INDIA AS THE GLOBAL R&D HUB FOR MANUFACTURING
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EXECUTIVE SUMMARY

For several years, R&D centres were concentrated within the developed world as companies restricted high-end R&D activities to their home country and within the physical boundaries of the corporate firm. However, over time, most firms expanded into developing regions and established local R&D centres to tap these newer markets.

India’s tryst with foreign firms’ R&D commenced in 1985, when Texas Instruments set up an R&D centre in Bengaluru. The country is estimated to have had the eighth largest annual R&D investment worldwide in FY11. India’s share in global R&D spending rose to 2.8 per cent in FY11 from 2.6 per cent in FY10.

The market size renders India an attractive location for large foreign firms seeking to expand operations. As Indian consumers have varied product preferences vis-à-vis developed nations, it becomes imperative for foreign companies to set up their local R&D centres to cater to the domestic market.

Obligated under the Trade Related Aspects of Intellectual Property Rights agreement of WTO, India encourages foreign firms to conduct R&D activities by providing a business-friendly environment. During FY06–10, IP applications filed for patents increased to 34,287 from 24,505, while those for designs surged to 6,092 from 4,949.

A young, low-cost and highly talented pool of workforce is another key factor that renders India a strategic location. The government offers fiscal incentives to R&D firms on equal terms, irrespective of their domestic or foreign origin. The country’s academic institutes collaborate with governments and industry players to perform advanced R&D with a set of highly qualified professors and talented students.

The R&D teams based in India have now advanced to a position where they lead the global R&D teams from across the globe and help the firms maintain leadership position in the global arena. The country sees opportunities, especially in automotive and pharmaceutical industries which will strengthen its position as the global R&D hub in the near future.

Contract research is expected to be a significant opportunity in the pharmaceutical industry due to increased pressure on top global pharmaceutical companies as several blockbuster drugs are going off-patent in coming years.

India is transforming into a global auto R&D hub as most auto giants worldwide are entering the automotive and auto-components sectors. Having established itself as a small car hub, the country is now transforming into a formidable choice for R&D activities.

\(^{\text{WTO is World Trade Organization}}\)
1. GLOBALISATION OF R&D

1.1 What is R&D?

R&D stands for research and development. Organisation for Economic Co-operation and Development defines it as ‘creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications’. R&D has become essential in the corporate world as the requirement for new product design and development has increased with reducing product life cycles. Firms willing to relinquish current profits to enhance future performance by investing in R&D are expected to be more competitive in the long run.

1.2 Internationalisation and globalisation of R&D

For several years, R&D centres were concentrated within the developed world as companies restricted high-end R&D activities to their home country and within the physical boundaries of the corporate firm. However, over time, most firms expanded into developing regions and established local R&D centres [albeit not on a full scale] to tap these newer markets. The expansion into few new markets in Asia Pacific led to gradual internationalisation of R&D activities. While Japan, Australia, South Korea and Taiwan had made their mark in the field, India and China became the major beneficiaries of the phenomenon.

The period during the 1970s and 1980s is referred to as the ‘internationalisation’ stage. During this stage, firms that conducted R&D abroad were small in size, and the work was related to technology transfer units linked to local adaptation. They graduated from that stage and improved their technological capabilities to absorb foreign technology and reverse engineer. This led to the stage called ‘globalisation’ of R&D that began in the 1990s. Higher order R&D activities in destination countries were made possible in this phase due to the advancement of information and communication technologies that delinked R&D from manufacturing activities.

2. INDIA AS THE GLOBAL R&D HUB

Texas Instruments [TI] was the first foreign company to set up an R&D centre in India. It opened its Bangalore (now Bengaluru) centre in 1985. Although initially developing and supporting proprietary software systems for their Integrated Chip design, it became a full-fledged design centre for application-specific products by 1990. The company has evolved since then. TI India has opened a design centre for 3G wireless chipsets and a centre for developing wireless Local Area Network (LAN) chipsets. The company has developed 225 intellectual property rights [IPRs] at its centre in Bangalore.
India’s share in global R&D spending has increased over the last five years. According to Battelle, India is estimated to have had the eighth largest annual R&D investment in the world in FY10. Its share in global R&D spending is estimated to have risen to 2.8 per cent in FY11 from 2.6 per cent in FY10.

The ratio of R&D expenditure to the national GDP increased over the years to 0.9 per cent in 2008, and has been maintained over the last couple of years. The government has planned to further increase the figure to 2% by the end of 12th plan, in line with its aim to project the country as a global R&D hub. India’s 11th Five-Year Plan (FYP) (2007–12) stipulates a 220 per cent increase for science and technology investments compared to the earlier plan (2002–07). The government is partnering with established R&D leaders globally for improving the local R&D capabilities. For instance, India and Russia have partnered for military hardware, wherein the latter would be constructing 12 nuclear power plants over the next 10 years for India.
2.1 Huge market for international manufacturers

Manufacturing holds a key position in the Indian economy, accounting for nearly 16 per cent of the real GDP in FY11. Growth in the sector has been strong, outpacing overall GDP growth over the last few years. This has been accompanied by a change in the nature of the sector; it has evolved from a public sector-dominated setup to a more private enterprise-driven one with global ambitions. As per the United Nations Industrial Development Organisation (UNIDO), India is currently the second largest producer (after China) of textiles, chemical products, pharmaceuticals, basic metals, general machinery and equipment, and electrical machinery. The sector’s importance to the domestic and worldwide economy is set to rise even further as a combination of supply-side advantages, policy initiatives and private sector efforts set India on the path to a global manufacturing hub.
The sheer size of the market makes India a strategic location for large foreign firms to expand their operations. With the Indian consumers having varying product preferences when compared to developed nations, it becomes imperative for these companies to set up their local R&D centres to cater to the local market. It also reduces product development costs and helps the company in achieving a faster time to the market.
Examples

3M sets up its R&D and manufacturing centres near its final markets. The company believes that this strategy would enhance its capability to tailor products and services, and respond to customer demands faster. 3M India plans to ramp up its R&D, by doubling head count over 2010-12 across its 2 R&D centres in Gurgaon and Bengaluru.

South Korea’s Samsung Electronics manufactures washing machines for sale in India. These washing machines include a memory backup to compensate for frequent power outages and a special rinse cycle for saris to prevent them from getting knotted.

The exhibits in the following page highlight growth trends in notable manufacturing sub-sectors.

2.2 Well-established Intellectual Property Rights (IPR) policy

IPR-related policies of the prospect host country play an important role in a company’s decision of whether to set up its R&D centre. The main areas of IPR include patents, copyrights, trademarks, industrial designs and geographical indications. The WTO requires all its member countries to abide by the minimum IPR standards as stated under the agreement ‘Trade-related Aspects of Intellectual Property Rights’ [TRIPS]. India is automatically obligated to abide by these rules by the virtue of being a WTO member since 1995. This creates a friendly environment for foreign firms to enter the region, without having to worry about the safety of the Intellectual Property (IP).

The confidence shown by foreign firms is evident from the rise in IP applications registered in the country over the last five years. Over FY06-10, IP applications filed for patents rose to 34,287 from 24,505, while applications for designs rose to 6,092 from 4,949. Interestingly, the patentee with the largest number of IP applications from India in FY10 was from the manufacturing sector – Hindustan Unilever [FMCG sector, 103 applications]. Pharmaceutical companies were not far behind – the top five Indian firms filed 112 IP applications.
2.3 Low-cost, highly skilled and young workforce

India’s low-cost and highly talented pool of workforce is the key differentiator between India and western countries. India adds 6000 PhDs, 200,000 engineers, 300,000 non-engineering postgraduates, and 2,100,000 other graduates to its workforce annually. The business language used is English, which creates a comfortable environment for foreign firms to set up their base in the country.

The cost of hiring a researcher in India is one-fifth of that in the US. Annual salary of a senior engineer in the US is in the range of USD150,000–200,000, while it is about USD30,000–40,000 in India.

Moreover, Indian graduates work for longer hours. Compared to US and German counterparts, who work for 1,900 and 1,700 hours, respectively, an Indian graduate works on average for 2,350 hours\(^2\) a year.

Another important factor is the average age of the workforce. With more than 50% population below the age of 25 and about 65% below 35, the average age of an Indian after 10 years is likely to be 29 years, whereas the average age of a Chinese and Japanese would be 37 and 48, respectively. By 2030, India’s working population is expected to be youngest in the world.

\(^2\) McKinsey Global Institute
2.4 Policy Support

Given the risk factor involved in any R&D activity, the Indian government tries to lessen the burden on the companies by offering incentives on equal terms irrespective of their domestic or foreign origin. These incentives could be in the form of financial incentives (direct funding of R&D projects by the government) or fiscal incentives (tax holidays, import tariff exception). Majority of the incentives are fiscal in nature as is the case with most developing nations. The following incentives are applicable to firms that undertake R&D activity:

- Tax deduction amounting to 100 per cent of all revenue expenditure, such as employee salaries or material acquisition, which have been expensed within three years of business commencement
- Tax deduction amounting to 100 per cent of all capital expenditure in the year the expenditure occurred
- Accelerated depreciation allowance for investments on plant and equipment made on the basis of usage of indigenously developed technology; this incentive allows companies to show higher depreciation sums, which are tax deductible, in the years just after such investment is made
- Tax deduction amounting to 125 per cent of the expenditure paid by the firm to a national laboratory, university, Indian Institute of Technology or a specified person, provided that the sum is used for scientific research undertaken under an officially approved national programme
- Income tax exemption amounting to 125 per cent of sums donated to a scientific research association, university, college or other institution for scientific research
- Tax holiday of all profits for a period of ten consecutive years, beginning from the initial assessment year, for businesses that carry out scientific R&D as their main occupation, provided that the undertaking is approved by the prescribed authority
- Exemption from custom duty to both public and privately funded R&D institutions for imports (purchases within India) in scientific and technical instruments, apparatus and equipment, accessories and spare parts, consumables, and computer software required for the R&D activity.

\(^3\)Department of Scientific & Industrial Research
Apart from these incentives which are generic and applicable to all industries, R&D is promoted in a bigger way in industries such as biotechnology, pharmaceuticals, telecom equipment, chemicals and automotive.

2.5 Educational Institutes

India has highly acclaimed educational institutes such as the Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs) and Indian Institute of Science (IISc). Most of these institutes conduct R&D in collaboration with central and state governments as well as industry players on a regular basis. These institutes, with highly qualified academicians and a set of talented students, can help propel India to become a global R&D hub.

<table>
<thead>
<tr>
<th>Academic Institute</th>
<th>Principal Sponsor</th>
<th>Focus Area</th>
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<tbody>
<tr>
<td>IIT Kharagpur</td>
<td>Vodafone Essar</td>
<td>Next generation telecom networks</td>
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<tr>
<td>IISc Bengaluru</td>
<td>Aircel</td>
<td>Information security and disaster management of telecom infrastructure</td>
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<tr>
<td>IIT Delhi</td>
<td>Bharti Airtel</td>
<td>Telecom technology</td>
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<td>IIT Chennai</td>
<td>Reliance Communications</td>
<td>Telecom infrastructure</td>
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Source: TCOE India, Aranca Research

3. MAJOR SECTORS AND OPPORTUNITIES

3.1 Pharmaceuticals

The Indian pharmaceutical sector is strong, with annual revenues of USD21.7 billion in FY10. Accounting for 10 per cent of the world’s market share, it is ranked third in the world after the US and Japan (in terms of volume). There are more than 5,000 pharmaceutical firms in India, employing about 340,000 people. The country accounts for around 25 per cent of the world’s generic drug production and has 25 per cent of the drug master files with the US Food and Drug Administration. India also has the highest number of FDA-approved production facilities in the world.
The Indian pharmaceutical industry is one of the highest R&D spenders in the manufacturing domain; companies spend between 10 and 20 per cent of their annual sales on R&D. The outcome of this rising R&D investment has been positive. Patents granted to India-based pharmaceutical companies have been increasing significantly. Indian firms have a comparative advantage in patent filings due to their high intellectual base and low-cost R&D.

Public-private partnership is another important feature in the current trend of R&D activities in India. In addition to setting up their own R&D base, several Indian companies are collaborating with research laboratories such as Central Drug Research Institute (CDRI), Indian Institute of Chemical Technology (IICT), and Centre for Cellular and Molecular Biology (CCMB).
Many blockbuster drugs would go off-patent in the coming years. This would exert pressure on the top pharmaceutical companies worldwide, thereby increasing demand for contract research. Considering the long duration of drug discovery and development as well as increased competition, these companies are looking at outsourcing research. With a well-established industry, lower R&D costs and availability of highly qualified workforce, India would be a suitable option for outsourcing research. Consequently, contract research is expected to create huge opportunity in the Indian pharmaceutical sector.

3.2 Automotive

India is transforming into a global R&D hub for the automotive and auto components sectors as most auto giants are setting up R&D centres in the country. The country offers several key advantages to global auto majors: Lower R&D costs, availability of skilled human capital, and a potentially large domestic market that justifies the investment. Having established itself as a small car hub, India is now becoming a formidable choice for performing R&D activities. Auto giants, including small car makers and luxury car manufacturers like Mercedes-Benz, have set up R&D centres in the country over the past few years. GM and Maruti Suzuki have promised to launch a car completely manufactured in India by 2014–15. The focus on R&D has further scope for expansion in the country over the next decade.
Examples

In 2010, Mercedes-Benz announced the setting up of a R&D hub in India which would graduate from component development to model development during 2010–12. The centre would focus on full-fledged vehicle design and development.

In 2009, Suzuki announced plans to make India its R&D hub and bring the level of product development at par with that in Japan.

Hyundai has decided that the R&D and production of all small cars would be done in India alone, going forward.

Volkswagen set up its global R&D centre in Pune to work on development of small cars for the global market.

In an effort to boost auto R&D in the country, the Indian government has set up several centres of excellence such as the National Automotive Testing and R&D Infrastructure Project (NATRiP) centres in collaboration with the state governments and the automotive sector.
India as the Global R&D Hub for Manufacturing

4. CONCLUSION

India offers a very attractive proposition for the global players to set up their R&D operations. It gives access to a huge market, and a very talented base of scientists and engineers who cost much lesser than their western counterparts. This talent pool will still be young over the next two decades while others such as China would have an ageing working population by 2030.

With English as its business language, and a well-protected environment for IP, India offers a conducive environment for the foreign firms to operate in the country. The government has been providing support to the field of R&D by setting up centres of excellence and offering fiscal incentives to firms irrespective of their whether they are of domestic or foreign origin.

The teams based in India have now advanced to a position where they lead the global R&D teams from across the globe and help the firms maintain leadership position in the global arena. The country sees opportunities, especially in automotive and pharmaceutical industries which will strengthen its position as the global R&D hub in the near future.
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