

# Analysis of Talent Supply and Demand

## Employment Requirements and Skill Gaps in the Indian IT-BPM Industry







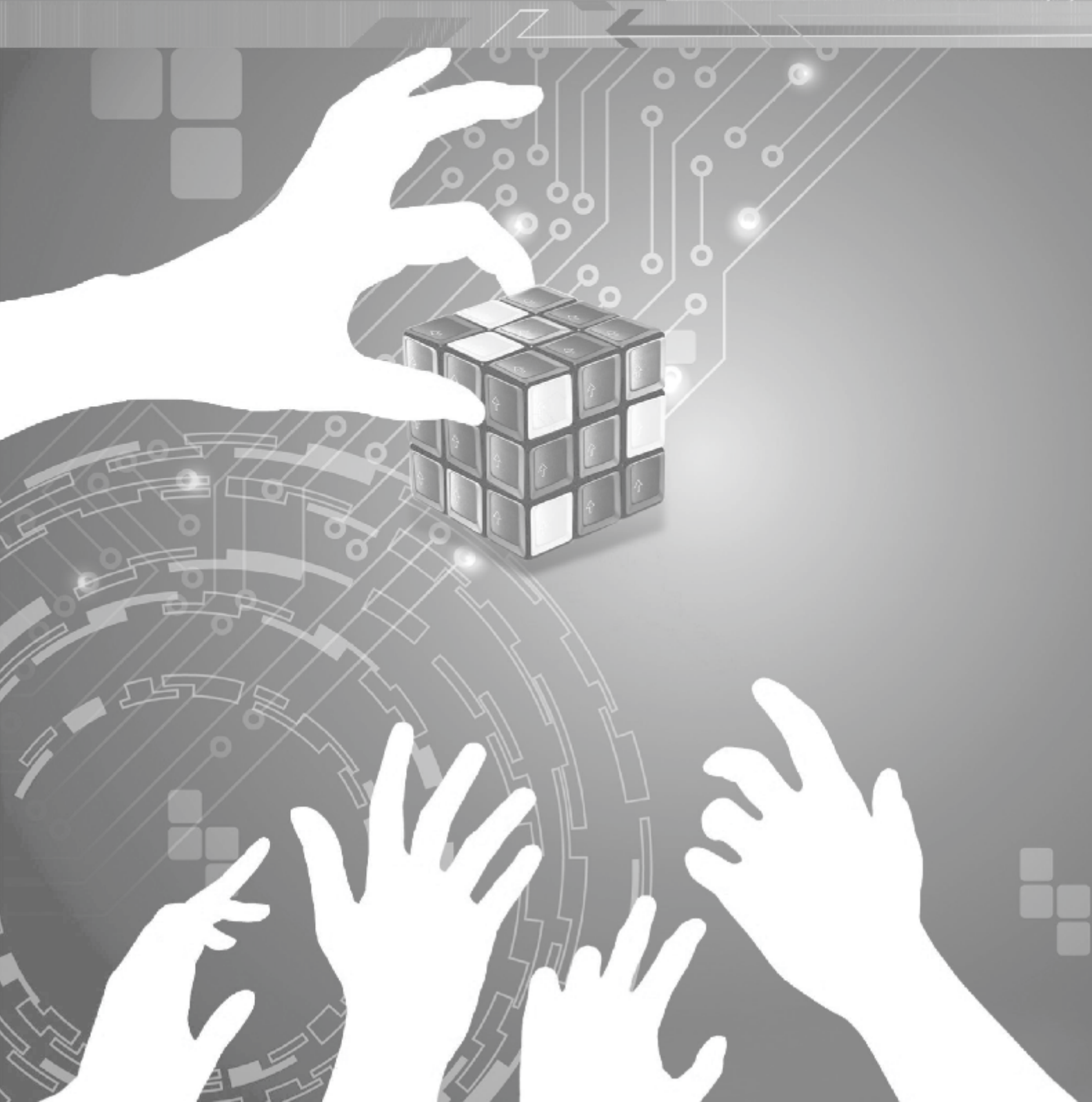
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# Analysis of Talent Supply and Demand

## Employment Requirements and Skill Gaps in the Indian IT-BPM Industry



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NASSCOM  
4E-Vandana Building (4th Floor)  
11, Tolstoy Marg, Connaught Place  
New Delhi 110 001, India  
T +91 11 4151 9230; F +91 11 4151 9240  
E [ssc@nasscom.in](mailto:ssc@nasscom.in)  
W [www.nasscom.in](http://www.nasscom.in)

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# Foreword

2013 was an important year for the Indian IT-BPM Industry as global markets struggled to emerge from their economic instabilities and environmental challenges. The situation, though challenging, also presented new opportunities to tap for the Indian IT-BPM Industry. One of the key imperatives for the industry is to continuously seek and develop the 'right' talent to drive their growth.

As per the National Skills Mission, 500 million professionals would need to be skilled by 2022, to make them employable. The Indian IT-BPM Industry currently employs about 3 million people directly and about 9 million, indirectly. As per the NASSCOM Perspective 2020 report, the industry has a potential to contribute to, as much as, 30 million employment opportunities (direct and indirect) by 2020.

This report analyses these requirements, in terms of Talent Demand and Supply in the Indian scenario. It aims to assess quantitative and qualitative gaps that exist and have the potential to stunt the growth of the Industry. It consists of detailed analytics and insights that highlight the issues in Talent Demand by the Industry, analyses the situation of Talent Supply from Indian education system and goes on to identify the Demand-Supply gaps.

An estimated 5 million graduates pass out of the Indian Education system every year, across a range of courses but only a few are able to find a suitable job. Employability of these graduates has often been questioned. The report touches upon this topic and gives recommendations to a range of stakeholders to work towards improving the situation – qualitatively and quantitatively.

This Talent Demand-Supply Analysis Report is one of several efforts by which NASSCOM aims to develop ready-to-deploy talent across the IT-BPM Industry.

We reaffirm our commitment to facilitate the growth of the industry and trust you will find the report useful.

R Chandrashekhar  
President

# Executive Summary

The Indian IT-BPM industry has made an unparalleled impact on the Indian economy with its far-reaching impact on socio-economic spheres including revenue growth, livelihood generation, infrastructure development and social transformation. As the pioneer of IT-BPM Services Industry in the world, the impetus is to maintain and sustain this leadership position in the long run. A key initiative in this regard will be the development and upskilling of talent so that the industry is able to uphold its global leadership.

As per NASSCOM's Strategic Review 2013, the industry aggregated revenues exceeding USD 108 billion and employed almost 3 million people. The industry accounts for almost 25 per cent of the total exports and 11 per cent of the total service revenues. Among the 3 million people employed, a majority are skilled workers. Despite nearly 5-5.5 million employable people getting injected into the labour market every year, the industry is facing a shortage of the 'right' talent. This is a cause of concern because, this 'right' talent is imperative for India to maintain its leadership position. Thus, one of the key initiatives taken up by the government in collaboration with the IT-BPM Industry is the development and up-skilling of talent to maintain its global leadership.

Currently, talent over-supply and low employability is leading to, on the one hand to under-employment and on the other to a supply deficit for the industry. If not tackled well, this could stunt the Industry's growth. To develop the relevant skills required in the IT-BPM industry, it is critical to understand the talent demand and supply landscape and also the skill sets required, in the industry.

The report aims to provide a qualitative and quantitative analysis of the Talent Demand and Supply for the IT-BPM Industry focussing on the number of professionals required and the skills set required of these professionals.

This report also addresses the key issue of employability in a novel way. A dipstick assessment involving leading organisations in the IT-BPM industry was conducted with respect to employability of the candidate base and its potential impact on the net talent supply.

It was noticed that in the non-BPM space (IT Services, Engineering and R&D and Software Products), around 24-26 per cent of candidates are employable in Tier 1/Tier 2 organisations.

For Business Process Management (BPM), the employable pool is estimated to be lower at 18-20 per cent.

However, initiatives such as National Occupational Standards (NOS) have the potential to increase the employability to 56-58 per cent for non-BPM and 33-35 per cent in the BPM space.

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Employability: Employability is defined as the proportion of people to whom organisations are willing to make an offer out of a given number of applicants who are willing to work in the IT-BPM industry. This percentage has been derived in the next page.

Boundary Conditions to the definition above: The boundary conditions that apply to this definition are:

- a) Demand is not a constraint (actual demand could be fluctuating) and
- b) This definition holds true only in the case of export-led IT-BPM Industry.







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# Talent Situation in the Indian IT-BPM Industry

Graduate talent supply for the IT-BPM Industry is not just restricted to Engineers or technically qualified talent. In fact with the scope of services being offered by BPM - Finance, Medical, Legal and almost every professional is part of the potential talent pool.

Out of the 5-5.5 million graduates that pass out every year, only about 0.6-0.7 million are considered employable by Tier 1/Tier 2 companies.

This insight is based on a research conducted with participation from employers like Infosys, TCS, HCL, Genpact, Convergys, etc. which identified the factors used to filter out candidates in the recruitment process.

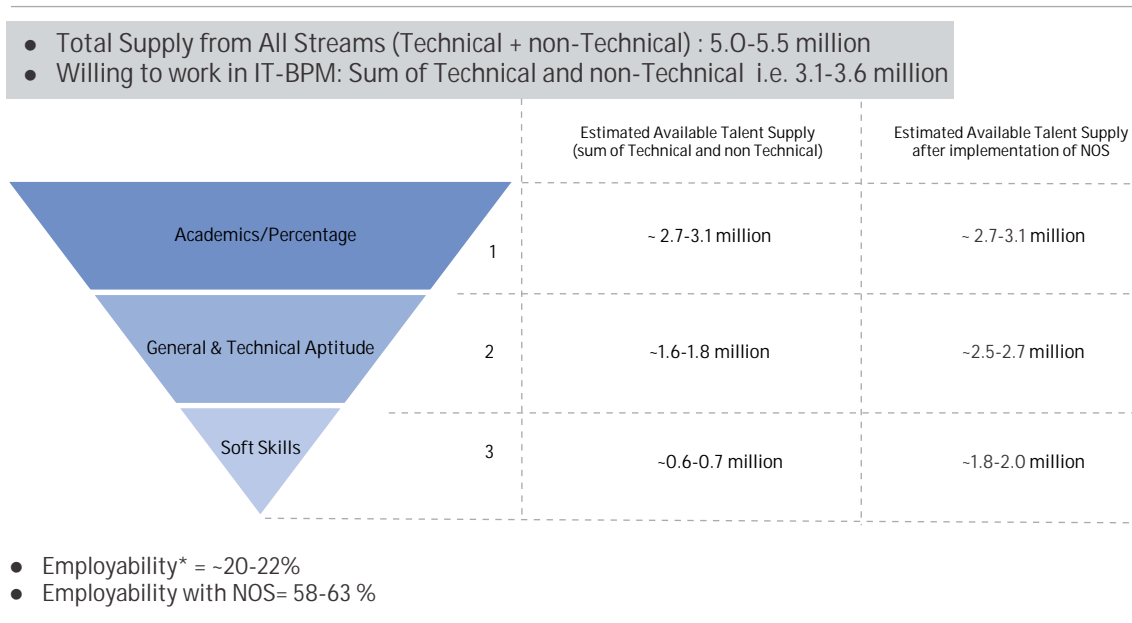
The three key factors used for these filtering were:

- a) Academic Performance
- b) General and Technical Aptitude
- c) Soft Skills

When applied one after the other, the research showed that these filters lead to an employable talent pool of 20-22 per cent for the IT-BPM Industry, meaning an employable pool of around 0.6-0.7 million.

With the implementation of NOS, we expect an approximate increase of 250 per cent in the number of employable candidates for the IT Services, Engineering and R&D and Software Products sub-sectors. This will lead to an increase to 1.8-2 million and hence these initiatives are seeing a strong focus by the government, industry as well as the academic community.

Figure 1: Talent Situation in the Indian IT-BPM Industry

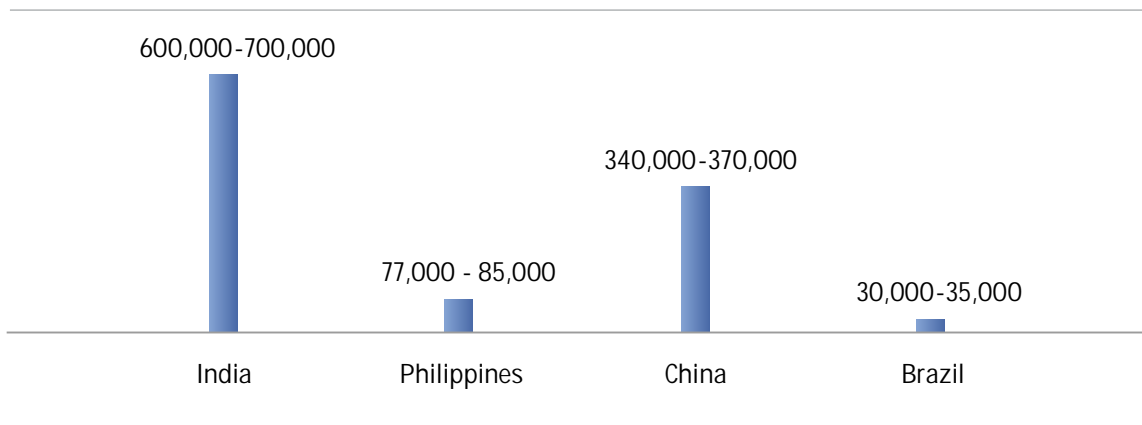


\*Employability is calculated as a percentage of talent supply available after screening for academics, general & technical aptitude and soft skills out of total supply willing to work for the IT-BPM Industry.

## How bad are these numbers for the Indian IT-BPM industry's global competitiveness?

The graduate supply numbers portray a great room for improvement and a key requirement to undertake effective measure in skill development, NOS being one of them. However, it must be noted that even at current employability numbers, India continues to lead the race in providing graduate talent and that India's current employable pool is bigger than the combined employable pool of China, Philippines and Brazil.

Figure 2: Employable pool



What this means is that compared to other countries that are or have the potential to threaten India's leadership, India still fares better on the graduate talent supply numbers. This by no means, is an indication to relax but an opportunity for us to continuously improve our skilling system so that we continue to lead the global IT-BPM industry.

\*Source NASSCOM-McKinsey Research 2012

Numbers have been estimated for 2013 based on a YoY growth of 8 per cent

## Talent supply for Non-BPM sector

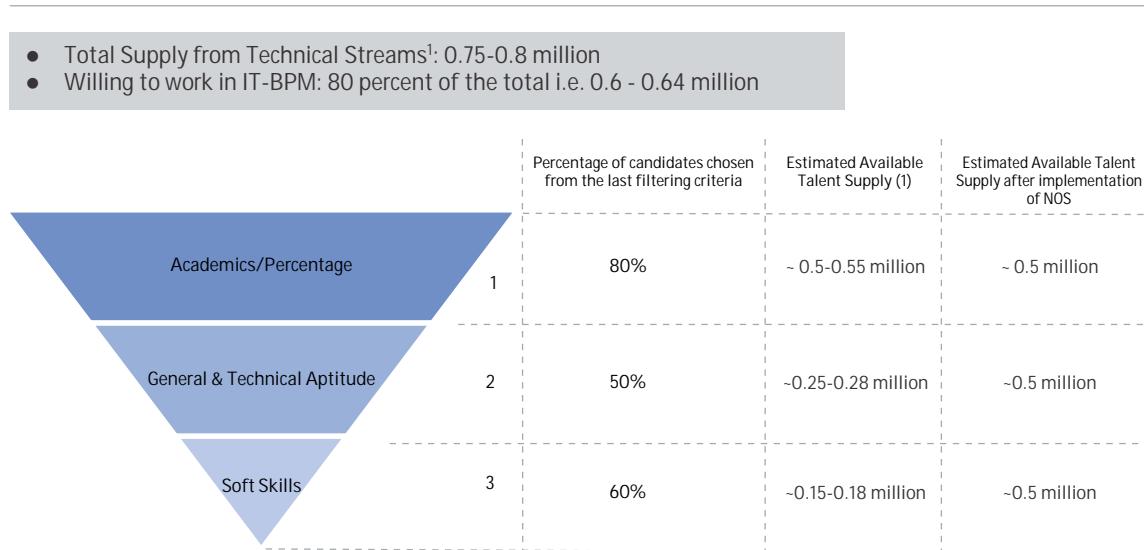
The research highlights that of the ~0.6-0.64 million candidates willing to work in the non-BPM sectors (IT Services, Software Products and Engineering and R&D), around 0.15-0.18 million are deemed employable as per the chart illustrated below.

These sub-sectors are technical in nature and require professionals from Engineering and related technical fields only.

Organisations filter out a considerable proportion of candidates at each stage, especially at Technical Aptitude owing to lack of requisite skills set as per the organisational standards.

With NOS, the candidates will be trained as per the organisations' requirements and hence the filtering out proportions would be negligible for factors: General and Technical Aptitude (meaning higher proportion of candidates filtering-in). Therefore, the industry will have a higher number of employable candidates at its disposal for recruitment.

Figure 3: Talent supply for Non-BPM Sector



- Employability\* = 24-26 per cent
- Employability with NOS = 75-80 per cent

<sup>1</sup>Technical Stream = Engg Degree + Engg. Diploma (PG+Post-school) + MCA

\*Employability is calculated as percentage of talent supply available after screening for academics, general & technical aptitude and soft skills out of total supply willing to work for IT-BPM industry.

## Talent supply for the BPM sector

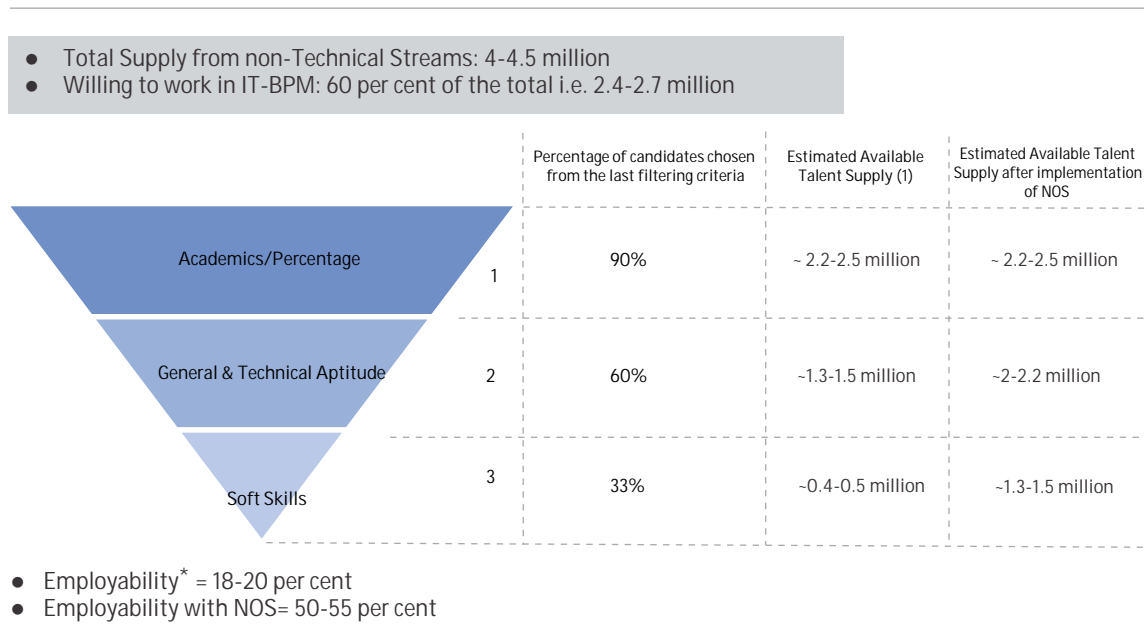
### Talent supply for the BPM Sector (Only Non-Technical Graduates)

The BPM sector consists of areas such as F&A, HR Outsourcing, Legal Process, Medical processes, etc. apart from the much-famed Customer Support processes. The scenario below assumes that only non-technical graduates, such as graduates from Commerce, Arts, Science, etc. backgrounds are willing to join the BPM sub-sector.

The current total potential supply (those who are willing to work) to this sub-sector is around 2.5 million. However only about 0.45-0.5 million are considered employable by the industry.

With the implementation of NOS, we expect an approximate increase of more than 200 per cent in the number of employable candidates to about 1.3-1.5 million. This has been estimated as a result on improvement on filtering out ratios for factors; General and Technical Aptitude (from ~60 per cent to ~90 per cent) and Soft Skills (from ~33 per cent to ~70 per cent).

Figure 4: Talent Supply for the BPM Sector



The three-level illustration provided earlier, highlights a crucial scenario that the Indian IT-BPM industry is facing today. On one hand, it faces the task of finding jobs for the large number of technical and non-technical graduates who pass out every year. On the other hand, it faces an equally challenging task of finding suitably 'employable' talent who can meet the requirements of the job and the clients.

\*Employability is calculated as percentage of talent supply available after screening for academics, general & technical aptitude and soft skills, out of total supply willing to work for IT-BPM industry.

# Structure of this Report

This report first analyses this talent demand-supply problem in detail, identifying state-wise and sub-sector-wise trends and insights, followed by analysis of Indian education supply chain and concludes with the identification of key issues and recommendations.

This report also outlines the key issues identified and the recommendations against each of them. These should be implemented to ensure that the industry growth is not hampered due to lack of skilled workforce in-line with the targets of the National Skills Mission and the Twelfth Five Year Plan. The report contains the following sections:

## Approach and Methodology of the Talent Demand Supply Analysis

This section outlines the approach and methodology used to undertake the research, data validation, analysis and insights.

## Talent Demand Situation in India

This section describes the net hiring numbers in the IT-BPM industry in India as impacted by attrition and lateral hiring of experienced candidates in the industry. It also outlines the flow of talent in the industry and presents a comprehensive analysis of talent demand by assessing the distribution of talent across regions, states and cities.

## Talent Supply Situation in India

This section presents a background of India's growth story and makes an opening case for the comparative advantage India enjoys because of its demographic dividend. Further, it details the categories of institutes that feed into the IT-BPM Industry as potential talent supply pools and presents a comprehensive analysis of talent supply in India by assessing its distribution across regions and states.

## Analysis of Talent Supply with respect to Academic Outcomes

This section presents an analysis of talent supply with respect to envisaged academic outcomes. It outlines an evaluation of courses and identifies key missing areas and lists out a comparison of courses on the basis of actual and desired academic outcomes.

## Gaps in Talent Demand and Supply

This section provides a view of the data collected during research in the form of current and future trends in the talent demand situation in India and the talent supply situation in India with respect to the IT-BPM industry. The data is provided on a geographical basis as well as with respect to qualitative skills requirement. This section also identifies the potential gaps in the talent demand and supply in the industry.

## Key Issues and Recommendations

This section highlights the key issues identified and provides recommendations and measures to be taken to address these issues that may hinder the growth of the IT-BPM industry.

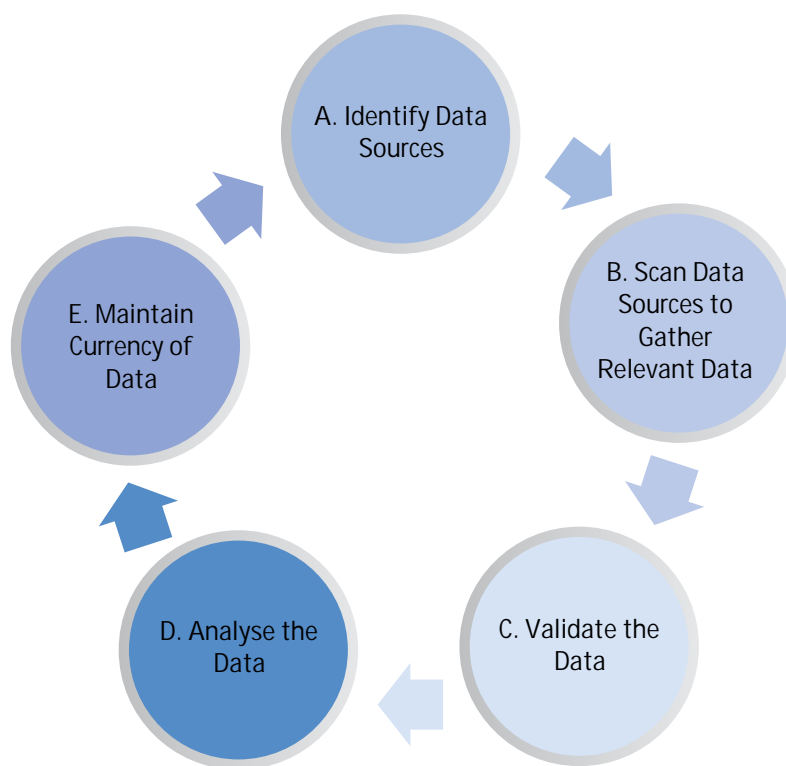
# Approach and Methodology of the Talent-Supply Demand Analysis

Data for the analysis was collected through primary and secondary research. The following methodology was adopted for analysing the demand and supply of talent as per the skill set requirements of the IT-BPM industry.

This analysis should be conducted on a bi-annual basis to ensure that the data for the demand supply situation in the IT-BPM is updated and provides the actual picture of the talent pool in the country.

The Approach and Methodology followed for the Talent Supply Demand Analysis is shown in the figure provided below:

Figure 5: Approach and Methodology for Talent Supply Demand Analysis

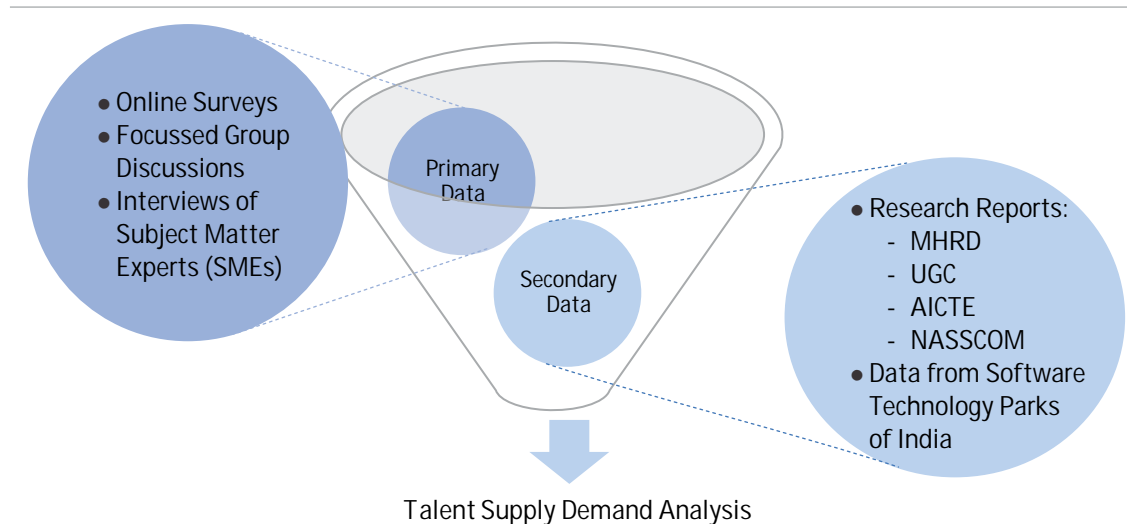


The first step to begin the research was to identify the data sources for gathering the information about the talent supply and demand landscape. Each step is described below:

#### A. Identify Data Sources

- Both primary and secondary sources were used for the research.
- Primary sources included Online surveys, SME Interviews and Focussed Group Discussions.
- Secondary sources included Research reports, company websites and Software Technology Parks of India publications.

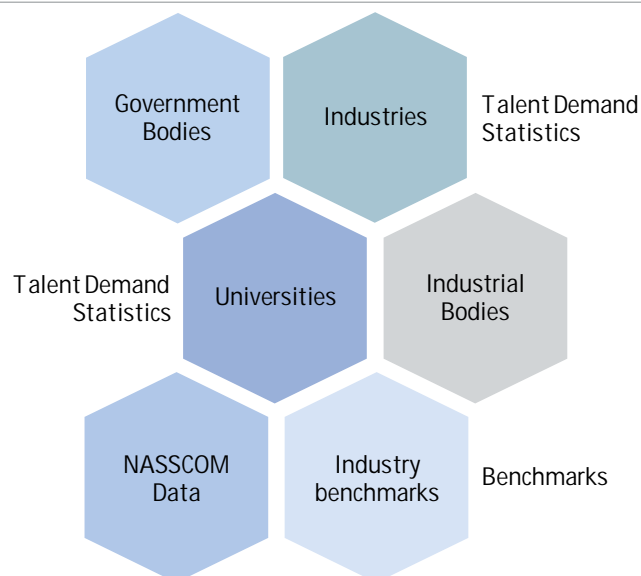
Figure 6: Data Sources for Talent Supply Demand Analysis



The following sources were identified as the primary sources of information for research:

- Talent Demand details from IT-BPM industry, regulators and government sources
- Talent Supply statistics from government sources like ministries and universities and educational institutes
- Industry benchmarks
- NASSCOM data

Figure 7: Primary Data Sources for Talent Supply Demand Analysis

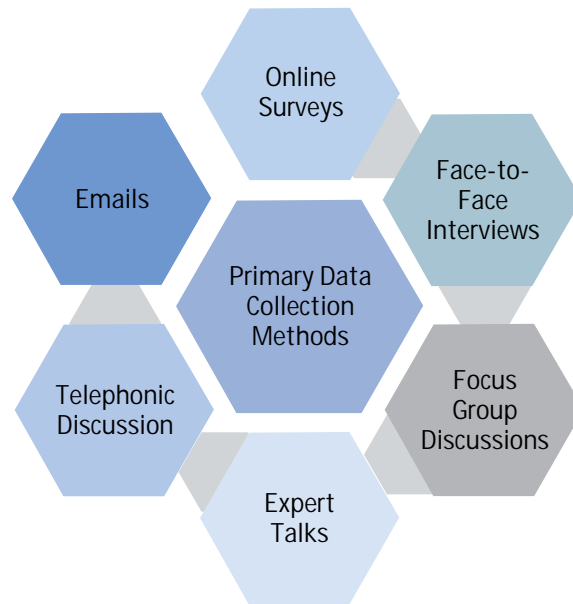




## B. Scan Data Sources to Gather Relevant Data

The next step was to gather the data from the pre-identified sources and prepare for analysis. A combination of primary and secondary sources was used for capturing qualitative and quantitative data for the Talent Demand-Supply report. The following techniques were used for capturing the data from primary sources:

Figure 8: Methods to Collect Primary Data



## C. Validate Data

The data gathered was then checked for consistency via the validation process. The collected values were compared with the current and previous NASSCOM publications and other reports in this area. Major inconsistencies, if any, were highlighted and addressed by re-evaluating the erroneous data points.

## D. Analyse the Data

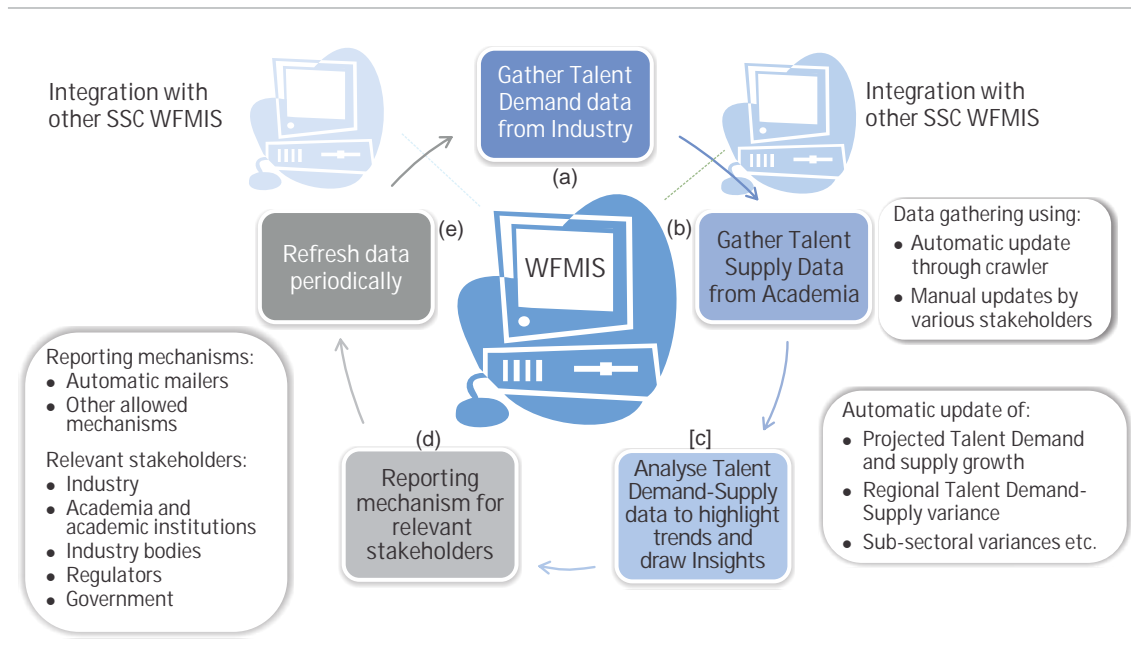
The data collected through primary and secondary research was analysed to generate key insights as agreed in the Statement of Work. Additionally, analysis to highlight the focus areas for the industry and academia were conducted to highlight the issues faced by each and the possible ways to address these issues.

## E. Maintain Currency of Data

The IT-BPM Industry is one of the most dynamic industries in the globe. The talent landscape of the IT-BPM industry varies often due to changes in industry practices, government legislations, international regulations, policies, etc.

It is also recommended to refresh this data every 3 months to 2 years (depending upon Industry requirements) to maintain relevance to the actual IT-BPM industry scenario. This is a very critical stage in the talent demand supply analysis process.

Figure 9: Maintenance of Talent Demand Supply Data



To maintain the talent demand supply data continuously, the following process needs to be followed:

- a) Gather Talent Demand Data
- b) Gather Talent Supply Data
- c) Analyse Talent Demand-Supply data to highlight trends and draw insights. Focus on areas like:
  - i. Projected Talent Demand Growth
  - ii. Projected Talent Supply Growth
  - iii. Regional Talent Demand-Supply Variance
  - iv. Qualitative Skill Gaps
  - v. Sub-sectorial Variances
- d) The report is shared with relevant stakeholders to enable data-based decision-making. The relevant stakeholders are:
  - i. Industry
  - ii. Academia
  - iii. Industry bodies
  - iv. Academic institutions
  - v. Regulators
  - vi. Ministries
- e) Refresh data within a period of 3 months to 2 years.

# Talent Demand Situation in the Indian IT-BPM Industry

By 2020, the IT-BPM Industry will hire more than 0.4 million candidates every year.

The Indian IT-BPM Industry is going through challenging times as far as demand for talent is concerned. It is still recovering from the aftershocks of the economic slump of 2009 and focussing more and more on innovation and re-engineering its business processes and ways of working.

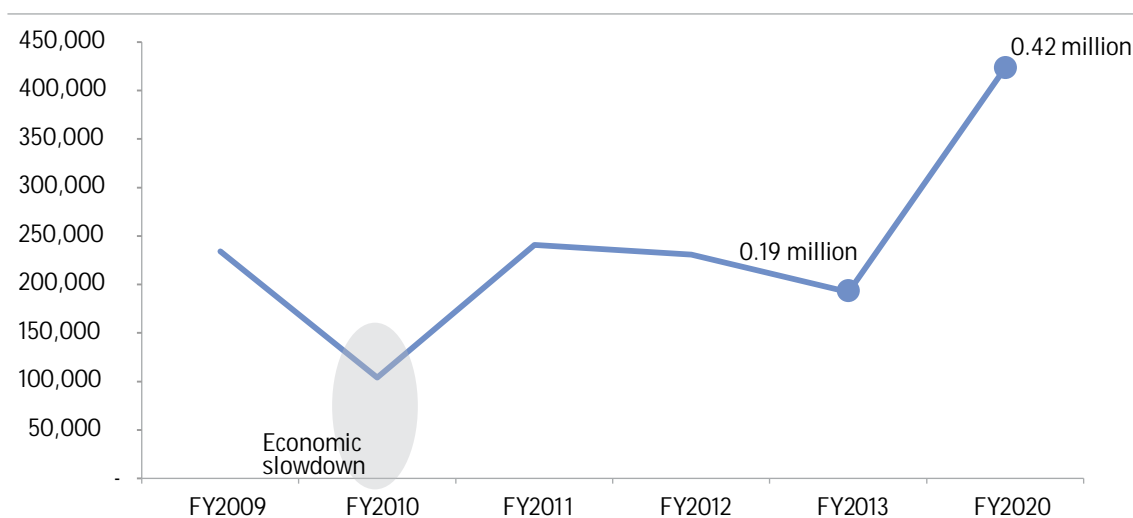
The net demand for talent in FY2013 stands at an estimated 0.19 million professionals.

This number is interesting when compared to the annual supply of engineers estimated to be ~0.7 million in 2013.

Assuming an employment growth scenario of 9 per cent, the demand for talent is expected to be more than double, i.e. 0.42 million by 2020.

However, if employment grows at 20 per cent, a number that was being projected frequently 5-6 years back, the talent demand could be ~0.7 million.

Figure 10: Employment Trends in the Industry  
Net addition in employment (2009-20)

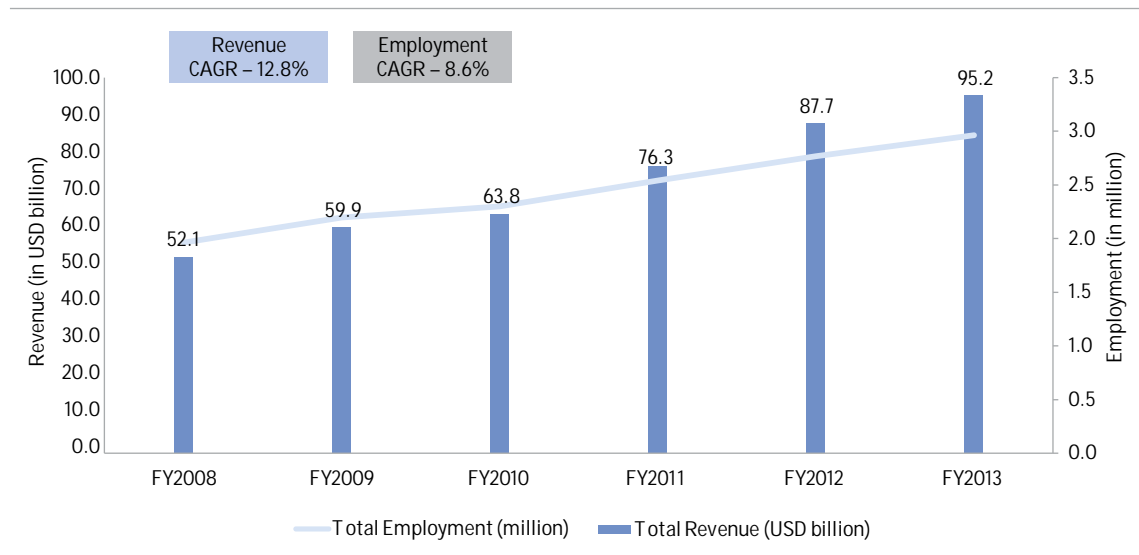


These figures indicate the hiring across all levels. However, the major portion of this hiring (~95 per cent) is at the entry level and constitutes fresh graduates/post graduates from formal and non-formal educational institutes.

This rate of growth in hiring, though substantial, will be slower than the growth in revenue.

Automation of various job roles such as software testing and call centre operators has adversely affected the hiring growth and hence, the total revenue has grown at a faster rate than rise in employment. This movement to an increase in “revenue per employee” is considered to be a sign of maturing industry.

Figure 11: IT-BPM Industry – Revenue and Employment Growth



The trend is prevalent in occupations like Software Testing in IT Services and Customer support where technology and automation imply that less 'human resources' are required to do the same tasks as software and chat/IVR-based support.

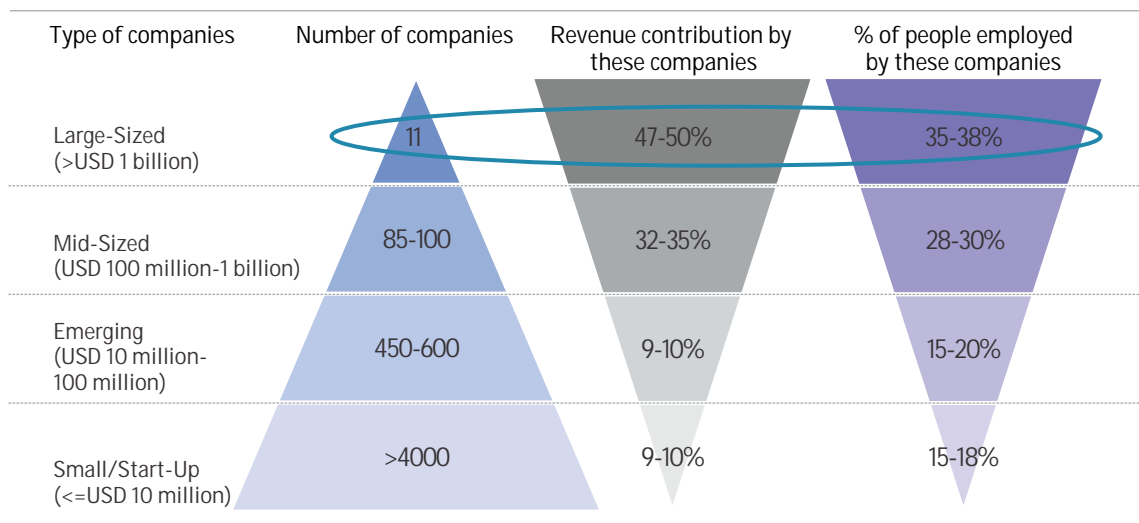
Small and Emerging companies too will contribute substantially to the increase in talent demand.

The Indian IT-BPM Industry is home to over 5000 organisations. Of these, the top 11 organisations employ a third of the total workforce who deliver around half of the industry's revenues.

Another interesting statistics is the presence of ~4000 smaller organisations that contribute to ~10 per cent of the industry's revenue but employ 15-18 per cent of the Industry's workforce.

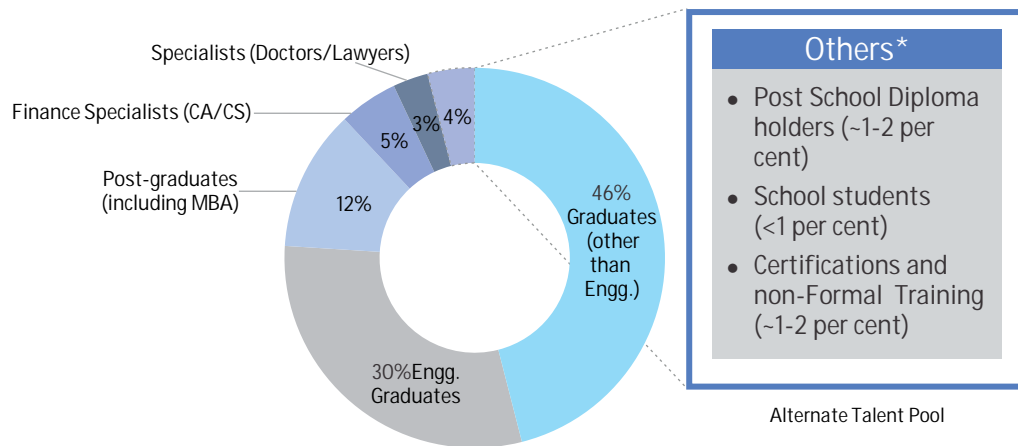
It is likely that these will be the key drivers for demand in the current economic scenario of uncertainty.

Figure 12: Top 11 companies employ 1/3rd of the industry and contribute 50 per cent of revenues



In terms of courses, Engineering and Computer Application will continue to remain key and a new alternate of talent supply will emerge.

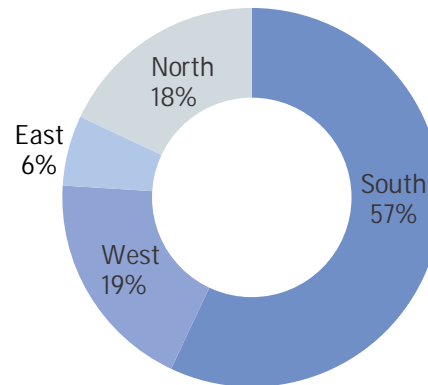
Figure 13: People employed by type of qualification



It is interesting to note that contrary to the popular belief that mostly engineers are hired in the IT-BPM industry, only 1/3rd of the people employed in the industry are Engineering graduates. ~50 per cent are graduates other than engineers.

The Southern region contributes maximum to this demand in addition to Maharashtra and NCR.

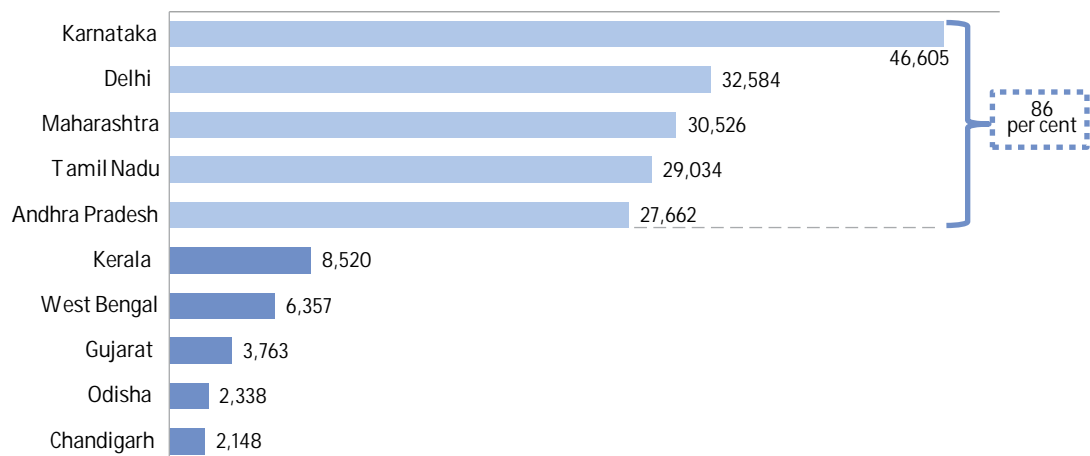
Figure 14: Region-wise Talent Demand Distribution



The Southern region accounts for 57 per cent of the total talent demand. This is mainly due to the states of Karnataka, Tamil Nadu and Kerala in the south, which are part of the top 5 states in the talent demand scenario. This is also due to the concentration of IT industry in the southern states when compared to the northern and eastern states.

West contributes to ~19 per cent to the Talent Demand followed by North which accounts for 18 per cent mainly due to NCR that has a huge cluster of IT companies. Demand in West region is essentially based out of Mumbai and Pune. Pune especially, has emerged as a major hub for the IT-BPM Industry.

Figure 15: State-wise Talent Demand Distribution  
Demand - 2013



A detailed analysis by state, indicates that Karnataka, Delhi, Maharashtra, Tamil Nadu and Andhra Pradesh constitute about 86 per cent of the total jobs created. The number has decreased over the last 5 years from 90 per cent. Within the 5 states, Karnataka leads by 40 per cent against the second ranked state i.e., Delhi. The reason behind such a huge gap is that Bengaluru which is the hub for IT-BPM industry is in Karnataka.

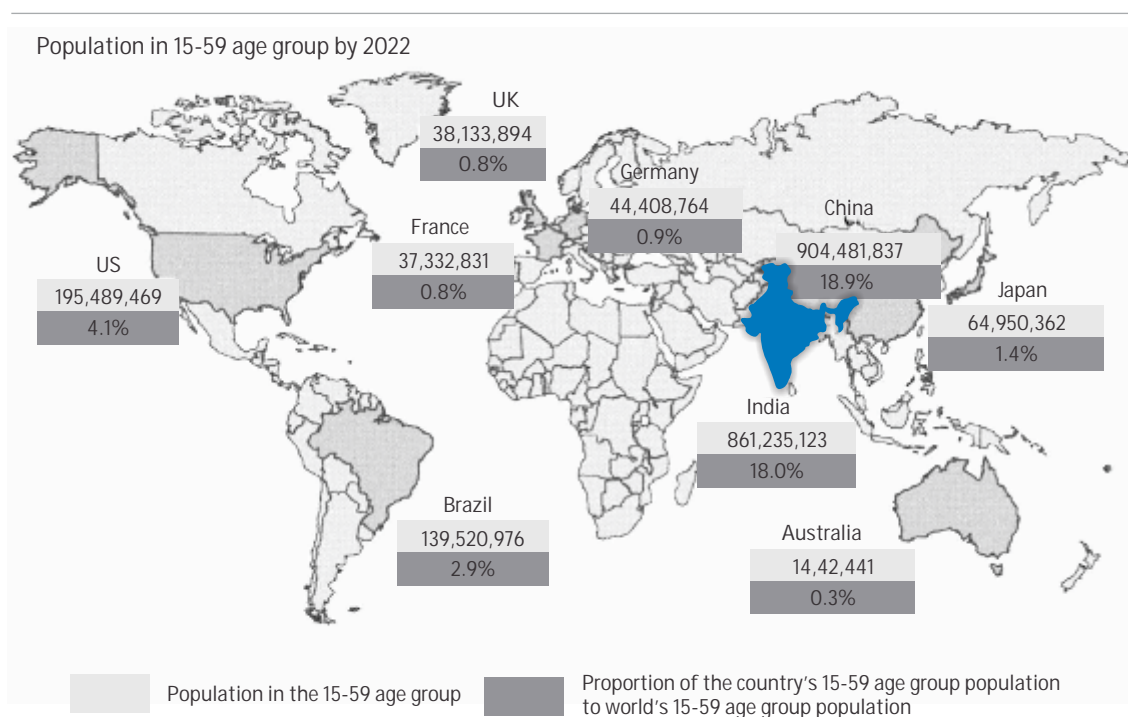
Maharashtra and Tamil Nadu are in the 3rd and 4th place respectively with many companies preferring to have their corporate headquarters in Mumbai. Pune in Maharashtra and Chennai and Coimbatore in Tamil Nadu contribute to this demand for talent.

# Talent Supply Situation in the Indian IT-BPM Industry

India's Demographic Dividend positions it as the Talent base of the world.

Compared to western economies, where there is a burden of an ageing population, India has a unique 20–25 years window of opportunity called the “demographic dividend.” This “demographic dividend” means that as compared to other large developing and developed countries, India has a higher proportion of working age population vis-à-vis its entire population. The result is low dependency ratio, which can provide a comparative cost advantage and competitiveness to the economy.

Figure 16: World Population – Age Demographics



Source: Knowledge paper on skill development in India: Learner First E&Y

Further, it is expected that the aging economy phenomenon will globally create a skilled manpower shortage of about 56.7 million<sup>1</sup> by 2020.

With the rising trend of outsourcing work globally, India has the opportunity to become a global reservoir of skilled manpower accounting for 28 per cent of the graduate talent pool among 28 of the world's lowest-cost economies.

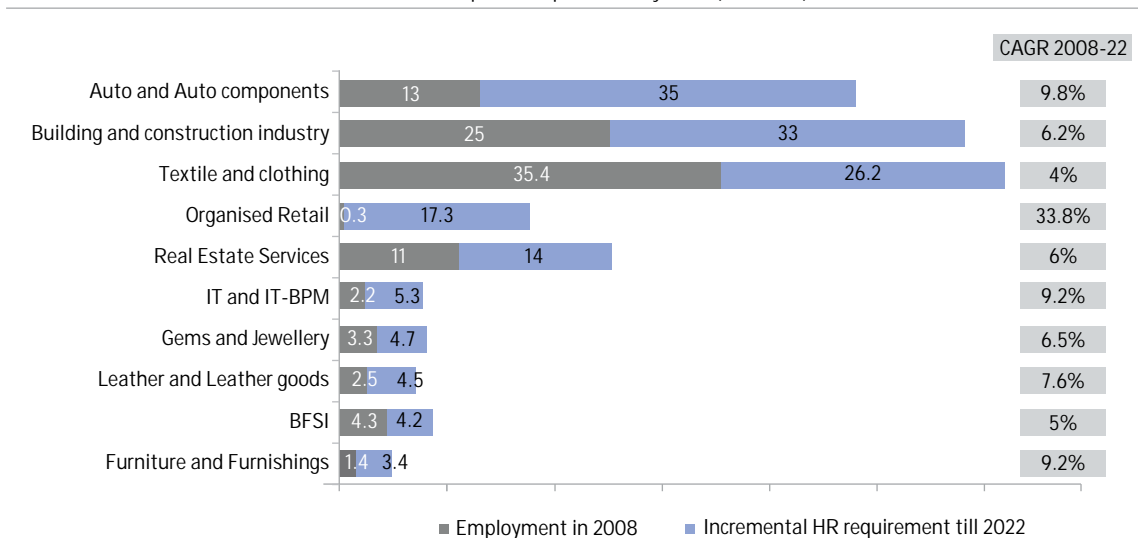
<sup>1</sup> "Skill development and training," Planning commission (Government of India), 2008



Among all the countries, India enjoys a unique advantage not only to fulfil its internal demand of skilled manpower, but also cater to the labour shortage in other countries. The government is taking proactive steps to fill the existing skill gap to leverage its position as a supplier of skilled manpower to the world.

India is expected to grow at a rate of 8 per cent on an average in the next 10 years. More than 700 million Indians are estimated to be of working age by 2022. Out of these, more than 500 million require some kind of vocational or skill development training.

Figure 17: Projected Growth in Sector-wise Manpower Requirement  
Growth in manpower requirement by 2022 (in million)



Source: Knowledge Paper on Skill Development in India: Learner first E&Y

Figure 18: Growth in Manpower Requirement

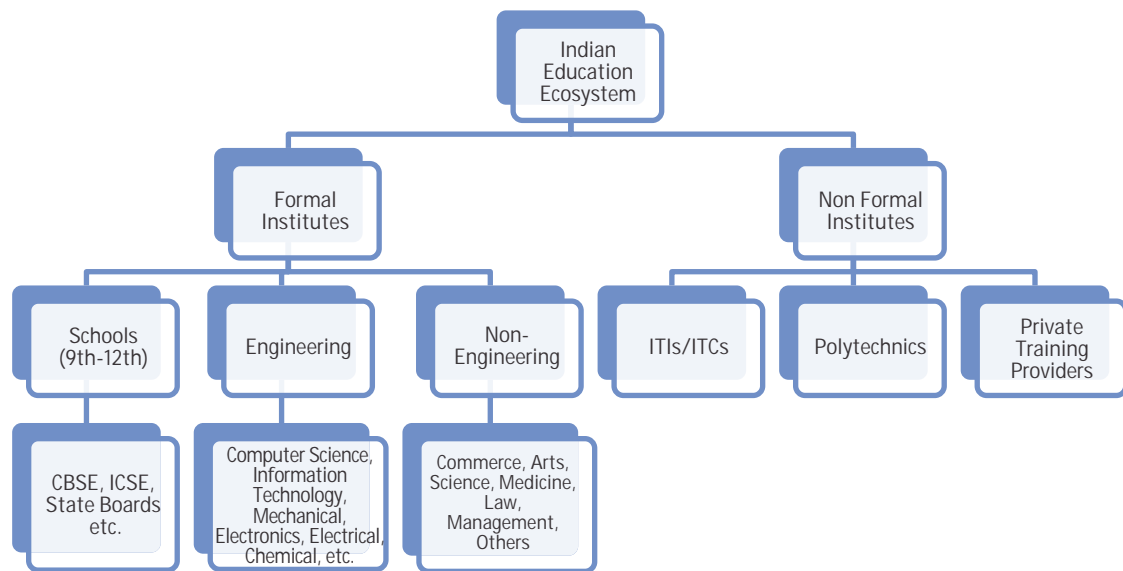
Year	GDP growth rate	Project employment (in million)			
		Agriculture	Industry	Services	Total
2011-12	9%	229.2	105	153.5	487.7
	7%	225.4	102	149	476.4
	5%	221.5	99.1	144.6	465.2
2016-17	9%	240.2	126.2	189.5	555.9
	7%	232	116.8	174.8	523.5
	5%	224	108.1	161.2	493.3

Source: NSDC

In the Twelfth Five Year Plan, the country has set a tough challenge in the field of vocational education and training to tackle this skill gap in the future. It aims to increase the percentage of workforce with formal skills to 25 per cent at the end of the plan. It is estimated that 50–70 million jobs will be created in India over the next five years and about 75 per cent–90 per cent of these additional employment avenues will require some vocational training.

The Indian talent ecosystem is a mix of formal and non-formal education sources.

Figure 19: Talent Supply Ecosystem



### Formal Institutes

Formal Institutes are educational institutes that provide education that corresponds to a systematic, organised education model that is structured and administered according to a given set of laws and norms. These institutes present a rather rigid curriculum as regards objectives, content and methodology<sup>2</sup>. Formal education institutions are organised in administration and curriculum and require a minimum classroom attendance from students. There are set programmes that must be followed by teachers and students that involve assessments - both intermediate as well as final before students can advance to the next learning level. It also awards degrees post the assessment on the basis of strict regulations. Formal Institutes comprise schools, engineering colleges and non-engineering colleges.

### Non Formal Institutes

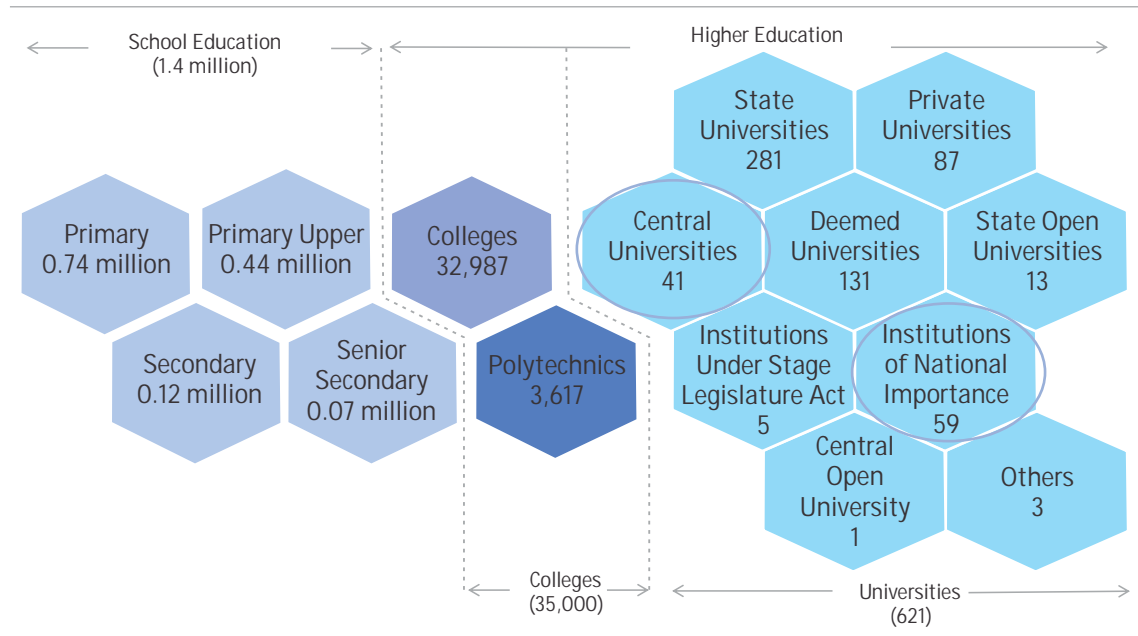
Non Formal Institutes are educational institutes, which provide education that does not necessarily follow a systematic, organised education model or a rigid curriculum related to objectives, content and methodology. Student attendance is not mandatory and the teacher-student interaction decreases and most activities take place outside the institution like home. The educative processes follow a more flexible methodology and process which are more capable of adapting to the students' needs and interest and take into consideration the student's pace of learning. These institutes emphasise on the immediate usefulness of the education for the student's personal and professional growth<sup>3</sup>. Non-formal institutes include ITIs, Polytechnics and Private Training Institutes.

<sup>2</sup> <http://www.techne-dib.com.br/downloads/6.pdf>

<sup>3</sup> <http://www.techne-dib.com.br/downloads/6.pdf>

The Indian Talent Supply ecosystem comprises 1.39 million schools, 32,987 formal colleges, 3617 Polytechnics and 621 universities providing education.

Figure 20: Talent Supply Ecosystem – Category-wise Break-up



The Universities in India can be further classified into four types which are as follows:

#### A. Central University

Central Universities are set up by an act of Parliament and is provided funding and grants mostly by UGC (Universities Grant Commission). There are 41 Central universities in the country like University of Delhi, University of Allahabad, Indira Gandhi National Open University and so on.

#### B. State University

State Universities are set up or recognised by an act of the state legislature. There are 281 state universities in the country. Three of the country's oldest institutions of higher learning, University of Calcutta, University of Madras and University of Bombay are state universities.

#### C. Deemed University

Higher Learning Institutes that are not universities but are often in recognition of their high calibre of education that are granted the status of a university are called Deemed Universities. As in other universities, students are conferred degrees upon completion of their programme. There are 131 deemed universities in the country. For example, NIT (National Institutes of Technology), IISC, Bengaluru, etc.

#### D. Private University

A private university is an institution of higher learning established through a state or central act by a sponsoring body, such as a society registered under the Societies Registration Act, 1860, or any other corresponding law for the time being in force in a state or a public trust or a company registered under Section 25 of the Companies Act, 1956. They need to be recognised by UGC to provide a valid degree. There are 87 private universities in India. For example, BITS Pilani.

#### E. Open University

An Open University (OU) that is open to people without formal academic qualifications and where teaching is by correspondence or broadcasting or summer school. It is notable for having an open entry policy, i.e., a student's previous academic achievements are not taken into account for entry to most undergraduate/post-graduate courses. The OU uses a variety of methods for distance learning, including written and audio materials, the Internet, disc-based software and television programmes on DVD Course-based television broadcasts. Materials are composed of originally-authored work by in-house and external academic contributors and from third-party materials licensed for use by OU students<sup>4</sup>.

Open Universities are further classified into:

- Central Open University – These are set up by Act of Parliament for providing distance education. There is only one such university which is IGNOU.
- State Open University – These are set up by an act of State Legislature to provide distance education. There are 13 such institutes in India like Karnataka State Open University.

#### F. Institutes of National Importance

Institute of National Importance (INI) is a status that may be conferred to a higher education institution in India by an act of parliament, an institution which "serves as a pivotal player in developing highly skilled personnel within the specified region of the country/state"<sup>5</sup>. There are 59 such institutions in the country. The common examples are IITs, ISI, and IIITs.

#### G. Institutes under State Legislature Acts

These are institutes established under the act of the State legislation. Examples include Nizam's Institute of Medical Sciences, Hyderabad and Sri Venkateshwara Institute of Medical Sciences; Andhra Pradesh. There are 5 such institutes in India.

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<sup>4</sup> [http://www.mu.ac.in/myweb\\_test/MA%20Education-Philosophy/Chapter-19C.pdf](http://www.mu.ac.in/myweb_test/MA%20Education-Philosophy/Chapter-19C.pdf)

<sup>5</sup> [http://en.wikipedia.org/wiki/Institutes\\_of\\_National\\_Importance](http://en.wikipedia.org/wiki/Institutes_of_National_Importance)

In terms of states, Rajasthan, UP and the 3 Southern states Tamil Nadu, AP and Karnataka have the highest number of universities.

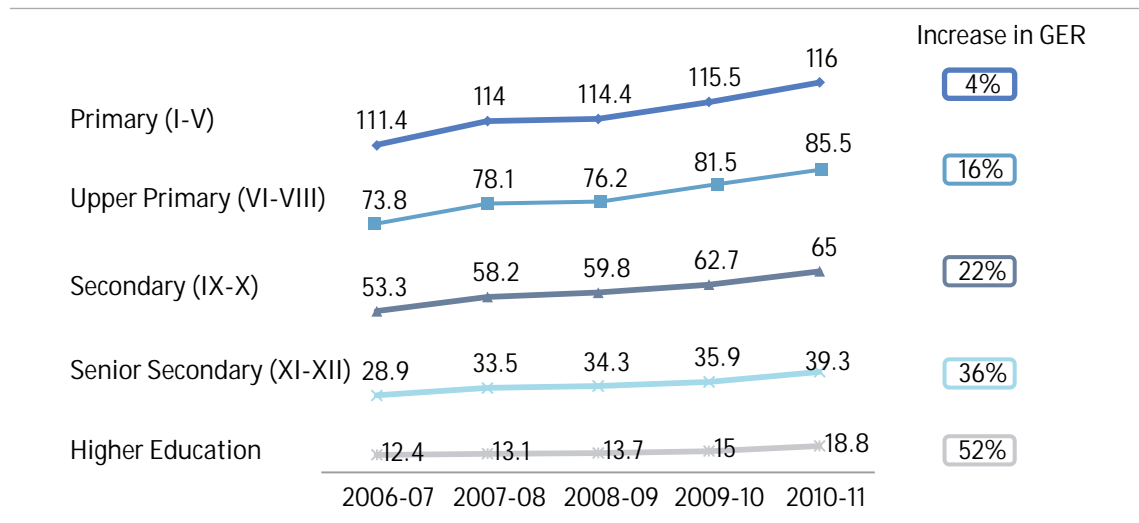
Figure 21: Prominent States – Talent Supply Break-up

State	Central Universities	State Universities	Private Universities	Deemed Universities	Institutes of National Importance	Total no. of Universities
Rajasthan	1	17	33	8	2	61
Uttar Pradesh	4	23	20	10	2	59
Tamil Nadu	2	19	-	29	3	53
Andhra Pradesh	3	32	-	7	2	44
Karnataka	1	23	3	15	2	44
Maharashtra	1	20	-	21	2	44
Gujarat	1	22	14	2	2	41
Madhya Pradesh	2	18	11	3	2	36
Haryana	1	10	14	6	1	32
West Bengal	1	20	1	1	3	26

Key issues faced in the supply ecosystem are the low enrolment levels, especially in higher education.

Since independence, the enrolment at various levels has gone up tremendously but the achievement in terms of Gross Enrolment Rate (GER) in higher education is still very low. As the level of education increases, the drop in talent enrolment decreases resulting in very low GERs in graduation and above academic levels.

Figure 22: Trends in GER Growth



While the trends show substantial increase in GERs at the Higher Education levels, the enrolments continue to be abysmal as shown on the next table.

Figure 23: Enrolment at various academic levels

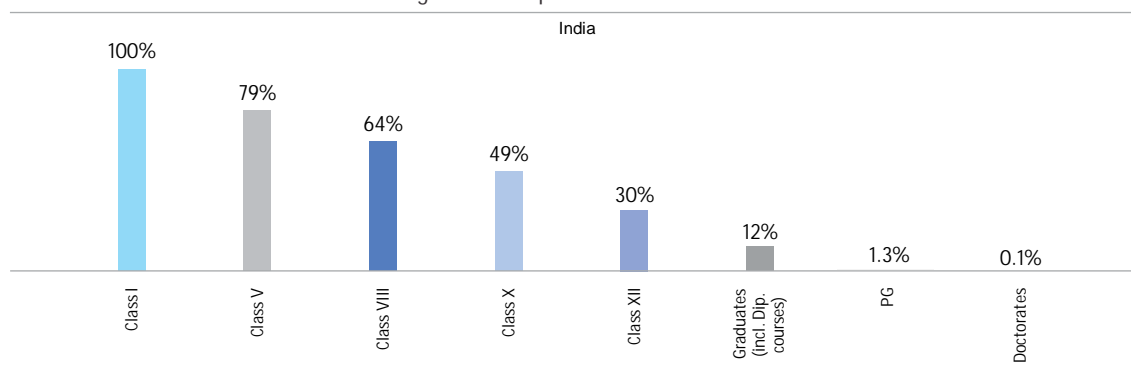
The Implementation of RTE and SSA has brought about substantial increase in school enrolments. However high drop-outs at Secondary and Sr. Secondary stage reduces the GER to 18% at PG level

Level	Enrolments (in '000s)			GER
	Boys	Girls	Total	
Primary(I-V)	70468	64849	135317	116%
Upper Primary (VI-VIII)	32808	29248	62056	85.5%
Secondary (IX-X)	17453	14326	31779	65%
Senior Secondary (XI-XII)	10848	8568	19416	39.3%
Certificate	53	62	115	
Diploma	2575	1004	3579	
Under Graduate	11173	8664	19837	
Post Graduate	1480	1224	2704	18.8%
PG Diploma	76	45	121	
Integrated	109	94	203	
M.Phil	9	9	18	
Ph.D	44	28	72	

Out of every ten candidates enrolled in a graduate course, only one opts for Higher Education while the remaining nine join the workforce.

This drop at the post graduate and doctoral levels is one of the key reasons for lack of innovation and original research coming out of the Indian Industry.

Figure 24: Drop in Talent Enrolment



While industry skill requirements are moving towards R&D and innovation-led work, the requirement from the supply side is to churn out more talent from higher education segment. This means that more focus needs to be provided to the enrolment in higher education including post graduates and Ph Ds which is currently extremely low.

Organisations are looking to be a part of the entire value chain from inventing to innovating to implementing till enhancing. This requires more of research and development competencies but the future supply looks bleak due to the low enrolment rate in post graduate and doctoral degrees. 0.07 per cent of the total student population enrolling in primary schools, enrolls in doctoral programmes.

Thus, the Talent Supply for Engineering, Research and Development sub-sector is sure to reach a stock out situation soon if proper interventions are not done.

Similarly, in the BPM sub-sector, one of the key trends in the skills set requirements will be the increasing demand for patent advisory (in addition to patent filing/documentation), high-end research and analytics, online market research and legal advisory<sup>6</sup>. These specialised skills can be supplied only by higher academic levels like graduation, post-graduation, diploma and doctorate where the GER is very low.

<sup>6</sup> Skill Gap Analysis Report for IT and BPM Industry

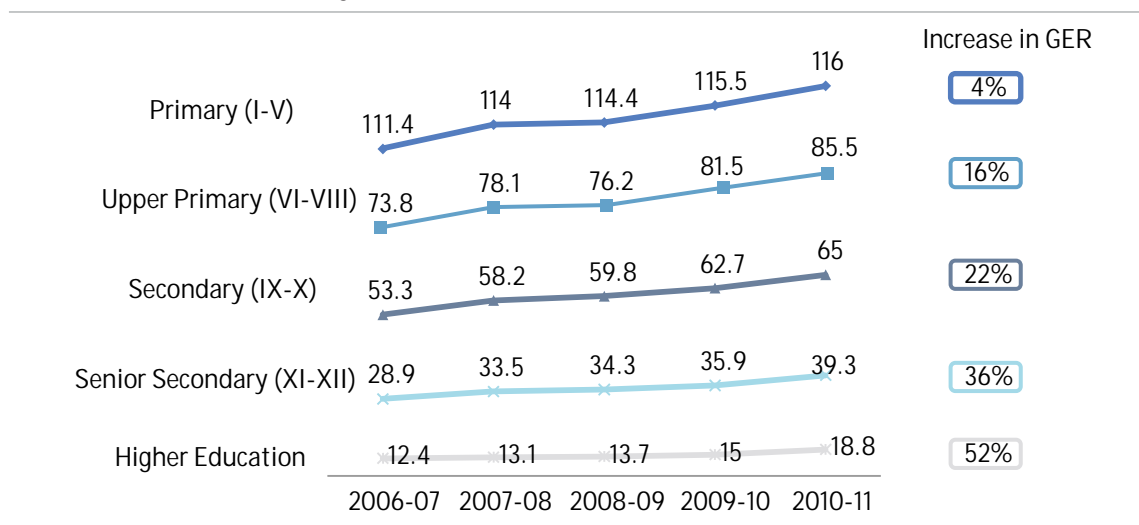
Growth in GER has helped the enrolment scenario, but enrolments at Higher Education continues to be a key concern for the industry.

The Gross Enrolment Ratio (GER) or Gross Enrolment Index (GEI) is a statistical measure used in the education sector and by the UN in its Education Index to determine the number of students enrolled in school at several different grade levels (like elementary, middle school and high school) and examine it to analyse the ratio of the number of students who live in that country to those who qualify for the particular grade level<sup>7</sup>.

Historically, the enrolment into higher education levels has seen an upward trend in sync with the upward growth trend in the number of institutes of higher education. In the figure given below, it is evident that from 1950–51 to 2004–05, the enrolment in higher education has increased from 2 million to 10 million.

It is also evident that higher education had seen the maximum increment of 52 per cent in GER from 2006 to 2011 which indicates that more and more students have been increasingly opting for higher studies and the number of dropouts after senior secondary levels have reduced since 2006. Secondary and Senior Secondary levels have also seen a substantial increase in the GER indicating a lower dropout rate in secondary and primary level.

Figure 25: Growth of GER across all Academic levels



In cognisance of the major trends in the skills demands of the IT-BPM industry, the high GER growth rate of higher academic level over the last five years is a positive trend. However, the major reason for concern is that the GER is not very high and hence, there is a lack of skilled talent in the IT-BPM industry.

<sup>7</sup>[http://en.wikipedia.org/wiki/Gross\\_enrolment\\_ratio](http://en.wikipedia.org/wiki/Gross_enrolment_ratio)



By 2020, more than 8 million graduates will pass out every year in India. Of these ~1.5 million will be from Technical streams.

Figure 26: Growth Trend of Technical streams  
Engineer/ Technology/ Architecture/ Design

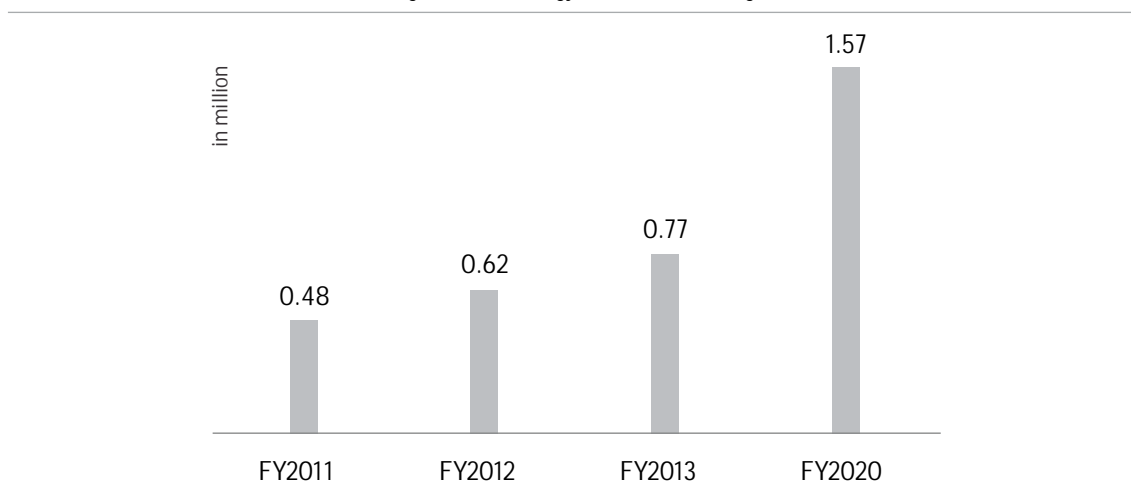
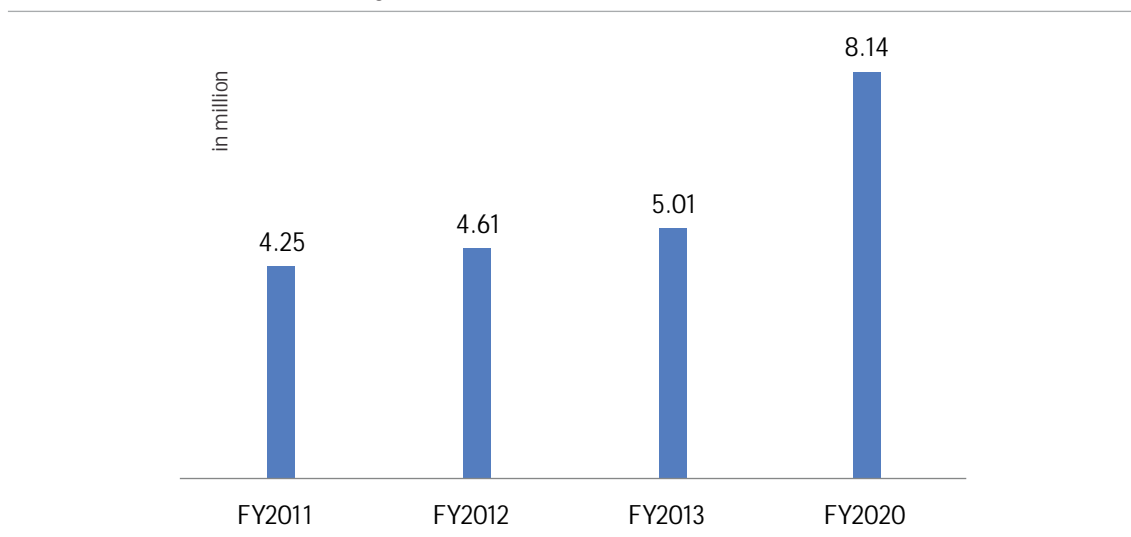
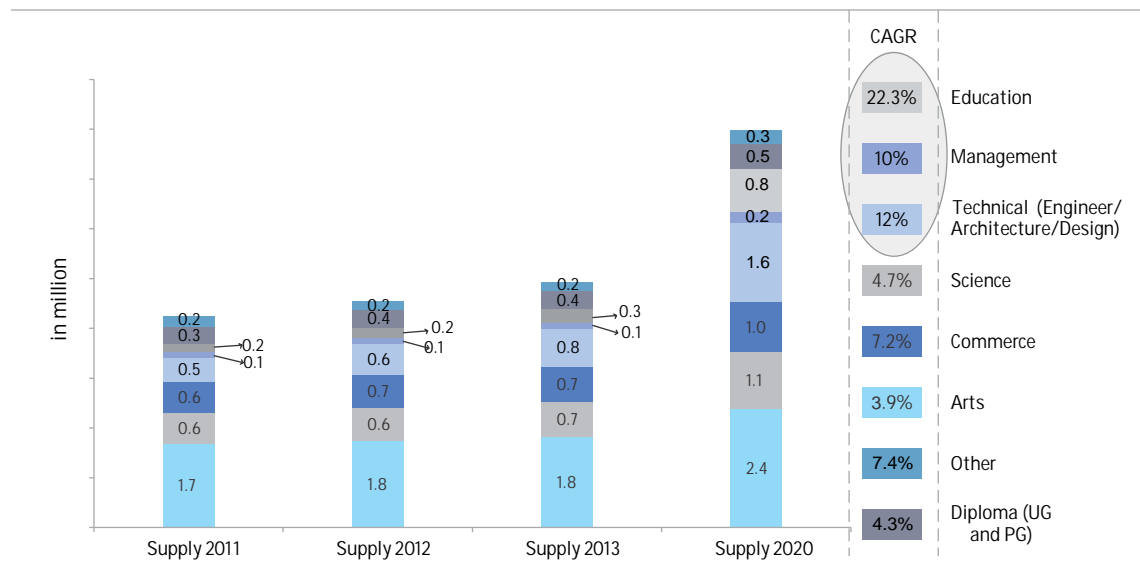


Figure 27: Growth Trend of Total Talent Pool



Majority of the growth in supply is coming from the Management and Technical streams.

Figure 28: Stream-wise Supply 2011-2020  
Arts still contributes highest proportion of students to the Talent Supply. However in terms of CAGR Education, Technical and Management streams lead the pack



Of the ~ 5 million graduates who passed out from the Indian education system, around one-third of them (1.8 million) are from the Arts stream. This number is estimated to reach 2.4 million by 2020, a CAGR of 3.9 per cent.

On the other hand, graduates from technical streams are expected to grow much faster at ~12 per cent from current 0.8 million to 1.6 million in 2020.

This is in alignment with the level-wise enrolment data which also indicates a high growth in enrolment in the technical streams.

## Bulk of the supply continues to come from 5 states

In terms of regions within India, South, North and West contribute to 75 per cent of the Talent Supply. Eastern states of Bihar, West Bengal, Odisha and the North Eastern states lag as they account for only 16 per cent of the graduate supply.

Figure 29: Talent Supply Distribution by Region

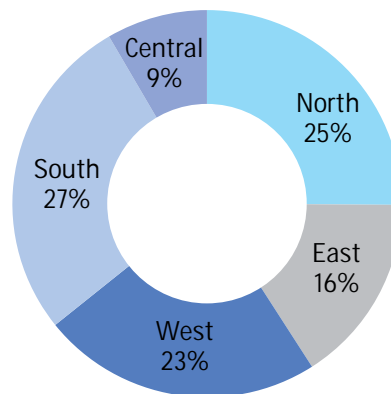
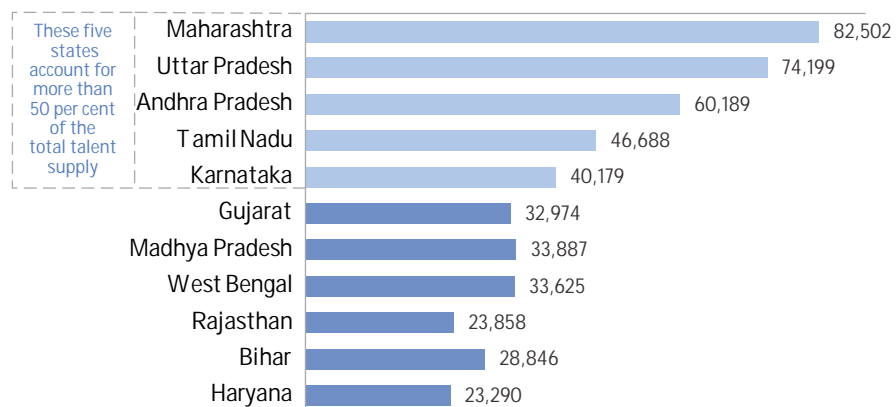


Figure 30: Talent Supply Distribution by State



Five states including Maharashtra, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Karnataka contribute to more than 50 per cent of the talent pool. Apart from Uttar Pradesh, these states happen to be the largest generators of demand in the IT-BPM Industry as well.

When analysing talent demand, the top five contributors were Karnataka, Delhi, Maharashtra, Tamil Nadu and Andhra Pradesh. The demand supply gap can be noted from the data, where UP is now a major supplier of talent to the other states to fulfil the demand supply gap.

It is also interesting to note that UP produces graduates mostly in conventional streams like Arts and Science. This is in stark comparison to the other states identified above with a higher supply of graduates from upcoming areas like Engineering and Management.

Figure 31: Talent Supply from Uttar Pradesh

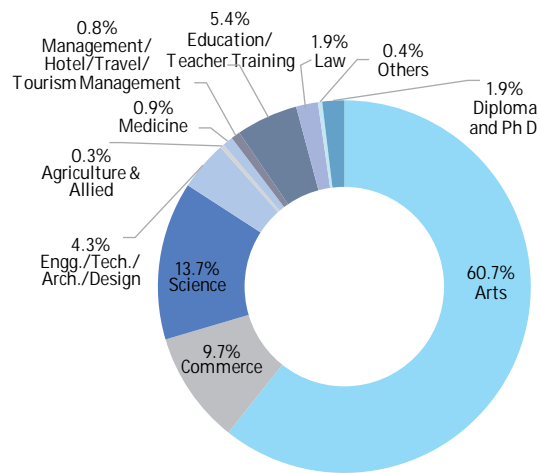


Figure 32: Talent Supply from Tamil Nadu

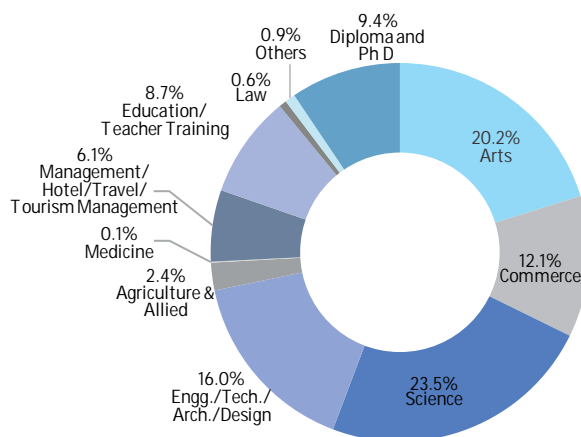


Figure 33: Talent Supply from Karnataka

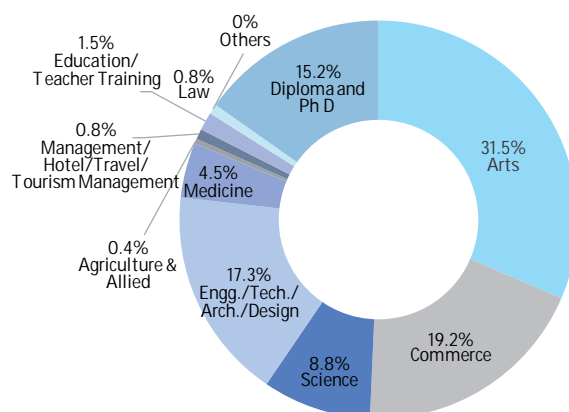
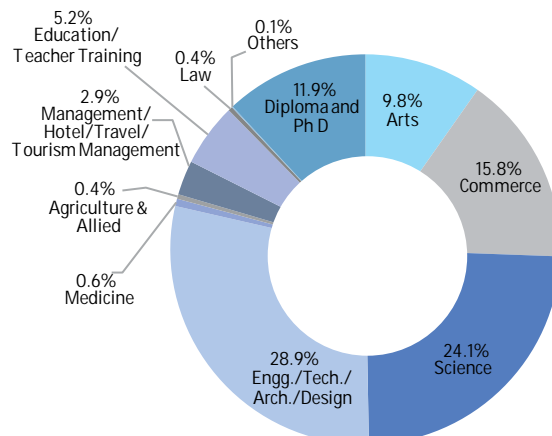


Figure 34: Talent Supply from Andhra Pradesh



(Refer to appendix for Analysis of Talent Supply from all states)

# Analysis of Talent Supply with respect to Academic Outcomes

In addition to the quantitative aspect of Talent Supply, it is essential to analyse the qualitative aspects of skill development via the formal Indian education system.

The objectives, efficiency and impact of the Higher Education streams and courses must be studied and analysed to identify how much is it in line with the set standards and expectations of the academia and industry.

An analysis of eight courses across streams and colleges was conducted to assess the academic outcomes with respect to formative and summative assessments. The courses were assessed using the Bloom's Taxonomy of learning objectives. The following courses were selected for the study:

1. Bachelor in Arts (BA)
2. Bachelor in Commerce (B Com)
3. Bachelor in Science (B Sc)
4. Bachelor of Technology (B Tech)
5. Bachelor in Medicine Bachelors in Surgery (MBBS)
6. Bachelor in Law (LLB)
7. Master in Business Administration (MBA)
8. Bachelor in Education (B Ed)

## Identification of representative sample

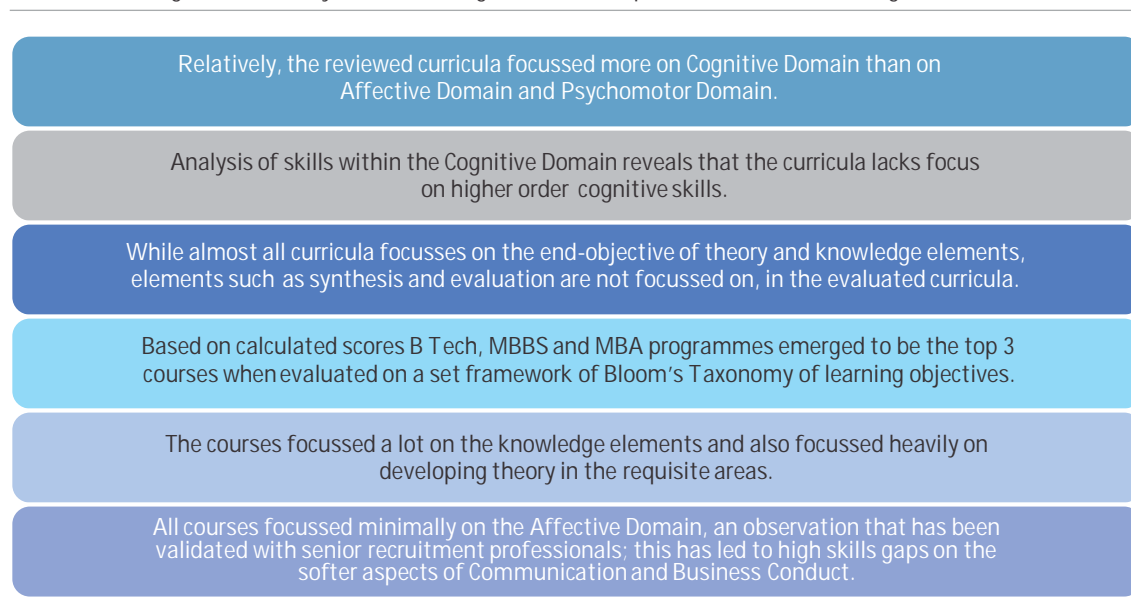
The courses and institutes were chosen to holistically represent regional coverage and based on preferred institutions as selected from a range of Indian Institutions by ~300 organisations through an online survey.

## Assessment insights

The Bloom's Taxonomy analysis of the eight courses highlighted the key areas of strengths and need for improvement with respect to outcomes expected by the industry. Based on calculated scores B Tech, MBBS and MBA programmes emerged as the top three courses when evaluated on a set framework of Bloom's Taxonomy of learning objectives.

The key areas of strengths and development identified in the eight courses are as follows:

Figure 35: The key areas of strengths and development identified in the eight courses



### Summary of curricula evaluation

Almost all analysed courses seemed to lack Higher Order Thinking Skills like Ideation, Innovation and Research and Development focus.

#### A. Bachelor of Arts

The evaluated Arts curriculum focussed on theory elements of English, Local Language, Economics, Geography, Sociology, Political Sciences etc. It included minimal components of practical or industry exposure. The course also focussed on culture, values, social ethics and community work.

Ideation was one of the key areas that was missing.

#### B. Bachelor of Commerce

The evaluated Commerce curriculum focussed on theory elements of Financial Accounting, Business Communication, Business Mathematics, Statistics, Economics, etc. It included components of accounting standards and account maintenance. There were components of financial analysis of organisations as part of projects but practical exposure was missing.

Decision-making as a result of analysis and ideation were some of the key areas that were missing.

#### C. Bachelor of Science

The evaluated Science curriculum focussed on theory elements of Physics, Chemistry, Biology, Statistics, Computer Science, Mathematics etc. It included a good mix of practical and theoretical subjects especially in the area of Physics, Chemistry and Biology. However, the curricula focussed less on research and ideation but more on understanding the application of theory.

Ideation and innovation/research skills were the key areas that were missing.

#### D. Bachelor of Technology

The evaluated Engineering curriculum focussed on theory elements of Applied Physics, Chemistry, Mathematics, Computer Systems, Electronics and Electrical Systems etc. The curriculum was found to be an optimum mix of practical and theoretical subjects. The practical subjects focussed essentially on the application of theory. The curriculum also comprised research and project work; however, original research/ideation was not mandatory but only optional. Due importance was assigned for professional experience (internship) by assigning credits and dedicating a window of time for the same.

Ideation and innovation/research skills were the key areas that were missing.

#### E. Bachelor in Medicine & Bachelor in Surgery

The evaluated Medicine curriculum focussed on theory elements of Anatomy, Biochemistry, Physiology, Medicine, Surgery, Psychiatry, etc. The curriculum was found to be a good mix of theory and practical courses. However, it contained too many subjects in the duration of the course/subject. The focus on practical and hands-on learning was extremely high. It covered courses pertaining to community welfare and social medicine. Additionally, the course curriculum gives due importance to practical exposure by dedicating one year for internship.

Ideation and innovation/research skills were the key areas that were missing.

#### F. LLB (Bachelor of Law)

The evaluated Law curriculum focussed on theory elements of Law of Contract, Family Law, Constitutional Law, Law of Torts, Environmental Law, Company Law etc. The curricula seemed too much fact and theory based. There was too less of focus on the practical aspects of the application of law. The curriculum did focus on case studies to highlight the reference to the laws in real scenarios; however, the proportion of this methodology was quite less.

Application of law, practical exposure and ideation and innovation were the key areas that were missing.

#### G. Master in Business Administration/ Post Graduate Diploma in Management

The evaluated management curriculum focussed on theory elements of Financial Management, Marketing, Organisation Behaviour, Operations Management, etc. The curriculum was a mix of theoretical subjects and project work to apply the theoretical knowledge. There was due importance in terms of credits assigned to the application of theory in the form of academic projects. Due importance was assigned for professional experience (internship) by assigning credits and dedicating a window of time for the same. The curriculum was closely integrated with the skills demanded by the industry.

Ideation and innovation/research skills were the key areas that were missing.

#### H. Bachelor of Education

The evaluated management curriculum focussed on theory elements of the role of Education System, Sociology, Culture and Values Systems etc. The curriculum focuses on teaching methodology and less on theoretical subjects. The curriculum focussed on understanding the bigger picture of education, culture and the impact of education on the social structure. Importance was also given to practical exposure in the form of community-based project work.

Ideation and innovation/research skills were the key areas that were missing.



## Analysis based on Bloom's taxonomy of learning outcomes

When analysis of the courses was done based on Bloom's Taxonomy, the courses seemed fairly strong on the Cognitive Domain. The Affective Domain and Psychomotor Domain were identified as the areas of improvement.

Figure 36: Analysis based on Bloom's taxonomy of learning outcomes

Domain	Learning Outcome	B A	B Com	B Sc	B Tech	MBBS	LLB	MBA/ PGDBM	B Ed
	Knowledge								
	Comprehension								
Cognitive	Application								
	Analysis								
	Synthesis								
	Evaluation								
	Listening								
Affective	Responding to phenomenon								
	Valuing								
	Organisation								
	Internalising values								
	Perception								
	Set								
	Guided Response								
Psychomotor	Mechanism								
	Complex Overt Response								
	Adaptation								
	Origination								

## Recommended learning outcomes based on NOS

The key learning outcomes that the courses focussed on were identified based on Bloom's Taxonomy. Learning outcomes based on NOS that should be included in the curricula, have been highlighted for each course.

The analysis clearly highlights a mismatch between the learning outcomes delivered by the courses as compared to the learning outcomes desired by the Industry (via NOS).

Figure 37: Comparison of Course-wise actual outcomes versus desired outcomes

S. No.	Course	Key Learning Outcomes (As-Is)	Key Learning Outcomes (Desired as per NOS)
1	B A	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Comprehension</li> <li>Valuing</li> <li>Organisation</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Thinking</li> <li>Application</li> <li>Problem Solving/Synthesis</li> <li>Responding to Phenomenon, Adaption</li> <li>Innovation/Creativity/Origination</li> </ul>
2	B Com	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Comprehension</li> <li>Analysis</li> <li>Evaluation</li> <li>Organisation</li> </ul>	<ul style="list-style-type: none"> <li>Problem Solving/Synthesis</li> <li>Responding to Phenomenon, Adaption</li> <li>Innovation/Creativity/Origination</li> <li>Oral Communication</li> </ul>
3	B Sc	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Comprehension</li> <li>Analysis</li> <li>Evaluation</li> <li>Organisation</li> </ul>	<ul style="list-style-type: none"> <li>Problem Solving/Synthesis</li> <li>Responding to Phenomenon, Adaption</li> <li>Innovation/Creativity/Origination</li> <li>Oral Communication</li> <li>Internalising Values</li> </ul>
4	B Tech	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Comprehension</li> <li>Analysis</li> <li>Evaluation</li> <li>Mechanism</li> <li>Complex response</li> </ul>	<ul style="list-style-type: none"> <li>Problem Solving/ Synthesis</li> <li>Innovation/Creativity/Origination</li> <li>Valuing</li> <li>Application</li> </ul>
5	MBBS	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Application</li> <li>Valuing</li> <li>Set</li> <li>Guided Response</li> <li>Complex Response</li> </ul>	<ul style="list-style-type: none"> <li>Responding to Phenomenon, Adaption</li> <li>Plan and Organise</li> <li>Innovation/Creativity/Origination</li> </ul>
6	LLB	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Comprehension</li> <li>Analysis</li> <li>Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Thinking</li> <li>Problem Solving/ Synthesis</li> <li>Responding to Phenomenon, Adaption</li> <li>Innovation/Creativity/Origination</li> </ul>
7	MBA/ PGDBM	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Comprehension</li> <li>Analysis</li> <li>Evaluation</li> <li>Mechanism</li> <li>Complex response</li> </ul>	<ul style="list-style-type: none"> <li>Guided response</li> <li>Mechanism</li> <li>Responding to Phenomenon, Adaption</li> <li>Innovation/Creativity/Origination</li> <li>Internalising values</li> </ul>
8	B Ed	<ul style="list-style-type: none"> <li>Knowledge</li> <li>Evaluation</li> <li>Valuing</li> <li>Comprehension</li> <li>Application</li> </ul>	<ul style="list-style-type: none"> <li>Analytical Thinking</li> <li>Problem Solving/ Synthesis</li> <li>Responding to Phenomenon, Adaption</li> <li>Innovation/Creativity/Origination</li> <li>Internalising values</li> </ul>

### Learning outcomes identified by NBA

National Board of Accreditation (NBA), India's only official accreditation body for engineering education, has established 11 Programme Outcomes. NBA is a provisional member of the Washington Accord—an international agreement between accreditation agencies for engineering education for 18 countries. The NBA criteria are:

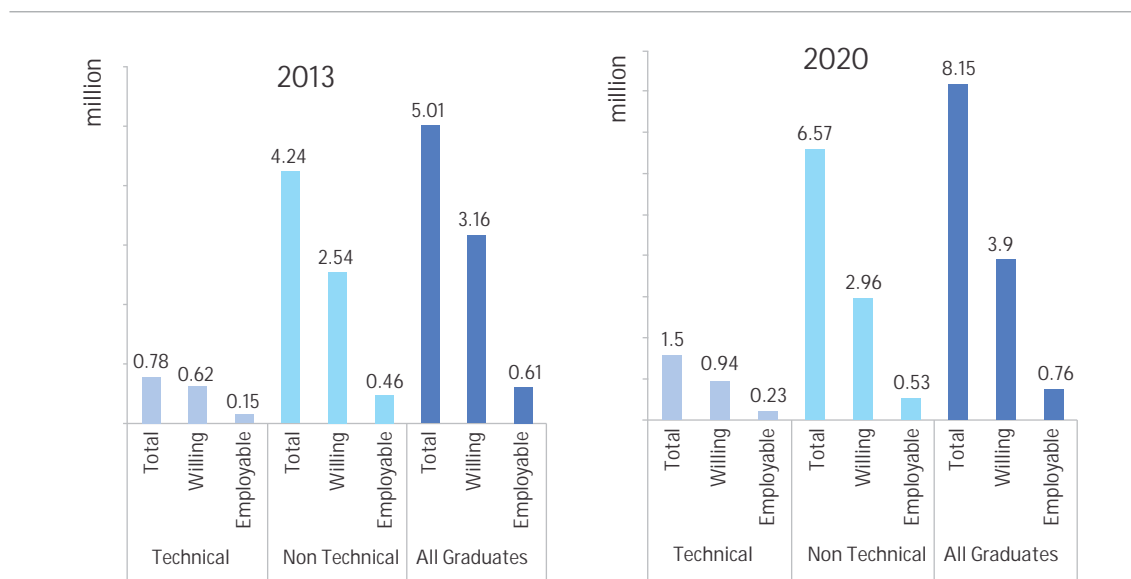
1. Graduates will demonstrate knowledge of mathematics, science and engineering.
2. Graduates will demonstrate knowledge of professional and ethical responsibilities.
3. Graduates will demonstrate skills to use modern engineering tools, techware and equipment to analyse problems.
4. Graduates will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.
5. Graduates will demonstrate an ability to identify, formulate and solve engineering problems.
6. Graduates will demonstrate an ability to design and conduct experiments, analyse and interpret data.
7. Graduates will demonstrate an ability to design a system, component, or process as per needs and specifications.
8. Graduates will demonstrate an ability to visualise and work on laboratory and multi-disciplinary tasks.
9. Graduates will be able to communicate effectively in both verbal and written form.
10. Graduates will develop confidence for self-education and the ability for life-long learning.
11. Graduates who can participate and succeed in competitive examinations.

When the learning outcomes of the analysed courses were compared with the learning outcomes identified by NBA for engineering graduates, the courses lacked communication, design skills and contemporary knowledge.

# Analysis of Talent Demand and Supply

The supply side issues of quality and quantity signals a concerning picture. Only 0.15 million technically qualified candidates are estimated to be employable in the non-BPM sub-sectors out of the ~0.78 million people supplied from technical streams in 2013. This proportion is lower for other streams.

Figure 38: Employability Scenarios



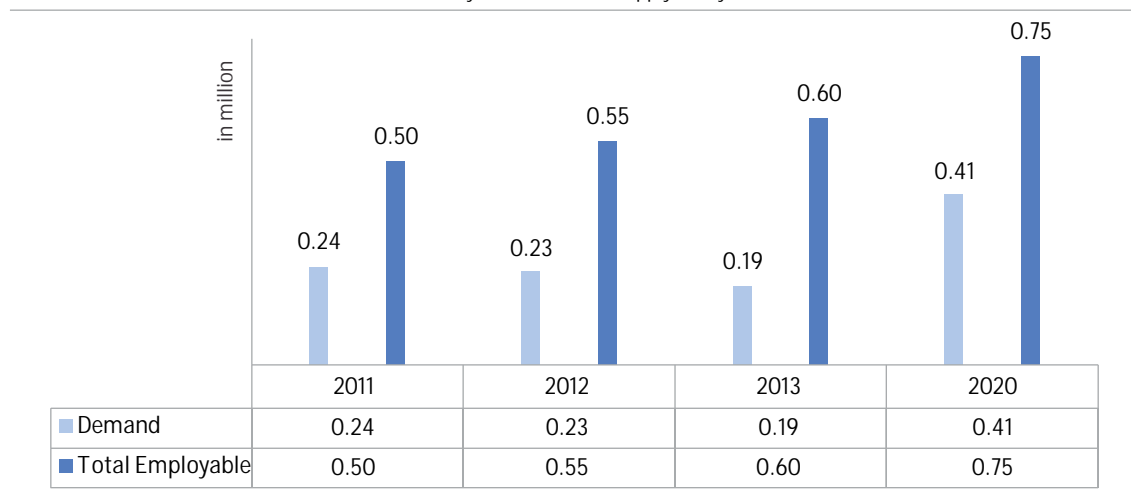
If no actions are taken to improve the employability situation, there could be an extreme excess of graduates leading to large-scale unemployment.

In the next few pages we will cover the quantitative and qualitative aspects of the Talent Demand-Supply situation.

## a) Quantitative Analysis

Overall, Talent Supply is and will continue to be in excess of Talent Demand.

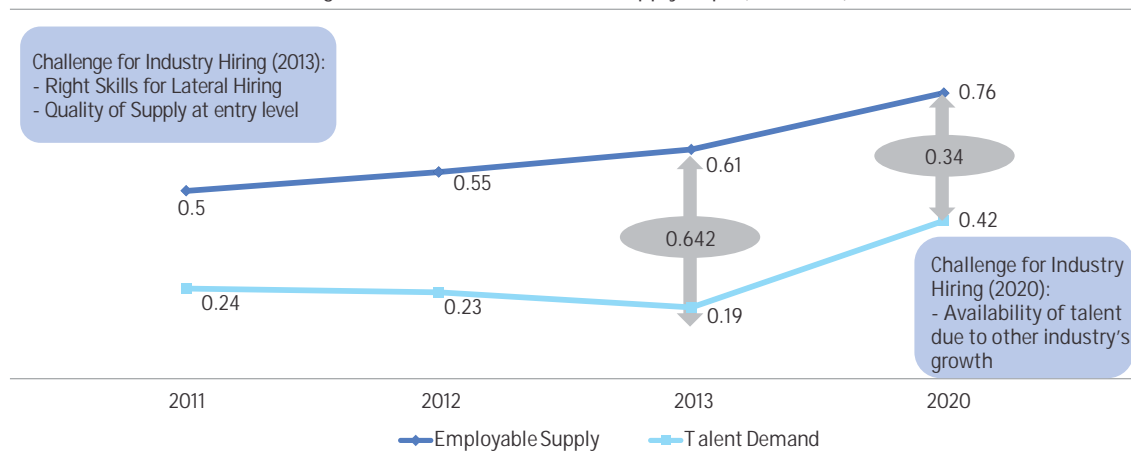
Figure 39: Talent Demand and Supply  
Industry Level Demand-Supply Analysis



Assuming an average growth rate of ~9 per cent per annum, the talent pool available is expected to stay in excess of the talent demand for the coming few years.

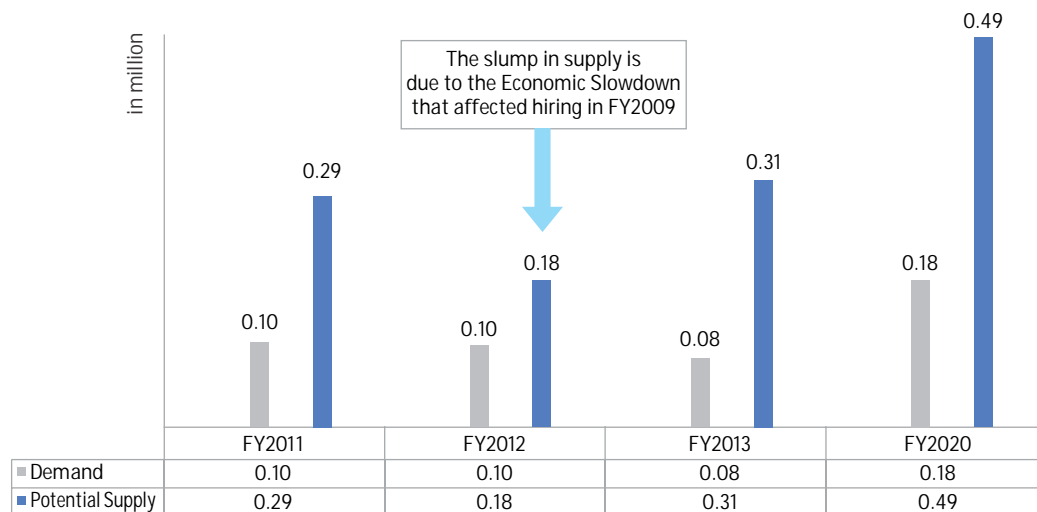
By 2020, the gap between demand and supply is expected to reduce, which will become a challenge as high-growth industries such as electronics, retail, telecom, healthcare and infrastructure will attract talent from the same supply pool.

Figure 40: Talent Demand and Supply Gaps (in million)



The talent demand-supply gap though lesser, will continue to remain positive for experienced hires as well.

Figure 41: Talent Demand and Supply for Experienced (>2 years) Candidates



It needs to be noted that the supply for experienced people is relatively constrained as compared to the supply of fresh talent. Experienced hiring is the category where companies hire from each other. Hence not only are these hiring numbers low, the process is much more complex and critical at the same time.

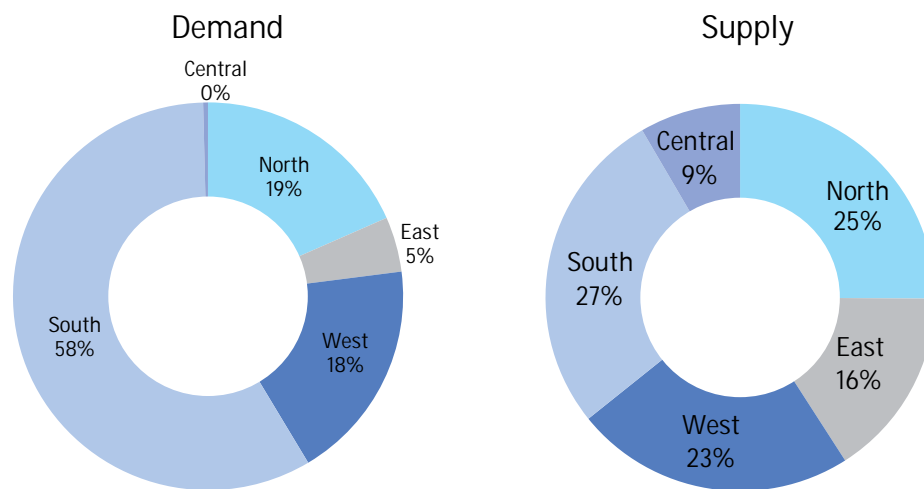
Statistically, it is estimated that approximately 95 per cent of net job creation in the Indian IT-BPM Industry is at the entry level.

While the quantity of talent will continue to be in excess of demand, large scale initiatives must be undertaken by all stakeholders concerned to increase employability to ensure that 'employable' talent supply does not lead to a crunch for industry growth. NOS Development is one of the first steps in the direction of development of adequate and rightly skilled talent pool to support the industry growth by 2020.

Regional imbalances in Talent Demand and Supply lead to migration of talent.

The South contributes to ~60 per cent of demand followed by the West. Talent Supply on the other hand is fairly well-distributed.

Figure 42: Region-wise Demand Supply Gaps



Region	Demand	Potential Supply
North	35,488	154,461
East	8,786	97,818
West	35,467	150,493
South	112,191	166,628
Central	776	50,688

Most of the regions have an excessive talent pool overflow while for the South, talent demand and supply are extremely close.

Such imbalances often lead to heavy migration and regionalisation of certain Industries. Cities like Bengaluru and Hyderabad are classic examples of “cyber-cities” that have fostered as IT-BPM hubs of India owing to the large demand of talent.

Consequently, a high volume of talent migrates to these cities to meet the relative demand overflow.

All States/UTs except Karnataka, Delhi/NCR and Chandigarh have a supply excess of IT-BPM talent.

Analysis of the Southern states shows Karnataka being demand rich by ~6000 professionals. Similar situation exists in Delhi, NCR in the North Region. All the other major states face a talent supply overflow.

Talent Demand-Supply imbalance is most prominent in states like Uttar Pradesh and Bihar, where despite the huge number of graduates passing out, the demand from the IT-BPM Industry is extremely low.

These states are amongst the most populous states in India with old Educational Infrastructure and housing some of the oldest Indian universities. However, the courses delivered in these institutions are more inclined towards conventional courses like Science, Commerce and Arts, which are not the most preferred talent supply sources by the Industry.

Figure 43: Talent Demand Supply Gap by State

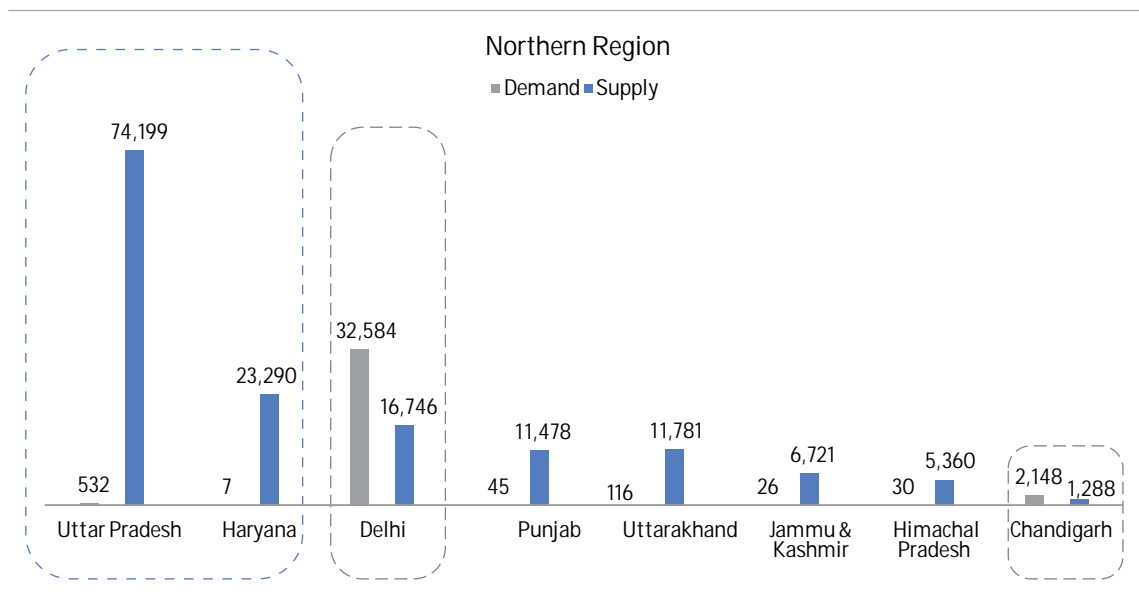


Figure 44: Talent Demand Supply Gap by State

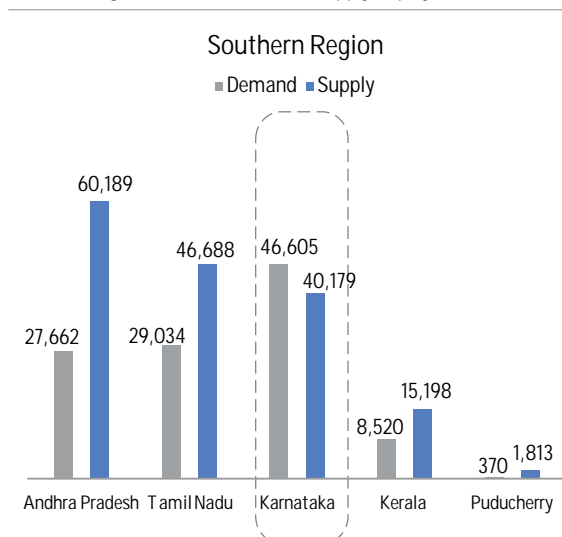


Figure 45: Talent Demand Supply Gap by State

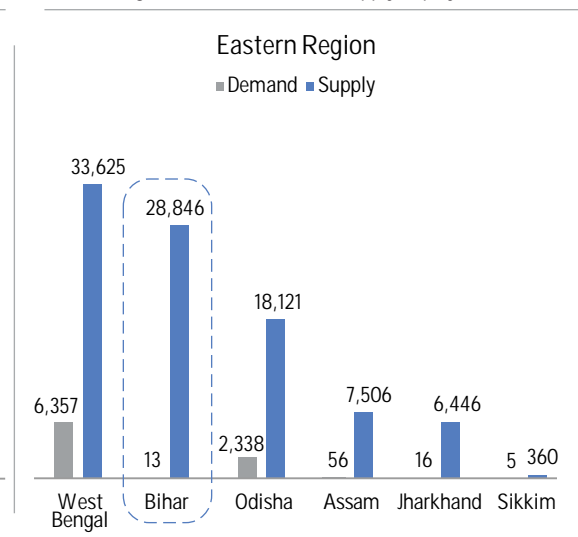




Figure 46: Talent Demand Supply Gap by State

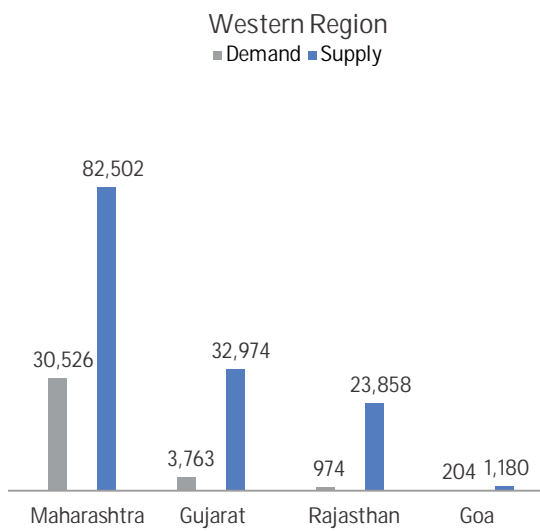
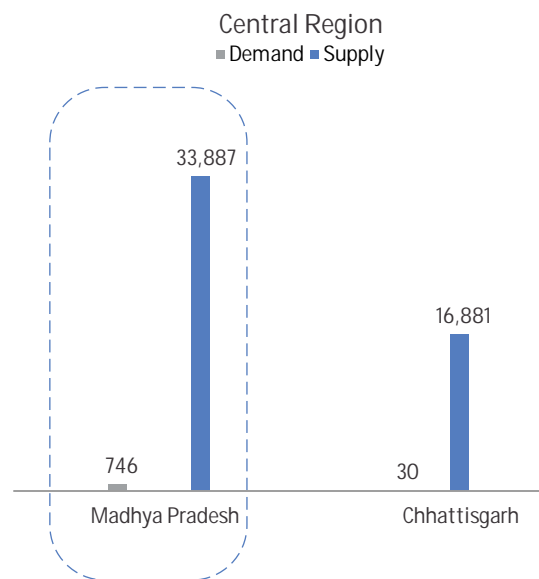


Figure 47: Talent Demand Supply Gap by State



Similar to the trends in UP and Bihar, Madhya Pradesh too lacks considerably in talent demand of IT-BPM professionals.

The state governments should take appropriate steps to encourage investment by the IT-BPM companies in these states to absorb the huge talent pool that exists.

## b) Qualitative Skill Gaps

With the changing landscape of the IT-BPM, the requisite skill availability becomes a necessity for the industry to grow.

The previous section explored the quantitative gaps in skills. In this section, we will look at the technical and behavioural skills in demand. These have been gathered using primary research with responses from over 300 recruiters.

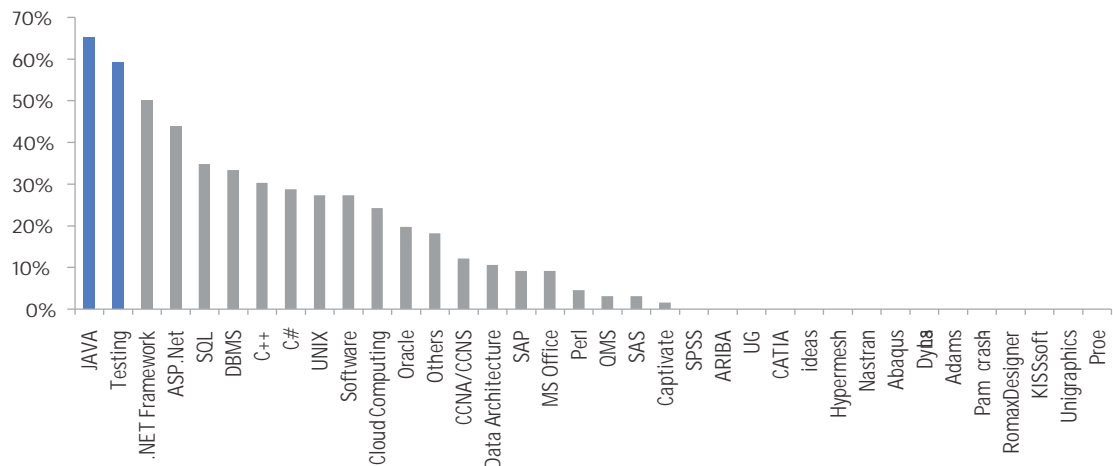
This analysis has been done for the two major sub-sectors in the IT-BPM industry:

1. IT Services (ITS)
2. Business Process Management (BPM)

### IT Services (ITS) Sub-Sector:

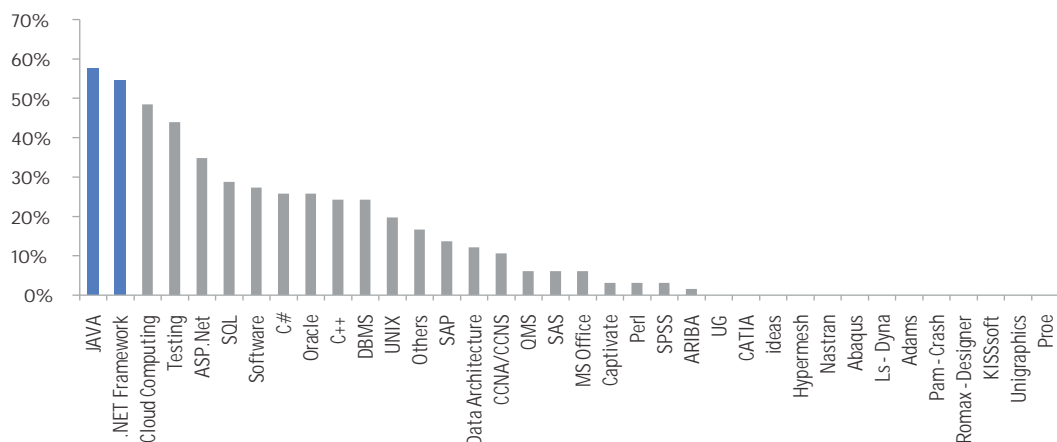
More than 50 per cent of Organisations consider Java and testing skills to be the most sought after skills in the industry. Other skills which are of importance to the industry are: .Net, ASP, SQL, DBMS, etc.

Figure 48: Current Technical Skills Requirement in the IT Services Sub-Sector



In the future, Cloud Computing will emerge as a key skill in demand by the Industry. Consequently, there is likely to be dearth of quality professionals in this area.

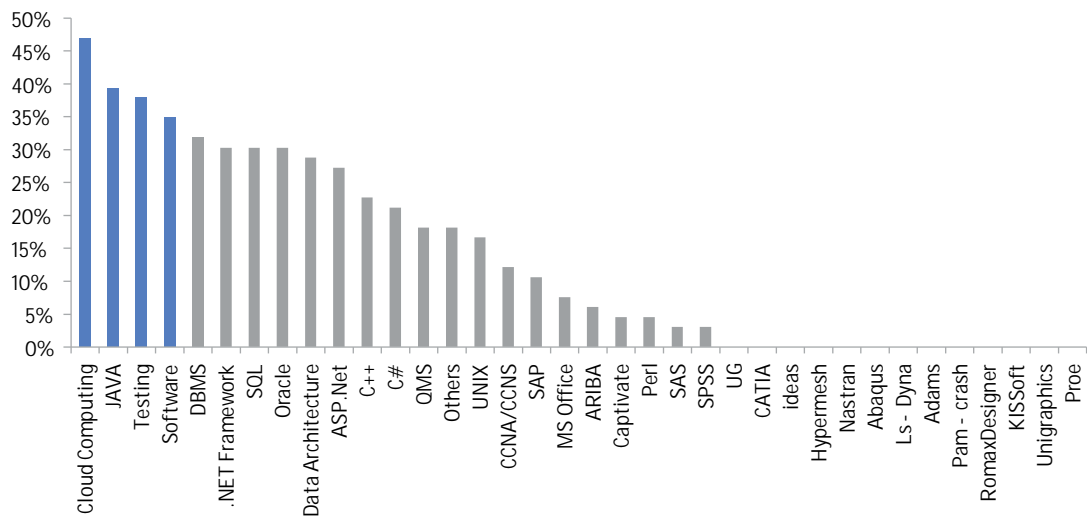
Figure 49: Future Technical Skills Requirement in the IT Services Sub-Sector



Hence, it is not surprising that the skills identified in demand viz. Cloud, DBMS, Software Lifecycle are the ones where the recruiters find gaps in proficiency.

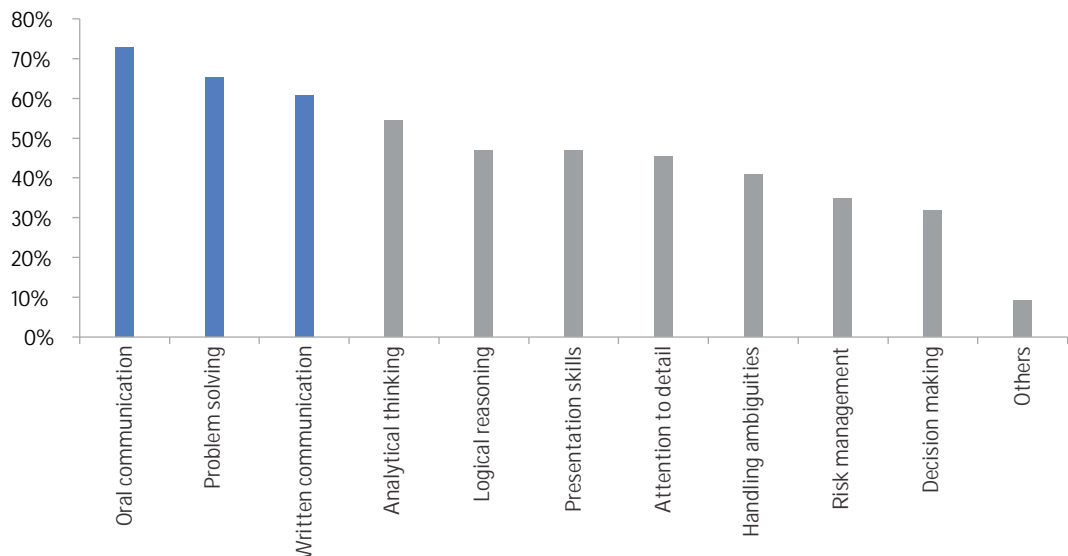
In the current scenario, more than one third of the organisations find that there exists a skill gap for Cloud Computing, Java, Testing, Software Development Lifecycle and DBMS.

Figure 50: Gaps in Technical Skills Requirement in the IT Services Sub-Sector



On behavioural skills, more than 70 per cent of the Organisations feel that oral communication, problem solving and written communication are the areas that need more focus.

Figure 51: Soft Skills Requirement in the IT Services Sub-Sector

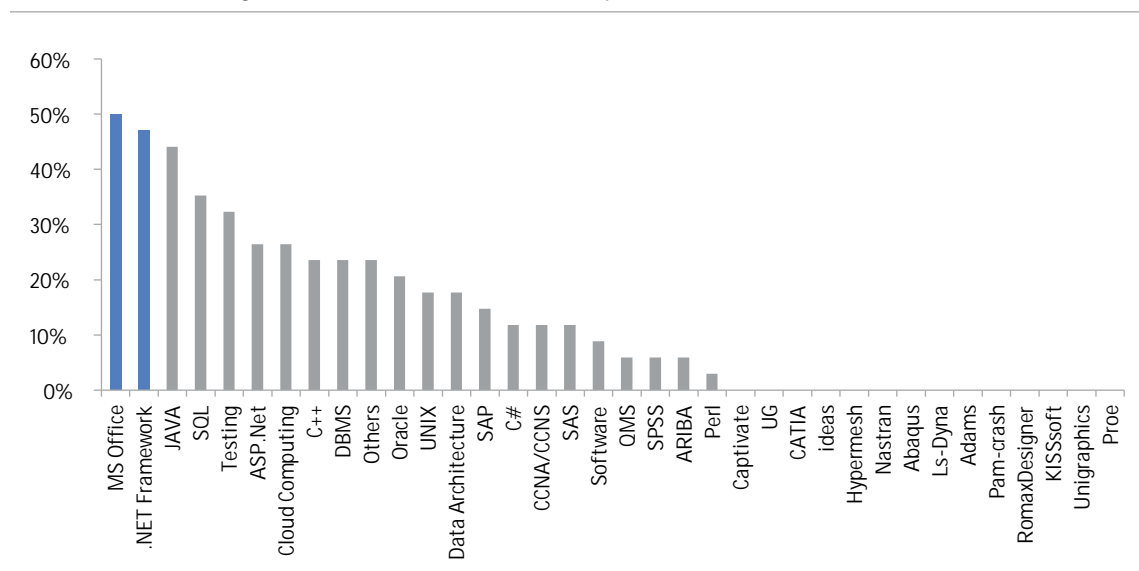


## Business Process Management (BPM) Sub-Sector:

BPM sub-sector is relatively less technical in its nature. It relies heavily on customer service and hence the soft skills become extremely important for employees in this sub-sector.

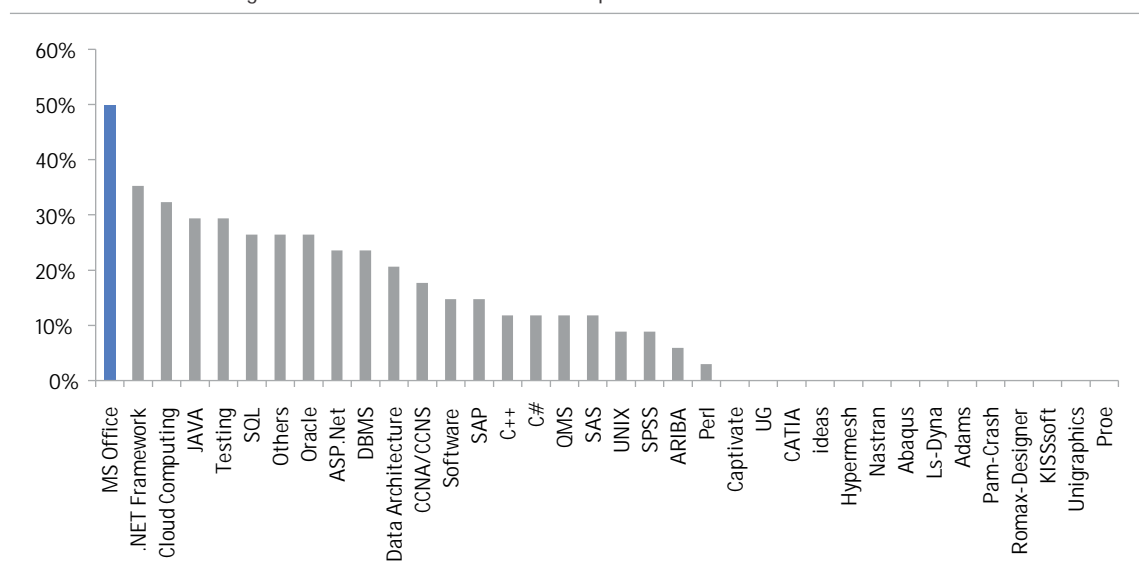
The technical skill requirements in the BPM sub-sector in current scenario are basic technologies like MS Office, .NET Framework, Java, SQL and Testing. MS Office is the most important skill with over 50 per cent Organisations validating its importance.

Figure 52 : Current Technical Skills Requirement in the BPM Sub-Sector



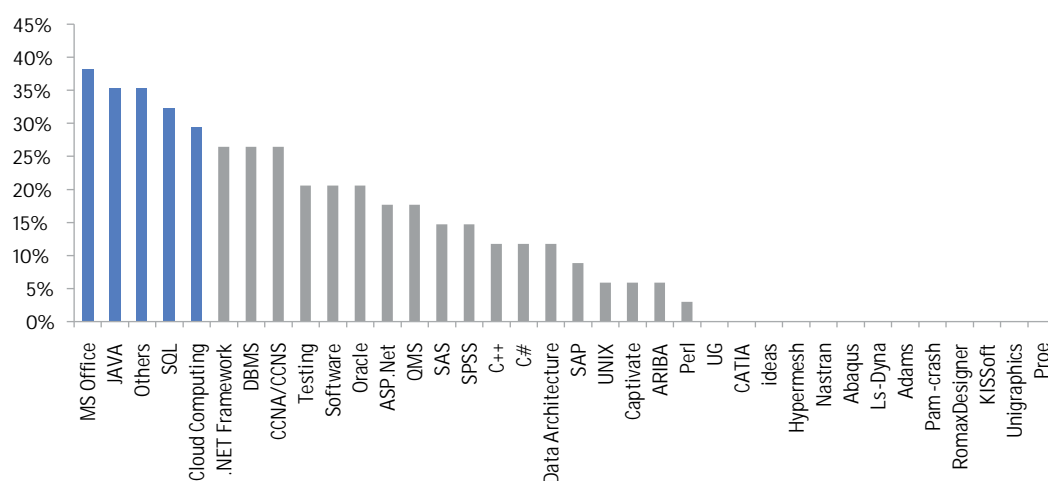
More than 50 per cent of the organisations consider MS Office to be the most important “technical skill” in the future as well. Cloud Computing and .NET too are likely to pick up demand in the medium term.

Figure 53: Future Technical Skills Requirement in the BPM Sub-Sector



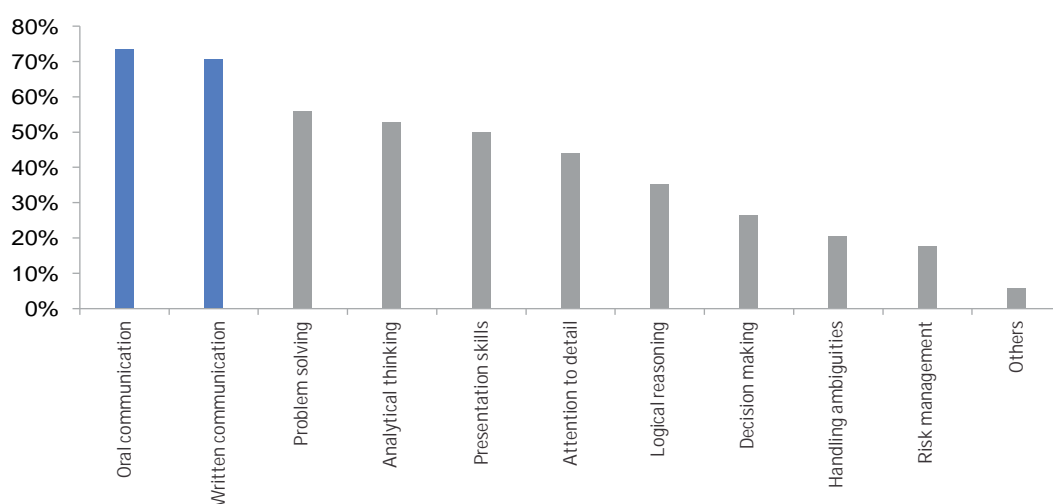
In terms of skill gaps, the same skills viz. MS Office, Cloud and Data Architecture have high skill gaps.

Figure 54: Gaps in Technical Skills Requirement in the BPM Sub-Sector



On the behavioural side, almost 70 per cent recruiters felt a deficiency in Written and Oral Communication – a skill considered to be the backbone of the BPM sub-sector.

Figure 55: Soft Skills Requirement in the BPM Sub-Sector



The common trend in the demand-supply analysis with respect to qualitative skills is the need for more technically competent workforce in Cloud Computing, Software, Java, .NET and Testing.

In terms of behavioural skills, analytical thinking, problem solving and communication are seen as important areas of focus as well as development in the workforce.

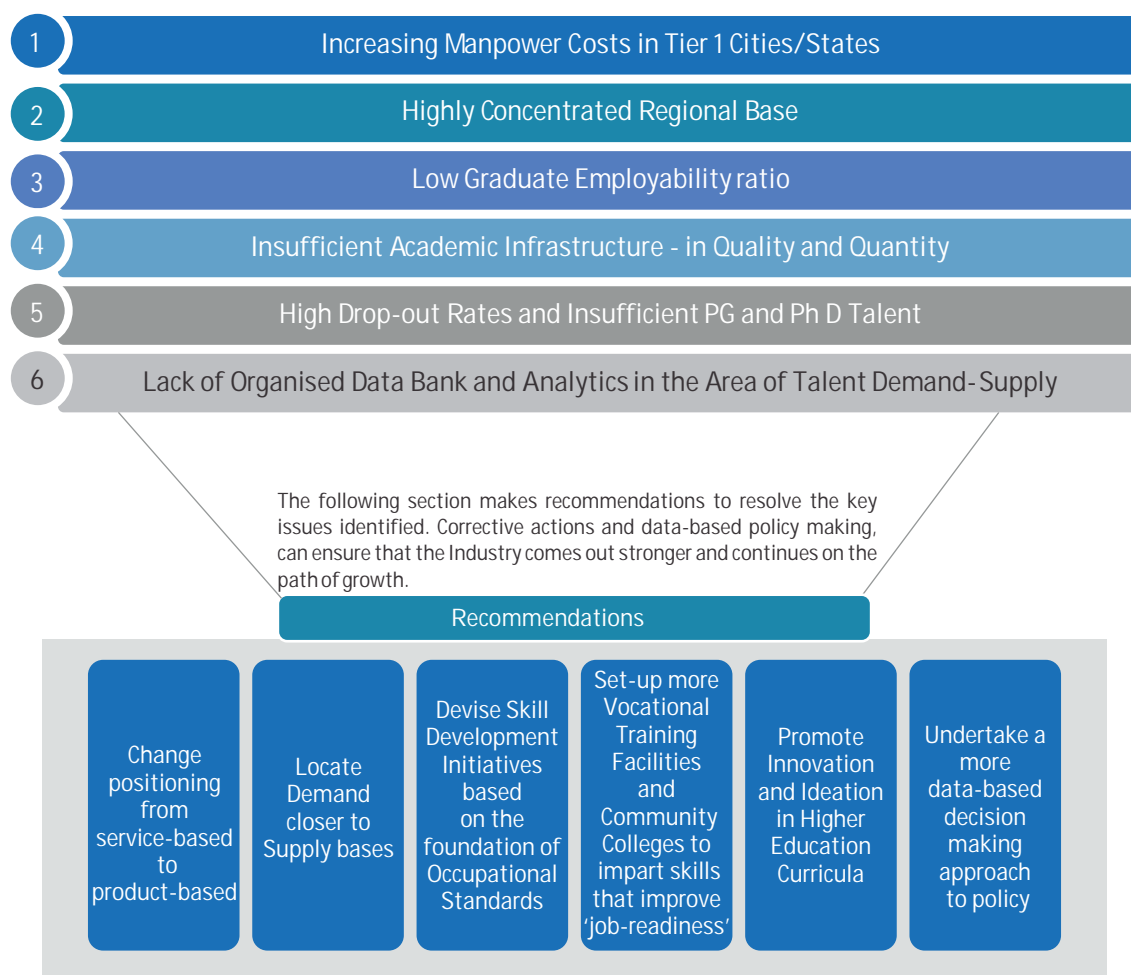
A focus on these skills would work towards increasing employability of the Indian graduates and equipping them with the 'right skill set' that can get them a job.

In the current scenario, despite the huge talent supply, employers find it challenging to fill up positions. We believe that NOS and NOS based training programmes can go a long way in establishing a win-win scenario for both employers and aspirants in the IT-BPM Industry by bringing in more clarity to the job scenario.

# Key Issues and Recommendations

The detailed analysis of Talent Demand and Supply in the IT-BPM industry highlights some interesting trends but also raises some key issues. These must be addressed to ensure that the Industry meets its growth targets and the National Skills Mission meets its employability targets outlined in the Twelfth Five Year Plan. The key issues identified have been outlined in the figure provided below, along with appropriate recommendations:

Figure 56: Key Issues Identified and Recommendations



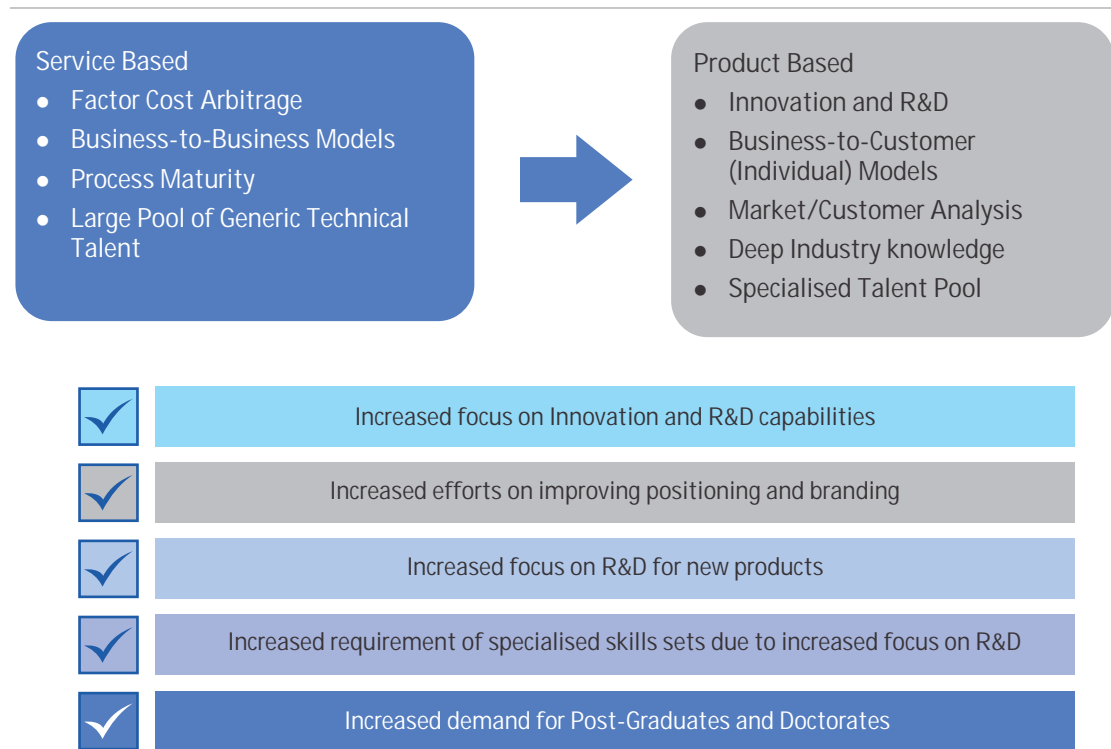
## Recommendation 1: More focus on product-based positioning

Issue: Need to increase revenue per employee

The industry should focus more on product-based positions as compared to the current position of a service-based industry. This will help in increasing revenue contribution per employee. The IT Services will continue to grow but the industry should also focus more on products in the future.

The key focus areas should be Innovation and R&D, Business to Customer (Individual) Models, Market/Customer Analysis and specialised talent pool.

Figure 57: Steps to Increase Focus on Product-Based Positioning



Product-based positioning requires niche and higher-order thinking skills. Successful products reap long-term benefits and a steady revenue chain for the organisations, resulting in higher revenue per employee.

Relevant stakeholders:

This recommendation is aimed at industry players to increase revenue per employee.

## Recommendation 2: Locate Demand closer to Supply bases

Issue: High regional concentration in four states and excessive focus on Tier 1 cities to establish IT-BPM companies and jobs

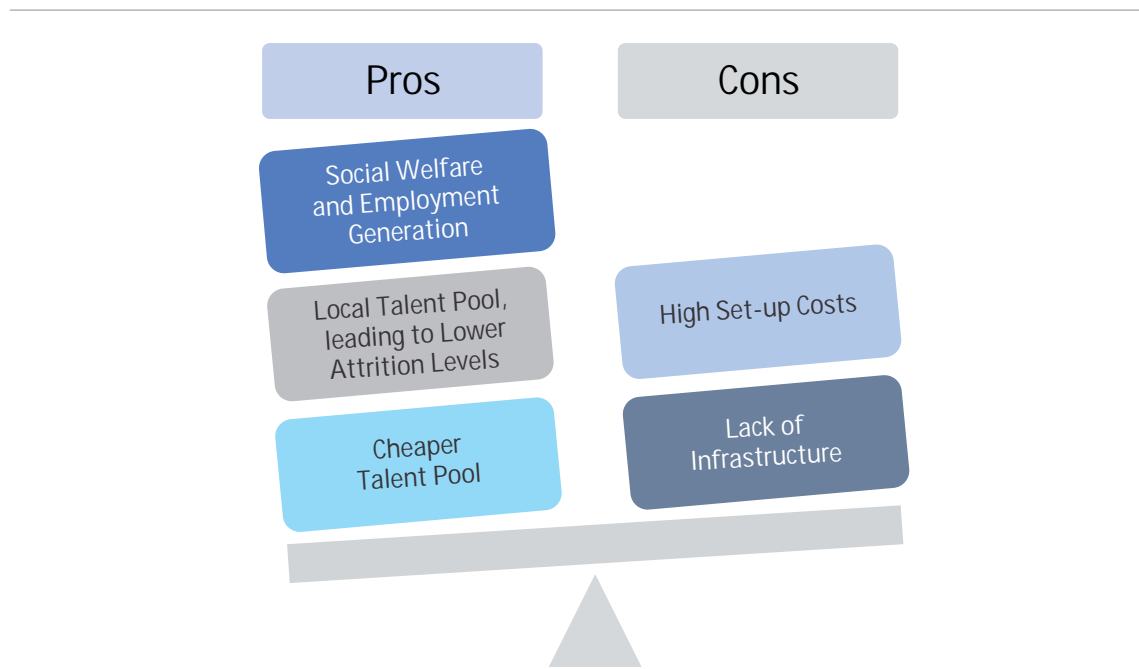
As quality talent saturates especially in the traditional centres of Indian IT-BPM Industry, migration of talent is becoming the norm. This situation combined with high attrition as a result of competition with other players is leading to increased manpower costs and are reducing the overall competitiveness of the Industry. This also results in talent demand-supply gaps in the industry. While in few states like Karnataka and Delhi NCR, demand is more than the supply, in other states, supply is in extreme excess of the demand for talent.

Therefore, there exists a need for the organisations to re-look at the operational centres and consider Tier 2 and Tier 3 cities for setting up centres.

Such a geographical movement of industry centre scan greatly benefit the organisations/industry by:

- Leveraging home base preference of some professionals
- Tapping comparatively less mobile BPM talent
- Providing better quality of life with lower commute times, cost of living, pollution levels and so on
- Reducing costs of operation

Figure 58: Tier 2 and Tier 3 Movement Benefit Analysis

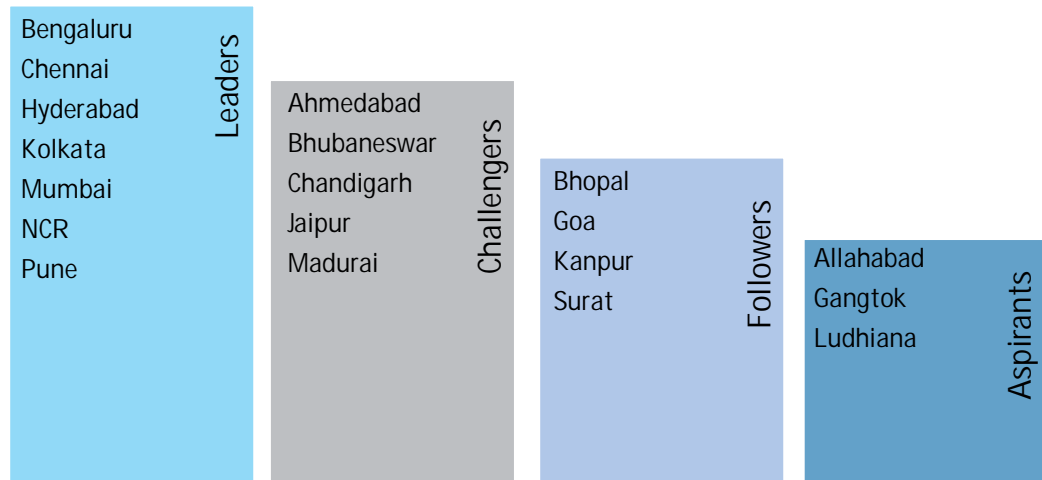




The only drawbacks of the Tier 2 and Tier 3 cities are infrastructure and state government policies that increase the set-up costs for the companies. If infrastructure and political factors can be managed, movement to Tier 2 and Tier 3 cities can prove to be a game-changer for the Indian IT-BPM Industry in the current decade by reducing cost as well as the talent demand-supply gap.

A NASSCOM and AT Kearney report categorised 50 Indian cities on a scale of location attractiveness into the following categories:

Figure 59: Attractiveness Index for Cities to set-up IT-BPM Industry



Recent actions taken by the government suggest that it is supporting this movement in policy by encouraging SEZs in Tier 2 and 3 cities to encourage setting up of IT-BPM offices in these cities. Thus, political factors and policies are favouring the expansion of the industry into other regions in the country. The industry must also contribute to the development of these cities and attempt to develop and consume local talent pool in these cities.

Relevant stakeholders:

This recommendation is aimed at industry players who should consider setting up operations near supply sources.

### Recommendation 3: Devise skill development initiatives based on the foundation of Occupational Standards

Issue: Extremely low employability rates for both Engineering and non-Engineering graduates

As described above, the biggest problem facing the supply side institutions is not of numbers, but of quality and employability.

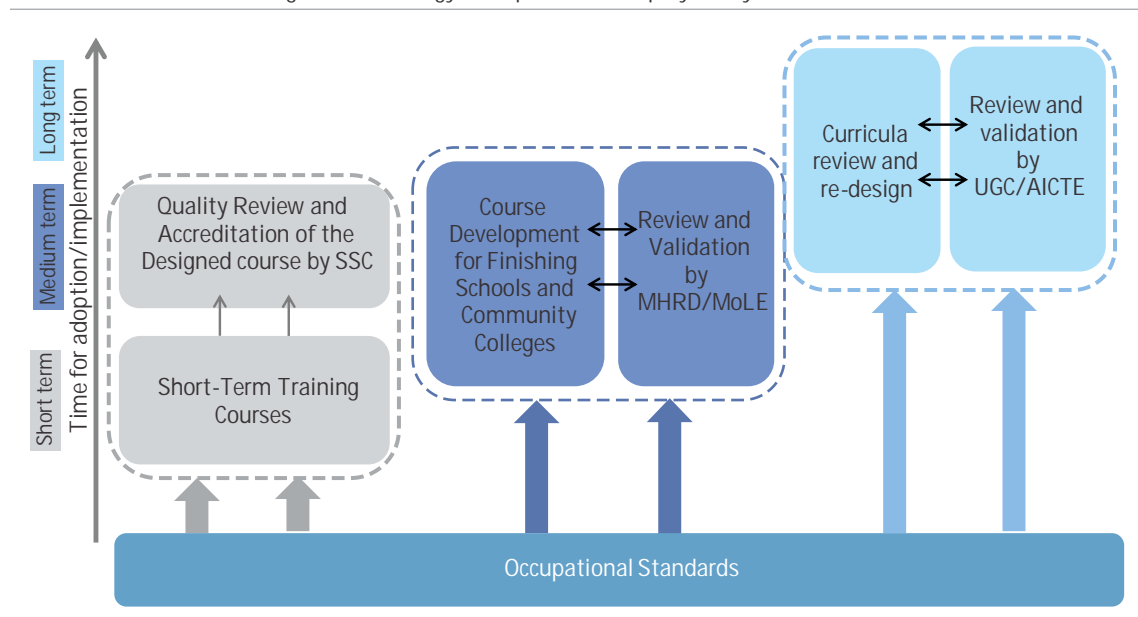
The IT-BPM industry in coordination with the government should execute focussed Skill Development Initiatives based on the foundation of Occupational Standards to increase the employability of the graduates and make them suitable for hiring by the industry. It is a well-accepted fact that the quality of skills imparted is highly inconsistent across the different institutes in the Talent Supply Ecosystem.

While India is churning out huge numbers of engineers every year, their quality is now getting heavily questioned because around 21 per cent of the total engineering graduates are employable and for non-technical graduates, it is as low as 6 per cent. Thus, there is a need for skill development, both in the formal as well as non-Formal Educational system to bridge the employability gap.

The recommendation is that these skill development initiatives are targeted as per the standards expected and laid down by the Industry players.

Thus, the skill development initiatives must be organised based on National Occupational Standards (NOS). NOS must be utilised to serve as a base to develop the required training programmes to develop the skills of the students and make them job-ready. The strategy to be adopted for improving the skills of the graduates can be categorised on the basis of the time-lines as shown in the figure provided below.

Figure 60: Strategy to Improve the Employability of Graduates



In the short term, Vocational Training providers should develop fast-track training programmes to impart the 'right' skills that make students ready for the jobs. These short-term training courses will be reviewed and accredited by the SSC, to ensure that it is in alignment with the OS and course design principles.

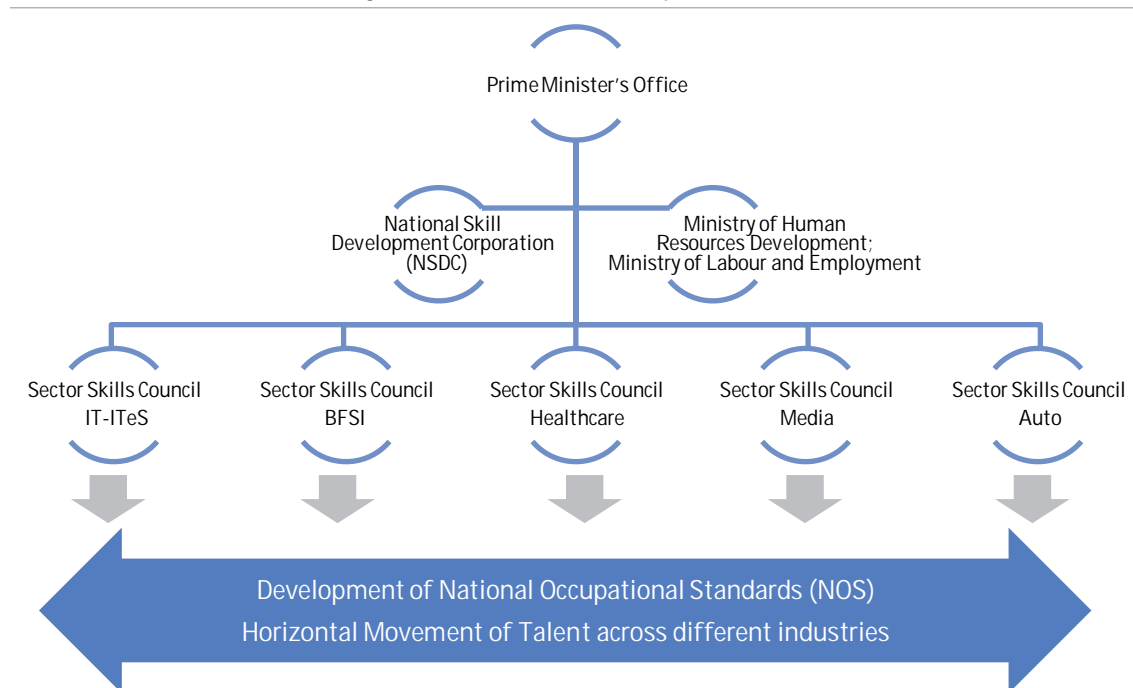
In the medium term, OS should lead to curricula redesign in the Indian Higher Education System mainly focussing on the development of courses for Finishing schools and Community colleges. These courses will be reviewed and validated by Ministry of Human Resource Development (MHRD) and Ministry of Labour and Employment (MoLE).

In the long term, OS will be used to review and redesign the curricula across universities and colleges and will be reviewed and validated by UGC and AICTE. OS should also be modified on a periodic basis or need basis to maintain relevance and currency to the industry, thereby, triggering the process of updating the education curricula.

This will ensure that the graduates are employable by the industry. Both public and private participation should be encouraged to ensure that skill development happens at a fast rate. The figure given below outlines the process for utilising OS as the basis for curricula redesign and development.

The government has identified 22 high-growth sectors identified by NSDC for skill development; most of them are clients/industry verticals of IT-BPM industry. The figure given below provides the structure of SSC for all industries in the country. These SSCs will be essential for the implementation and adoption OS to ensure skill development in their respective sector.

Figure 61: SSCs for Skills Development in India



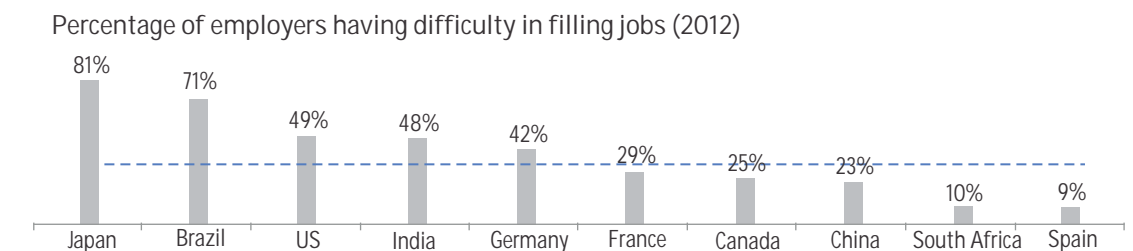
Relevant stakeholders:

This recommendation is aimed at Government bodies like NSDC and MHRD and IT-BPM companies to devise Skill Development Initiatives based on the foundation of Occupational Standards and improve employability rates of engineering and non-engineering graduates.

## Recommendation 4: Set up more vocational training facilities and community colleges to impart skills that improve 'job-readiness'

Issue: Talent is available in quantity but not quality

Figure 62: Percentage of employers having difficulty in filling jobs (2012)



Source :ILO

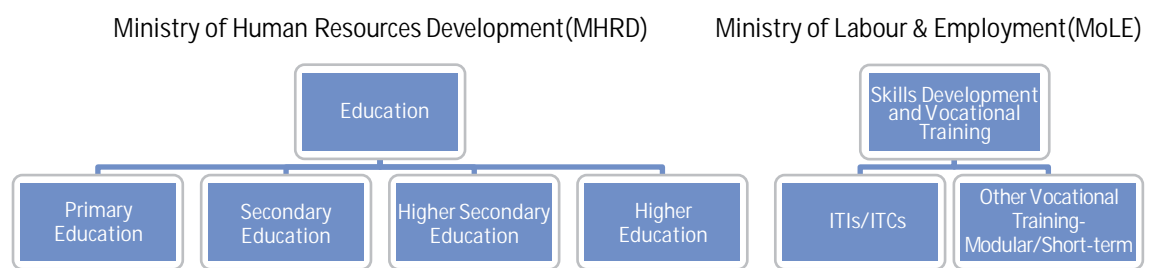
A research conducted by NSSO for the ILO shows 48 per cent of employers reported to be having difficulty in filling jobs. This indicates that there is a huge shortage of properly skilled labour as per the requirements of the industry.

Another research conducted by IMaCs and NSDC showed that there exists a growing need to increase employability by implementing skill development programmes by offering strong market linkages, specialised skill development, continuation of learning, etc. It also goes on to identify a need for a strong system where Vocational Skill Building is imparted as a part of Education.

To improve the academic infrastructure, there is a need to set up more Vocational Training facilities and Community Colleges to impart 'job-readiness' skills sets.

Vocational Training largely offered through ITIs and ITCs falls under the ambit of MoLE through the Directorate General of Education and Training (DGET). The DGET must ensure the implementation of the National Policy through the State Governments and their agencies which have been provided in the figure below.

Figure 63: State Government and their agencies



It must be highlighted that the government has taken and continues to take a lot of initiatives in the right direction to improve the employability scenario. However, a lot needs to be done to ensure every graduate is employable.

Figure 64: Government Initiatives

#### Government is making the right moves in terms of policy-making

- Implementation of RTE
- Focus on more balanced and socially inclusive education system
- Establishment of National Council for Vocational Training
- Encouraging PPP and Employer participation in ITI system
- 400 ITIs upgraded to Centres of Excellence
- Implementation of Modular Employable Skills(MES) framework to focus on skills training to support upward mobility and life long learning

Relevant stakeholders:

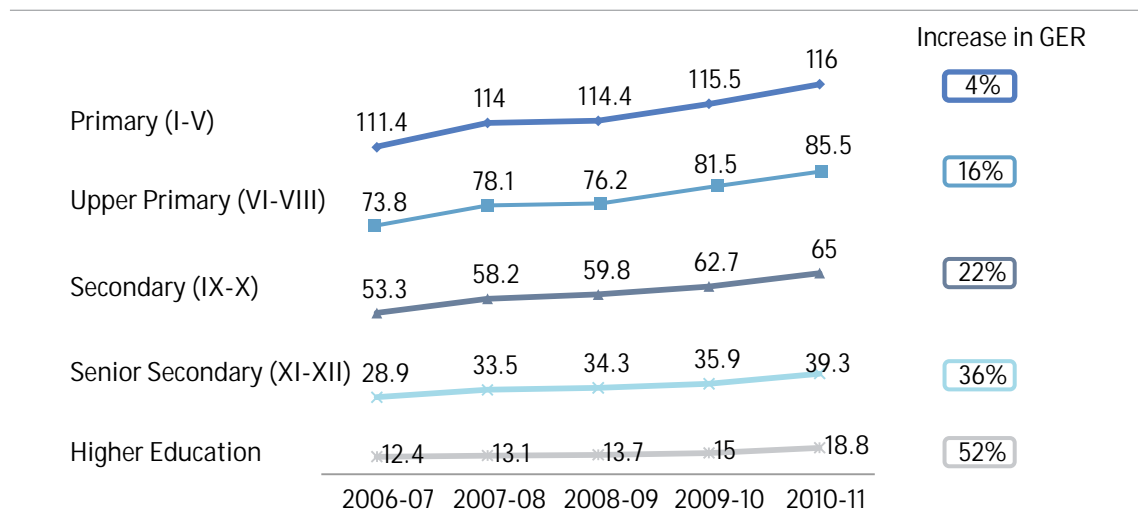
Government bodies like the NSDC and the MHRD are responsible for setting up more vocational training centres and colleges in the country to improve quantity of academic institutions and the quality of academic infrastructure.

## Recommendation 5: Promote Innovation and Ideation in Higher Education curricula

### Issue: Insufficient PG and Ph D/M Phil talent pool

Currently, the Industry is churning out a mere ~25,000 Ph Ds and ~500,000 PGs, which is a very miniscule number against the total enrolment in primary school level in the country. This also indicates that out of every 1000 candidates who enrol in Primary Education, only ~13 reach the PG stage and ~1 reaches Doctorate education.

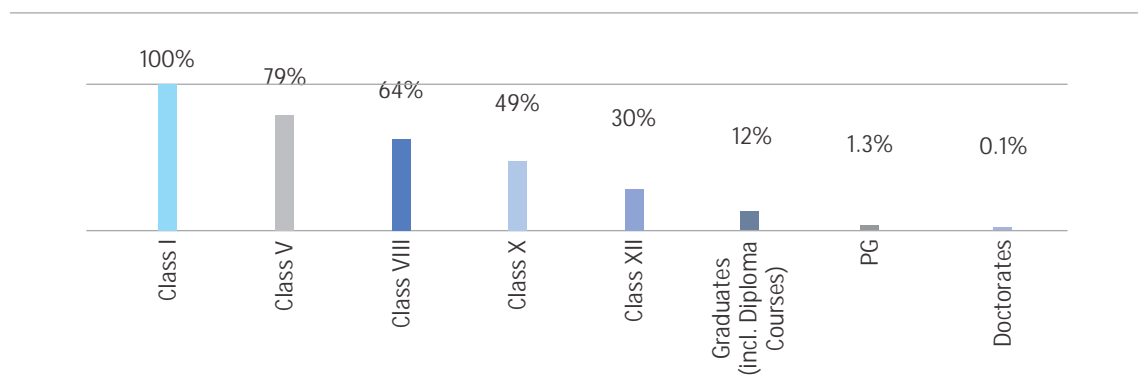
Figure 65: GER Growth Rate



The GER shown in the figure below for higher education continues to be very low even though it has increased by 52 per cent in the last 6 years.

Additionally, the trends indicate that out of every 100 students who enrol in Class 1, a mere 12 reach Graduation level while a mere 1 student reaches the post graduate stage.

Figure 66: Drop in Talent Enrolment in India



Again, it needs to be appreciated that post RTE implementation, there has been a remarkable improvement in GERs for primary and secondary education but still the number in higher education and especially PG and Ph D remains very low.

The Government now needs to ensure that these benefits also reach out to the higher education sector.

To ensure increase in enrolment in Doctoral and post-graduation courses, education policy level changes are required. This will ensure that the supply in these areas increases leading to an increase in Innovation and Research facilities in India. Some of the steps that can be taken to make PhD and PG courses more attractive to students are listed below:

Figure 67: Steps to Increase Enrolment in PG and Ph D

Set-up dedicated CoEs for Research and Innovation - Students passing out of these often join research or academia which will lead to overall development of skill profile

Government should increase Budget Allocation for Institutions Post-Graduate Institutes to focus on Faculty and Infrastructure Development

INIs should be given more Autonomy to decide the Course Structure and introduce Curricula that Drives a Culture of Innovation

The Higher Education Sector must be opened up for Foreign Investments. As the top tier Universities set up shops in India, this too will lead to a cascading effect on the quality of Education and Talent Output

Relevant stakeholders:

This recommendation is aimed at Academia who should consider undertaking steps to improve curricula of PG and Ph D to promote innovation and ideation.

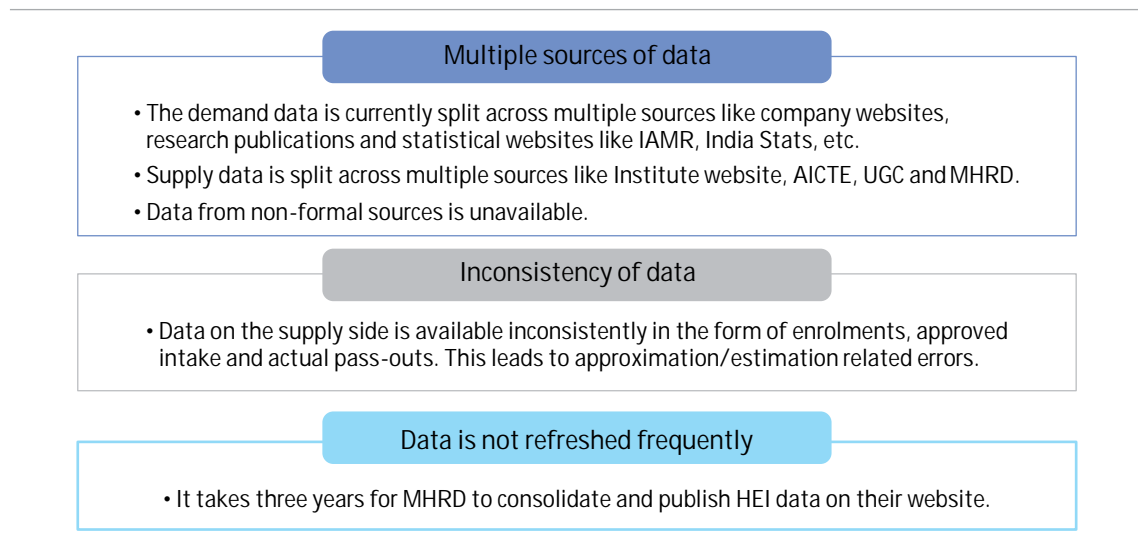
## Recommendation 6: Undertake a more data-based decision-making approach to policy

Issue: Lack of structured information and analysis around Talent Demand-Supply situation

To improve the lack of structured information and analysis around talent demand-supply scenario in the industry, policy-making should be determined by a more data-driven approach. Figure : Talent Demand Supply Information Issues

The following figure provides the list of issues which are identified while gathering the talent demand supply data.

Figure 68: Talent Demand Supply Information Issues



The following additional analysis are recommended based on the preliminary findings of this report:

- Primary research on employment and employability of school pass-outs (NVEQF Level 1-3)
- Talent Demand-Supply analysis drilled-down to the level of occupation and job-role
- Mobility studies indicating the percentage of talent moving to Tier 1 cities for employment in the IT-BPM Industry

Relevant stakeholders:

This recommendation is aimed at associations like NASSCOM, NSDC and MHRD to utilise the power of available data and drive a more informed policy and decision-making.



# Appendix

## Appendix A: State-wise Analysis of Talent Supply

Figure 69: State Talent Supply Profile - Andhra Pradesh  
AP is one of the well-known hub for Engineering Talent Supply  
It also boasts of some of the biggest universities like Osmania University

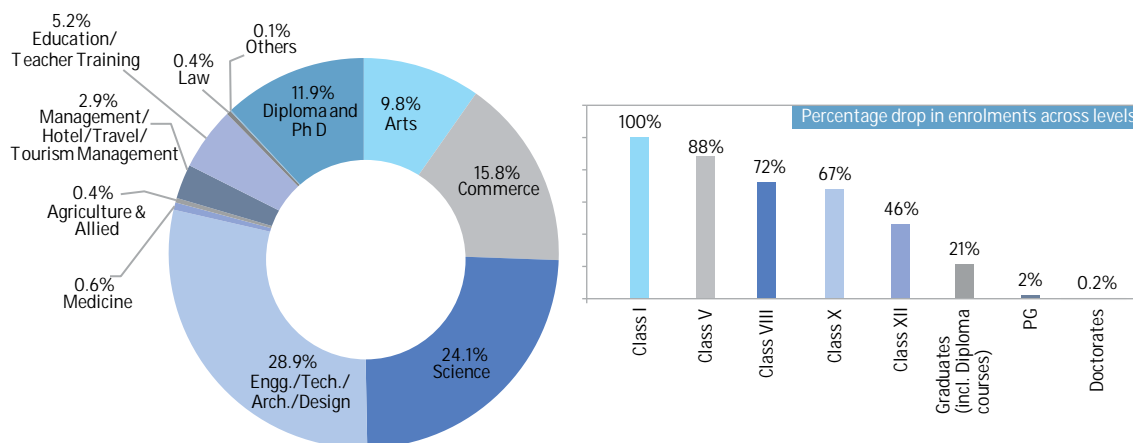


Figure 70 : State Talent Supply Profile - Assam  
More than half of the Talent Supply is from the Arts stream

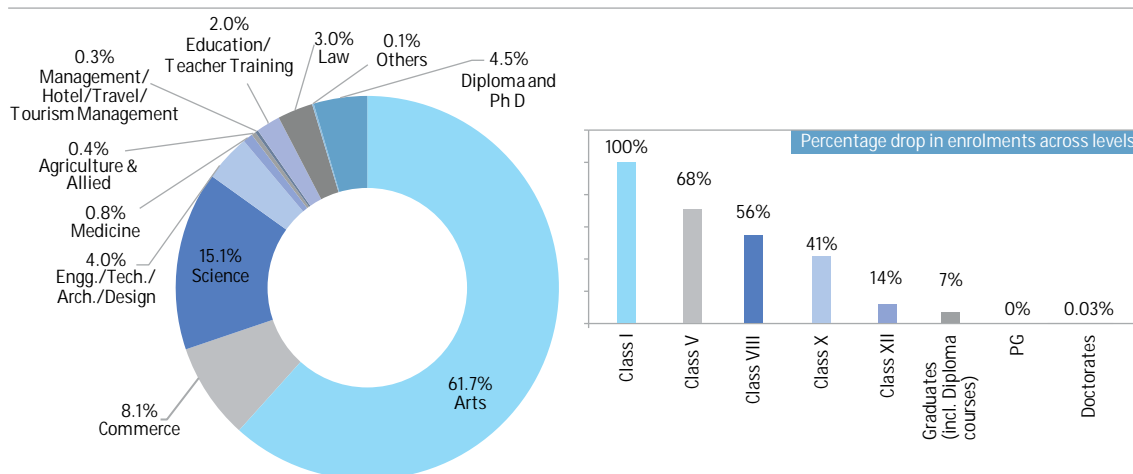


Figure 71: State Talent Supply Profile - Bihar  
Bihar has a huge supply base. However the proportion of this supply from professional courses is extremely low

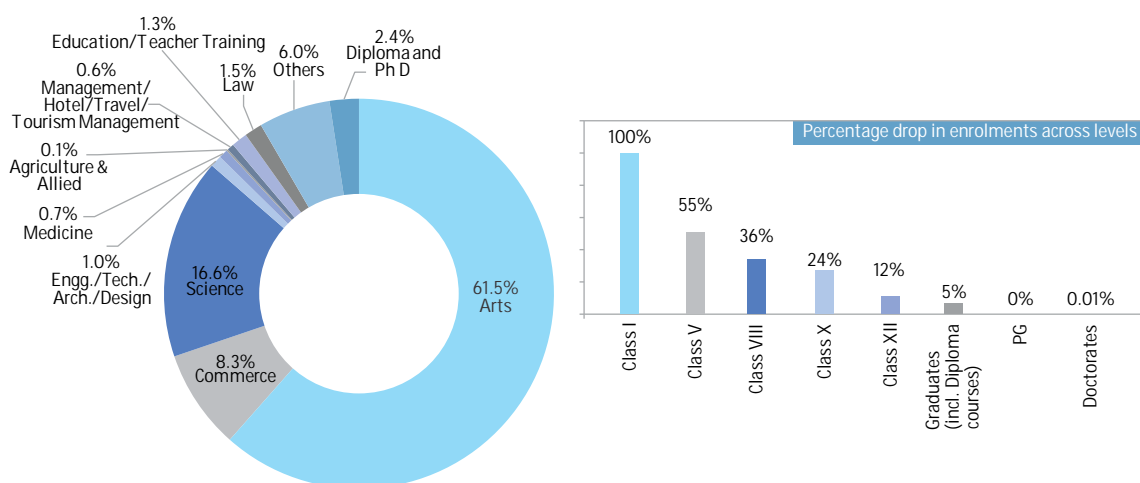


Figure 72: State Talent Supply Profile - Chhattisgarh  
While majority of supply is from conventional streams, Technical streams also contribute a fair chunk of the overall supply at ~12 per cent

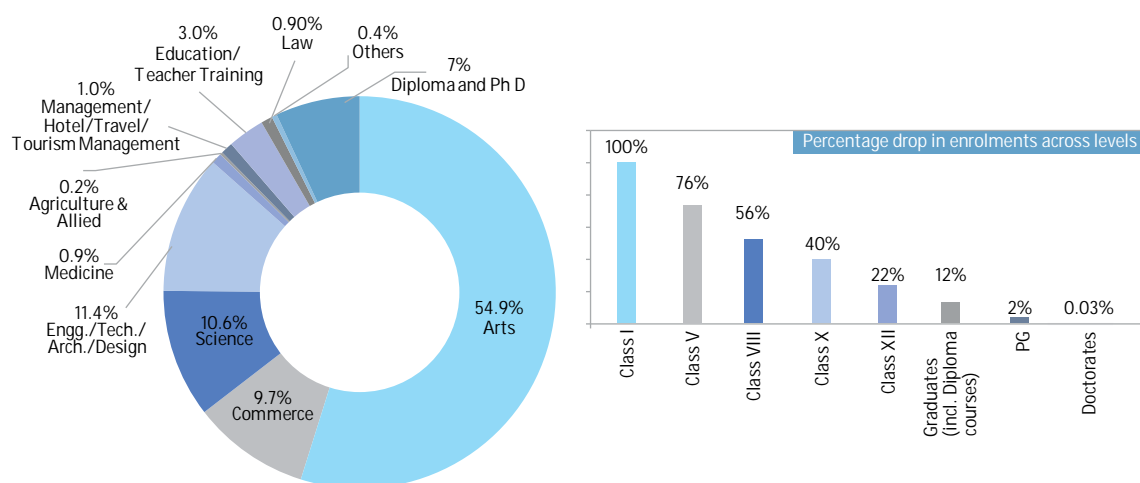


Figure 73: State Talent Supply Profile - Goa  
Talent from Professional courses contributes a sizeable proportion to its overall supply  
Unlike other states, Arts contributes ~15 per cent to the overall supply

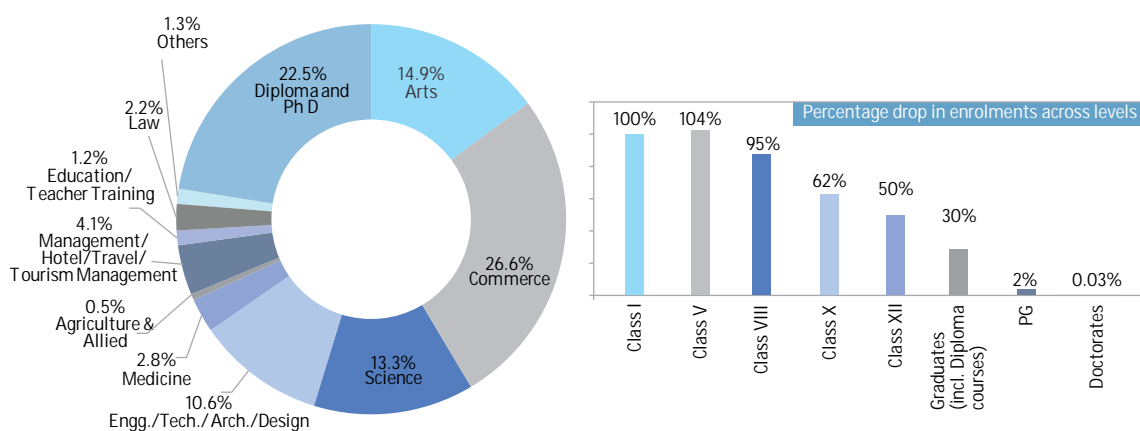


Figure 74: State Talent Supply Profile - Gujarat  
Education scenario in Gujarat is on the upswing  
While the overall supply isn't too much, it is proportionately spread across all streams

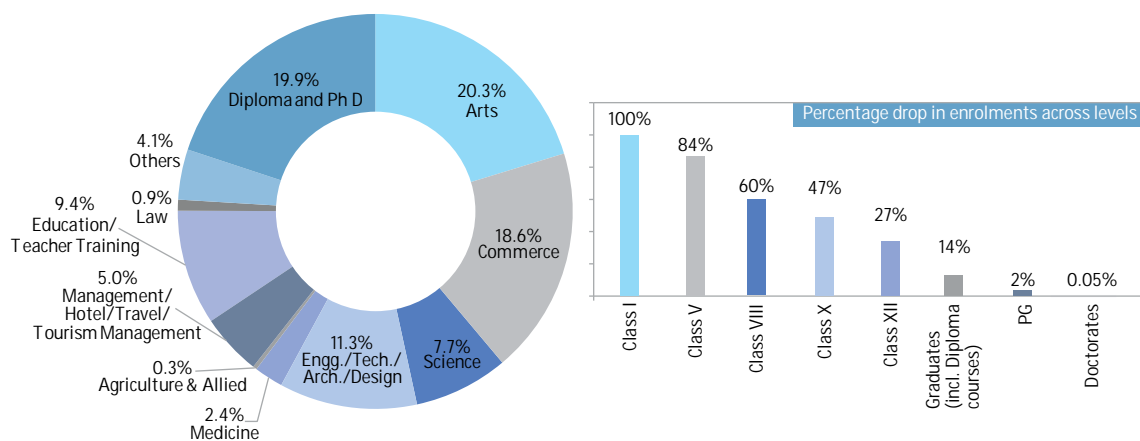


Figure 75: State Talent Supply Profile - Haryana  
Haryana is focussing heavily on Professional courses such as engineering and MBA  
Also, the enrolment ratios are higher than the National Average

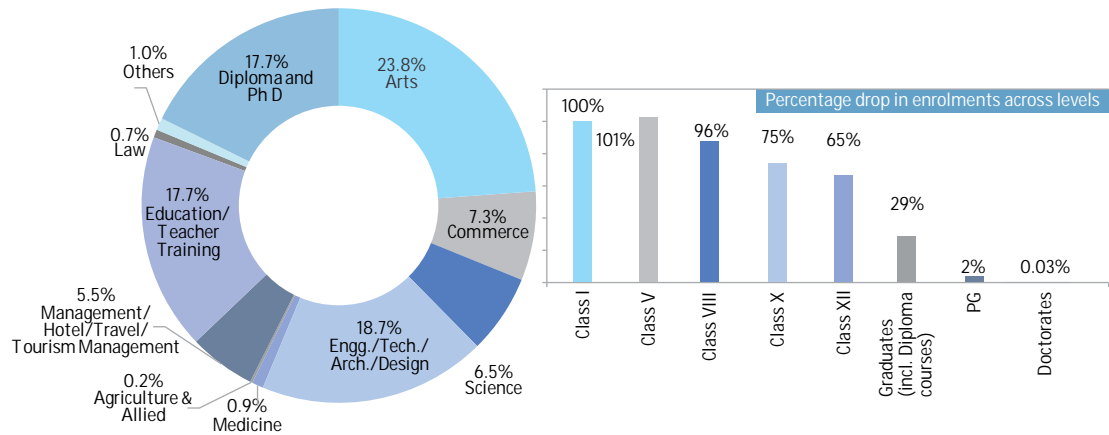


Figure 76 : State Talent Supply Profile - Himachal Pradesh  
Himachal Pradesh scores well on the Primary Education Front  
There is however, scope for improvement when it comes to avenues for Higher Education

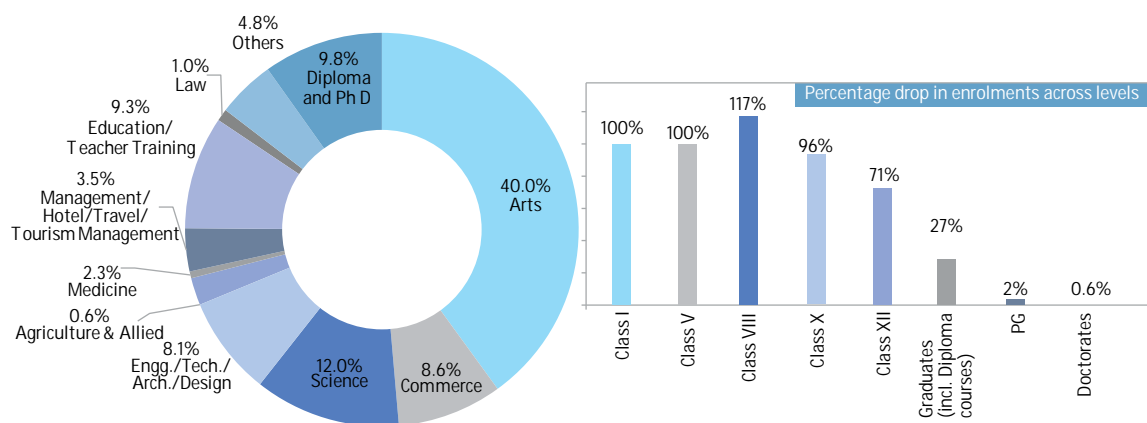


Figure 77 : State Talent Supply Profile - J&K  
Talent Supply from Education streams contributes to a third of the total supply from the state

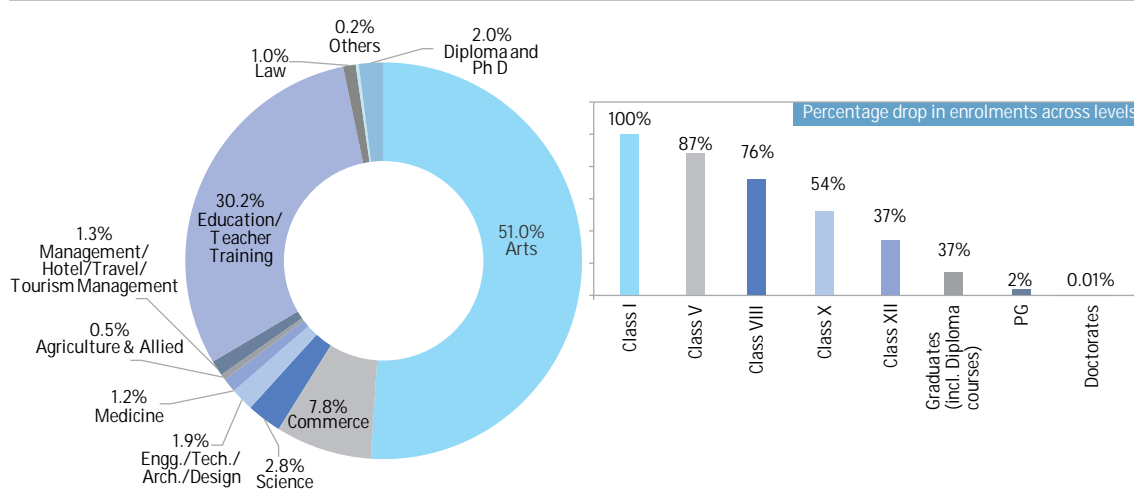


Figure 78 : State Talent Supply Profile - Jharkhand  
Jharkhand scores the least when it comes to enrolments at the Primary and Secondary Education levels

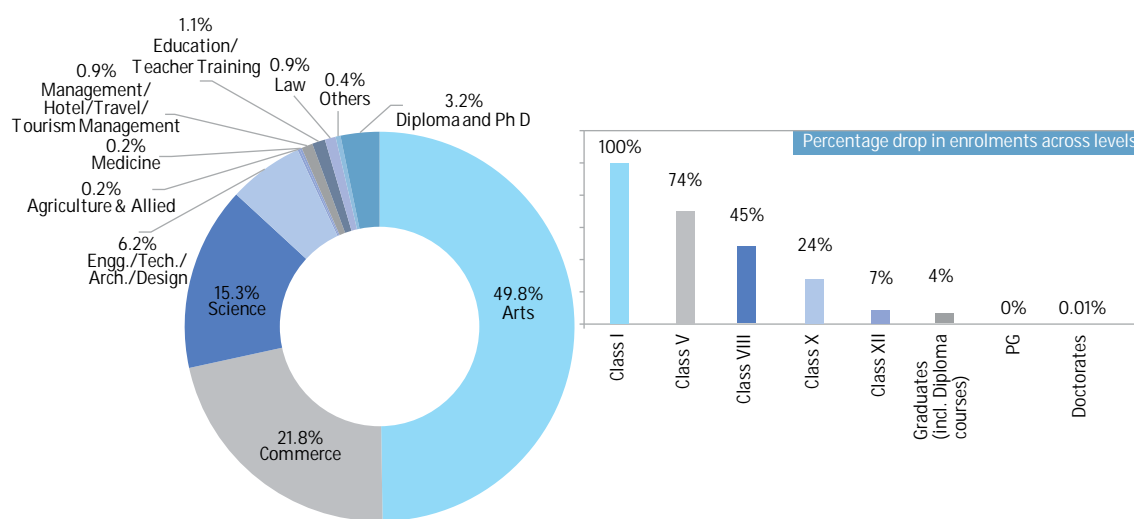


Figure 79: State Talent Supply Profile - Karnataka

In terms of absolute numbers, Karnataka is one of the largest providers of Engineer and Medicine Graduates

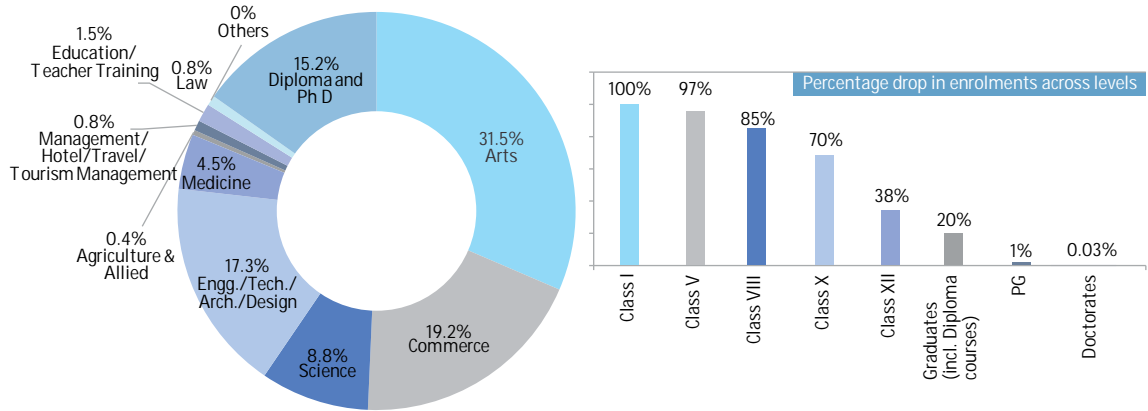


Figure 80: State Talent Supply Profile - Kerala

More than half the Talent supply from Kerala is from Science and Technical streams  
It also boasts of the highest enrolment rates at the Secondary and Sr. Secondary Education levels

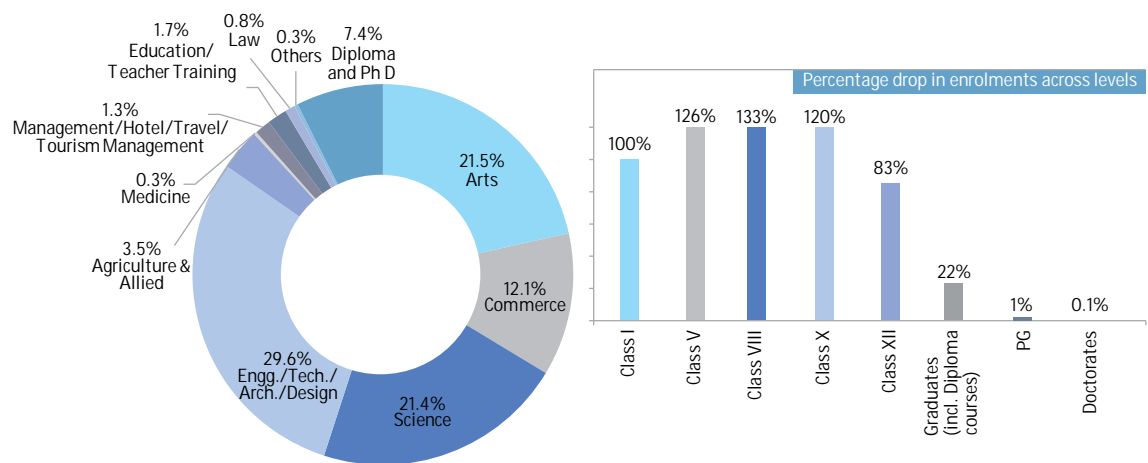


Figure 81: State Talent Supply Profile - Madhya Pradesh  
Arts, Commerce and Science are the prominent streams covering ~ 80 per cent of talent supply

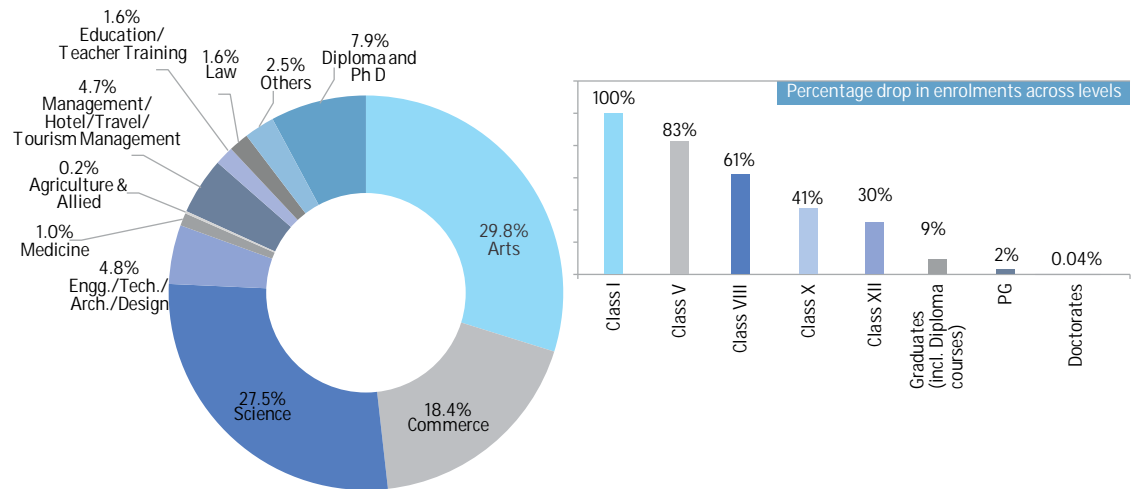


Figure 82 : State Talent Supply Profile - Maharashtra  
Maharashtra is one of the highest providers of Talent Supply in the country  
Medicine Graduates at ~15 per cent are one of the highest in the country

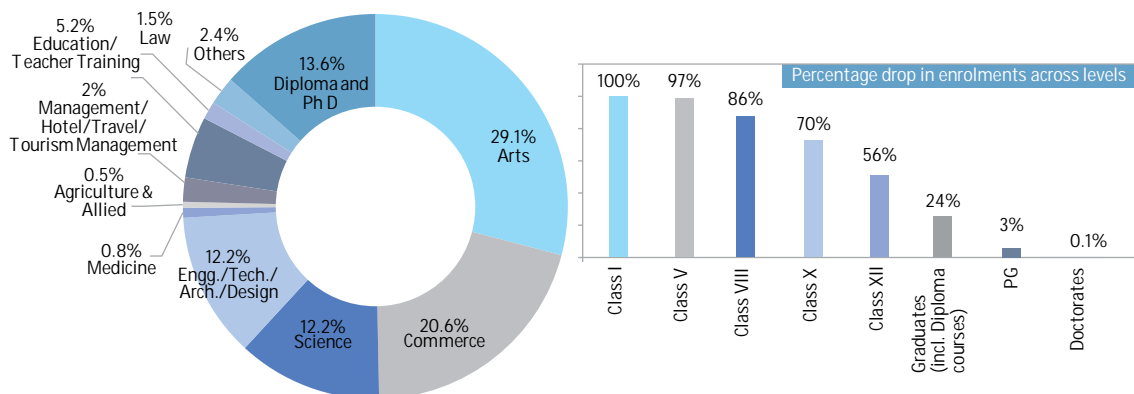


Figure 83: State Talent Supply Profile - Odisha

Odisha is fast becoming one of the larger providers of Technical Streams in the country  
This also resonates well with the focus of IT-BPM organisations in key cities like Bhubaneswar  
The enrolments at school levels though, are a cause for concern

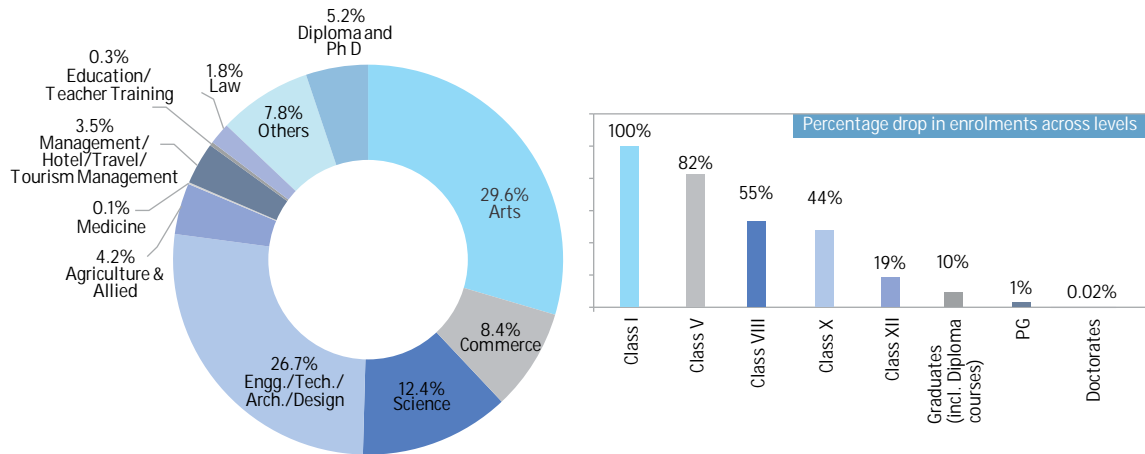


Figure 84: State Talent Supply Profile - Punjab

Punjab too like several other states, is focussing on improving Talent supply from the Technical Stream  
A lot of it is due to the increased participation of the Private Sector

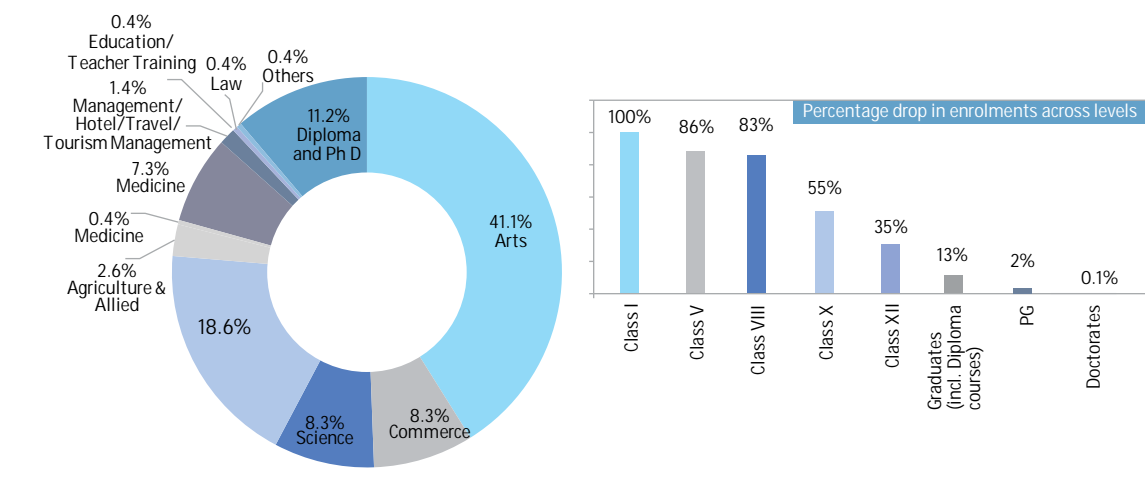




Figure 85 : State Talent Supply Profile - Rajasthan

Arts contributes to around two-fifths of the total Talent Supply in the state  
The enrolments rates at the School Levels are extremely lower than the National Average

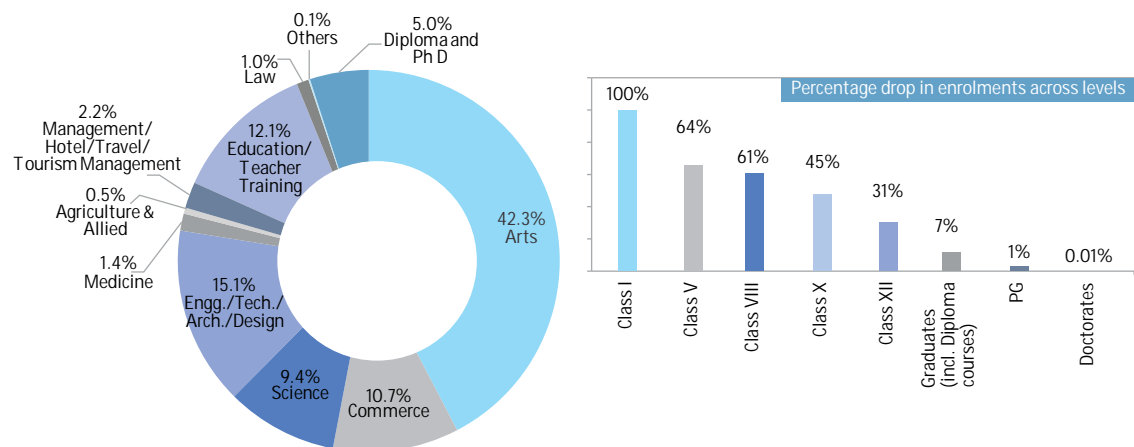


Figure 86: State Talent Supply Profile - Sikkim

Sikkim has of late, received investments from the Private Sector in Higher Education  
The enrolments rates at the Secondary and Sr. Secondary levels are lower than the National Average

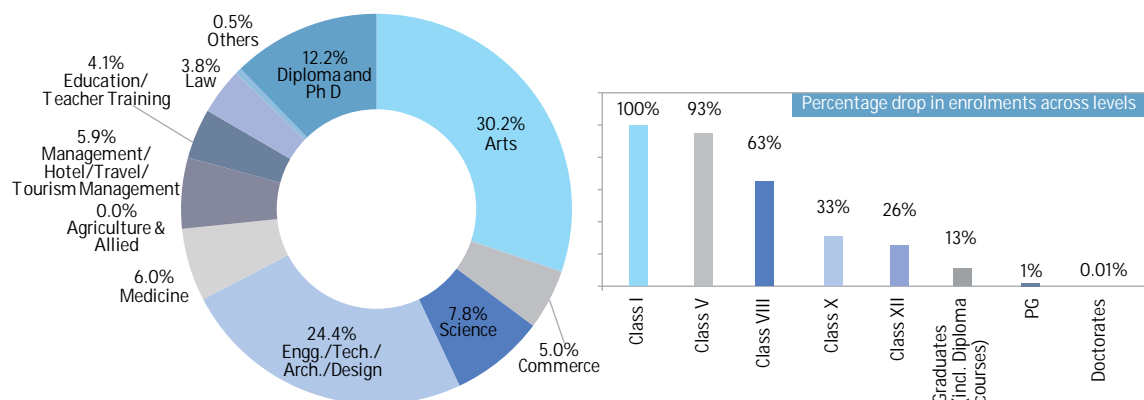


Figure 87: State Talent Supply Profile - Tamil Nadu

Tamil Nadu is one of the four Indian states that contributes heavily to the supply of Technical Talent Pool in the country  
The enrolments at the PG level are higher than the National Average

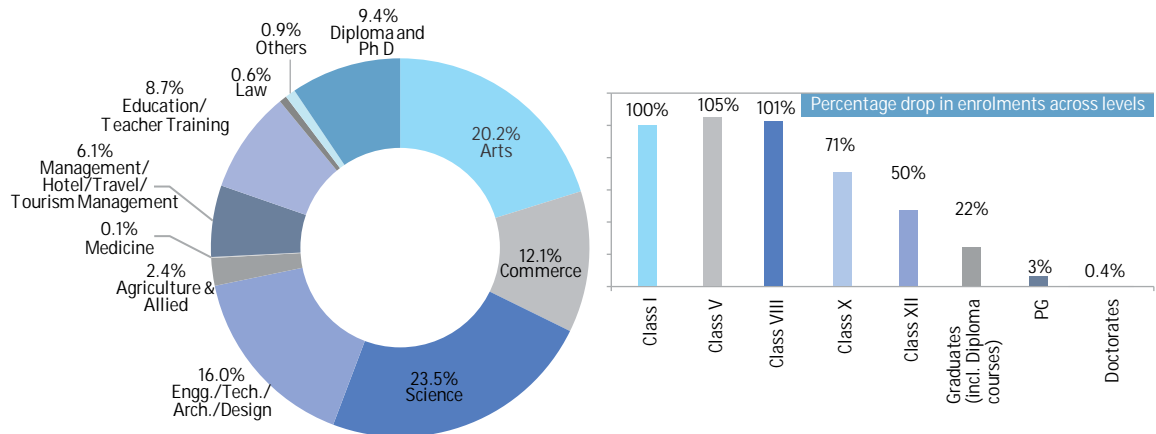
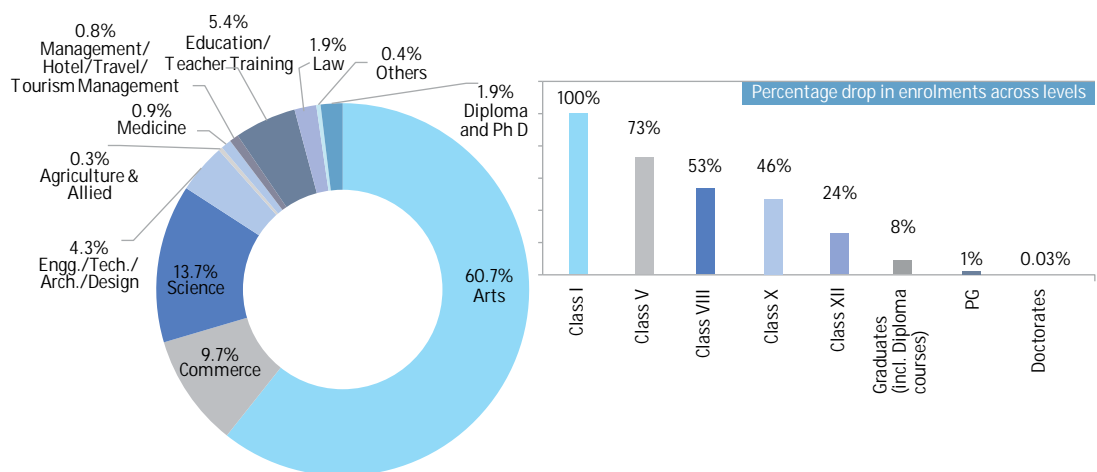
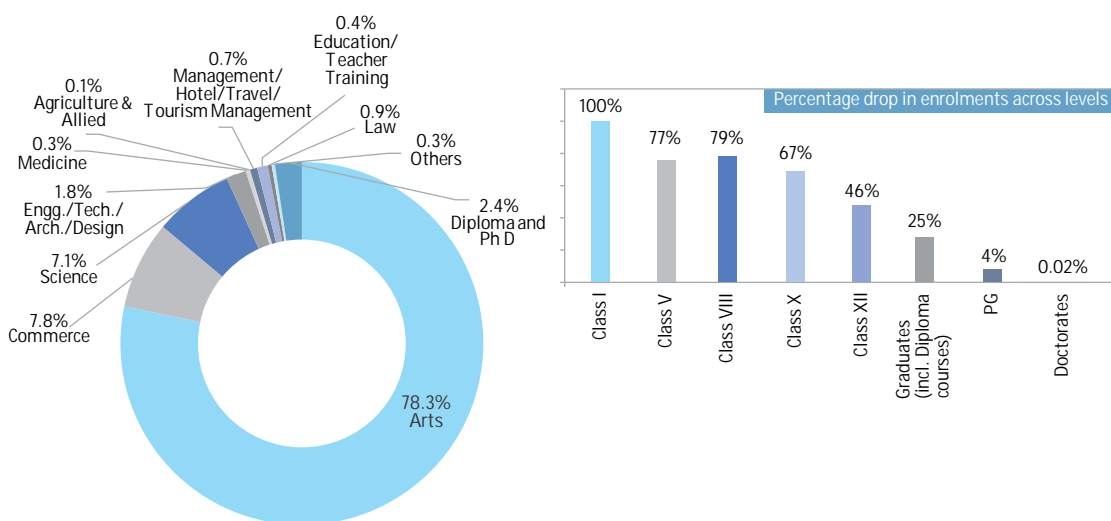


Figure 88: State Talent Supply Profile - Uttar Pradesh

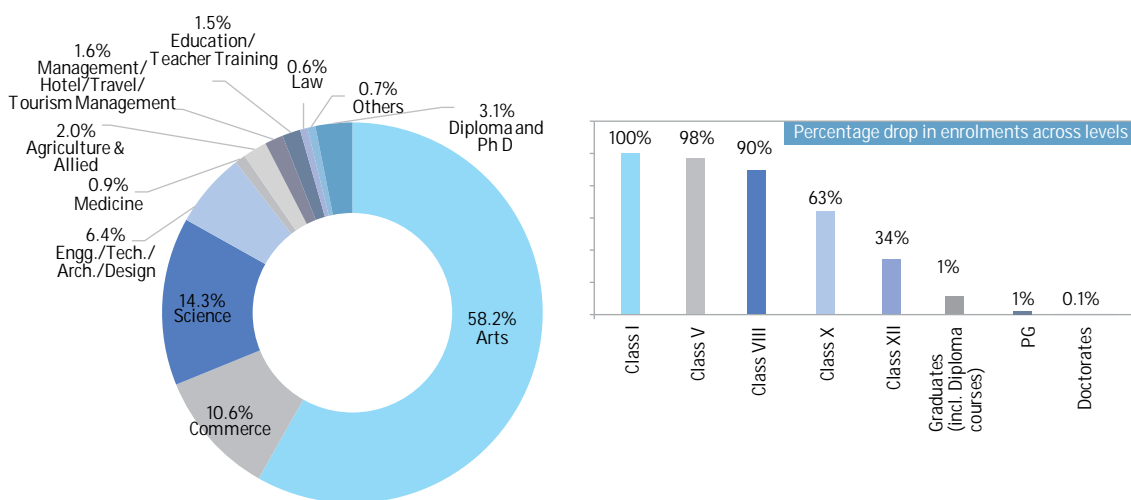
UP is one of the largest suppliers of Graduate Talent in India  
60 per cent of this is focussed on Arts streams



**Figure 89: State Talent Supply Profile - Uttarakhand**  
There exists a lot of scope for improvement of Talent supply beyond Arts in the state  
Arts contributes to more than three-fourths of the total talent supply from the state



**Figure 90: State Talent Supply Profile - West Bengal**  
Arts, Commerce and Science streams contribute to more than 80 per cent of the state's Talent Supply  
Engineering contributes to a mere 7 per cent



## Union Territories

Figure 91: State Talent Supply Profile - Chandigarh  
Chandigarh performs well on school as well as graduate enrolments as compared to the National Average

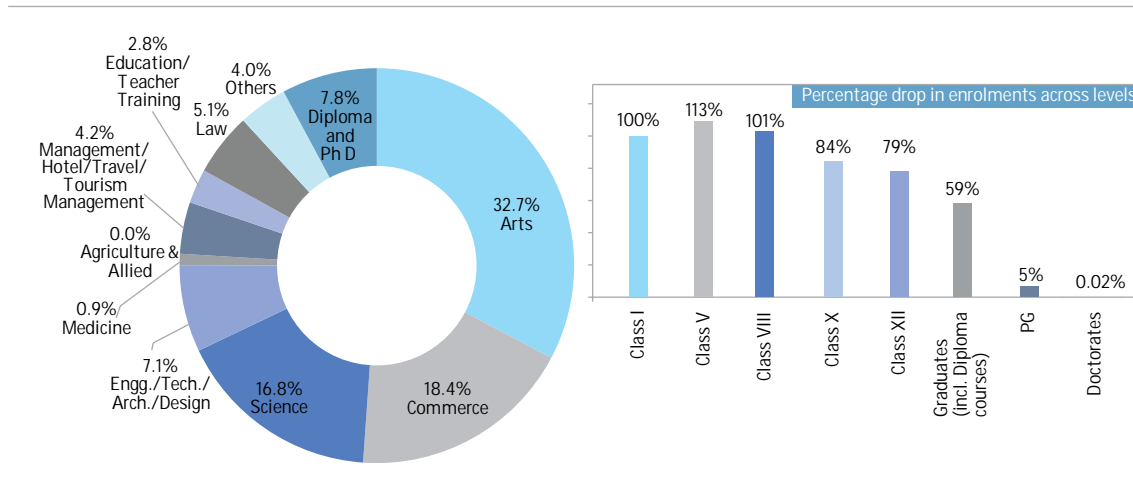


Figure 92: State Talent Supply Profile - Delhi  
Delhi is one of the three states with a negative Talent Demand-Supply gap  
It also boasts of some of the best public-funded educational Institutions like DU and AIIMS

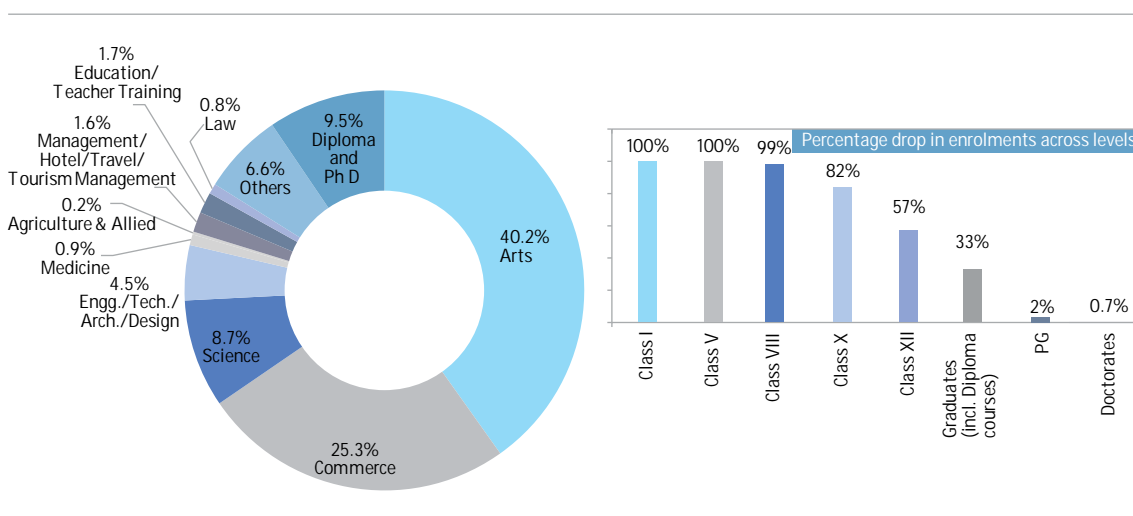
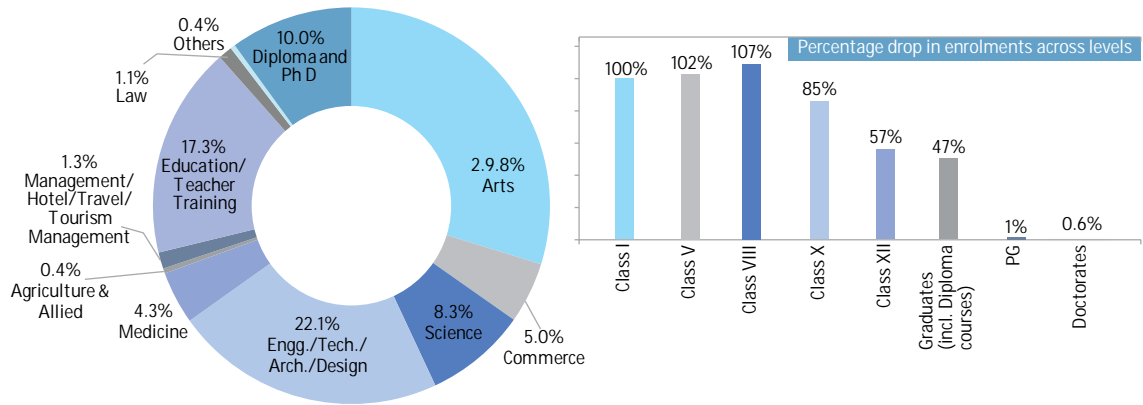


Figure 93 : State Talent Supply Profile – Puducherry  
Talent supply from Puducherry is a good mix of Arts, Technical and Education related streams  
School enrolments too are better than the national average

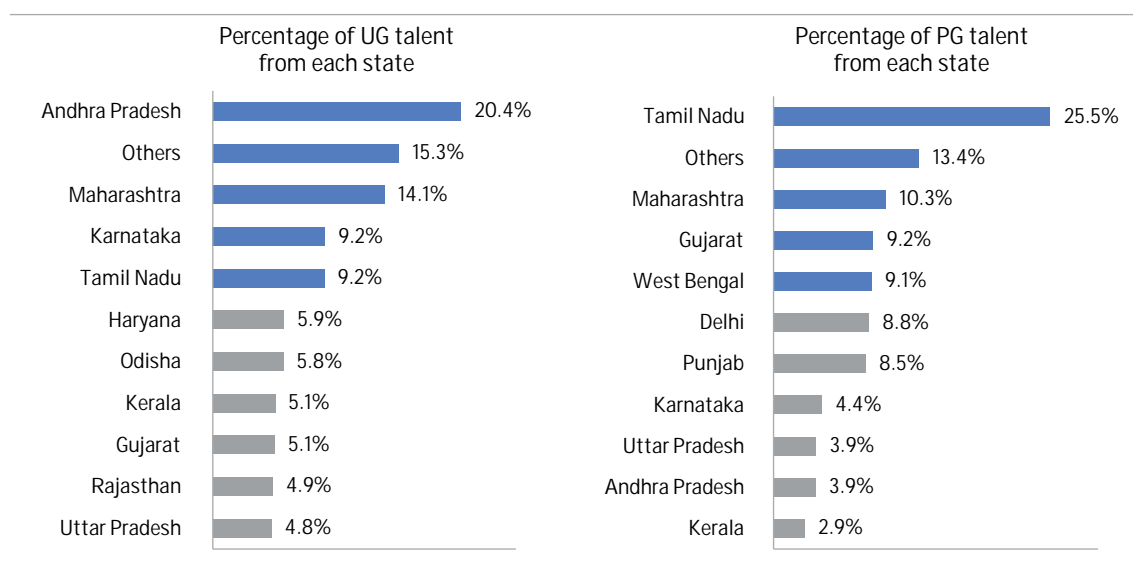


## Appendix B: Talent Supply Trends by Course

### Talent Supply Trend in Engineering/Technology/Architecture Courses

An analysis of the Engineering Talent supply sources indicates that nearly 60 per cent of the Under Graduate Engineering Talent Pool comes from Andhra Pradesh, Maharashtra, Tamil Nadu and Karnataka in descending order of their share in the supply pool. The analysis of the Post graduate engineering supply pool indicates a contrast with Tamil Nadu supplying nearly one fourth of the entire PG Talent followed by Maharashtra at a distant second at 10 per cent. This is alignment with the trend in talent demand as well.

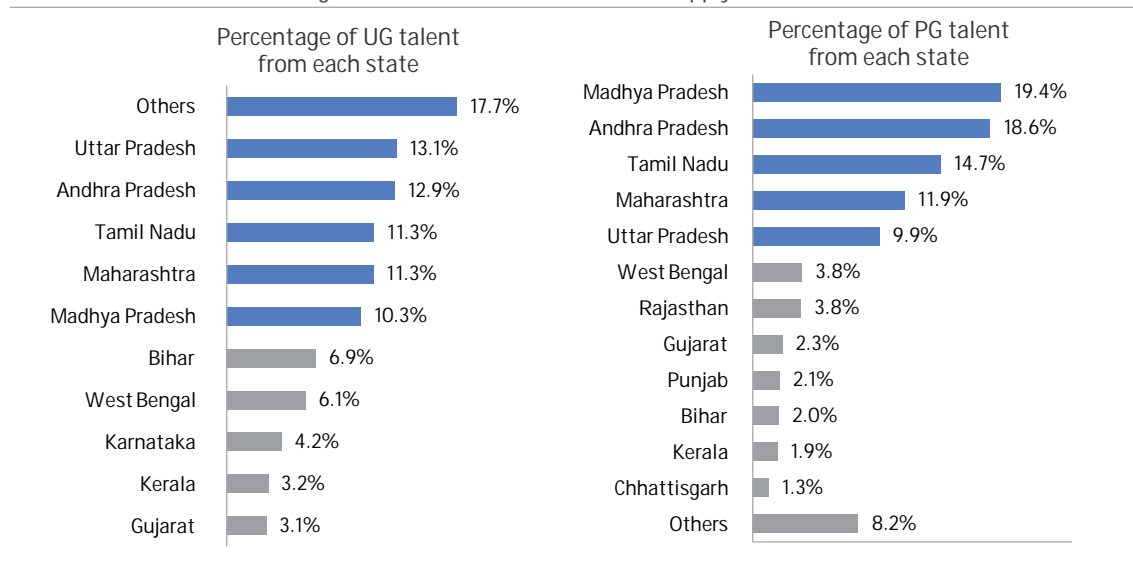
Figure 94 : Engineering UG and PG Talent Supply - State wise



### Talent Supply Trend in Science Courses

More than 60 per cent of BSc graduates are from 5 states which are Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Maharashtra and Madhya Pradesh in order of their share in the talent pool. In the Post graduate talent pool, nearly 70 per cent of the talent is supplied by Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Maharashtra and Uttar Pradesh.

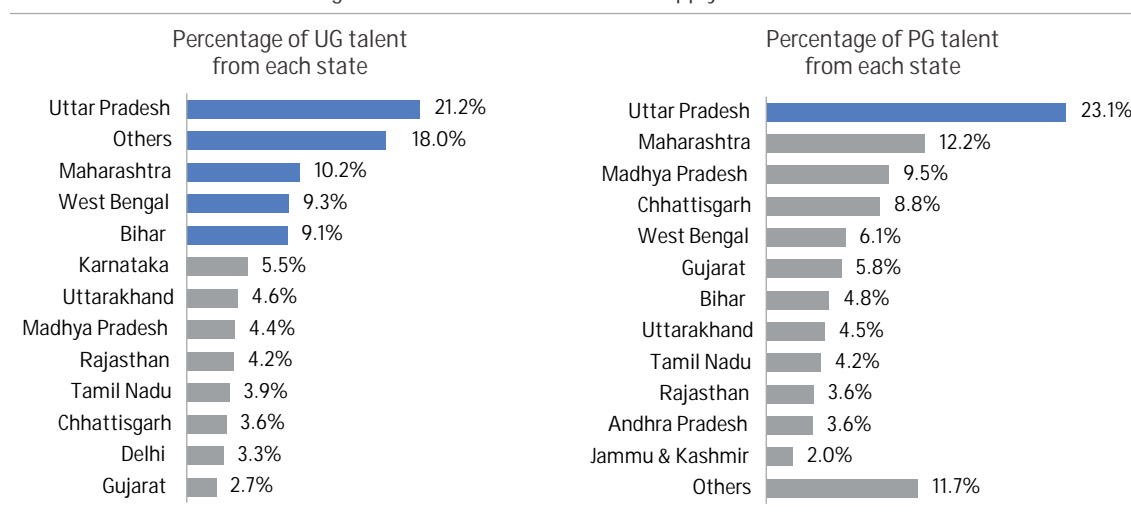
Figure 95: Science UG and PG Talent Supply - State wise



## Talent Supply Trend in Arts Courses

Almost a quarter of the BA graduates are sourced from Uttar Pradesh. Uttar Pradesh, Maharashtra, West Bengal, Bihar and Karnataka supply nearly 67 per cent of Art stream graduates. Uttar Pradesh tops as the highest supplier for the Post Graduate Arts Pools with a share of nearly 23 per cent followed by Maharashtra, Madhya Pradesh, Chhattisgarh and West Bengal supplying nearly 60 per cent of the PG Arts talent pool.

Figure 96 : Arts UG and PG Talent Supply - State wise

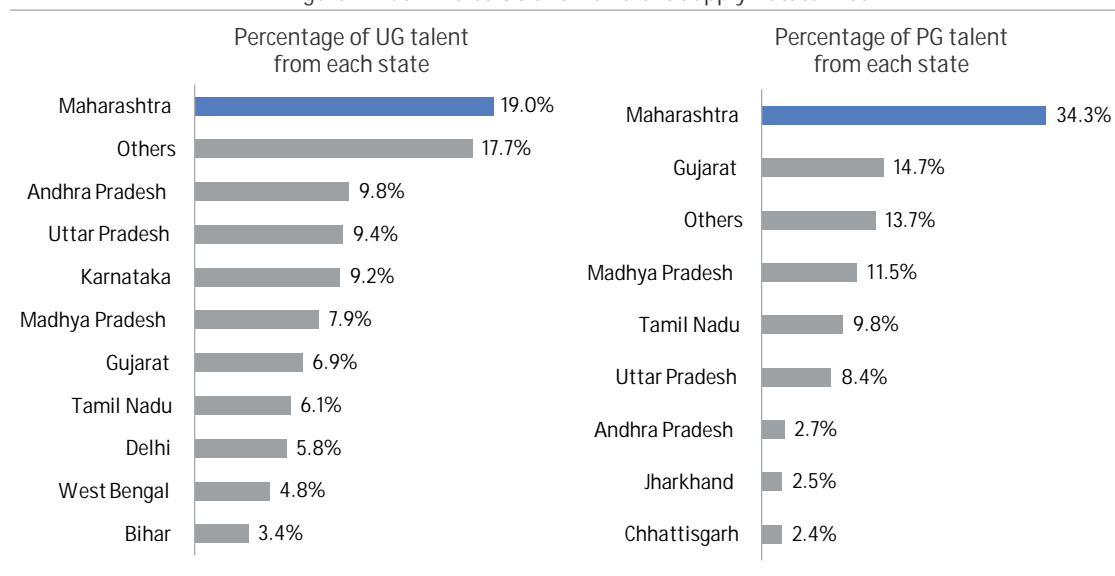


## Talent Supply Trend in Commerce Courses

In the B Com Talent Pool, Maharashtra is the largest supplier at ~19 per cent followed by Andhra Pradesh, Uttar Pradesh, Karnataka and Madhya Pradesh. Together these 5 states supply ~43 per cent of the UG Commerce talent pool.

Maharashtra supplies a quarter of the PG talent in the commerce stream. It is followed by Gujarat, Madhya Pradesh, Tamil Nadu and Uttar Pradesh. Together these 5 states supply a whopping 78 per cent of the total PG commerce talent pool.

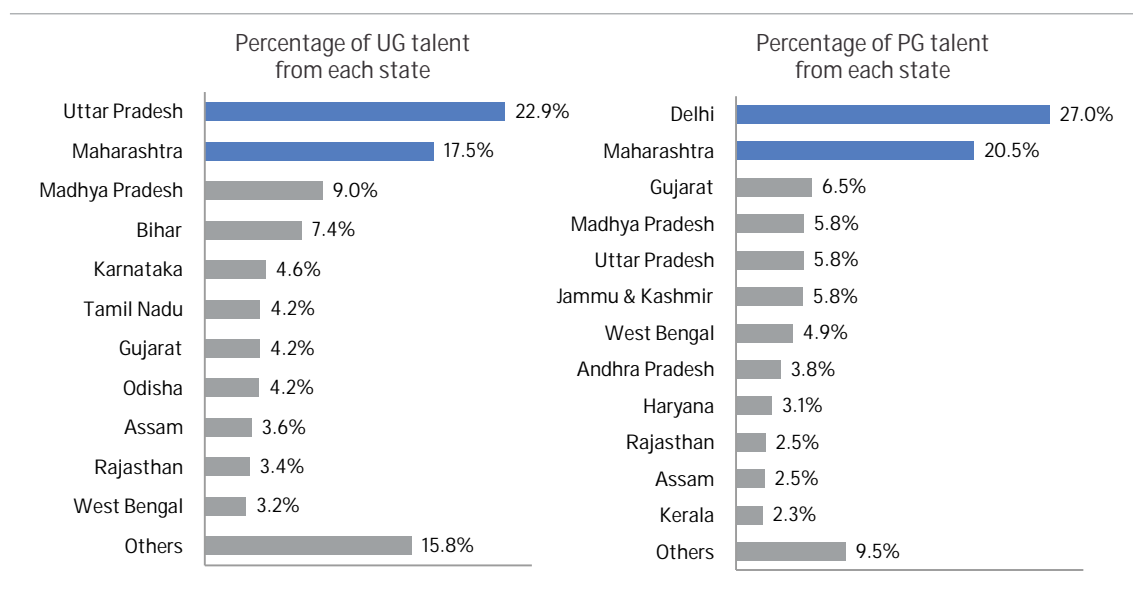
Figure 97: Commerce UG and PG Talent Supply - State wise



## Talent Supply Trend in Law Courses

Nearly, a quarter of all BA LLB graduates are supplied from Uttar Pradesh, followed by Maharashtra, Madhya Pradesh and Bihar. These 4 states together produce nearly 60 per cent of legal graduates. In the PG Legal Talent Pool, the main supplier is Delhi accounting for more than 27 per cent of the Total Talent Pool followed by Maharashtra at 20 per cent. Together they account for ~47 per cent of the Total Talent Pool.

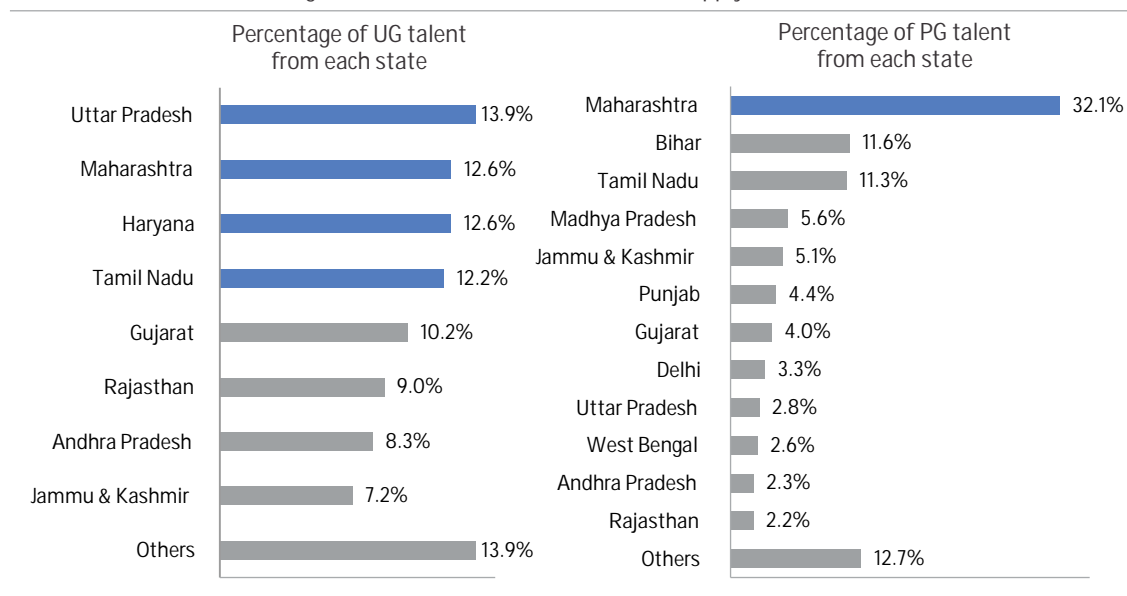
Figure 98 : Law UG and PG Talent Supply - State wise



## Talent Supply Trend in Education/ Teacher Training Courses

The B Ed Talent Pool Supply is replenished mainly by Uttar Pradesh which supplies nearly 14 per cent of the entire Talent Pool with Maharashtra coming a close second. Maharashtra is the leading supplier of PG talent in the field of education commanding a share of over 30 per cent in the PG Education Talent Pool. Overall in the field of education, Maharashtra is the main supplier of talent.

Figure 99: Education UG and PG Talent Supply - State wise



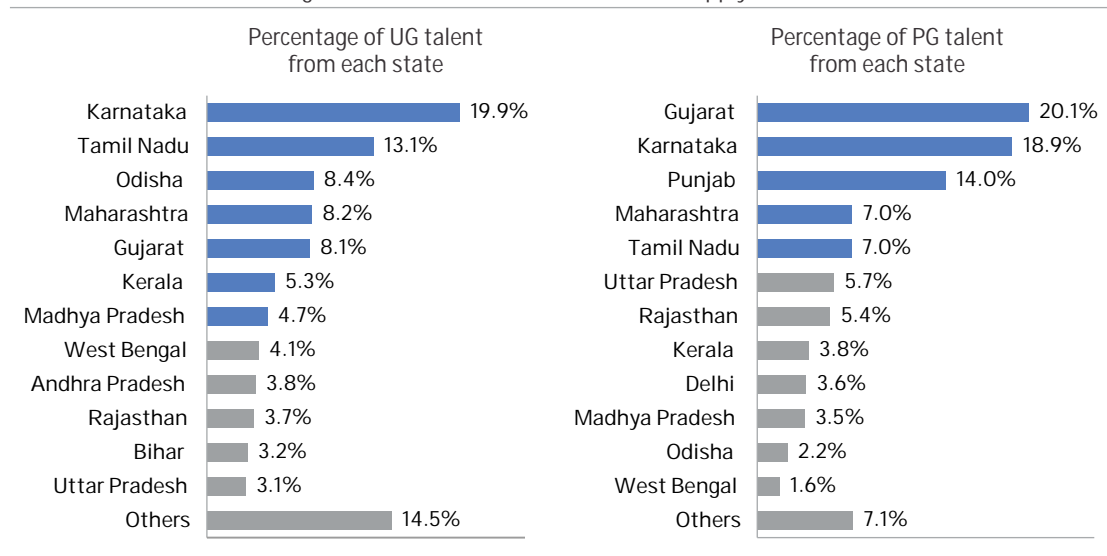


## Talent Supply Trend in MBBS/MD Courses

Karnataka supplies the highest number of MBBS graduates accounting for nearly 20 per cent and along with Tamil Nadu, Odisha, Maharashtra and Gujarat supplying more than 50 per cent of the entire MBBS Talent Pool.

In PG Talent or MD Talent Pool, Gujarat leads with a huge share of 20 per cent followed by Karnataka at 19 per cent. Punjab which doesn't feature in the top 5 MBBS suppliers is the 3rd largest supplier of PG talent in medicine.

Figure 100 : Medicine UG and PG Talent Supply - State wise

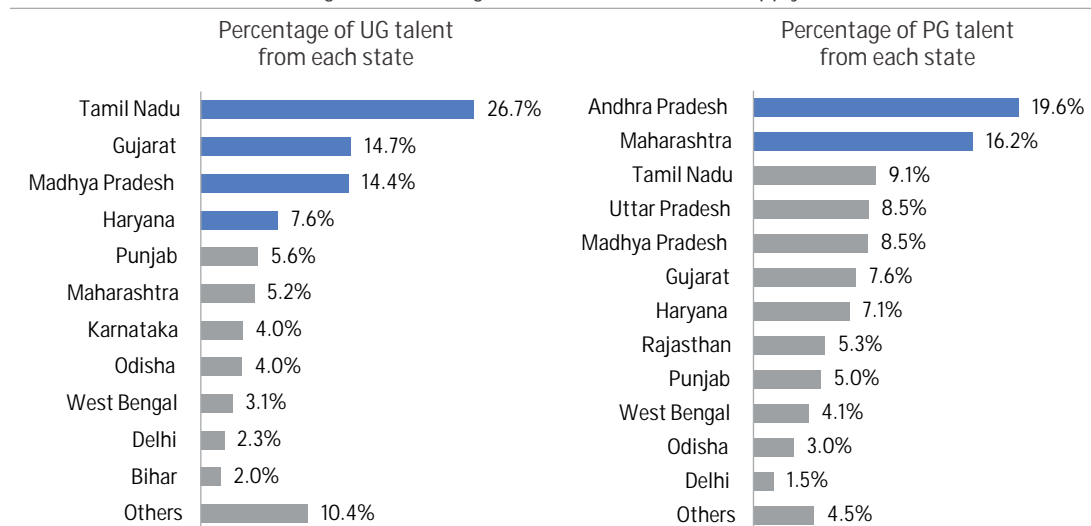


## Talent Supply Trend in Management/ Hotel/ Travel/ Tourism Course

Tamil Nadu produces the maximum number of undergraduates i.e., over a quarter, followed by Gujarat and Madhya Pradesh.

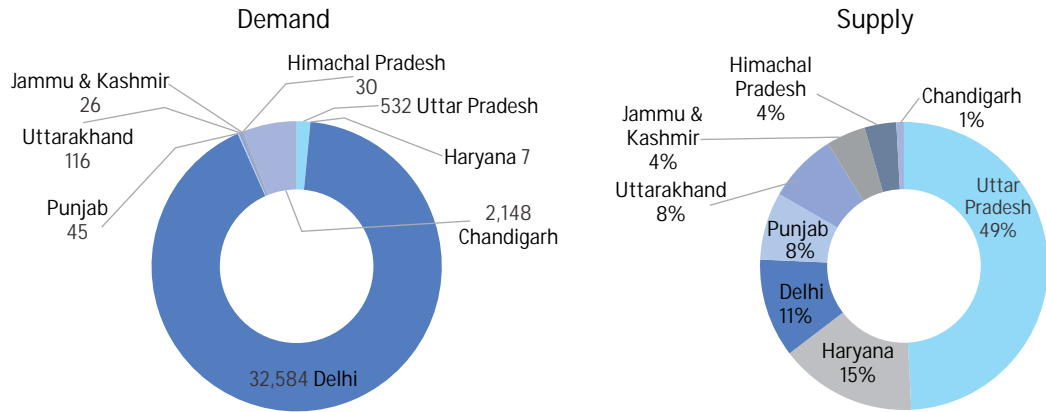
In the PG Talent Pool, the top supplier is Andhra Pradesh at ~20 per cent followed by Maharashtra, Tamil Nadu and Uttar Pradesh. Together, they supply over 50 per cent of the total PG Talent Pool in Management.

Figure 101: Management UG and PG Talent Supply - State wise



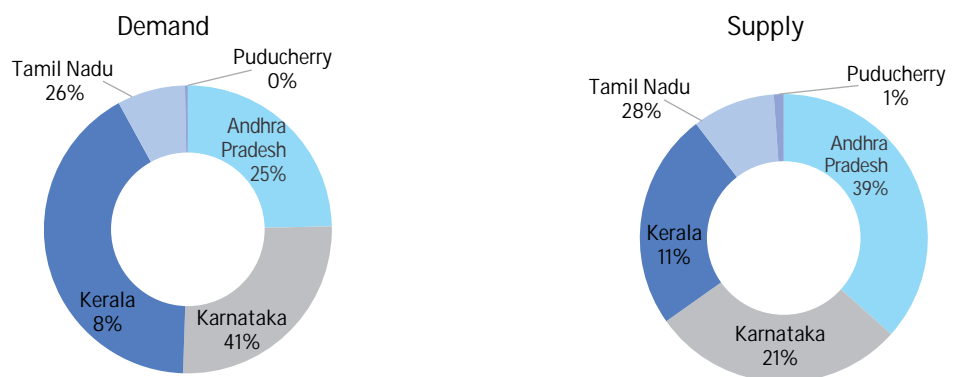
## Appendix C: Analysis of Talent Demand-Supply Gaps by Regions

Figure 102: Demand Supply – North  
Delhi–NCR has the largest demand in the Northern region, UP supplies the most



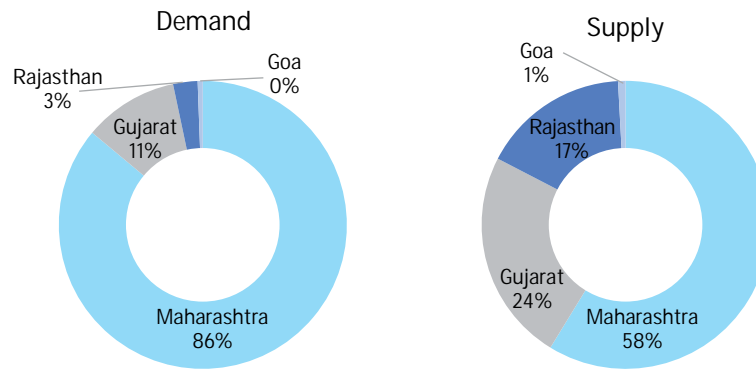
Region	Demand	Potential Supply
Uttar Pradesh	532	74,199
Haryana	7	23,290
Delhi	32,584	16,746
Punjab	45	11,478
Uttarakhand	116	11,781
Jammu & Kashmir	26	6,721
Himachal Pradesh	30	5,360
Chandigarh	2,148	1,288

Figure 103: Demand Supply – South  
While Karnataka Andhra Pradesh and TN continue to be the big 3, Kerala is emerging as the new destination



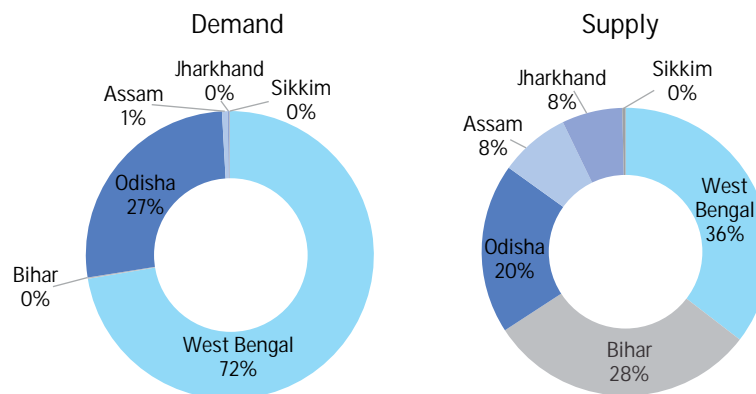
Region	Demand	Potential Supply
Andhra Pradesh	27,662	60,189
Tamil Nadu	29,034	46,688
Karnataka	46,605	40,179
Kerala	8,520	15,198
Puducherry	370	1,813

Figure 104 : Demand Supply – West  
While Maharashtra continues to lead both demand and supply, Gujarat is emerging as the new centre for IT-BPM Industry in the West region



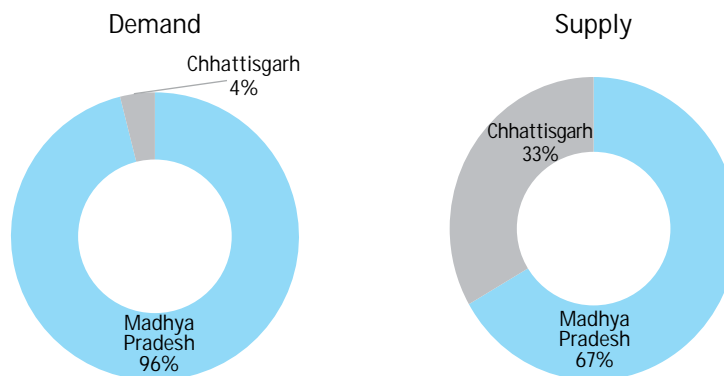
Region	Demand	Potential Supply
Maharashtra	30,526	82,502
Gujarat	3,763	32,974
Rajasthan	974	23,858
Goa	204	1,180

Figure 105 : Demand Supply – East  
Odisha and West Bengal have large potential of growth



Region	Demand	Potential Supply
West Bengal	6,357	33,625
Bihar	13	28,846
Odisha	2,338	18,121
Assam	56	7,506
Jharkhand	16	6,446
Sikkim	5	360

Figure 106 : Demand Supply – Central  
The Central region is extremely supply heavy. Clearly, it is not the preferred location for Indian IT-BPM Industry



Region	Demand	Potential Supply
Madhya Pradesh	746	33,887
Chhattisgarh	30	16,881

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**IT - ITeS SSC**  
**NASSCOM**

4E-Vandana Building (4th Floor)  
11, Tolstoy Marg, Connaught Place  
New Delhi 110 001, India  
T +91 11 4151 9230; F +91 11 4151 9240  
E [ssc@nasscom.in](mailto:ssc@nasscom.in)  
W [www.nasscom.in](http://www.nasscom.in)