

The untapped opportunity

An Evalueserve report explores the demand for research professionals in India over the next 10 years



professionals in the Indian R&D industry over the next 10 years. There is an opportunity for international technical universities and research institutes to assist India in meeting this demand for trained R&D professionals. This article provides an overview of various possible business models that international universities could consider for establishing their presence in India.

The Indian R&D industry was valued at \$8.5 billion in 2005, representing around 1.16 per cent of India's GDP. Evalueserve estimates the Indian R&D industry to grow at a CAGR of 26 per cent to reach \$27.5 billion in 2010. The R&D spend is expected to grow further at a CAGR of 19 per cent over the period 2011-15 to reach \$64.5 billion in 2015. Thereby the contribution of R&D as a percentage of GDP is expected to grow to around 2.0 per cent by 2010 and 2.6 per cent by 2015.

This translates into an additional requirement of approximately 294,000 researchers during 2006-10 and another 300,000 researchers over 2011-2015. While the Government of India is ramping up its higher educational infrastructure by opening new institutions/universities and expanding the teaching faculty and infrastructure in the existing institutions; there is an opportunity for foreign institutions / universities to set up their training and research institutes in India. These are some business models that international universities could consider.

Offer higher education

High growth in the services industry coupled with increased participation of the private sector in education has resulted in demand for specialised courses and training in India. Given growth projections of

Industry-led research and development is witnessing rapid growth in India. Over 200 multinational companies have initiated research and development operations domains like IT/telecom, biotechnology, pharmaceuticals, chemicals, and consumer goods.

Public-private partnerships have seen growth with both industry and academic/research institutions benefiting from the process. Several MNCs are currently meeting their requirement of R&D professionals by hiring expatriates for senior positions and training qualified engineers/science graduates in India for entry-level positions.

However, in the next five to 10 years, lack of suitably qualified and trained technical professionals could be an impediment to the growth of the R&D industry. There is bound to be a demand for research pro-

the Indian services industry, the country is likely to witness tremendous activity in the higher education sector in the next five to 10 years.

In a developing country with a population of more than one billion people, the pressure to get employed is very high. Therefore graduates aspire for a master's degree at an early age. The trend is further accentuated by an inclination towards courses in science or technology, which offer better employment opportunities.

However, in the current scenario, the options available to an aspiring Indian student are limited by the lack of the requisite infrastructure in higher education. Therefore, a large section of the students spend exorbitant sums to enroll themselves into private Indian institutes and foreign universities. As a society where emphasis is laid on education and distinction, parents are willing to make the additional investment for their child's future.

A student could pay up to \$10,000 per year for a post-graduate course in an Indian private institute and around \$30,000 per year for education in a foreign university. Earlier, these courses were restricted to the rich and scholarship-holders only. However, increased access to soft educational loans has made expensive higher education accessible to a larger section of society. Student loans have been a major factor in catalysing the growth of the private sector and foreign education.

Furthermore, the market generally rewards professionals with an advanced degree with high-paying jobs. The degrees open attractive opportunities, not only in India, but also overseas. Therefore with the option of paying out the loan later, it suits Indian students to pay high tuition fees.

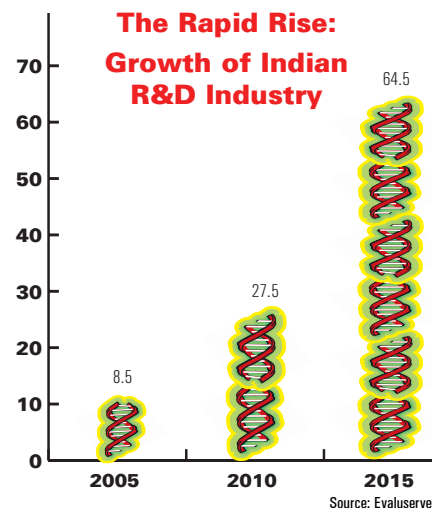
For example, The Indian School of Business (ISB) Hyderabad, which has a tie-up with the Kellogg School of Management, the Wharton School, Pennsylvania and the London School of Business, and charges more than \$30,000 for a one-year MBA course. The school attracts 500 students annually and the placement salaries go as high as \$66,000 per annum for a domestic offer and \$233,800 per annum for an overseas placement.

International universities could play a significant role in expanding access to high quality, higher education in the country. Given a choice, students would prefer to

enroll into a foreign university at an Indian campus, which offers an international exposure through faculty and student exchange programmes. Therefore, a foreign university in India would offer the best of both worlds - high quality education at low cost.

From the university perspective, it can create a sustainable business model through larger enrollments at a lower fee structure. International universities can enter the Indian market, either through collaboration with an Indian institute or on a stand-alone basis. Some examples of foreign partnerships in education in India are:

- ❖ Staffordshire University has partnered with Jadavpur University and University of Madras to offer masters courses, primarily in engineering.
- ❖ The Indian Institute of Science (IISc), Bangalore and Cardiff University, Wales, UK, have partnered to co-operate in training and research in the fields of science and technology. The collaboration includes exchange programmes for scientists and students, and sharing of information related to research activities.
- ❖ The Maastricht Economic Research Institute on Innovation and Technology (MERIT) at the University of Maastricht, Netherlands tied up with the Centre for Development of Advanced Computing (C-DAC), Mumbai in July 2006 to start a two-year project called FLOSSWORLD supported by the European Union (EU), in the area of open source software. The project has been implemented in several countries.



JOINING HANDS

GOING forward, the public-private partnership in education and research needs to be strengthened as both have an important role to play in building the system. A cross-border partnership at a macro level creates a lasting impact on the society. It creates a platform for creation of jobs, cross-border employment, cross-pollination of cultures, technology transfer, sharing of best practices and bilateral relations, to name a few. Countries, such as the US, the UK, Switzerland and India have made successful attempts in this direction.

For example, The Department of Science & Technology (DST), India and the Swiss National Science Foundation (SNSF) have partnered together with the aim of linking together research groups from Swiss and Indian institutions. EPFL, VPRI of Lausanne, Switzerland plays a key role as the academic and research partner in this programme. The approximate project budget is about \$46,500. EPFL is also responsible for a number of other private and public alliances, such as the Indo-Swiss Academic Alliance, Indo-Swiss Scientific & Technological Cooperation, Indo Swiss Bilateral

Research Initiative and the Indo-Swiss Joint Research Programme. Furthermore, EPFL has collaborated with premier Indian technical universities, such as the IITs, IISc and IIIT for cross-border student internships and projects, creating a mix of international minds. The number of students enrolled for the PhD programme at EPFL has been 43 and 51 for 2005 and 2006, respectively. The institute conducts joint research projects at the IIT campuses. Faculties are brought in from both Switzerland and India. The Swiss project partners include ETHZ, IDIAP, University of Lausanne and University of Zurich.

Similarly, the UK-India Education Research Initiative (UKIERI) is aimed towards improving higher educational and research, and create sustainable institution to institution links between the UK and India. The programme is backed by the governments, the British Council, the education sector and businesses. The main activities of the programme include promoting research partnerships between centres of excellence and developing joint training courses.

Conduct international research projects

The Indian arm of the university can also conduct research on international projects in close association with the parent university. The cost of conducting research in India is much lower than that in developed countries. The differential could be as high as 30-40 per cent. For example, the salary of a chip designer with a master's degree and five years' experience is about \$7,000 a month in the US. Whereas in India, the salary for a similar profile would be about \$1,500 a month.

Similarly, the annual cost incurred for a senior engineer in the US is about \$150,000-200,000, while in India an equivalent would cost about \$30,000-40,000. On other related costs, such as infrastructure, constructions, etc, India again scores far better. Moreover, Indians work for longer hours as compared to their Western counterparts. Therefore, India cre-



ates a much higher value per dollar that is spent on R&D.

However, the value cannot be estimated by cost alone. Given the quality and size of the talent pool and the time zone advantage, conducting research in India would result in shorter time-to-market for product development and innovations.

In addition, the university can staff students and interns in live research projects. This would not only add tremendous value to their experience and enrich their training, but also increase their job opportunities.

Conduct research for local industry

The university can also offer consulting/advisory services and training programmes to local private and public entities. Some examples of partnerships of universities and the private sector are:

- ❖ IBM has partnered with IIT Mumbai for collaborative research on technology; Intel has partnered with IIT Madras for research on speech technology; Wipro has partnered with Wollongong University, Australia in the area of education and research in IT services.
- ❖ Bharti, the largest mobile service provider in India, has partnered with IIT Delhi to establish the Bharti School of Telecommunication Technology and Management for technical research and education.

Employment Opportunity in Indian R&D Industry

	2005	2010*	2015*
PhDs Required	27,000	56,000	86,000
Post-Graduates Required	80,000	168,000	258,000
Graduates Required	159,000	336,000	516,000
Total Researchers Required	266,000	560,000	860,000

* Projected Source: Evaluserve

❖ On the other hand, Pramati Technologies, a developer in Java 2 Enterprise Edition (J2EE) application server technology based in India, has partnered with leading global institutions, such as MIT Massachusetts, University of Muenster Germany, IIIT Bangalore, XLRI Jamshedpur, National Chiao Tung University Taiwan, and Tsinghua University China to introduce courses in Java technology.

Incubate technology start-ups

Incubation parks within university campuses are common in developed countries. These parks help research professionals in commercialising their ideas and innovations. The university can provide the necessary IP, infrastructure, advisory and technology support to these technology-based business start-ups. The financial resources can be provided by the venture capital community, which supports such innovation parks backed by universities. As Indians show a strong inclination towards entrepreneurship, the technology-based business incubation model is likely to be successful in India.

Indian Institute of Information Technology (IIIT) Bangalore is amongst the leading institutions that encourages a technology-based business incubation ecosystem. The incubation park is based on the Stanford University-Silicon Valley model to encourage entrepreneurship amongst students. In the recent past, two companies, namely 'Backend Bangalore' and 'BedrocQ' have been incubated by the park.

Conduct social research

The government encourages R&D in domains, agriculture, space, defence, healthcare, alternate energy, pollution-control and calamity-control. A few Indian universities specialise in carrying out research in some of these fields. The international universities can collaborate with them to conduct joint research and share best practices.

And finally...

The government of India encourages the diffusion of higher education and research in a number of ways. It offers special subsidies and maintenance grants to state-funded institutes including the reputed establishments, such as IITs and AIIMS.

States such as Karnataka have additional norms to support public subsidies to the private sector. For foreign institutions, a 100 per cent FDI is allowed via the automatic route in the education sector.

Over the years, the government has been the largest spender in R&D and education. In 2004, it contributed 85 per cent of the R&D spend in the country. Government bodies, such as the Department of Science and Technology support R&D through a number of initiatives. In terms of international regulations, it has adopted the WTO's IP regime formulated in 2005.

Students in particular, are offered multiple advantages in the form of soft loans from nationalised banks, grants-in-aid, fee subsidies, and so on. In addition, students are offered attractive education loans.

In December 2005, the outstanding loans of the public sector banks under the education portfolio stood at \$2,091 million. Out of this, new loans disbursed in the first three quarters of 2005-06 was \$2,705 in 1,76,870 accounts. Moreover, loans up to \$16,650 were given to meritorious students without collaterals.

India is fast becoming a country of growing importance to the world economy. The real strength of the country does not lie in its population, or cost advantage, but in its skill-set. An international university in India can not only provide high quality training to the Indian technical graduates, but also leverage the talent pool for international R&D endeavours. Therefore the entry of foreign universities in the Indian higher education sector creates a win-win situation for both the university as well as the Indian education and R&D industry. 🌱

Research partnerships: between universities and the private sector in India

IIT Kharagpur undertakes research in collaboration with MNCs, such as, Motorola, Compaq, Oracle and GE Caps.

IIT Chennai and Hewlett Packard (HP) run a joint laboratory at IIT's campus. This lab develops technologies for emerging economies.

HP Labs also partners with IISc Bangalore, BITS Pilani and the National Institute of Design, Ahmedabad.

Intel has formed alliances with the IITs, IISc and IIIT-B to conduct Curriculum Development Workshops for the faculty of engineering colleges, which helps to bridge the gap between academia and industry.

Intel strives to promote R&D activities based on its design, through its Intel Technology Laboratories (ITL) at IIT Mumbai, Chennai and Delhi; IISc Bangalore, and the National Center for Software Technology (NCST), Mumbai.

GM has tied up with 21 institutes, including the IITs and IISc. It conducts research with IISc on fuel alternatives and light-weight engine materials.

IBM collaborates with the IITs, C-DAC Pune, the Indian Institute of Information Technology (IIITs), and IISc Bangalore.

Texas Instruments has set up its Digital Signal Processing (DSP) laboratory at IISc Bangalore and five IITs.

Samsung undertakes designing of colour televisions, washing machines and air conditioners in collaboration with IIT Delhi's Industrial Design Department. It also has a consumer laboratory at IIT Delhi that undertakes usability studies

Hindustan Lever collaborates with the IITs, IISc and the University of Mumbai's Department of Chemical Technology (UDCT).