancing their innovative capacity, in terms of patenting activity. The return of multinational companies to India following the bolstering of its IP regime might have helped local companies adapt to this new policy environment.

TRIPS *IN EMERGING COUNTRIES*

In India, TRIPS has had a significant impact on the capability and willingness of biopharmaceutical firms to invest.

India became compliant with the main provisions of TRIPS – including granting product patents - in 2005 after a 10-year process. Following the 2005 introduction of product patents in India, local companies could now make financial returns from their innovation from the time of marketing approval to patent expiry.

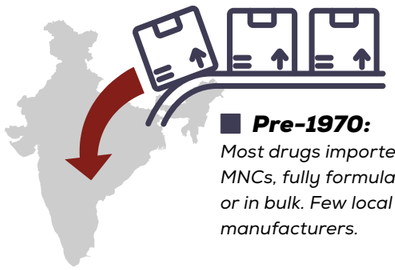
This step-change has led to sharp disagreement amongst scholars and observers. Some critics have argued stricter IP controls in India would harm competitive industry dynamics, and converting from a reverse-engineering to an R&D-led business model would be too difficult for Indian companies (Ramani and Maria 2005).

There is also the fear that patent protection and the return of foreign companies to India would raise drug prices, making them less available to poor patients.

In contrast, more recent studies have shown that TRIPS compliance has spurred innovation by domestic companies in the form of increased patenting activity and R&D expenditure (Chadha 2009; Mahajan 2011).

This suggests that critics have overlooked the capacity of Indian biopharmaceutical companies to adapt to regulatory change and upgrade their technological capacity.

INDIA AND **TRIPS**: A HISTORY



Pre-1970:
Most drugs imported by MNCs, fully formulated or in bulk. Few local manufacturers.

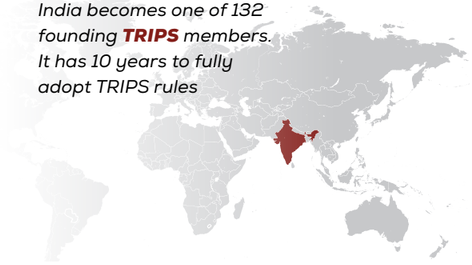
1970:
*Patent Act removed product patents on food and drugs. Process patent period cut to **5 years** after granting.*

75% — 1971

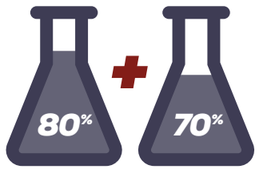
35% — 2003

% of foreign companies in Indian market.

1995:
*India becomes one of 132 founding **TRIPS** members. It has 10 years to fully adopt TRIPS rules*



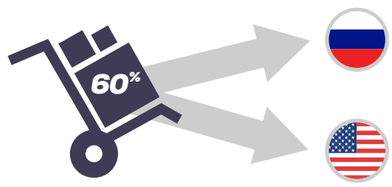
1999:
Indian pharma market achieves self-sufficiency:



OF FINISHED FORMULATIONS + OF BULK DRUGS

ARE SOLD IN INDIA

2002:
20,000+ registered drug manufacturers.
USD9bn sales (finished formulations and bulk drugs)
85% of formulations (by value) remain in Indian market.
60%+ bulk drugs (or active principle ingredients) exported, mostly to the USA and Russia.



APRIL 2005:
India becomes TRIPS compliant.

This leads us to two key questions: How is it that some Indian companies seem to have succeeded in the move from being imitators to innovators and what has that meant for India's public health?

TRIPS: A TRIGGER OF INSTITUTIONAL CHANGE

The main rationale behind the IP standards behind TRIPS is to provide incentives for companies to invest in pharmaceutical innovation. On one hand, the minimum standards of IP protection required by TRIPS give an incentive for firms to innovate by giving them legal certainty that they will have time to achieve a return on investment in R&D and launching a new drug. This can cost in excess of $800m for small-molecule pharmaceuticals and $1.3m for biologics (DiMasi and Grabowski, 2007)

On the other hand, TRIPS restricts drug imitators, whose business models focus on reverse-engineering and producing them at low cost through process innovation (Ramani and Maria 2005).

As the bulk of biopharmaceutical firms in developed countries follow the innovator model, the introduction of TRIPS in India was strongly endorsed by Europe and the US, to assist their biopharmaceutical industries expand their sales and operations overseas. (Ramani and Maria 2005).

Under TRIPS, the reality is that Indian biopharmaceutical firms have retained - to different degrees - characteristics of both the imitator and innovator models.

CROSS-BORDER ALLIANCES

Cross-border alliances represent a major route by which Indian biopharmaceutical companies changed and adapted during the 1995-2005 TRIPS transition period.

These are long-term strategic agreements between organizations headquartered in different countries. They involve one or more areas of activity, such as market entry, skill acquisition or technological exchange (cf. Dacin et al. 2007). Such alliances are valuable to firms in emerging economies who want rapid access to technology and managerial capabilities to compete in global markets (Svetlicic and Rojec 1994; Zahra et al. 2000).

There are a number of reasons Indian companies would look for resources outside their own borders. For instance, India has suffered a shortage of skills in biology and clinical research, crucial to drug discovery and development. Shortcomings in the patent writing expertise among India's professionals can make them ineffective in an international setting (Grace 2004). And Indian companies have in the past lacked the financial resources to pursue international patenting (Ramani and Maria 2005).

Finding cross-border partners, then, can offer swift access to major assets— financial resources, managerial and procedural expertise and scientific knowledge—not available inside India. Access to these assets can help companies adjust to TRIPS.

Cross-border alliances can boost the legitimacy of an Indian company. As its reputation improves, so does the ability to secure a consensus for the right resources to survive and expand in global markets (Dacin et al. 2007).

By adapting to the requirements of TRIPS, Indian firms seem to have mostly overcome foreign partners' concerns about weak business ethics and opportunistic behaviour. And that has opened up new opportunities to procure relevant knowledge and resources.

TRIPS-led regulatory change has arguably increased the appeal of the Indian biopharmaceutical market for foreign R&D-based firms driven away by the abolition of product patents in 1970 (Joshi 2003). Cross-border alliances with Indian firms offer a faster

CROSS-BORDER ALLIANCES HELPED INDIAN BIOPHARMACEUTICAL COMPANIES CHANGE AND ADAPT DURING THE TRIPS TRANSITION PERIOD.

foothold back into the Indian biopharmaceutical market than setting up operations alone.

Equally, the number of cross-border alliances held by a biopharmaceutical company can positively influence its innovation outcome during the TRIPS transition.

CLOSER ANALYSIS

Given these arguments, it could be that the number of cross-border alliances held by a biopharmaceutical company will positively influence its innovation outcome during the TRIPS transition period.

To assess this hypothesis, I conducted an analysis of recent cross-border alliances and relative networks, focused on 213 deals involving 255 companies, including 63 headquartered in India. Alliance data was sourced from the Thomson Reuters database SDC on Alliances and Joint Ventures, while firm-level financial data was sourced from Datastream.

In total, the database contains 123 companies listed on the Indian stock exchange that operate in the pharmaceutical and biotechnology sector.

This implies that 60 companies in the sample do not report any alliance over the observation period. Of the 213 deals studied, 157 were cross-border ties and 56 ties between Indian companies.

Each alliance was 'averaged' at three years (Rosenkopf and Schilling 2007; Schilling and Phelps 2007), along the lines of similar studies of alliance networks in high-technology sectors, including chemicals, semi-conductors and telecommunications.

INTERNATIONAL R&D TIE-UPS ON THE RISE

The number of active cross-border alliances involving Indian firms varied between 1999 and 2009 (figure 1). Their number peaked in 2002, with 115 out of a total of 132 alliances. Cross-border links dropped sharply in 2004, with just 60 cross-border alliances out of 81 alliances in total, one year before the full introduction of TRIPS.

It peaked again in 2008, but dropped sharply in 2009, perhaps due to the financial crisis. The size of the domestic alliance network remained stable.

Closer inspection of India's cross-border partner firms shows most (85%) are in the standard industrial classification (SIC) drugs category. Specifically, they operate in pharmaceutical formulations, biological products, in vitro and in vivo diagnostic substances and medicinal chemicals and botanical products.

Figure 1
Trend of active cross-border vs domestic alliances, computed as the yearly sum of the size (degree) of the 123 sample firms' cross-border and domestic networks (1999–2009).

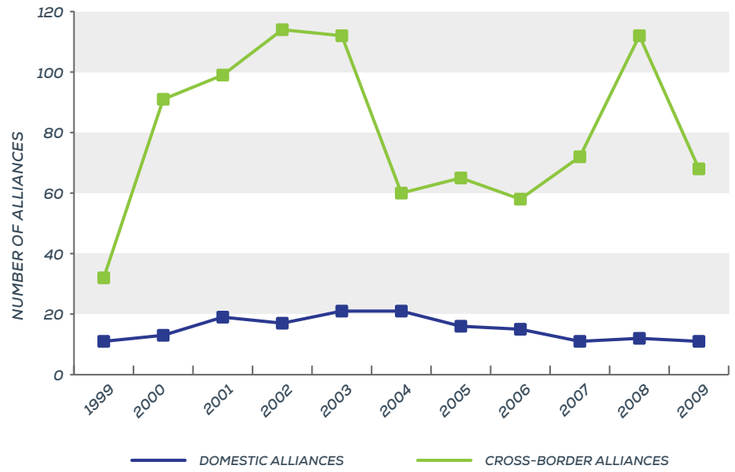
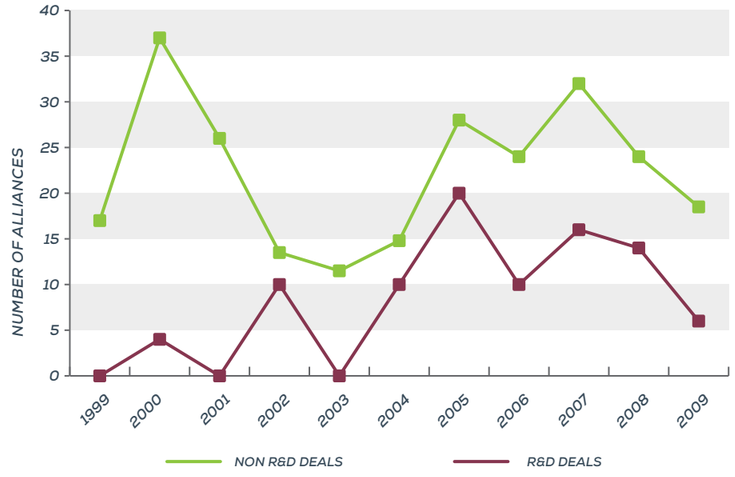


Figure 2
Trend of active cross-border R&D-oriented vs non R&D-oriented alliances, computed as the yearly sum of the size (degree) of the 123 sample firms' cross-border R&D and non-R&D networks (1999–2009).



And 83% of those partners are based in just six countries: USA (42%), Germany (10%), Japan (6%), UK (6%), Canada (5%) and Switzerland (4%).

So, over a 10-year period (between 1999 and 2009) Indian biopharmaceutical companies joined forces mostly with other biopharmaceutical companies in developed economies and in highly regulated markets.

The focus of cross-border partner firms' R&D activity is also revealing. Biopharmaceutical firms join forces to discover new compounds by sharing R&D efforts with the partner. Or they might license-out or license-in compounds for further manufacturing/marketing activities.

Figure 3
R&D expenditures of the 123 firms in the sample (R&D expenditures as a % of sales).

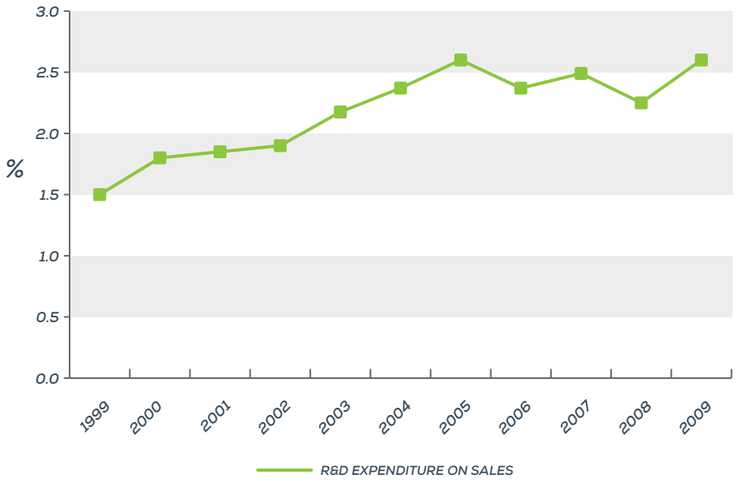


Figure 2 shows R&D vs non-R&D deals. It shows R&D deals are catching up with manufacturing and marketing-based agreements.

Interestingly, R&D expenditures as a share of sales, also rose steadily (Figure 3).

MOVING UP THE VALUE-CHAIN

Indian biopharmaceuticals firms are trying to move up the value-chain, from a manufacturing to an R&D model. They're choosing their partners more carefully, they have increased R&D expenditures and they are involved in more R&D-led cross-border alliances.

Figure 4 shows the annual trend of the number of patents granted by United States Patent Trademark Office (USPTO) and Indian Patent Office (IPO) by year of application over the same period.

Patenting hit a high in 2002, 2003 and 2004, with 227, 281 and 267 patents respectively. Patenting activity with USPTO peaked in 2003 with 83 patents but was stable generally.

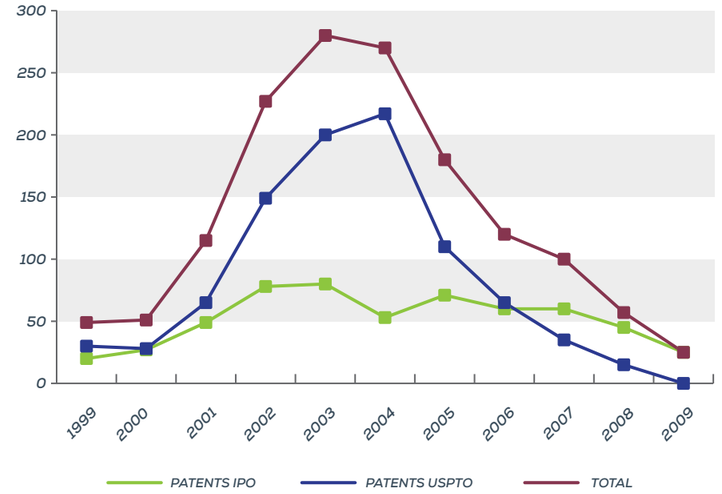
Rates of patenting with the IPO fluctuates: a high of 214 patents in 2004 dropped to 61 in 2006 and just 11 in 2008. As a whole, the best year for patent applications later granted is 2003-4, just before full enforcement of TRIPS-compliant regulation.

There is evidence (table 2) to suggest cross-border alliances positively impact national patenting activity and innovation at an international level.

A larger cross-border alliance network seems to influence strongly the number of USPTO-granted patents. Conversely, the size of a domestic network makes no significant difference.

Cross-border alliances have galvanised the innovative performance of biopharmaceutical firms during and after the introduction of TRIPS, both nationally (IPO-granted patents) and internationally (USPTO-granted patents).

Figure 4
Trend of patents granted by USPTO and IPO to the 123 sample firms by year of application, over the years 1999–2009.



INDIA'S INCREASED INNOVATION

This analysis provides evidence of an increase of biopharmaceutical innovation in India during the TRIPS transition period.

The new intellectual property regulation following TRIPS seems to have caused Indian companies to pursue more R&D-oriented business models, which manifest through:

- A higher number of R&D-oriented alliances towards innovative biopharmaceutical partners in regulated markets and
- Increased patent filings and R&D investments.

This research proves that Indian biopharmaceutical firms have been able to pursue international patenting activity, in contrast to earlier expectations and highlights that cross-border alliances may have been crucial in providing the necessary financial resources, scientific knowledge and managerial and procedural expertise to do so.

PASSAGE BACK TO INDIA

TRIPS-compliant regulation has encouraged foreign players to form alliances with Indian companies to penetrate that market faster (Joshi 2003; Kamiike and Sato 2011).

So TRIPS seems to offer a win-win environment, where local and

INDIAN BIOPHARMACEUTICAL COMPANIES ARE TRYING TO MOVE UP THE VALUE CHAIN, FROM A MANUFACTURING TO AN R&D MODEL.

international interests seem to be served equally. Future expansion of innovation in India could well depend on policy that encourages collaboration between local and foreign firms.

The impact of TRIPS regulation on drug prices and access to medicines is less clear. One view is that, thanks to the 20-year 'monopoly' of new patents on drugs, reintroducing patent protection on new compounds would trigger a sharp rise in drug prices across the developing world (Chauduri 2011; Hafner and Popp 2011).

Intellectual property rights are only one part of a complex interplay of factors that determine drug prices. In India, these include different market segments and the influence of government legislation to control prices.

Any assessment of the influence of IPR on drug prices must take scale into account. TRIPS-induced regulation has an influence on patented medicines only.

But TRIPS-induced regulation influences a mere 10% of drugs on the Indian market. The remaining 90% are generic copies of products already off-patent in regulated markets after 2005 or generic versions of compounds patented before 1995. Taken as a whole, a TRIPS-driven potential price rise is of limited significance.

Prices in this thin, on-patent slice of India's drug market are also influenced by factors such as therapeutic competition, limited domestic purchasing power, the lack of an insurance market, parallel importing and compulsory licensing.

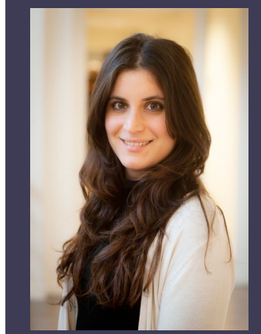
Finally, it is also interesting to note that other mechanisms contribute to retail drug prices in developing countries, such as local mark-ups, taxes and import tariffs.

It follows that the impact of TRIPS-compliant regulation on drug affordability and availability in India may be much less straightforward than expected by critics.

However, an important question remains open. A major rationale for asking emerging economies to become TRIPS compliant is to encourage local companies to develop new treatments for local diseases that fall outside the commercial interest of Western corporations.

While this study only hints at the effectiveness of TRIPS in driving locally-produced, cost-effective treatments to tackle domestic health priorities, it confidently opens the door to more research.

ABOUT THE AUTHOR



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Her work has been awarded prizes by the Academy of Management, Strategic Management Society and Academy of International Business.

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