



**INDIA'S HOME-GROWN
MEDICINE INNOVATORS
ARE ON THE MARCH,
BUT FACE LEGAL AND
POLICY CHALLENGES**

IP AND INNOVATION CRUCIAL FOR INDIA TO FULFIL BIOTECH POTENTIAL

■ By Amir Ullah Khan

An innovative diabetes treatment from an Indian biotech company is set to transform the lives of 387 million people living with the condition globally.

Biocon is close to releasing an insulin product that can be consumed orally. If successful, it could spell the end of the daily injections regime for around 387m people with diabetes worldwide, including 67 million in India. Not only that, it will save millions of dollars and increase compliance.

Biocon is one of the several entrepreneurial companies at the sharp end of India's burgeoning innovative health biotech industry.

Crucially, they are bringing new medicines to the market that have been researched and developed entirely in India.

That trend for high value innovation is vital to India's future economic growth and to realise its massive potential as a global centre for biotech innovation.

Such innovation is on the march in a country that has built a global reputation for reverse-engineering and manufacturing low-cost copies of existing drugs.

Biocon's chief, Kiran Mazumdar-Shaw said: "If India can successfully tackle the gaps in infrastructure and challenges in policy and funding, the country has a huge potential to become the leading global innovation hub for biotech."¹

Aside from bringing much needed

¹ "Biotech could take India ahead", New India Express, 20 February 2015
<http://www.newindianexpress.com/education/edex/Biotech-Could-Take-India-Ahead/2015/02/23/article2678039.ece>

investment and high-skilled jobs to India, this home grown biotech boom could make cheaper drugs, vaccines and therapeutics a reality for the millions of Indians who currently struggle under the current healthcare system.

Biocon is already a well-known innovator. Its pioneering products include ALZUMAb - an anti-CD6 monoclonal antibody for the treatment of chronic plaque psoriasis and the “Insupen”, a convenient and affordable reusable insulin delivery device and a new biotech drug for treating breast cancer.

Biocon is also responsible for India’s first monoclonal antibody therapeutic, BioMAbEFGR, a treatment for head and neck cancers, which are prevalent in India where chewing tobacco remains a common practice.

■ THE IMPORTANCE OF IP

Ms Mazumdar-Shaw is convinced of the role played by intellectual property in Biocon’s success.

She told the World Intellectual Property Organization: “IP was there right from the start. To begin with, when Biocon was just part of a small company trying to compete in international markets, it was really just a matter of where

I could sell the products, of our freedom to operate.”

“But after Unilever bought the company, we entered this highly professional world where the role of IP was very acute. We were creating very novel IP and I started then to see just how valuable this was.”²

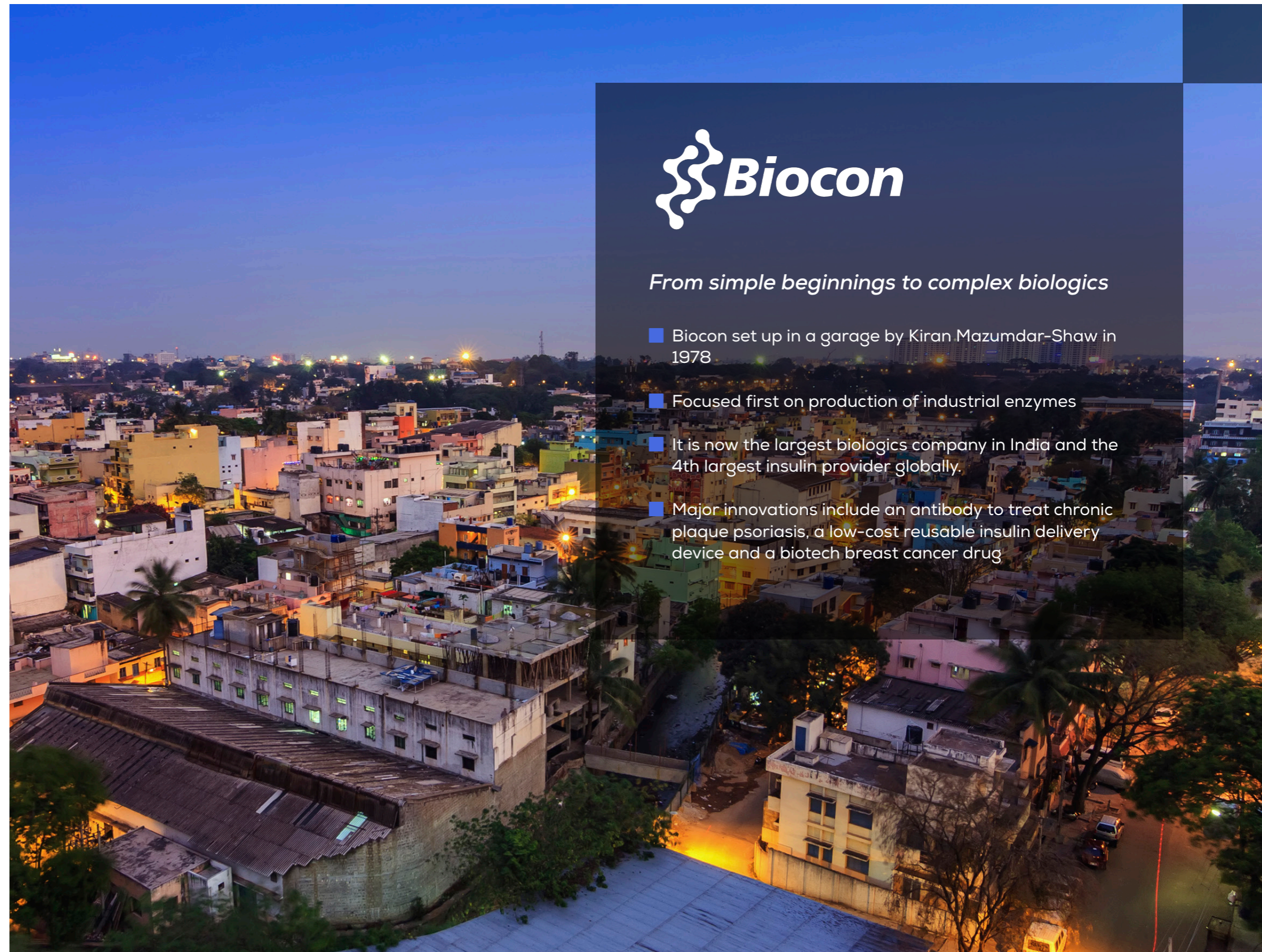
One important function of an effective patent system is to make knowledge behind an invention available to society. This is because patent applications are freely available to the public, even before the patent term has expired.

Such disclosure accelerates innovation; competitors can design around an invention without having to “re-invent the wheel”. They can also develop different or improved medicines, which then compete with the initial innovation.

Take Biocon’s recombinant formulation of human insulin, launched in 2004.

Biocon’s team spotted a yeast-shaped hole amongst the existing patents for insulin processes, that allowed them to develop a new way of creating the diabetes drug.

Mazumdar-Shaw said: “We noticed that most of the patented processes used e-coli and bakers’ yeast. At Biocon we had expertise



From simple beginnings to complex biologics

- Biocon set up in a garage by Kiran Mazumdar-Shaw in 1978
- Focused first on production of industrial enzymes
- It is now the largest biologics company in India and the 4th largest insulin provider globally.
- Major innovations include an antibody to treat chronic plaque psoriasis, a low-cost reusable insulin delivery device and a biotech breast cancer drug

² WIPO Magazine, “Building biotech in Bangalore”, September 2005, available at http://www.wipo.int/wipo_magazine/en/2005/05/article_0001.html

in another sort of yeast, and had already licensed the IP for it from a small company in the US. So the way was clear.”

“We started making our own insulin using Pichia yeast. This was a new and unique process, which wasn’t covered by any of the existing patents.”³

The result of Biocon’s IP ingenuity? Their creation, Insugen, is now sold in 30 countries, on top of a 10 per cent share of the India market. A marketing arrangement with Bayer HealthCare has also extended Insugen’s reach into China, home to around 100 million diabetics.

AFFORDABILITY, NOT COMPULSORY LICENCES

Medical research is increasingly networked and collaborative. It means that valuable information on a drug under development has to be disclosed to partners long before it’s placed on the market.

IP fuels this collaboration. It gives the owners of ideas legal certainty that they can share their ideas without their collaborators stealing it. Without IP, collaboration in R&D between different research partners would be impossible.

Mazumdar-Shaw says: “Sharing IP is the way to develop business very fast in today’s world. I don’t mean just buying it, but really sharing it. We have something another company needs; and they have something we need. Put it together and you have this powerful and very exciting synergy.”⁴

But a clear line must be drawn between IP and affordability of medicines, says Mazumdar-Shaw. “We need an enforceable patent regime to be able to develop these drugs in the first place, but the issues of affordability have to be addressed through a number of different angles and mechanisms, such as insurance.”

In the short term, flexibilities in the patent system to help lower drug prices through overriding patents is attractive to politicians, but it allows them to put off difficult decisions. Investment in the wider healthcare system or tackling contributory factors to poor health in India is neglected.

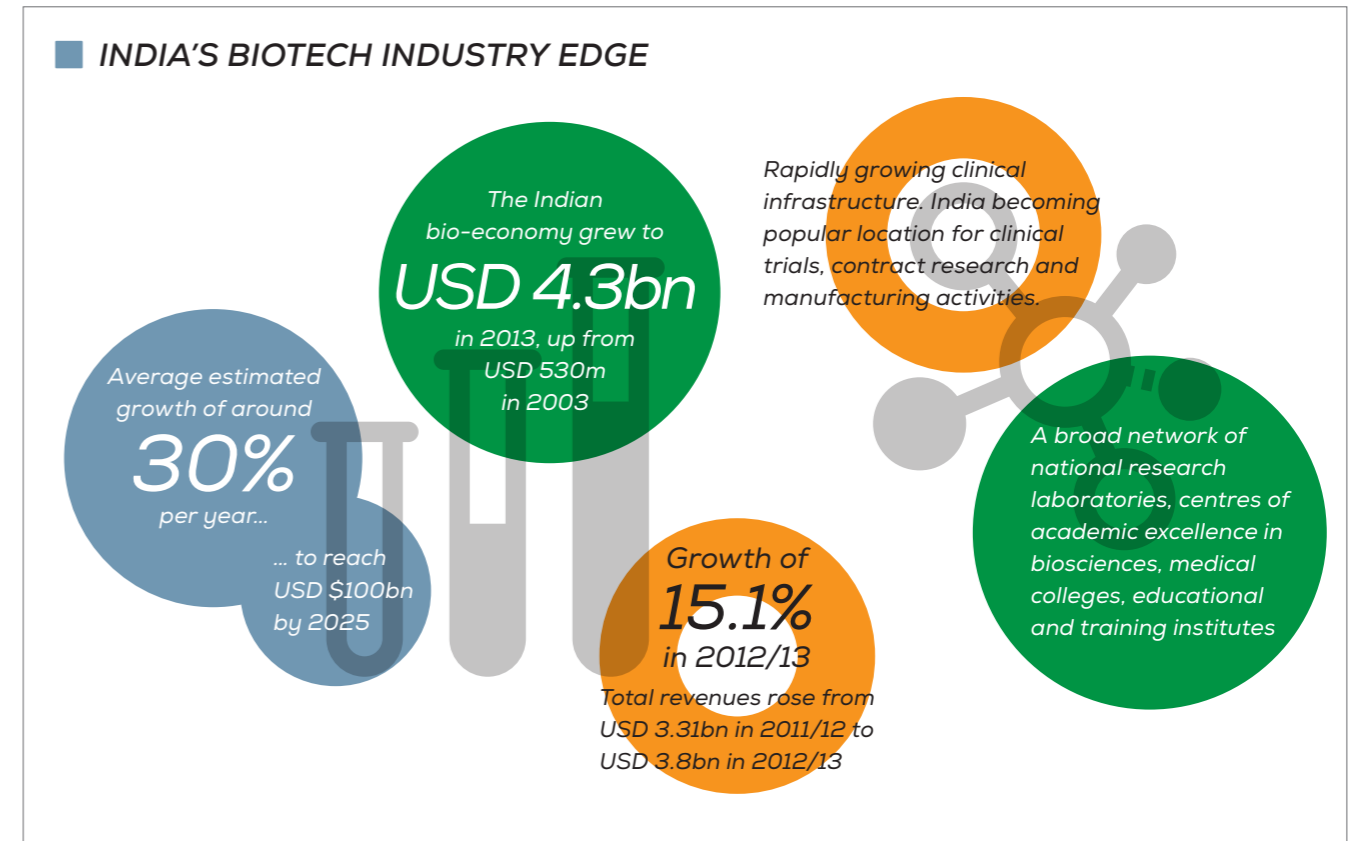
Mazumdar-Shaw says: “Take cancer drugs. If the dosage costs Rs200,000, Rs600,000, or even Rs8,000, what is clear is that the poor cannot afford any of these prices. The government is washing its hands of providing Universal Health Care and forcing price reduction among pharmaceutical firms.

“Using compulsory licenses to secure affordable supplies of essential medicines may be justifiable in some circumstances, such as in 2001 when the US threatened Bayer with a compulsory license on ciprofloxacin, which it intended to stockpile as a defence against mass anthrax poisoning.”⁵

India often has the cheapest drugs anywhere, including Pakistan and Nepal; there’s no more room for price reduction.

Mazumdar-Shaw adds: “If the government puts more pressure on drug prices, it could even lead to drugs disappearing from the marketplace as profit margins will be too narrow. The Indian Patent Act is rather vague in its definitions and does not specify clearly where a compulsory license is justified. Hopefully India will not go for more compulsory licenses.”

This concern is echoed by other industry leaders in India. Srinivas Reddy, director of Hyderabad-based Hetero Pharma told the Economic Times that the country has lost nearly \$10 billion worth of investment by not respecting IP norms. The Indian patent office’s decision to issue in 2012 a compulsory license to Natco Pharma to make German drug maker Bayer’s kidney cancer drug Sorafenib “did more harm to



our image than actually helped patients [and] was hardly in favour of public health or an emergency situation, as very few patients were treated for the disease; it also did not add much to Natco’s revenues...the decision scared away potential investors.”⁶

Biocon is keen for India to structure its pharmaceutical market more in the manner of China. “China on the other hand is a much better market than India because there is more clarity in terms of pricing and on compulsory licensing.

That is why we are seeing the Chinese catch up and potentially overtake India as a manufacturer and exporter of medicines. The Chinese pharmaceutical industry also benefits from high levels of government procurement at the national level. In India by contrast, the focus is on generics and low cost drugs, with procurement taking place at the state level.”⁷

Chinese industry is also benefiting from the country’s health reforms, which has increased significantly the numbers of people covered for

drug costs. “Also while in China the insurance sector is really large while in India is in poor. No state government in India takes health and health insurance seriously.”⁸

So what can the pharmaceutical industry do make its innovative drugs more accessible to the poor? “Take the case of Gilead for the hepatitis C oral tablet”, says Mazumdar-Shaw. “It is a groundbreaking drug, but its high cost would put the company firmly in the crosshairs for a compulsory license in many countries.

³ “Building on a foundation of IP”, WIPO, available at <http://www.wipo.int/ipadvantage/en/details.jsp?id=2602>

⁴ Ibid

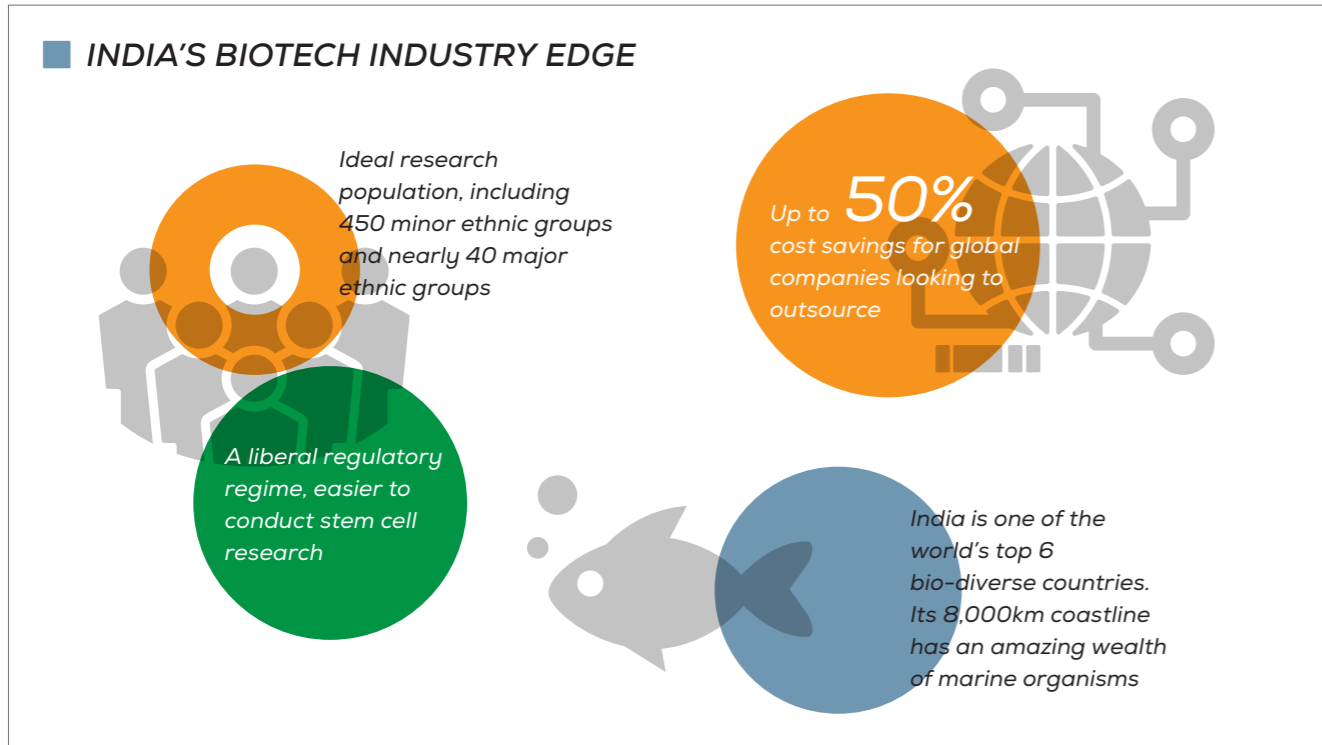
⁵ Interview with author

⁶ “Compulsory Licensing hit India’s image: Hetero Pharma,” Economic times, 31 March, 2015, available at:

http://articles.economicstimes.indiatimes.com/2015-03-31/news/60682269_1_sofosbuvir-swine-flu-drug-kidneycancer-drug-sorafenib

⁷ Interview with author

⁸ Interview with author



“However Gilead signed voluntary licensing agreements with seven reputable Indian-based generics companies to manufacture the drugs at a cheaper price for distribution in the developing world, in return for a modest royalty.

“This approach safeguards important intellectual property, but has been effective at getting the drugs to patients in 91 developing countries, accounting for 54 per cent of the total global infected population – over 100 million people.”⁹

OPPORTUNITY CALLS

India’s traditional medicine systems may be a storehouse of future products. Their commercialization requires the application of biotechnology effort for example creating stabilized formulation.

Under the leadership of Narendra Modi, the Indian government has shown it understands the potential to develop the country’s innovative life sciences sector. A number of generous tax incentives and R&D initiatives are evidence of that.

The opportunity to develop is twofold: first, from foreign companies using India as a low-cost research base to help them bring new molecules to market. Second, local entrepreneurs will look to exploit India’s advantages to set up and grow their own innovative biotech companies.

India’s huge population puts it among the world’s largest markets for vaccines. It has already become one of the largest manufacturers of vaccines globally, and is showing strong signs of innovation there.

Among good examples are Hyderabad’s Bharat Biotech’s

innovative H1N1 influenza and rotavirus vaccines, and the two anti-malaria vaccines under joint development between Ranbaxy and Bharat Biotech.

Another innovative niche being carved out by Indian companies is in monoclonal antibodies products. There is strong promise being shown in the areas of active therapeutic proteins, protein and antibody production and fabrication of diagnostic protein chips. At the same time, India’s relatively liberal regulatory regime makes it a promising location for stem cell research, cell engineering and cell-based therapeutic R&D.

India has well-established strengths in the information technology area. It’s now becoming a world leader in bioinformatics – the use of computer science, statistics, mathematics and engineering to analyse and interpret biological data. Low-cost, whole genome sequencing and the growing role of molecular diagnostics in both precision and preventive medicine are all playing a strong role here.

CHALLENGES AHEAD

India’s potential to be a world leader in health biotech innovation is clear. But there are still things holding it back. One is the lack of clearly defined and enforceable IPRs that are crucial to encourage

companies to invest capital into high-risk biotech research.

The US Chamber of Commerce’s Global Intellectual Property Center ranked India 29th out of 30 countries in its International IP Index 2015, above only Thailand.

And it ranked a disappointing 81 of 141 countries surveyed in the 2015 Global Innovation Index, published by Cornell University, INSEAD and the World Intellectual Property Organization.

Of particular concern to innovators is section 3(d) of the Indian patent act, which is intended to ensure only genuine innovations and not trivial modifications are awarded patents. But given that most of the innovation undertaken by Indian biopharmaceutical companies is incremental rather than ground-breaking, there is a danger the law may stop them in their tracks.

Businesses continue to complain about India’s archaic and rigid labour laws – 44 at the national level and 150 state laws. They say the laws are costly, time-consuming and hold back start-ups and more established companies.

Another major challenge is funding for new business ideas. India spends just 1 percent of its GDP on research and development, with up to 80 percent of that money coming from government.

By contrast, about 75 percent of research funds in wealthy countries come from the private sector. Today, India is responsible for less than 3 percent of the world’s research and little of which is eventually commercialized.

INNOVATION AND ACCESS

Above all else, India must increase access to innovative medicines without harming the patent rights that allow its innovative biotech sector to flourish.

In the developed world governments or third-party payers generally negotiate prices with drug makers. It means patients get the best deal while the incentives to invest in innovation remain.

In the developing world, some companies are using IP creatively to get their innovative medicines to as many patients as possible. India’s ultimate challenge is to explore and expand such collaborative approaches to maximize its biotech potential.

ABOUT THE AUTHOR

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9 Adapted from interview with the author.