

RESEARCH AND DEVELOPMENT IN INDIA

Ashok Sonawane,
Ph.D. Research Scholar,
Commerce Research Centre,
K.T.H.M.College, Nashik.

Introduction

The research ecosystem in India presents a significant opportunity for multinational corporations across the world due to its intellectual capital available in the country. Legions of Indian engineers working across the globe highlight the highly trained manpower available at competitive costs. Consequently, several MNCs have shifted or are shifting their research and development (R&D) base to India. These R&D bases either develop products to serve the local market or help the parent company overseas deliver new innovative generation of products faster to the markets across the world.

Market Size

India's Engineering R&D (ER&D) Globalization and Services market reached US\$ 22.3 billion in 2016 and is set to rise to US\$ 38 billion by 2020. @

India accounted for 40 per cent (US\$ 13.4 billion) of the total US\$ 34 billion of globalised engineering and R&D in 2016. #

India will likely get into the list of the top 25 nations in the Global Innovation Index, in the next 10 years. %

India-based R&D services companies, which account for almost 22 per cent of the global addressed market, grew much faster at 12.67 per cent.

The market for Engineering R&D (ER&D) companies in India is mainly structured across pure play PES companies such as Cyient, QuEST, eInfochips and the larger IT companies with a PES play such as Wipro, TCS, HCL. India's ER&D services market is expected to reach US\$ 15-17 billion by 2020 and North America continues to be the largest market contributing to 55 per cent of revenues.

- Tata Motors has tied up with Microsoft for using its connected vehicle technology along with artificial intelligence (AI) capabilities to improve the in-car connected experience.
- Robert Bosch Engineering and Business Solutions (RBEI) has inaugurated its new reliability testing laboratory in Naganathapura in Bengaluru, build for US\$ 3.5 million, and capable of testing Electronic Component Units (ECU) used in automobiles, aircrafts, home appliances and similar other systems.

- Uber Technologies plans to make its Bengaluru technology centre a hub of product innovation for India as well as for global markets with a target of introducing new products on payments, vehicle intelligence and mapping.
- Britannia Industries Limited, India's largest biscuit maker, has set up an ultra-modern research and development facility in Bidadi, on the outskirts of Bengaluru, by making an investment of Rs 200 crore (US\$ 29.3 million).
- Abbott Laboratories, a global drug maker based in US, plans to set up an innovation and development center (I&D) in Mumbai, which will help in developing new drug formulations, new indications, dosing, packaging and other differentiated offerings for Abbott's global branded generics business.
- Everstone Group, an India-focused private equity firm, has acquired a controlling 70 per cent equity stake in Mumbai-based drug delivery technology firm Rubicon Research Private Limited for Rs 220 crore (about US\$ 33 million).
- US-based Mondelez International, a multinational confectionery, food, and beverage company which makes Cadbury chocolates and Bournvita, plans to invest US\$ 15 million to set up a global research, development and quality hub in Thane, Maharashtra.
- The Tata Group has entered into collaborations with world's leading academic institutions, which include Harvard University, Yale University, the Indian Institute of Technology, Madras, and the Royal Society, United Kingdom, in order to fund research and development opportunities in those institutions.
- The United States and India have signed a US\$ 30 million agreement for a public-private five-year research initiative on smart grid and energy storage technology.
- The Government of India and the Government of the United Kingdom have signed an agreement to work together in the fields of Solar Energy and Nano Material Research, which is expected to yield high quality and high impact research outputs having industrial relevance, targeted towards addressing societal needs.
- The Indian Space Research Organisation (ISRO) has successfully launched 20 satellites and injected them into the required orbit, launching the maximum number of satellites in a single mission ever. The launch took place aboard the Polar Satellite Launch Vehicle (PSLV-C32) at the Satish Dhawan Space Centre in Sriharikota.
- Boston Scientific Corporation plans to develop devices such as stents, catheters and pacemakers at its Gurgaon facility in India for the Asia Pacific, Middle East and African markets, which will make India its biggest R&D hub outside the US.
- India is becoming a new innovation destination of choice, with Bengaluru been ranked fifth among the top ten destinations in the world to open innovation centres.
- Ford Motor Company plans to set up a new global technology and business centre in

Chennai, which will host operations of Ford Global Business Services in areas of Information Technology (IT), product engineering, finance and accounting and data analytics.

- India's largest two wheeler manufacturer, Hero Motocorp has set up an integrated R&D facility with an investment of Rs 850 crore (US\$ 126.74 million) on the outskirts of Jaipur.
- Informatica, a US-based cloud and data management company, plans to make huge investment in next four years to expand its Bengaluru R&D facility.
- QuEST Global, a pure-play engineering and research and development (R&D) services provider, has raised investment of around Rs 2,396 crore (US\$ 357.27 million) from leading global investors Bain Capital, GIC and Advent International for a minority stake in the company.
- The National Research Development Corporation (NRDC) has signed a Memorandum of Understanding (MOU) with Indian Institute of Chemical Biology (IICB) which will give an impetus to the "Startup India" and "Make in India" missions of the Government of India by promoting entrepreneurs, incubation, Intellectual Property Rights (IPRs) and technology transfer.

R&D opportunities in various sub-sectors in India

ICT and wireless technology	<ul style="list-style-type: none"> • Establishment of Software Technology Parks of India (STPI'S) • National Policy of IT aims at bringing the power of ICT within the reach of all its citizens to enable India to emerge as a global hub for IT by 2020
Pharmaceuticals and Health Care	<ul style="list-style-type: none"> • US\$ 55 billion in revenues by 2020 and US\$ 26.1 billion in genetics by 2016 • Create a new Health Policy for 2015-2025 to focus on healthcare for all holistically
Manufacturing technologies	<ul style="list-style-type: none"> • Automation and environmental sustainability are the key focus areas for manufacturing companies • Planned expenditure in R&D in manufacturing sector is estimated to increase by 63 per cent in 2016-17 as compared with that in 2015-2016
Material energy	<ul style="list-style-type: none"> • Multi-disciplinary research to combine emerging concepts in nanotechnology with fundamental metallurgical chemistry is the way forward
Bio-energy	<ul style="list-style-type: none"> • Bio-energy is emerging as a promising alternative to meet rural energy needs in India
Water technologies	<ul style="list-style-type: none"> • R&D efforts would concentrate on developing technologies for treatment, recycling, recovery, reuse and efficient use of water

Source: Make In India, FICCI

Government Initiatives

Some of the major initiatives taken by the Government of India to promote R&D sector are:

- The Union Cabinet has approved the MoU between United States Geological Survey (USGS) and Indian Space Research Organisation (ISRO) enabling ISRO to receive USGS's Landsat-7 & 8 in India and USGS to receive ISRO's Resourcesat-2 (AWiFS and LISS III) data of US region.
- India and Israel have agreed to enhance the bilateral cooperation in science and technology in

the next two years by providing US\$ 1 million from each side to support new research and development (R&D) projects in the areas of big data analytics in healthcare and cyber security.

- The Ministry of Environment, Forest and Climate Change (MoEFCC) has announced a R&D initiative to develop next generation sustainable refrigerant technologies as alternatives to the currently used refrigerant gases like hydrofluorocarbons (HFCs), in order to mitigate its impact on the ozone layer and climate.
- The Government of India plans to set up an Indian Council for Fertilizers Research, which would encourage development of new fertilisers and nutrients and thereby boost the growth of agriculture sector in the country.
- India and Japan are exploring ways to strengthen their collaboration in various fields of science and technology, such as artificial intelligence, energy, ocean sciences, marine instrumentation, high skill development and analysis of Big Data, research & development and bio information, while many projects are in the planning process.
- The Department of Industrial Policy and Promotion (DIPP) aims to lower the time taken to clear pending Intellectual Property Rights (IPR) applications to 18 months by March 2018 and those of trademarks to one month by March 2017, which is expected to encourage innovation and entrepreneurship in the country.
- The Union Cabinet has given an "in principle" clearance for the location of a Laser Interferometer Gravitational-Wave Observatory (LIGO) facility in India which will be the third in the world and will be set up and managed by the IndIGO Consortium (Indian Initiative in Gravitational-wave Observations).
- India's steel minister Mr Narendra Singh Tomar has announced creating a fund of Rs 100 crore (US\$ 14.91 million) to help setting up R&D units with the participation from industries and the government to overcome the technological gaps. Mr Tomar said "It is under the active consideration of the government to infuse more funds in this initiative to utilise locally available cheap raw material, to remain competitive in the world market.
- A team of scientists from India and Bangladesh will conduct for the first time, joint marine research within Bangladesh's Exclusive Economic Zone (EEZ), which is expected to help in understanding climate change and monsoon patterns in India.

Conclusion

With the government's support, the R&D sector in India is all set to witness some robust growth in the coming years. According to a study by management consulting firm Zinnov, engineering R&D market in India is estimated to grow at a CAGR of 14 per cent to reach US\$ 42 billion by 2020.

India is also expected to witness strong growth in its agriculture and pharmaceutical sectors as the

government is investing large sums to set up dedicated research centres for R&D in these sectors. The Indian IT industry is also expected to add to the development of the R&D sector.

References

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