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Human Resource and Skill Requirements in the IT and ITES Industry Sector (2022) – A Report

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Human Resource and Skill Requirements in the IT and ITES Sector*

Study on mapping of human resource skill gaps in India till 2022

*Interim

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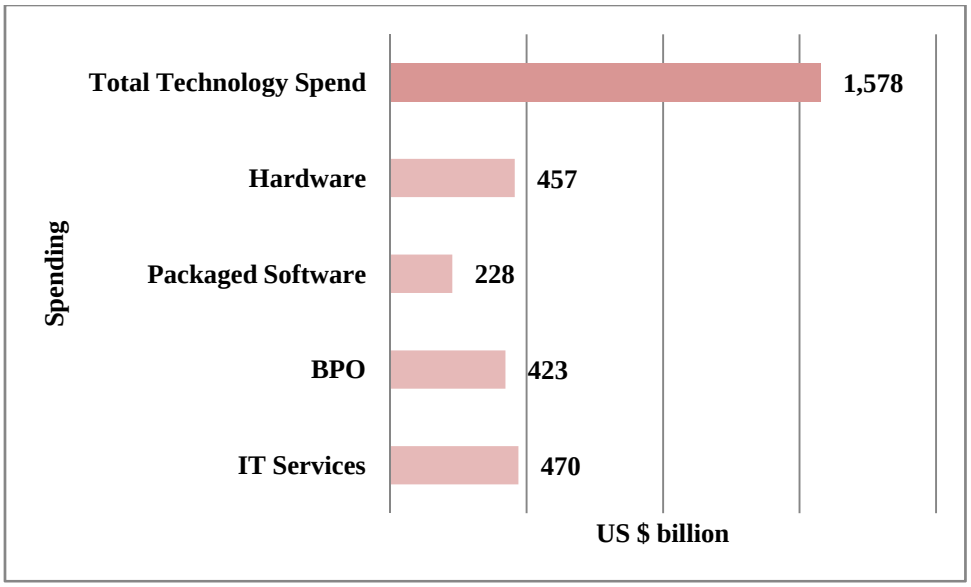
1. Environment Scanning and Competitiveness of IT and ITES Industry

1.1. The Global IT and ITES Industry

The global technology spending on hardware and Information Technology (IT) related services is estimated to be about US $ 1.7 trillion and growing at a CAGR of about 7%[1] in the last two years. Over and above this, the engineering and R&D spend accounts for about US $ 800 billion.

Figure 1: Global technology spending in 2007



Source: IDC, NASSCOM[2]

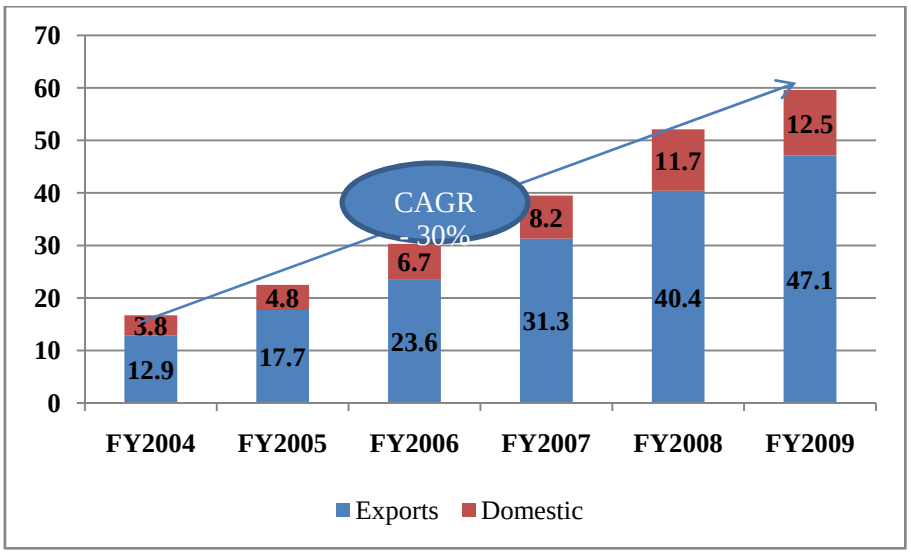
The spend in IT Services and IT Enabled Services (ITES)/Business Process Outsourcing (BPO)[3] was expected to touch over US 500 billion and US $ 450 billion in 2008 respectively, with IT Services recording a growth of 6.3% and BPO Services recording a growth of 12% globally. IT Services is expected to grow at a CAGR of 6 to 7% till 2012 and ITES is expected to grow at 10 to 12% over the same period. Despite the current economic slowdown, technology spending is expected to sustain in the long term and pick up after the next 4 to 6 quarters. Given this background and the context of India's 'IT story', it has to be put in perspective that India still accounts for only about 4.5%[4] of this market. This indicates that there is ample room for India to tap the potential for growth in this market in the years to come.

[1] Source: IDC, 2007
[2] NASSCOM – National Association of Software and Service Companies
[3] ITES and BPO are used interchangeably
[4] IMaCS analysis

1.2. Overview of India's IT and ITES Industry

The Indian IT and ITES Industry recorded a turnover of US $ 60 billion in 2009, with exports accounting for about US $ 47 billion and contributing to over 70% of industry revenues. The industry has grown at a CAGR of close to 30% between 2004 and 2009.

Figure 2: India's IT and ITES Industry – Turnover in US $ billion

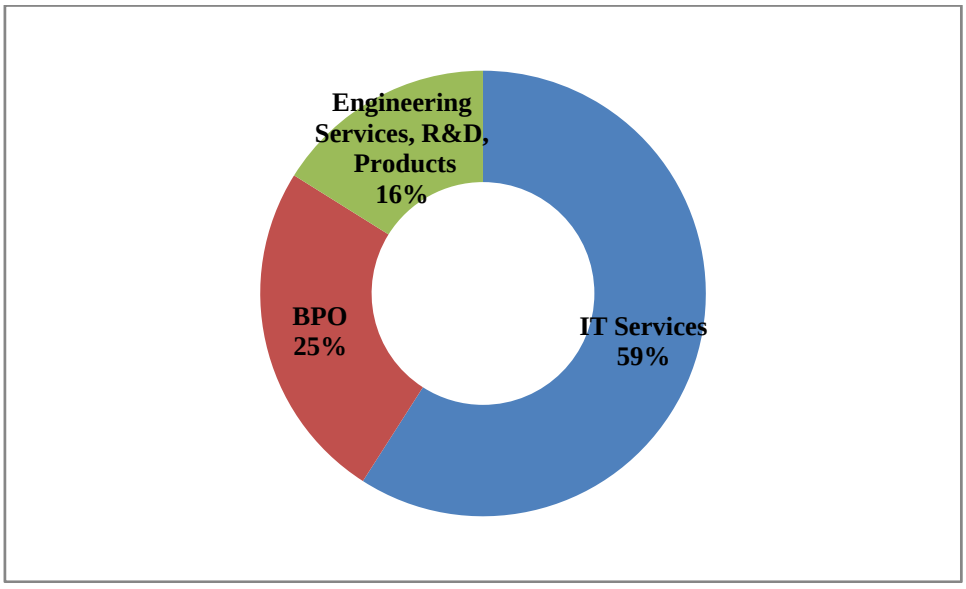


Source: NASSCOM and IMaCS analysis

The major segments of the Industry are IT Services, BPO, and Engineering Services, R&D, and Products. Much of the activity is centred on service offerings in Banking, Financial Services, and Insurance (BFSI), Hi-Tech and Telecom, Manufacturing, and Retail. These are also referred to as various 'industry verticals' in common parlance.

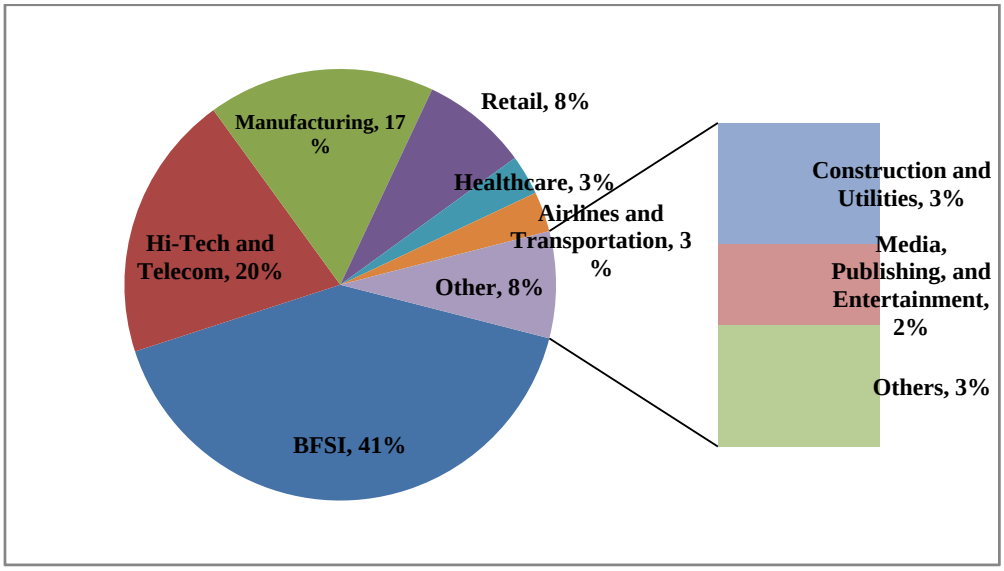
The major market for software and services remains the Americas (primarily USA), accounting for about 60% of revenues. However, recognising the need to diversify their client base, companies in this industry have increase the share of revenues outside of USA from about 30% in 2004 to about 40% currently. Continental Europe and APAC are likely to see increase in their share of revenues.

Figure 3: Major segments in the IT and ITES Industry



Source: NASSCOM and IMaCS analysis

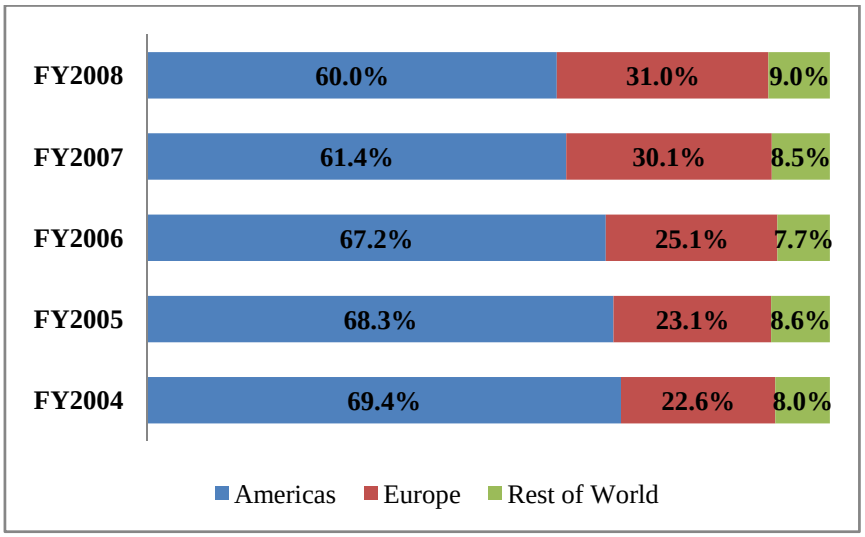
Figure 4: Industry verticals in the IT and ITES Sector



Source: NASSCOM and IMaCS analysis

The domestic market contributes to over US $ 12.5 billion in revenues (21%) . If the hardware sector is included, this would touch US $ 24 billion. The domestic market is also expected to be a major area of growth in the future with increasing IT adoption beyond hardware and expected to grow at 8% in the near term.

Figure 5: Share of export revenues from different geographies



Source: NASSCOM and IMaCS analysis

An important characteristic of large movers has been scaleability, which is the ability to ramp up operations quickly and efficiently. Early movers (from 1990s) have been able to establish scale in the last 10 years and have emerged as leading players in the industry.

Table 1: Top 10 IT companies (2008)

1	Tata Consultancy Services
2	Infosys Technologies Limited
3	Wipro Limited
4	Satyam Computer Services*
5	HCL Technologies Limited
6	Tech Mahindra Limited
7	Patni Computers Systems Limited
8	i-Flex Solutions Limited
9	L&T Infotech Limited
10	Polaris Software Lab Limited

**-now acquired by Tech Mahindra*
Source: NASSCOM

The industry has been hit by the current economic slowdown and clocked only 12% growth over the previous year and achievement of 2010 targets have been deferred by a year. It is expected that the growth will pick up in the future when a reversal occurs. The importance of this industry is underscored by the fact that it contributes to about 3.5% to 4.1% of India's GDP in FY09 in terms of net value added and employs close to 2.2 million knowledge professionals. India's acceptance as a

preferred offshoring destination in the world is evidenced by the fact that it was ranked at the top (first place) in AT Kearney's Global Services Location Index. The IT and ITES Industry has been mainly based in the metros and tier-1 cities in India.

Figure 6: Major centres of IT and ITES Industry in India

Source: STPI and IBEF sector update, 2009

This is expected to span out to certain tier-2 cities in the future along with the growth of the industry.

The following sections outline the major segments in the IT and ITES Industry.

1.3. IT Services

1.3.1. Share of segments

The IT Services segment is the largest contributor to the IT and ITES Industry, accounting for about 60% of industry revenues. The following are the major segments in the IT Services sector.

Table 2: Major segments in IT Services exports

IT Services - Exports	Contribution (%)
Project Oriented	***58%***
IT Consulting	3%
Systems Integration	3%
Custom Application Development	49%
Network Consulting and Integration	1%
Software Testing	2%
Outsourcing	***33%***
Application Management	12%

IT Services - Exports	Contribution (%)
IS Outsourcing	6%
Others	15%
Support and Training	***9%***
Software development and support	7%
Hardware deployment and support	1%
IT education and training	1%
Total	***100%***

Source: NASSCOM and IMaCS analysis

Customer Application Development and Maintenance contribute to over 50% of revenues in this space. This is primarily because the activity is viewed as 'outsourceable'. The industry garners a large chunk of its revenues from IS outsourcing and software support activities.

Enterprise solutioning, Remote Infrastructure Management (RIM), testing services, are expected to fuel growth in this segment. In order to grow, companies are increasingly looking at positioning themselves as end-to-end solution providers. Recent acquisitions by IT companies are primarily meant to acquire either scale or capabilities in niche segments such as IT consulting, telecom and healthcare products.

The BFSI, telecom, retail, and manufacturing sectors account for major portion of the IT Services revenues.

1.3.2. Demand Drivers for IT Services

The key demand drivers for the IT Industry in India are as follows:

- ***Global growth in IT Services spending:*** The IT spending is expected to grow at 6.3% globally in the next five to six years. Given the growth in the spending base, as well as India being poised to increase its share from the current levels of about 7% in the IT Services space, it is well poised to tap into the global IT spending. The 'addresseable' market is expected to triple from US $ 500 billion today to US $ 1.5 to 1.7 trillion till 2022.
- ***Growth in markets beyond US and EU:*** Markets beyond US and EU, especially BRIC[5] and APAC will be major growth areas in the future. These markets are expected to witness growth much more than the US and EU.
- ***Growth in domestic spending:*** The growth in domestic spending will be fuelled by the following:
  - *High rates of GDP growth:* As per the BRIC Report of Goldman Sachs, India is likely to be the only country among the BRICs to clock GDP growth between 5% and 6% across

[5] BRIC – Brazil, Russia, India, China

all years till 2050. This would fuel growth in a host of downstream industries where IT adoption would be high, such as BFSI.

- *Increasing IT spending:* India's IT spending is expected to be US $ 24 billion in 2009. This will be also fuelled by increasing end-user spending, which is expected to reach US $ 110 billion growing at a CAGR of 15% from 2007[6].
- *Other areas which will drive domestic demand:* Other areas which will drive domestic demand are increasing Government spend on IT and e-governance. Industry adoption will be spearheaded in BFSI, telecom, retail, and healthcare.

- ***Sustaining cost competitiveness:*** It is estimated that for multinational corporations sourcing from India, cost savings delivered are in the range of 25 to 60 per cent of the company's original costs. This is expected to sustain for the next 15 years. On a scale of 4 in terms of overall financial attractiveness for this industry, India scored 3.22 as compared to China (2.93), Malaysia (2.84), and Thailand (3.19).

Large technical pool of skilled professionals; a diversified product, service, and market play; and innovation are expected to enable this growth, as described in the later sections.

1.3.3. Key Success Factors

To take advantage of the potential market and increasing spend, the following are key success factors for the firms in the industry:

- Having a breadth of service offerings spanning low-end application development to high-end integrated IT solutions.
- Domain expertise across a host of business verticals – BFSI, retail, engineering, Enterprise Solutions, IT consulting.
- Sustaining process maturity as evidence by CMM level certifications.
- Scaleability to quickly capitalise on large value contracts and multi-million dollar deals.
- Ability to attract and retain talent vis-a-vis competing companies.
- Ability to retain customers.
- Ability to tap into new business models such as Software as a Service (SaaS), tying pricing to value and savings on a profit sharing model.
- Innovating in business models and technology offerings.

[6] Source: Gartner

1.3.4. Key Risk Factors

The industry, specifically the IT Services sector is exposed to the following risk factors:

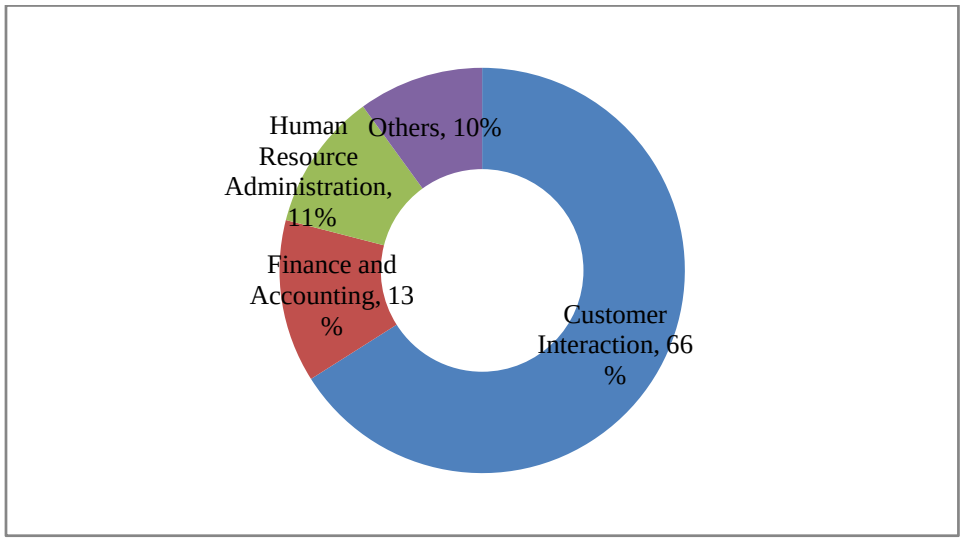
- Variations in global demand growth would present itself as a significant risk factor as the industry is predominantly export driven (accounting for 21% of revenues).
- Revenues from the BFSI segment are exposed to high risk as evidenced by the recent economic crisis.
- US market accounts for 60% of the revenues. The industry is exposed to risks due to this dependency.
- Currency risks will continue to be a cause of concern. An annualised rupee appreciation of 5.5% could result in a decrease in revenue growth from 21% to 15%.
- Ending of tax breaks for STPI by 2010 could result in reduced PAT levels.
- Availability of quality human resource, and ability to innovate would present themselves as risks.
- Increasing protectionism in US and EU could present itself as a major risk factor.
- Threats of terrorist attacks, pandemics, and other force majeure events also present themselves as risks in the current geo-political context.
- Other countries such as Brazil, China, Philippines, Vietnam, Czech Republic, Ireland, and Malaysia could eat into India's pie.

1.4. ITES/BPO

1.4.1. Share of segments

India's share in the global BPO spend is about 3.2%. In 2009, the ITES/BPO sector recorded about US $ 15 billion in revenues and has grown at a CAGR of 33% in BPO exports. Customer interaction, and Finance and Accounting services account for a significant portion of BPO revenues.

Figure 7: Major ITES segments



Source: NASSCOM and IMaCS analysis

As in the case of the IT Services Industry, those who have scale have demonstrated ability in garnering large value contracts. Most leading IT companies have BPO divisions/subsidiaries. Leading players are Genpact, IBM Daksh, WNS, and Wipro BPO.

1.4.2. Demand drivers for ITES/BPO

- ***KPO as a growth area:*** The growing area in this segment is what is called as Knowledge Process Outsourcing (KPO). As per industry estimates, the Indian industry can tap into an opportunity worth US $ 12 billion by 2010 employing 250,000 persons in this area moving beyond simple voice and data services. Some of the KPO services already outsourced to India include data analytics, content management, research and information services, animation, biotech and pharmaceutical research, medical and health services. The global market research and analytics segment is expected to worth US $ 60 billion with an outsourceable component of US $ 25 to 30 billion. The growth is expected to be in the areas of Legal Process Outsourcing (LPO), Engineering Services Outsourcing, and Financial and Market Research.
- ***Increasing global spends on BPO sector:*** The global spend on BPO is expected to grow at a CAGR of 10% to 12% till 2012 from its current size of US $ 462 billion. This is expected to drive growth in the Indian BPO sector.
- As indicated in the section on IT Services, domestic GDP growth and increasing domestic IT spends will also fuel growth of the BPO sector in the domestic context.

1.4.3. Key Success Factors

The key success factors for the Indian BPO industry are the following:

- Ability to move up the value chain through KPO service offerings.
- Ability to attract and retain talent.
- Ability to integrate with IT Service offerings through end-to-end solutions.
- Demonstrate process compliance in aspects related to client confidentiality and information security.
- Managing pricing pressures through adequate scale.

1.4.4. Key Risk Factors

In addition to risk factors mentioned under the section on IT Services industry, data theft and information security present themselves as serious reputation risks for companies in the industry. Additionally, the industry is also prone to regulatory risks as a result of the need for outsourcing service providers to comply with various regulations such as Gramm-Leach-Bliley Act (GLBA), Data Protection Act of the UK, and Sarbanes-Oxley Act.

1.5. Engineering Services, R&D, and Software Products

Engineering Services and R&D: This segment is worth over US $ 7.3 billion in exports and has witnessed a growth of 25% since 2004. Engineering services and R&D is expected to touch US $ 50 billion in revenues by 2020[7]. Over 200 product-based multinational companies are known to be sourcing part of their product development requirements from their captive offshore centres in India or from third party vendors in the country. Range of services outsourced includes engineering and designing solutions across diverse industry verticals like telecommunications (30% of revenues), automotive (19%), aerospace (8%), construction, utilities and industrial design and research and development divisions of the leading high-tech companies.

Software Products[8]: Software products form the fastest growing segment of the global IT industry, with the software spends forecast to grow from USD 294 billion in FY 2008 to USD 537 billion in 2015. Over the same period, the addressable market for Indian software product businesses is estimated to reach USD 290 to 315 billion.

The next decade will play a crucial role in bringing about disruptive growth for the Indian Software Products segment, and the annual revenue aggregate of this segment is forecast to grow from USD 1.4

[7] Source: NASSCOM
[8] Source: NASSCOM Product Study

billion in FY2008 to USD 9.5 to 12 billion by FY2015. Over the past 3 years, the annual revenue aggregate of Indian software product businesses has grown at a CAGR of 44%.

The growth is likely to be in the areas of Business Intelligence (BI), Enterprise Resource Management (ERM), Storage, Security, BFSI, telecom, healthcare, Retail, search engine marketing, mobile applications, social networking, and online gaming.

2. Current Employment in the IT and ITES industry

The Indian IT and ITES industry currently employs about 2.2 million persons in comparison to 0.8 million in 2004. The productivity (as measured by revenue per employee has been witnessing steady growth).

Table 3: Employment in the Indian IT and ITES Industry

		FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Total Exports	Market Size (US $ billion)	12.9	17.7	23.6	31.3	40.4	47.1
	Employment	512,000	706,000	928,000	1,243,000	1,560,000	1,736,615
	Revenue per employee (US $/employee)	25,195	25,071	25,431	25,181	25,897	27,122
Domestic Market	Market Size (US $ billion)	3.8	4.8	6.7	8.2	11.7	12.5
	Employment	318,000	352,000	365,000	378,000	450,000	500,000
	Revenue per employee (US $/employee)	11,950	13,636	18,356	21,693	26,000	25,000
Total	Market Size (US $ billion)	16.7	22.5	30.3	39.5	52.1	59.6
	Employment	830,000	1,058,000	1,293,000	1,621,000	2,010,000	2,236,615
	Revenue per employee (US $/employee)	20,120	21,267	23,434	24,368	25,920	26,647

Source: NASSCOM and IMaCS analysis

In the context of growth forecasted for the industry, availability of skilled human resource supported by appropriate skill building initiatives will be key to this growth.

In the near term, it is expected that the IT and ITES industry can achieve an export target of USD 60-62 billion by FY 2011, employing 2.5-3 million professionals directly in the export segment and contributing substantially to the socio-economic development of the country.

3. Skill Requirements in the IT Industry

3.1. Value chain of activities in the IT industry

The typical value chain of activities in the IT industry is illustrated below.

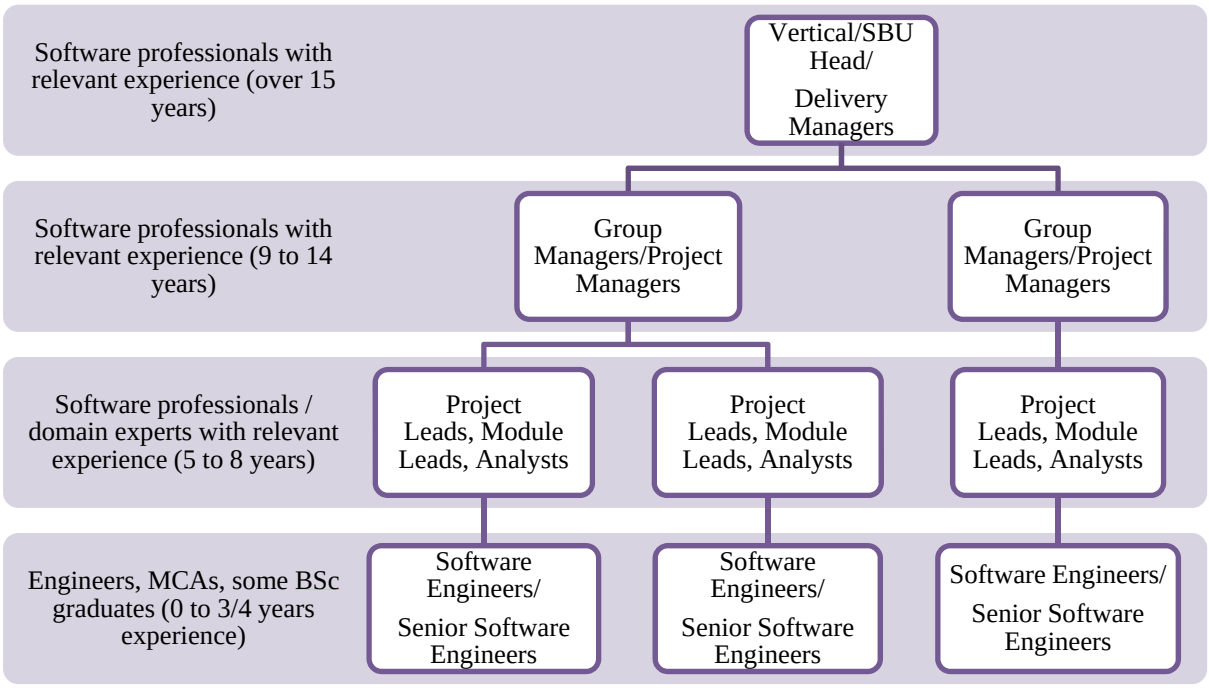
Figure 8: Typical activities in the value chain of IT Services

Source: IMaCS analysis

3.2. Profile of people employed

The profile of people employed at various levels is shown below.

Table 4: Profile of people employed in the IT Industry



3.3. Skills required and skill gaps in the IT Industry – Delivery

Table 5: Skill requirements and skill gaps in the IT Industry - Delivery

Level	Skills Required	Skill Gaps
Software Engineer	▪ Ability to think logically/analytically as derived from educational background (and demonstrated by academic track record) ▪ Basic programming skills – proficiency in at least one language/platform (say, Java or .Net framework) ▪ Adequate communication skills ▪ Ability to think beyond 'Programming' and acclimatize	▪ Inability to 'deep-dive' into a particular language/technology platform as experience level increases ▪ Inadequate soft skills, especially when it comes to interacting with the client ▪ Inadequate knowledge of corporate culture – reporting, compliance, escalations, e-mail etiquettes and protocols.

Level	Skills Required	Skill Gaps
	with the concept of 'Software Engineering' and 'Systems Thinking'	▪ Most persons are not able to view their role as a 'software engineer' – they see it more as a 'programmer' – this results in gaps in 'systems approach/thinking' ▪ Poor awareness of concepts of software engineering.
Project Leads and Module Leads	▪ Competency in a few technology areas, programming languages/platform, or domain – deep expertise required either in technology or domain or both ▪ Ability to understand the basics of software architecture – databases, platforms, hardware, servers, etc. ▪ Understanding of business functionality resident in the software ▪ Ability to understand customer needs ▪ Ability to translate the Functional Specifications to Design and System Specifications ▪ Ability to lead and work with a team	▪ Inadequate specialisation ▪ Poor domain exposure ▪ Less than adequate ability to undertake project estimation ▪ Inadequate communication skills and soft skills ▪ In many cases, specific experience is lacking which leads to gaps in abstraction of learning.
Project Managers	▪ Deep domain knowledge ▪ Adequate technical knowledge ▪ Ability to interface with customer and on-site teams ▪ Team management skills ▪ Knowledge of process and quality	▪ Inadequate domain/business knowledge ▪ Inadequate 'solutions' mindset when interacting with customer ▪ Inadequate process knowledge

Level	Skills Required	Skill Gaps
	compliance – ISO/SEI/Security processes and the ability to align team processes to meet process compliance requirements ▪ Adequate Project Management skills ▪ Process Management and Risk Management skills – covering Time, Cost, Quality, Delivery	▪ A large portion of these skills are learnt by experience, which if further compounded by the fact that there are no structured training programmes at this level.
Business/Group Heads	▪ Ability to maintain profitability of business ▪ Adequate client management skills ▪ Escalation management skills ▪ Ability to plan, set business targets, chart out recruitment and staffing plan ▪ Flair for 'deal making' and clinching deals with customers ▪ Ability to negotiate with customer	▪ Inadequate ability to manage large scale on transition from a Project Manager to a Business Head position ▪ Less than required negotiation skills when interfacing with customers.

Source: Industry inputs and IMaCS analysis

While the above describes skill requirements and gaps in the 'Delivery' of IT services, the following describes the skill requirements and gaps specific to Pre-Sales and Business Analysis, as well as Product companies.

3.4. Skill requirements and skill gaps specific to Pre-Sales and Business Analysis

Table 6: Skill requirements and Skill gaps specific to Pre-Sales and Business Analysis

Level	Skills Required	Skill Gaps
Business Analysts	▪ Basic understanding of software engineering concepts – technology aspects of project team ▪ A keen understanding of business functionality of software/module/project ▪ Ability to capture customer requirements and translate the same to the development ▪ Ability to capture learning from one project/process and apply the same in other projects ▪ Knowledge of process requirements ▪ Knowledge of use case tools – UML, Rational Rose, etc. ▪ Ability to write RfI/RfP/RfQ documents and make proposals of good quality. ▪ Ability to make pre-sales pitches/presentations ▪ Ability to formulate Functional Specification Documents.	▪ Insufficient ability to understand customer requirements ▪ Inadequate ability to understand specifics of other markets – regulations, compliance requirements ▪ Poor communication skills – especially written/business communication skills ▪ Inadequate proposal presentation skills.

Source: Industry inputs and IMaCS analysis

3.5. Skills required and skill gaps among Product Developers

The following are the skills required and gaps specific Product Developers. It should be kept in mind that there are only a few established IT product companies in India. The 'product business' is perceived to be much riskier and is a very involved activity even from the perspective of skill requirements.

Table 7: Skills required and skill gaps among Product Developers

Level	Skills Required	Skill Gaps
Product Developers and Analysts	▪ Deep industry knowledge ▪ In-depth domain knowledge ▪ Ability to 'abstract' learning in an industry or specific process flow to other industry groups or processes ▪ Ability in incorporate the required degree of 'flexibility' in design ▪ Ability to maintain product specific system documentation ▪ Ability to plan major releases over a long term (spanning a few years) ▪ Knowledge and ability to track changing market regulations impacting the product (changing tax regimes/VAT rates, etc.)	▪ While most of the skills required here have enough room for improvement, the following are the areas where gaps are acute: • Insufficient knowledge of market regulations and other areas specific to the product • Less than adequate depth in domain knowledge and process flow.

Source: Industry inputs and IMaCS analysis

3.6. Major trends impacting skill requirements for the IT Industry

The major trends that would impact the human resource and skill requirements in the IT Industry are outlined below:

- ***Continuing demand for a skilled workforce:*** The IT industry would continue to grow at healthy growth rates over the next decade leading to a continuing demand for a skilled workforce. This will be lead by demand for engineering graduates as well as an increasing component of Science and graduates from other streams.

- ***Continuing and building upon transformation from IT Services to include IT Consulting:*** The IT industry and its human resource would need to build consulting capabilities (architecture, application selection, solutioning, process engineering/re-engineering) to help them tap into higher value projects which would have several downstream revenue spin-offs.

- ***Ability to Innovate:*** IT companies would need to straddle the value-chain right from *inventing* to *innovating* to *implementing* till *enhancing*.

- ***Increasing play in Migration Projects:*** While a large proportion of projects would be in the maintenance space, the industry is likely to see an increasing share of projects which would involve migration across systems and platforms. This would be on account of consolidations and Mergers and Acquisitions occurring in several industry sectors globally.

- ***Green IT and Cloud Computing:*** This could be one more potential area for building scale and innovation going forward. This spans aspects both ***internal and external*** to the industry. Adoption by industry of Green technologies and practices including Green buildings, Green computing infrastructure e.g. energy efficient data centers, power efficient computers, sharing infrastructure e.g. shared data centres, addressing issues like e-waste management is a potential growth area. This has also a vast business opportunity in terms of consulting with clients on Green IT.

- ***Increasing share of other business verticals:*** While the IT industry has been dominated by the BFSI segment, the industry is likely to witness increased share from segments such as Retail, Telecom, Healthcare, Technology, etc.

- ***Increasing play of Infrastructure Management Services:*** This is likely to be a major growth areas with companies increasingly outsource much of their infrastructure management to Indian IT vendors, including ITIL management, and IT Service Management.

- ***Larger share of newer markets:*** The industry is likely to see increasing share from continental Europe, Japan, and even continents such as Africa and Latin America.

- ***Increasing play in the Indian market:*** With increasing propensity of the Government to outsource more of IT (as evidenced by the e-seva facility for passports), this would be a large pie waiting to be tapped. Indian IT professions need to have a domestic market focus – right from pricing to local language skills in order to cater to this demand. Even software programming could witness a larger portion of local languages.

- ***Evolution of newer pricing models:*** The emergence of newer pricing models such as '***outcome based pricing'*** will demand higher productivity levels from employees.

4. Skill Requirements in the ITES Industry

Though the IT and ITES industry are generally spoken of in the same breadth, it is important to recognise the differences between these two segments. This also has implications on the profile of skills required in the ITES industry.

The value chain of activities in the ITES industry is as follows:

Figure 9: Value chain of ITES industry

Source: IMaCS analysis

Even within the ITES industry, the skill sets required for BPO services are very different from KPO services. We shall examine this in detail.

Figure 10: Differences in ITES Service Offerings

4.1. Skill Requirements and Skill Gaps in the BPO sector

The typical profile of people employed in the BPO sector is shown below:

Figure 11: Profile of persons employed in BPO sector

The skill requirements and gaps in the BPO sector are outlined in the table below.

Table 8: Skills required and skill gaps in the BPO sector

Level	Skills Required	Skill Gaps
Executives (Voice based)	Functional skills: ▪ Ability to handle enquiries ▪ Computer/key board skills ▪ Attention to details ▪ Basic process knowledge and ability to provided technical support ▪ Ability to meet turn around time requirements Soft skills: ▪ Adequate communication skills ▪ Active listening skills ▪ Ability to understand accents ▪ Ability to empathise with customers ▪ Aptitude to undertake repetitive work	Functional skills: ▪ Inadequate process compliance ▪ Lack of attention to details ▪ Lack of understanding of basic quality initiatives ▪ Lack of understanding of information security and privacy issues Soft skills: ▪ Inadequate communication skills ▪ Lack of aptitude for multi-skilling
Executives (non-voice)	Functional skills: ▪ Strong analytical skills ▪ Ability to comply with process ▪ Ensuring faster turnaround time ▪ Ability to use tools ▪ Basic business/process understanding Soft skills: ▪ Good communication (spoken, written) skills ▪ High level of perseverance ▪ High energy level	Functional skills: ▪ Lack of problem solving skills ▪ Lack of process adherence ▪ Lack of business/process understanding Soft skills: ▪ Inadequate communication skills ▪ Lack of customer orientation

Level	Skills Required	Skill Gaps
	▪ Emotional intelligence ▪ Aptitude for repetitive work ▪ Integrity	▪ Lack of aptitude for the job
Team Lead	Functional skills: ▪ Understanding of process and the nuances of the Statement of Work (SoW), especially on issues related to quality ▪ Ability to plan, control and monitor activities ▪ Understanding of best practices with regard to quality management and Information Security Soft skills: ▪ Team management skills ▪ Motivating the team ▪ Understanding and managing customers expectations	Functional skills: ▪ Inadequate business and process knowledge ▪ Inadequate sensitivity to compliance and information security issues Soft skills: ▪ Lack of customer orientation ▪ Lack of empathy
Process Manager	Functional skills: ▪ High level understanding of key outsourced business processes ▪ Ability to plan, control and monitor activities ▪ Understanding of best practices with regard to quality management and Information security ▪ Understanding of client requirements	▪ Inadequate domain knowledge ▪ Understanding of business perspective

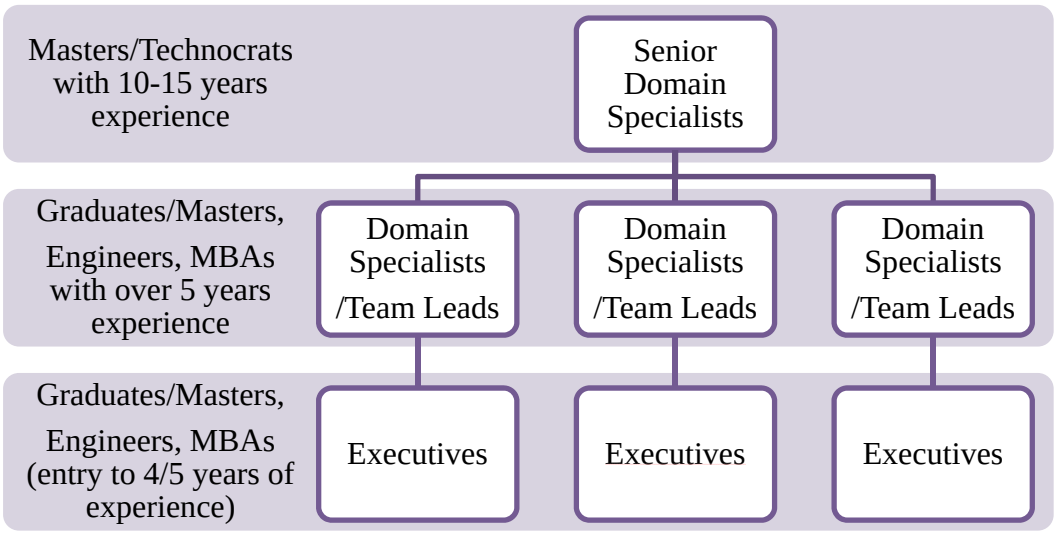
Level	Skills Required	Skill Gaps
	▪ Migration of outsourced processes ▪ Time, cost and quality consciousness Soft skills: ▪ Team management skills ▪ Motivating the team ▪ Understanding and managing customers expectations	

Source: Industry inputs and IMaCS analysis

4.2. Skill Requirements and Skill Gaps in a KPO

The profile of persons employed in a KPO is depicted below.

Figure 12: Profile of persons employed in a KPO



As can be observed from the above figure, the persons employed in a KPO are much different from those engaged in a BPO. KPO involves high-end analytics, including financial analytics, legal processing, STM (scientific, technical, medical) related, etc. This has implications on the skills required and skill gaps too.

Table 9: Skills Required and Skill Gaps in KPO sector

Level	Skills Required	Skill Gaps
Executives	▪ Adequate domain and technical knowledge of field of graduation/specialization ▪ Adequate communication skills – especially report writing skills ▪ Aptitude for knowledge intensive work ▪ Adequate process knowledge ▪ Adherence to timelines	▪ Inadequate domain knowledge – be it from engineering stream, legal (ability to read patents and IP related), medical (ability to understand drug usage from patent narration) ▪ Poor aptitude ▪ Inability to do repetitive work ▪ Lack of adequate writing skills.
Domain Specialists and Team Leads	▪ Adequate domain knowledge ▪ Ability to manage teams ▪ Adequate review ▪ Soft skills ▪ Ability to plan, schedule, allocate work, compliance with quality and security processes	▪ Inadequate project management skills. (This is especially compounded by the fact that there are not adequate project management training programmes targeted at KPO/BPO industry).

Source: Industry inputs and IMaCS analysis

4.3. Major trends impacting skill requirements in the ITES Industry

- The industry is likely to see an increasing share of penetration from KPOs. While the BPO sector would contribute large volumes, the KPO sector would be a *'value play'*. Companies would seek to increasingly move up the value chain with KPO offerings.

- A lot more areas are likely to witness KPO activity spanning patent advisory (in addition to patent filing/documentation), high-end research and analytics, online market research, and legal advisory.

- A larger portion of the revenues are likely to come from end-to-end service offerings in the domestic market.

- A larger portion of processes viewed as ‘core’ and ‘more risky’ would be outsourced to India based ITES vendors as overall confidence in this sector increases in the eyes of clients.

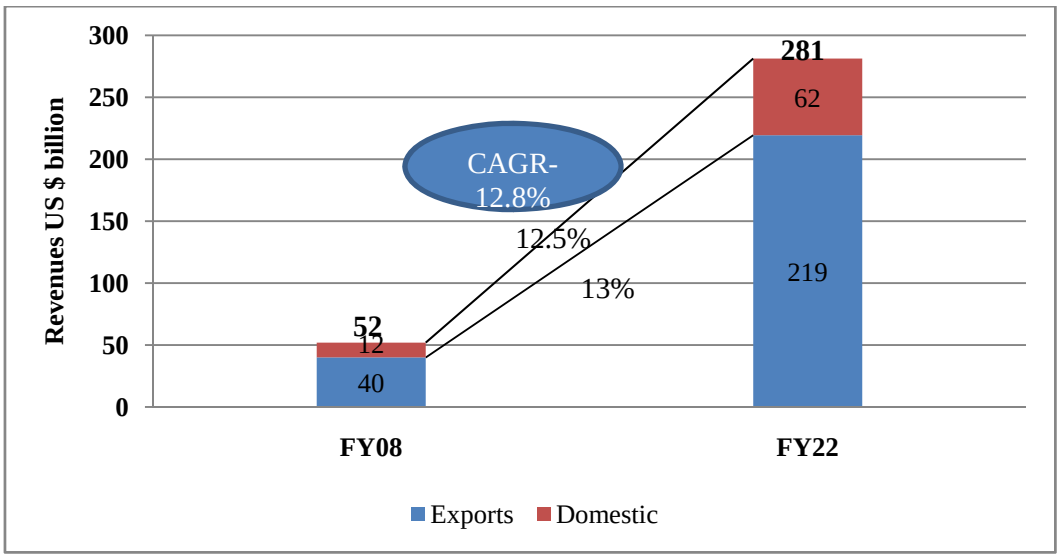
5. Projected Industry Size and Human Resource Requirement

5.1. Outlook for the IT and ITES Industry

As outlined in the earlier sections, sustained technology spending globally, and increasing GDP growth and spending in India are expected to be primary drivers of growth. Post 2020, growth drivers in addition to traditional IT and BPO services large companies (in the Fortune 500) in US and EU will arise from Small and Medium Businesses (SMBs), public sector, healthcare, media, and utilities. A significant portion of the growth would be driven by markets in BRIC countries, APAC, Japan, and Rest of the world. A shift would occur in terms of customer expectations, led by innovation, end-to-end offerings, risk management, and compliance. It is expected that the 'outsourceable' market would expand from the current US $ 500 billion to about US $ 1.5 to 1.6 trillion by 2020. Sustained GDP growth, increasing public sector spends, and adoption of IT by industry would drive the domestic component of the market.

Given these factors, it is expected that the Indian IT and ITES Industry would record about US $ 220 billion in exports and US $ 60 billion domestically by 2022, totalling to about US $ 260 billion growing at a CAGR of 12.8%.

Figure 13: Forecasted size of Indian IT and ITES Industry by 2022



Source: NASSCOM 2020 Perspective and IMaCS analysis

This growth can be much more with markets opening up further and supported by large investments in innovation, skill building, IP creation, and development of IT infrastructure in tier-2 and tier-3 cities. At the same time, risks such as protectionism, poor infrastructure and skill development could dampen the growth. Various scenarios are presented below on this basis.

It is expected that the share of IT and ITES would change from about 75% and 25% respectively to about 60% and 40% respectively, indicating an increasing share for the ITES (BPO/KPO) segment.

Table 10: Scenario analysis for the Indian IT and ITES Industry – Market Size (in US $ billion) and Growth

US $ billion			**FY08**	**FY22**	**CAGR**
Pessimistic	**Exports**		**40**	**182**	**11.4%**
		IT	29.5	109	9.8%
		ITES	10.5	73	14.8%
	Domestic		**12**	**45**	**9.9%**
	Total		***52***	***227***	***11.1%***
Likely	**Exports**		**40**	**219**	**12.9%**
		IT	29.5	132	11.3%
		ITES	10.5	88	16.4%
	Domestic		**12**	**62**	**12.4%**
	Total		***52***	***281***	***12.8%***
Optimistic	**Exports**		**40**	**317**	**15.9%**
		IT	29.5	190	14.2%
		ITES	10.5	127	19.5%
	Domestic		**12**	**84**	**14.9%**
	Total		***52***	***401***	***15.7%***

Source: NASSCOM 2020 Perspective and IMaCS analysis

For this growth to materialise, India needs to develop its talent pool and serve as a hub for end-to-end services, and innovation in business models and technology offerings. Expansion of IT and ITES Industry to tier-2 and tier-3 cities is also critical towards this end towards achieving cost competitiveness and inclusive growth.

Figure 14: Expected expansion into tier-2 and tier-3 cities

Source: STPI and Tramell Crow

As enunciated by **NASSCOM's 'Perspective 2020'**, the success story of the industry would rely on the following:

- **Catalysing growth beyond today's core markets**
- **Establishing India as a trusted global hub for professional services**
- **Harnessing ICT (Information and Communication Technology) for inclusive growth**
- **Developing a high calibre talent pool**
- **Building a pre-eminent innovation hub in India.**

5.2. Projected Human Resource Requirements

Based on the trends witnessed in productivity and the likely growth potential of the IT and ITES industry, it is expected that the industry would employ about 7.5 million persons directly by 2022. A large portion of this employment is expected to occur in the ITES (BPO/KPO) exports sector, followed by IT exports and then in the domestic market.

The projected human resource requirement for the various growth scenarios mentioned earlier are detailed below.

Table 11: Projected human resource requirement in the IT and ITES sector (in million)

Human Resource Employment Scenarios (million persons employed)		**FY08**	**FY22**	**Incremental**
Pessimistic	**Exports**	**1.7**	**4.9**	**3.2**
	IT Exports	0.9	2.0	1.1
	ITES Exports	0.8	2.9	2.2
	Domestic	**0.5**	**1.1**	**0.6**
	Total	***2.2***	***6.1***	***3.8***
Likely	**Exports**	**1.7**	**6.0**	**4.2**
	IT Exports	0.9	2.4	1.5
	ITES Exports	0.8	3.6	2.8
	Domestic	**0.5**	**1.5**	**1.0**
	Total	***2.2***	***7.5***	***5.3***
Optimistic	**Exports**	**1.7**	**8.6**	**6.9**
	IT Exports	0.9	3.5	2.5
	ITES Exports	0.8	5.1	4.3
	Domestic	**0.5**	**2.1**	**1.6**
	Total	***2.2***	***10.7***	***8.5***

Source: IMaCS analysis

The incremental human resource requirement in the IT and ITES sector is expected to be about 5.3 million persons till 2022.

5.2.1. Expected changes in educational profile of the workforce

In the IT Exports segment, a large portion of the workforce is currently engineers and MCAs – over 80%. The proportion of graduates of science and other streams engaged in software development is expected to shown significant increase from about 5% to 10% currently to about 15% to 20%. This would be driven by the following factors:

- Demonstrated willingness by firms to train graduates and employ them in software development and functionality testing
- Increasing desire by graduates from such stream to enter into the attractive IT industry
- Pricing pressures and the need to remain cost competitive which would drive IT companies to develop a relatively low cost talent pool.

5.3. Possible focus areas for skill building

Based on our interactions with industry, we feel there exists a case for targeted skill building initiatives in the following areas of the IT and ITES industry (including BPO and KPO).

It is to be noted that the scale and scope for training between IT, BPO, and KPO will vary as the skill related issues are quite different.

Figure 15: Potential areas for skill building in the IT and ITES industry

IT	BPO	KPO
• Logical thinking and problem solving • Specific programming languages (demand driven) • Project Management Training – estimation, review, etc. • BI/DW and EAI modules • Modelling tools – UML, Rational Rose (for business analysis) • Communication and softskills • Teacher Training modules for Software Engineering and Programming Languages	• Process flows – such as credit card workflows • Communication skills • Accent training	• IP advisory and filing • Understanding patents • Legal transcription • Process specialists • Project Management • Information Security/Quality Compliance

Note: This is indicative and not exhaustive

Modularised skill building in these areas is required to ensure constant upgradation of skills in the projected workforce of 7.5 million persons by 2022. Out of this about 70% to 80% would be in the junior to mid level streams (about 5 to 6 million). Building skills in this workforce is critical for the IT and ITES industry to maintain its competitive edge and innovate.

This report has been prepared by **ICRA Management Consulting Services Limited (IMaCS).**

IMaCS is a multi-line management and development consulting firm headquartered in India. It has an established track record of over 15 years in consulting across various sectors and countries. IMaCS has completed over 950 consulting assignments and has worked in over 30 countries across the globe. Through the process of carrying out several assignments over the last decade and half, IMaCS has accumulated considerable analytical and consulting expertise, backed by the following capabilities:

- Deep understanding of policy formulation.
- Extensive and organised database on several sectors.
- Knowledge of key factors of success in different projects and programmes.
- Ability to research emerging trends in the economy, as well as in specific sectors.
- Insight into different programmes and organisational processes.
- Ability to carry out economic analysis, build quantitative and financial models to project future performance and identify imperatives.
- Ability to identify the various types of risks and suggest appropriate strategies to mitigate the same.

The Education and Skills practice at IMaCS focusses on identifying skill gaps, mapping future skill requirements, and formulating strategies to address them. Our service offerings encompass diagnosis, design and implementation of education and skill development interventions for government and private sector.

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