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Teknologisamarbeid med India

Indian IT/Software Professional Background and Recruitment

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Forord

Denne undersøkinga er eit oppstartsarbeid på ei muleg rekruttering av indisk IKT-kompetanse for DIFI. Rapporten presenterer ein oversikt over utdanningssystemet generelt i India, dei beste utdanningsinstitusjonane i landet, indisk IT-bransje og forslag på kort sikt og lang sikt innan rekruttering av IKT-personell.

Undersøkinga er gjennomført av Rajendra Akerkar med støtte av Svein Ølnes og det er ein del av eit større arbeid med utgreiing om eit muleg teknologisamarbeid med India.

Vestlandsforsking, 2012

Innhald

Country Profile

India is one of the world's oldest civilisations, dating back to 2,500 B.C. Aryan tribes from the northwest invaded the country in about 1,500 B.C.; their merger with the earlier Dravidian inhabitants created the classical Indian culture. Arab incursion starting in the eighth century and Turkish in the twelfth century were followed by those of European traders, beginning in the late fifteenth century. By the nineteenth century, Great Britain had assumed political control of virtually all Indian lands. India achieved independence in 1947.

The Republic of India was established in 1947 and comprises 34 states and Union Territories, the latter controlled by the central government. The country covers about 3.3 million square kilometres with a population of 1.029 billion and dominates southern Asia. It is slightly larger than one-third the size of the United States. India is home to 17% of the world's total population, accommodated in an area that is 2.4% of the world's total area.

India has the world's 10th largest economy and the third largest in Asia behind Japan and China, with a total GDP of around $570 billion. Services, industry and agriculture account for 50.7%, 26.6% and 22.7% of GDP respectively. The United States is India's largest trading partner. Bilateral trade in 2003 was $18.1 billion.

There are some 18 official major languages and 1,652 dialects. Among these languages, English enjoys associate status, but is the most important language for national, political, and commercial communication. Hindi is the national language and primary tongue of 30% of the people. Hinduism (80.5%), Islam (13.4%), Christianity (2.3%), Sikh (1.9%) are the major religions in the country. The literacy rate is 52% (of the total population of age 15 or older).

- Workforce size: 1,43 billion (Source: CIA Factbook, 2011)
- Outsourcing sector: Offshore outsourcing (IT and BPO): 47,000 million (Source: NASSCOM, 2011)
- Outsourcing sector: Exports of computer and info services: 46,687 million (Source: IMF, 2010)
- Outsourcing sector: Exports of misc business services: 11,163 million (Source: IMF, 2010)
- Adult Literacy: 60 % of population (Source: UNESCO, 2011)
- Basic Education: Expenditure on education: 4.1 % of GDP (Source: UNESCO, 2010)
- University Graduates: Annual graduates: 2,900 thousands (Source: UNESCO, 2010)
- Technological Readiness: Internet access: 1.6 users per 100 inhabitants (Source: International Telecommunications Union, 2010)
- Technological Readiness: Broadband Internet access: 0.8 subscribers per 100 inhabitants (Source: International Telecommunications Union, 2010)
- English speaking population: 15.02 % (Source: MHRD, 2011)

2. India's Steps towards Becoming an IT Economy

2.1 The Indian IT Advantages

In 1991, the long running fiscal deficit precipitated an economic crisis in India and as a result the government relaxed controls over the international movement of capital enabling foreign companies to operate subsidiaries with a major foreign stake of ownership in India. This was when multi-national IT players started coming to India; but the intensive ramp-up of their resources started only after the year 2000.

Around this time, India decided that if it was ever to become a global player and developed country, it would first have to become an information technology country and build on its historical reputation in mathematics.

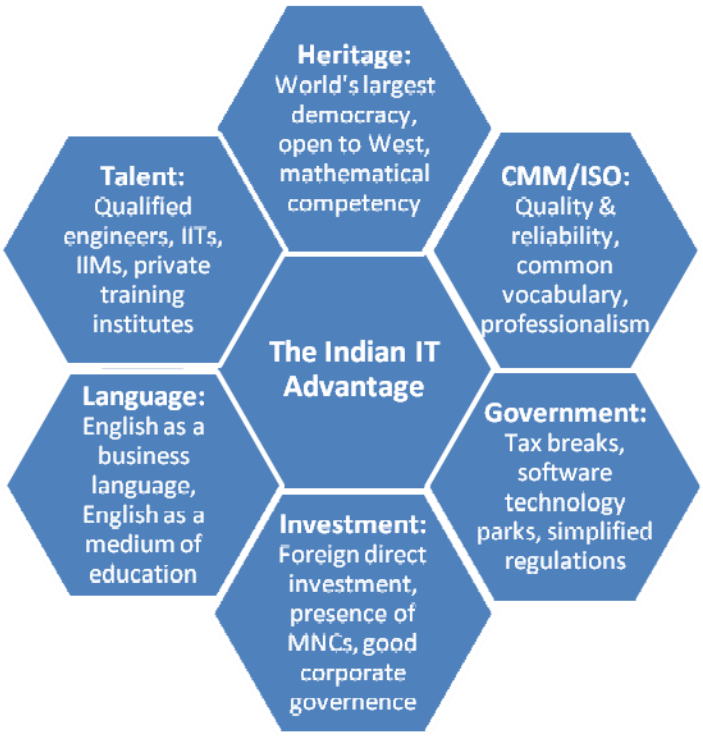

Figure 1: Indian IT advantages

Indian IT firms led by Infosys, Tata Consultancy Services (TCS), and Wipro began to expand the narrow domestic market and serve the needs of the foreign IT services market. Indian IT professionals were deployed as temporary onsite workers to clients in the Western world who in turn were able to produce software code drastically cheaper than with computer professionals from developed countries. This business model instantly became known as *body-shopping*.

The Indian IT industry started as a labor-arbitrage body shop, but is now moving into knowledge-intensive services. Indian IT engineers have not only learnt how to solve problems, but have gained experience in re-engineering processes and making process flows more effective.

Advantages of successful IT business in India are graphically depicted in the Figure 1.

2.2 Software Technology Parks

In 1999 the Government of India established a scheme known as *Software Technology Park* (STP) which exempts the export-oriented IT market from paying tax on their export revenue as per Section 10(A) and (B) of the Income Tax Act.

Considering that India's domestic market is very price sensitive, the benefits to be realized under the STP scheme are even more of a reason for an Indian IT company to look for offshore revenues. And when India started to move into offshore business process outsourcing (BPO), the Indian industry coined the term ITeS, which stands for *IT Enabled Services*.

The Indian software industry has been maturing in many aspects. In the value chain it started as a subcontractor for manpower and shifted to doing complete coding or testing phases of projects. In the early 90s, the quality norm ISO9000 was introduced and the Indian software industry quickly recognized its potential to improve its quality processes while at the same time establishing a sole selling proposition on the international market. **When Capability Maturity Model (CMM) was introduced in the late 90s, almost the entire Indian IT industry went for a re-certification and within a few years, many software companies matured to level 4 or level 5. More than half of the total high-maturity organizations in the database of the Carnegie Mellon Software Engineering Institute (SEI) are from India.** While Software Process Improvement (SPI) usually is a slow process, the fast adaptation in India has many reasons.

The average age of IT engineers, BPO employees, and managers in the Indian industry is very young. Younger people are generally more receptive to change and improvements, but they also need more guidance, supervision, and control; SPI provided a framework to cater to requirements. Moreover, Indian managers would have come into contact with quality frameworks earlier in their career as developers and provide backing for SPI initiatives.

2.3 The 'Silicon Valleys' of India

IT and BPO offshoring companies are mostly clustered around the major cities. Thus, the industry has grown in various locations in India. In India's north the focus is on three regions: Mumbai, Delhi, and Kolkata. In the south, IT development and BPO is concentrated on the technology triangle of Bangalore (Bengaluru), Hyderabad, and Chennai. The following Figure 2 illustrates major IT hubs in India.

Figure 2: Major Offshoring locations in India

Bangalore is often referred to as the Silicon Valley of India; it has grown from a garden city, where pensioners would move to spend their retirement years, to a supercharged city of rapid growth.

In the Mumbai region, the city of Pune has scooped up some work previously performed in Mumbai itself. Pune is a separate city itself, but very close to Mumbai to allow business with clients based in Mumbai.

Foreign investors see India as an attractive investment option, despite the uncertain global economic climate, according to the second edition of Indian Attractiveness Survey (see Figure 3).

- 20% Foreign Direct Investment (FDI) increase in India in 2011.
- Nearly 255,416 new jobs created by FDI projects in 2011. (Source: NASSCOM 2011)

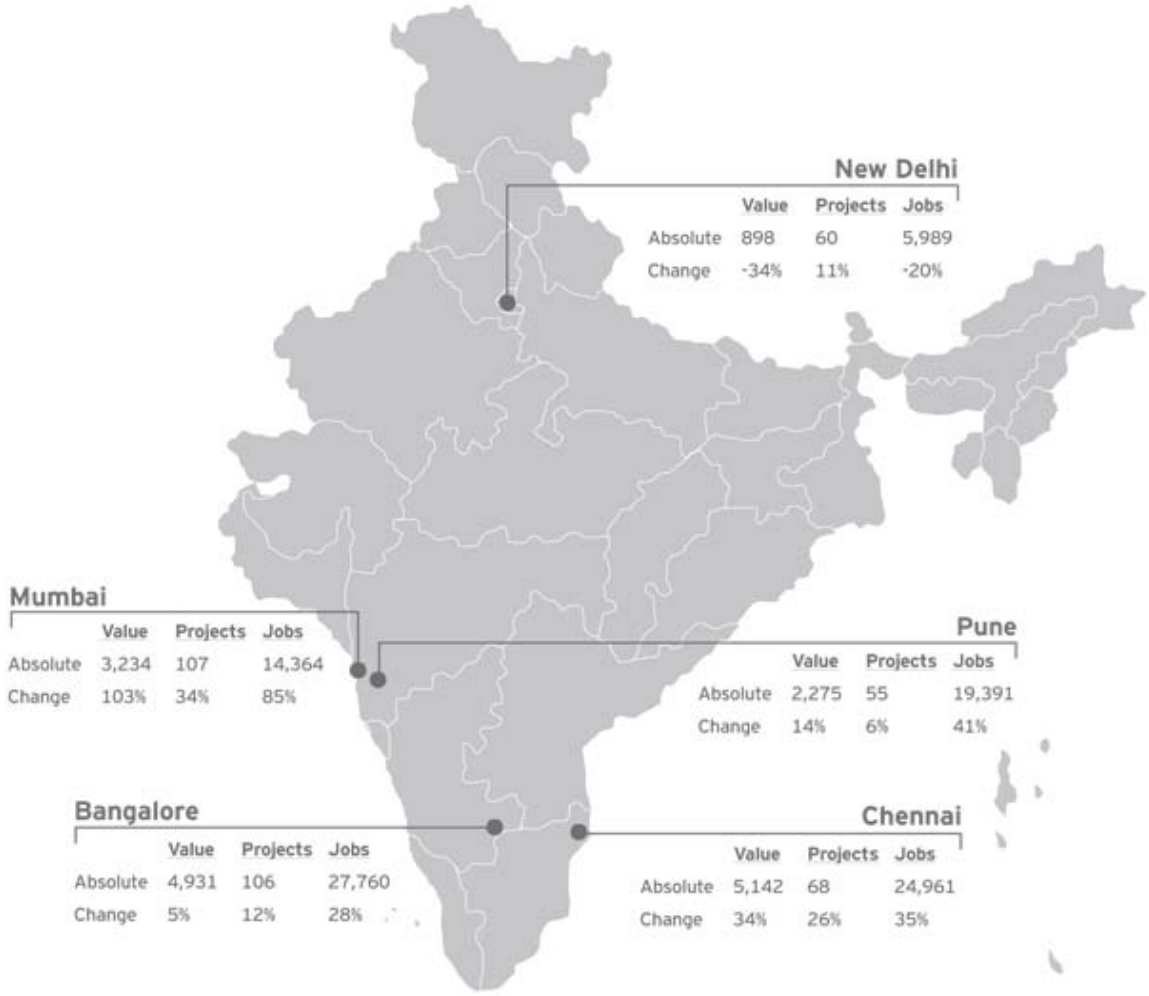

Figure 3: Top five FDI recipient cities (Source: FDI intelligence 2011)

3. Operating Models

3.1 Offshore

With offshoring one participates in worldwide markets and does the things which are most appropriate and cost-effective in the respective markets. Offshoring concerns sourcing rather than sales activities, and it supports global or domestic rather than local operations**. offshoring also comprises short-term project work and replacement of home company resources with more cost-effective international 'bodies', which is called body shopping or staff augmentation.**

In this report, we will simply refer to offshoring as sourcing work from India and I will use the term onsite or onshore as work conducted at the company's home location.

The trend of establishing a company's own facilities in a low-cost location is known as *captive offshoring*. Following Figure 4 depicts distribution of captives in India.

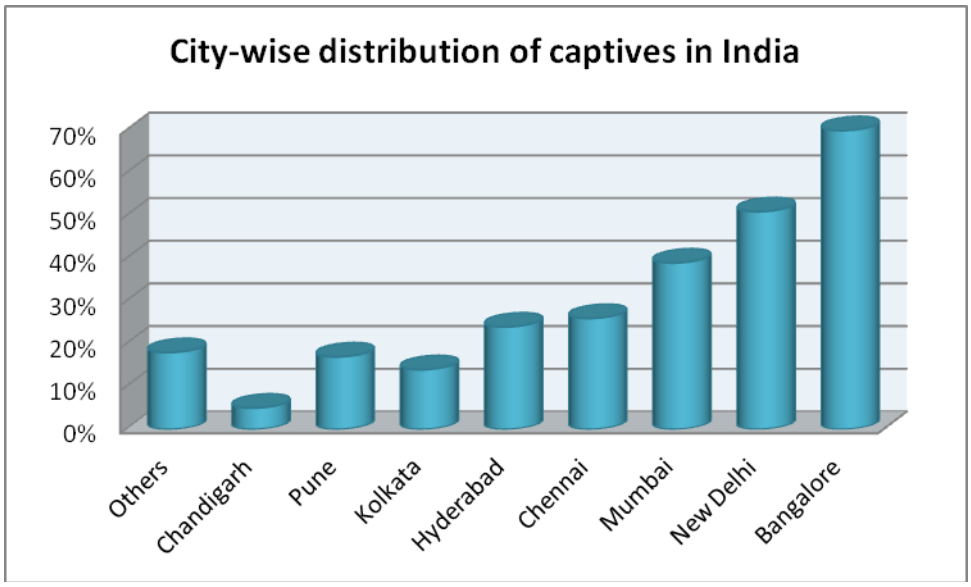

Figure 4: IT hub distribution of captives in India (Source: NASSCOM report 2010)

They are mainly concentrated in Bangalore, New Delhi, Mumbai, Pune, Chennai, and Hyderabad. These cities are offering the best infrastructure business environment, and possibilities of recruiting from the job market. Between 2000 and 2011, more than 400 companies from across the globe and across verticals have established such captive centers in India.

From an Indian perspective, work coming to offshore captive centers is mainly maintenance of old systems and very rarely on new technologies and new product development.

3.2 Outsource

Outsourcing is the act of obtaining services from an external source, that is, one whose business is incorporated outside the boundaries of the firm; it is a basic redefinition of the company around core competencies and long-term external relationships with suppliers.

There are two clear objectives: First, the value to the end customer should be increased. Second, the corporation should work at the highest productivity levels possible. Key to the definition of

outsourcing is the concept of ongoing management and service delivery at prescribed performance levels.

Outsourcing thus does not include hiring contract workers or short-term, project-based work provided by third parties; this is commonly referred to as body shopping or staff augmentation.

Looking at places of service delivery, outsourced services may be provided domestically, that is, onsite in the company's own location and buildings, or offsite at the service provider's location.

Business Process Outsourcing **(BPO) involves the contracting of the operations and responsibilities of a specific business function or process to an offshore vendor. It is categorized into back-office outsourcing, which includes internal functions like human resources, payroll, or finance, and front-office outsourcing, which is about customer-related services.**

3.3 Companies of Indian Origin

Recent years, many offshore IT deliveries are performed by Indian owned companies. One of the key things that separate CIOs from multi-national companies is the lack of innovation focus. While the top Indian pure players are consistently praised for their technical skills and on-time delivery, their spend on R&D is small in comparison to MNCs

To name a few of the world famous companies working on outsourced jobs in India are:

- Tata Consultancy Services (TCS)
- Wipro Limited
- Infosys
- Cognizant Technology Solutions (CTS)
- International Business Machines (IBM)
- Genpact
- Hindustan Computers Limited (HCL)
- Tech Mahindra Limited
- Patni Computer Systems

Most of these companies have offices in Bangalore, Mumbai and Pune.

3.4 Multi-national Companies

Established multi-national companies (MNCs) in the IT & BPO service domain have replicated the offshore model and counter the emergence of Indian pure players. MNCs have already built up a huge presence in India, but despite high growth, they continue to trail behind the pure players in terms of growth and profitability; the five largest international players together account for less than 9% of the Indian IT workforce. While they have a better strategic positioning in the global market, they are challenged with adapting the heart of their operating model to offshore delivery.

4. Human Resource

4.1 Education System & Training

Educational policy planning is under the overall charge of the central Ministry of Human Resource Development which includes the Department of Elementary Education and Literacy and the Department of Secondary and Higher Education. The National Council of Education Research and Training (NCERT) defines the National Frame Curriculum for classes I - XII. At secondary level, school boards at state (province) level affiliate schools and set examination standards in accordance with the national framework. The Central Board of Secondary Education (CBSE) and Council for Indian School Certificate Examinations (CISCE) cover all India besides the National Institute of Open Schooling (NIOS).

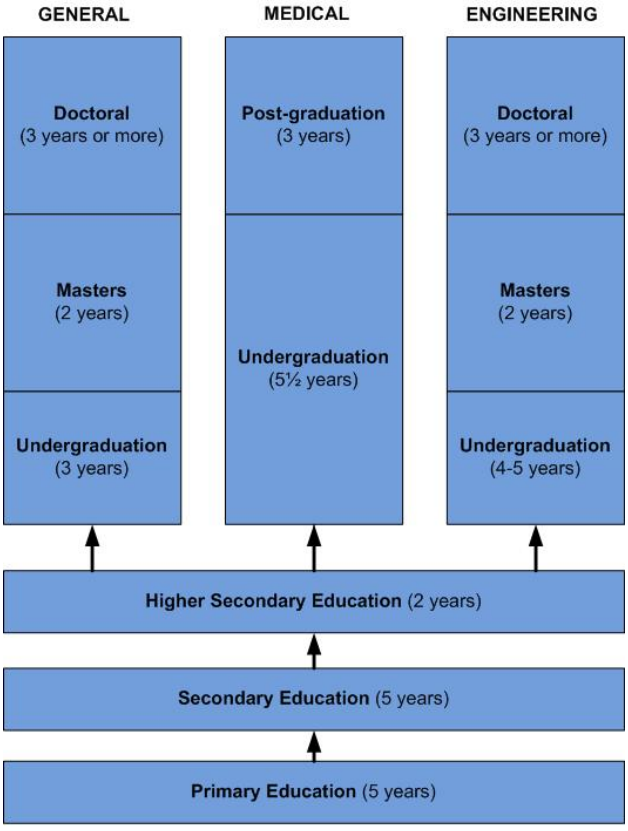

Figure 5: Indian Education Structure

A uniform structure of school education, the 10+2 system, has been adopted by all the states and Union Territories (UTs) of India following the National Policy on Education of 1986.

Elementary school, Class I – VIII, is recognised as the period of compulsory schooling. The pre-school covers two to three years. The elementary stage consists of a primary stage comprising Classes I-V (in some states I-IV), followed by a middle stage of education comprising Classes VI -VIII (in some states V-VIII or VI -VII). The minimum age for admission to Class I of the primary school is generally 5+ or 6+. The secondary stage consists of Classes IX-X (in some states VIII-X), and a higher secondary stage of schooling comprising classes XI-XII in all states. In some states/UTs these classes are attached to universities/colleges.

In all the states and Union Territories, public examinations are conducted at the end of classes X and XII by the respective State Boards of Secondary and Higher Secondary Education. Both Standard X and XII are normally marked on a percentage basis.

The Central Government is responsible for the major policy on higher education and for the co-ordination and determination of standards in higher education institutions. State Governments for their part are responsible for the establishment of state universities and colleges and for providing grants for their development and maintenance.

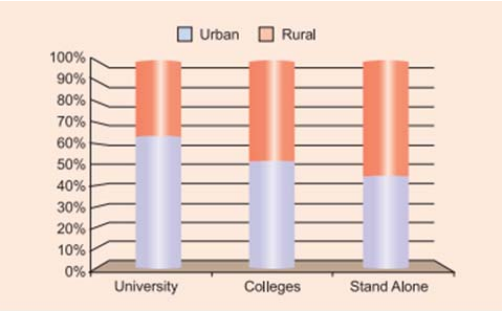

Figure 6: Location-wise distribution of academic institutions

There are approximately 36% of the Universities, 48% of the Colleges, and 56% of stand-alone Institutions are located in rural India. Distribution among rural and urban area is shown in Figure 6 (Source: UGC report 2010).

There are, 51 Academic Staff Colleges for academic training of teachers. These numbers are changing as new institutions are established; the number of colleges in particular is continuously growing.

The present-day educational structure in India consists of:

Central Universities:	18
Indian Institute of Technology (IIT):	14
Indian Institute of Management (IIM):	6
State Universities:	280
Deemed Universities:	121
Undergraduate Colleges :	40,725

4.2 Academic Degree Structure

India has a three-tier degree structure with bachelor (3-4 years), master (2 years) and research degrees (3-5 years). Apart from degree programmes, universities also offer shorter programs at certificate and diploma-level. Diploma courses are available at undergraduate and postgraduate level. At undergraduate level, they vary from one to three years in length; postgraduate diplomas are normally awarded after one year's study.

Master degrees are of different types. The Master of Arts, Science or Commerce takes another 2 years of studies in the same subject after the bachelor degree. Most programmes consist of coursework although some universities have programmes involving research. The specialised master degrees, i.e. Master of Education, Master of Business Administration and Master of Computer Science, have different entry requirements. For instance, the MBA requires a bachelor's degree in any subject. The professional master degrees are of 3 or 4 semester duration based on a 4-year bachelor in the same field. The Master of Technology and Master of Engineering take 1.5 years but there is also a 2-year Master of Science of Engineering degree by research. In medicine, the programmes last two or three years.

Some universities offer the Master of Philosophy (MPhil), a pre-doctoral research programme requiring a master for admission. It can either be completely research based or also include course work.

4.3 Recognition of Degrees from India in Norway

India	Norway
Completion of the first year of university education	Access to higher education
Bachelor Degree (3 years)	Recognized as equivalent to 120 ECTS[1] credits at Bachelor degree level
Bachelor Degree (4 years)	Recognized as equivalent to Bachelor Degree / 180 ECTS credits
Bachelor Degree (3 years) + Master Degree (2 years)	Recognized as equivalent to Bachelor Degree plus 60 ECTS credits at Master Degree level
Bachelor Degree (4 years) + Master Degree (2 years)	Recognized as equivalent to Bachelor Degree /180 ECTS credits plus Master Degree /120 ECTS credits, in total 5 years higher education / 300 ECTS credits
Bachelor Degree (3 years) + Master Degree (2 years) + Ph.D. (3-5years)	Recognized as equivalent to Bachelor Degree /180 ECTS credits plus Master Degree /120 ECTS credits plus 120 ECTS credits at Doctoral Degree level
Bachelor Degree (4 years) + Master Degree (2 years) + Ph.D. (3-5years)	Recognized as equivalent to Bachelor Degree /180 ECTS credits plus Master Degree /120 ECTS credits plus Ph.D. / 180 ECTS credits

Table 1: Comparison of Indian and Norwegian degrees (source: ECTS http://ec.europa.eu)

4.4 Education Background of IT Professionals

India's IT industry does not only attract computer scientists but also graduates from related disciplines in engineering and commerce, who are given a three month induction program to software development. As opposed to studies in computing science, where students first learn programming and technology, such induction programs focus on software engineering right from the beginning. In other words, **the process-based approach to software development is embedded into employees at a very early stage.**

The Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs) are frequently mentioned as government-owned premier flagship institutions, leading one to believe that every IT engineer has a degree from one of these truly world-class schools.

Additionally, the introduction of a Master of Computer Applications (MCA) degree in Indian universities in late 80s was aimed at producing graduates with the combination of technical and management skills essential for IT industry.

[1] European **Credit** Transfer and Accumulation System (http://ec.europa.eu/education/lifelong-learning-policy/ects_en.htm)

Together, all universities and colleges in India annually produce around 117,000 engineers with an IT-related 4-year degree and another 76,000 with a 3-year diploma course. However, the IT industry requires between 200,000 and more than 400,000 new joiners each year.

4.5 Special Training

The rapid expansion of the IT sector sees a need for a growing investment by IT companies in the development of their existing and new employees, both in terms of technical as well as managerial skills. In India, IT companies now keep aside between 3% and 5% of revenues for training programs.

In the BPO industry, the rapid growth and the offering of high-end BPO services require companies to provide new employees with in-depth training; domain competencies are no longer available 'off-the-shelf'.

All topics related to training, e.g. training needs analysis, organization of training courses, and their evaluation, are usually the responsibility of the learning & development department, a sub-section of HR.

Well-designed training programs together with clear career paths have become a major instrument for retaining employees. Sometimes it is possible to convince employees to continue working on an important but technically or personally unchallenging project by offering them training on a new technology in return.

Official certifications like PMP® by the Project Management Institute, or application technology related certifications by Microsoft®, Oracle®, SAP®, etc. are sometimes more important to show on the CV of IT developers than formal university degrees. If the company sponsors such trainings, very often they request the employee to sign a bond, i.e. to agree to stay with the company for a certain period of time or to pay back the prorated costs of the training. On the other hand, as companies are looking for good return on training investment, they often require trainees to pass a written test after the training.

5. Recruitment

5.1 Typology of Employees

Factors people value when selecting, staying, or leaving a job can be used for segmenting the workforce; a recent study by Global Talent Metrics[2] in cooperation with the Indian Institute of Management, Bangalore has identified six clusters that account for 66% of the Indian IT workforce, as given in Table 2.

Employee segment	Percentage*	Description
Demanders	16%	Demanding with very high expectation from their employers. Want best pay, a top brand company, a high-growth career path, and constant recognition
Just a job	13%	Opposite of demanders. Looking for a job that pays moderately with relatively low expectation across other factors
Start ups	12%	Looking for exciting work, learning opportunities, fast growth, and building value relationships. Do not value pay and brand
Work not pay	11%	Expect high career growth, challenging work at a prestigious company with good management. Do not necessarily expect best pay in the market
Mercenaries	9%	Purely motivated by pay as the only factor: want the highest pay irrespective of what work they do and where they work
Cash and brand	5%	Like mercenaries, but also extremely conscious about the brand name and image of the company for social recognition

Table 2: Value factors for employee

It is a good idea to map prospective employees or team members to these clusters and then compare with what the company or project has to offer.

[2] http://www.stargtm.com/

5.2 Salary Structure

On average, entry-level software developers currently earn an annual wage of 270,000 INR (27,510 NOK). In general, salary range per position and experience is described in the Table 3.

Position	Description	Years of experience	Annual compensation (thousand INR)	Annual compensation (USD)
(Senior) Vice President Outsourcing	Strategic outsourcing of software or IT infrastructure services	20+	7.000 – 10.000	165.000 – 240.000
Vice President Delivery	Delivery management of application software	20+	5.000 – 7.000	120.000 – 165.000
Vice President Quality	Quality assurance, CMMi certification, risk management	15+	4.500 – 6.000	105.000 – 140.000
Director Testing	Delivery management for testing assignments (application, system software, storage, networking)	15+	3.500 – 4.500	80.000 – 105.000
Software Quality & Testing Manager	Management of testing projects	8 – 15	1.200 – 3.500	30.000 – 85.000
Senior System Administrator	Unix, Solaris, HP, Storage, Windows	8+	1.500 – 1.800	35.000 – 45.000
Senior Software Architect	J2EE, .NET, Unix, C++	8 – 15	1.800 – 4.000	45.000 – 95.000
Project Manager	SAP application software development	8 – 12	1.300 – 1.600	30.000 – 40.000
R&D Professionals (with Ph.D. / M.Sc.)	Algorithm design, data modelling, data analytics, speech recognition	1 – 15	800 – 4.000	20.000 – 95.000
Software Engineer	Application development or maintenance	0 – 1	200 – 300	4.700 – 7.000

Table 3: Salary range in the Indian IT industry (source: NASSCOM 2010)

5.3 Onsite Assignments of an Indian

Onsite assignments for Indians are occasionally planned as part of the career progression of an individual, but they almost always follow a business need. Thus, **assignments are mostly not long-term and more likely to be in the range of a few weeks to one year.** Assignments lasting a few weeks up to three months are mostly about knowledge transfer, understanding business requirements, bug fixing, testing, and software roll-out. Longer assignments are needed for the role of onsite coordinator in large projects; however, these rarely pass the 6 months to 12 months threshold.

5.4 Onsite Assignment Strategy for Indians

Given the business needs and cost constraints, there are some **general suggestions for how to achieve more successful assignments**:

- Although immediate project requirements cannot be ignored, there should be some kind of long-term planning from a human resource perspective
- Clear frameworks, processes, and expectation settings should govern the onsite assignment. Especially the communication process is a key factor

- Intercultural communication training about the target culture and things expected in this culture – both in professional and private life

The process of returning should be well planned. This keeps employees happy and motivated up to the last day of their onsite assignment.

When recruiting Indian IT professionals, an important distinction has to be made between

- those who have spent a considerable time working in the West,
- those who have been on short-term project assignments abroad, and
- those who have not yet had this opportunity.

6. Recommendations for Effective Recruitment

The best strategy for recruitment drive will be to organize a study-cum-recruitment tour to India, especially visits to important IT hubs, e.g. Bangalore and Mysore.

Main Focus of this tour will be to visit important companies in those regions, and at the same time arrange workshop/discussion meeting about outsourcing opportunities and recruiting possibilities for engineers with appropriate skills.

Ideal plan:

Suitable time for India tour: November/December 2013.

Duration: 5 to 7 days

Regions to visit: Bangalore and Mysore

1st and 2nd day: Visits to companies in 'Electronics city campus' in Bangalore

- **IT Services Majors** - Accenture, Cognizant, Infosys, IBM India, Mastek, TCS, Wipro.
- **Mid-size Companies** - Birla Soft, Celstream, NVIDIA, Patni.
- **Academic Institution**: International Institute of Information Technology, Bangalore

2nd day: Recruitment workshop / Discussions with IT companies on outsourcing possibilities

3rd day: Visit to Mysore region

4th day: Visits to companies in Whitefield – International Technology Park Bangalore (ITPB)

- **IT Services Majors** – TCS, Cognizant, Infosys, Mastek, Persistent Systems.
- **Mid-size Companies** - Mphasis, Cybage Software Pvt Ltd, Cosmos eSolutions Pvt Ltd, Patni.

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