



NATIONAL
EMPLOYABILITY
REPORT

ENGINEERS

Annual Report 2016

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Aspiring Minds is India's leading employability solutions company, headquartered in Gurgaon with operations in US, China, India, Middle East, Philippines and Sub-Saharan Africa. The company offers scientific assessments with an innovative large-scale sourcing model analogous to a GRE-for-job concept. The state-of-the-art assessment tools developed by Aspiring Minds have been used across industry verticals to help recruit the right people, develop profile-wise employability benchmarks and assess workforce health.

Aspiring Minds' intelligent adaptive assessments span across Language, Cognitive skills, Domain knowledge and Personality. A strong in-house research and development team with alumni from IITs and MIT form the development backbone of the patent pending assessment tools.

AMCAT® - Aspiring Minds' flagship product is India's Largest Employability Test. Conducted across the country throughout the year, AMCAT has been taken by over 2,000,000 candidates in 4000+ campuses, spread across 25 states. Tens of thousands of candidates secure their dream jobs every year through AMCAT.

Powered by a highly dedicated management team of over 500 full-time employees, drawn from the IITs and IIMs and a pan-India operational presence, Aspiring Minds has helped leading brands across verticals to improve their recruitment process efficiency and the quality of talent they hire. Aspiring Minds' products and solutions have been adopted by more than 3500 clients in sectors as diverse as BFSI, IT, ITeS, Hospitality, Retail, etc.

The client list includes Sapient, Coca Cola, GE, Genpact, Bank of America, CITI, HCL, Axis Bank, Wipro, Tata Motors, Daimler, HDFC Bank, Microsoft, Mphasis, DUPONT, Hyundai, ZS Associates, Ericsson, Deloitte, Huawei, John Deere, Grofers, Frankly ME, Kart Rocket and many more.



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NATIONAL EMPLOYABILITY REPORT

INTRODUCTION

It is our pleasure to present the fourth edition of the National Employability Report for Engineers. Since we started publishing, this report has become an authoritative source for employability statistics for engineers and an auditory mechanism for higher education. In the last report, we showed how the focus on quantity, i.e. number of colleges, became the very reason for the low employability of engineers in the country. We now note that, the same opinion has been echoed by several stakeholders including several states requesting AICTE to reject proposals for actively championing the cause of better education rather than

Colleges are showing deep interest in employability improvement and are adopting the idea of employability assessments

more number of engineering colleges. Colleges are now showing deep interest in employability improvement and are adopting the idea of employability assessment from the first year onward to identify gaps and fill them. Over 3500 big or small companies have adopted the use of standardized assessments for hiring irrespective of college tier, location or reputation.

On the other hand, our report led to more questions being debated. Whereas we commented on employability, various stakeholders wanted to know, rightly so, about the kind of jobs students aspire for and what percent of those actually end up getting jobs. Are there inefficiencies in this process? Also many industry and academic stakeholders expressed the need to look beyond the software industry at other engineering sectors and also the new kind of careers becoming available for engineers.

Keeping the same in mind, backed by an year of tireless work by Aspiring Minds' research cell, we have come up with a comprehensive report which looks at all these aspects. We now look at what students want, what they are capable of getting and what they end up getting. This rounds the whole education-employment ecosystem. We have not just covered jobs in the software sector but those in mechanical, electrical and civil engineering sectors, among others. We have worked to draw a skill map, through theoretical and empirical evidence, for alternate careers for engineers such as sales engineer, technical content developer and report employability for these.

Over 3500 big or small companies have adopted the use of standardized assessments for hiring irrespective of college tier, location or reputation.

I hope you will find these analysis and the resultant findings thought provoking. You, like me, will recognize the need for new methods for guiding the budding engineers in this country, helping them become employable and finally help each one get a job just by merit. I look forward in engaging with you in such discussions to take our efforts for a better India forward.

Varun Aggarwal,
Director, Aspiring Minds Assessment Pvt. Ltd.





EXECUTIVE SUMMARY

The key findings of the present study are as follows:

No significant improvement in employability in the last four years

We did the previous large scale study of employability of engineers in 2014. We had found that only 18.43% of engineers were employable for the software services sector, 3.21% for software products and 39.84% for a non-functional role such as Business Process Outsourcing. Unfortunately, we see no massive progress in these numbers. These numbers as of today stand at: 17.91%, 3.67% and 40.57% respectively for IT Services, IT Products and Business Process Outsourcing. This is despite the fact that the number of engineering seats have not increased in the past year. We are not inferring that all initiatives for employability improvement have failed and there may be pockets of excellence present. However, the need of the hour is to find these pockets and scale them up to make an exponential impact on employability. This is crucial for India to continue its growth story and achieve the PM's vision of India becoming the human resource provider for the whole world.

Only 3.84% folks employable for startup software engineering jobs

Investments and growth of technology startups is the new business story in India. Ratan Tata recently said that India is becoming the Silicon Valley of the 1990s. To sustain this growth, we need candidates with higher technology caliber, understanding of new products and requirements and the attitude to work in a startup. With this in mind, we specifically captured employability for startup technology roles this time. Unfortunately, we find that only 3.84% of engineers qualify for a startup technology role. This is a big concern and would surely hamper the growth of startups in India. It may also cause the market to be diluted with a lot of low quality products floating around.

More aspiration to work for startups

Last year, we had found 6% students were interested to work for a startup. This year it is up by 33% to 8%. Students from tier 1 colleges are most motivated to work in startups as compared to others. It is also observed that inclination of males is strikingly high to work with startups than that of females. Among all of these, more students as compared to last year are interested to work for startups. While this is good news, there is still a long way to go as only a handful of candidates (8%) are interested to work for startups.

Higher salary aspiration and higher salary for same skill

This year on, we find that students have higher salary aspirations. Last year the median salary aspiration was INR 310 thousand, which is now INR 340 thousand implying that the market is also paying higher salaries. The median salary for the same skill was INR 282 thousand last year, which is INR 313 thousand this year. This means that talent is getting expensive and we believe this is due to the huge demand of manpower in technology sector and lack of supply. However, it is important to note that this supply is artificially low: more than 25% of employable candidates are beyond the top 750 engineering colleges. This pool of candidates is missed out by companies and to make sure that the war for talent doesn't lead to salaries going out of control, we need to find ways of better meritocratic matching of students with jobs.



METHODOLOGY

The report is based on a sample of more than 150,000 engineering students from 650+ engineering colleges across multiple Indian states. All these candidates graduated in 2015¹. The analysis and findings of this report are based on the results of these students on AMCAT: Aspiring Minds Computer Adaptive Test, which is India's largest and only standardized employability test. AMCAT covers all objective parameters such as English communication, Quantitative aptitude, Problem-solving skills, knowledge of domain areas such as Computer Science and Programming, Mechanical Engineering, Electrical Engineering etc. for determining employability in the IT/ITeS & other core engineering roles. The test was conducted under a proctored and credible environment ensured by Aspiring Minds.

Employability has been quantified based on the benchmarking studies done at various companies in different sectors by Aspiring Minds. Currently, AMCAT is used by more than 3500 companies, including seven of the top-ten IT services companies in India, for their assessment and recruitment solutions. The benchmark for employability in a profile and sector is defined by a theoretical understanding and empirical validation of the knowledge, cognitive skills and domain expertise required. The benchmarks established for different profiles ensure both elimination of unsuccessful candidates for a job (elimination of type I error) and inclusion of all candidates who will be successful in the given job (elimination of type II error). The same has been validated among multiple companies in various sectors.

The report also covers a section on aspirations of engineers and a study which attempts to understand the factors which lead to an engineer getting a job in India. The data for the same was captured by means of a scientific survey on a stratified sample of about 27,000 engineers.

Together with the AMCAT scores, the various demographic details of the candidates are also captured by Aspiring Minds' testing platform, which enables a comprehensive and meaningful analysis provided in the report.

1. The sample was statistically balanced across various parameters to be representative of the true technical graduate population. A carefully chosen stratified sample was used for the study.





EMPLOYABILITY BY ROLES

Engineers are absorbed in many different job profiles and sectors in the industry. Within the IT sector we study employability in roles like IT Product, IT Services and Associate ITeS Operations. With a variety of startups coming up as well as students showing an inclination towards joining them, we have also included the employability of engineers in a Startup-Ready engineering role. This year, the role of Design Engineer is further sub categorised for better understanding. Other than IT and core engineering profiles, we also look at alternate careers which are available to engineers. These include roles such as Technical Content Developer, Analyst and Sales Engineers. Given that IT jobs are not growing at the same pace as before, engineers are pursuing different kinds of roles that draw on their analytical/technical skills. The employment of engineers in these roles will only grow with time and it is important to capture the employability trends in them.

The criteria for employability is based on the studies conducted with various corporations in these sectors, benchmarking their current employees in various profiles through objective assessment based on AMCAT and establishing feedback through on-job performance data. These benchmarks serve as a standard for several large-sized companies across the nation.

ROLE	EMPLOYABILITY
IT ROLES	
Software Engineer – IT Product	3.67%
Software Engineer – IT Services	17.91%
Startup Ready – IT Services	3.84%
Associate – ITeS Operations (Hardware and Networking)	37.06%
ENGINEERING ROLES	
Design Engineer – Non IT	6.56%
Sales Engineer – Non IT	19.08%
NON-TECH ROLES	
Business Analyst – KPO	10.86%
Associate – ITeS/BPO	40.57%
Technical Content Developer	11.66%
Creative Content Developer	16.72%

Table 1 : Employability Percentage of Engineering Graduates in Different Roles

ROLE	EMPLOYABILITY
DESIGN ENGINEER	
Chemical Design Engineer	1.64%
Civil Design Engineer	6.48%
Electrical Design Engineer	6.50%
Electronics Design Engineer	7.07%
Mechanical Design Engineer	5.55%

Table 2: Employability Percentage of sub-categories in Design Engineer Role

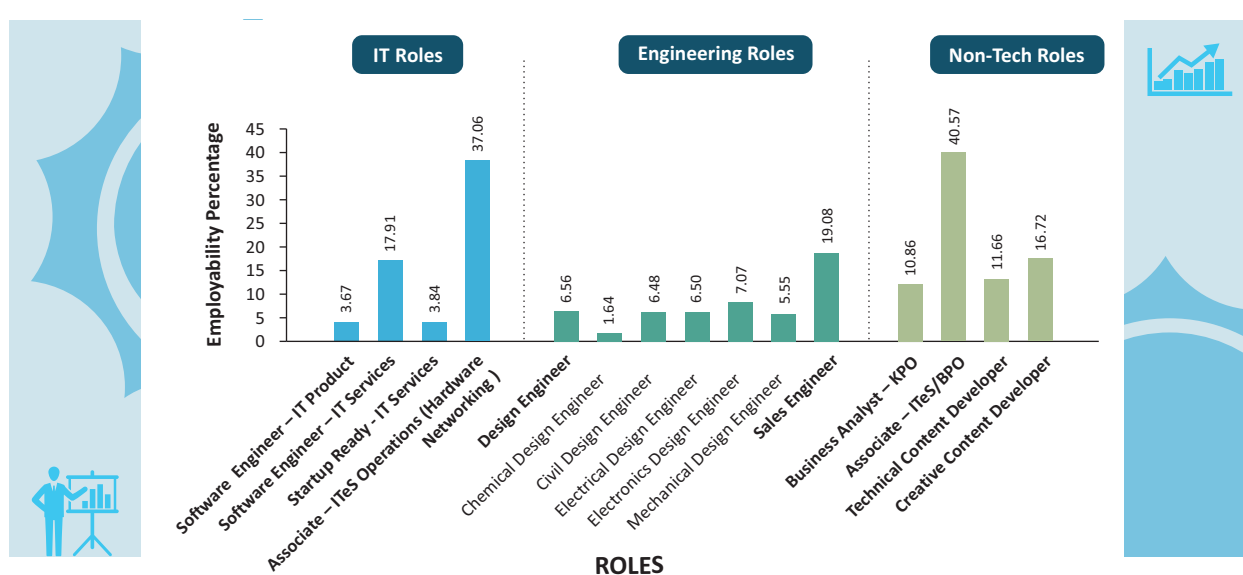


Figure 1: Employability Percentage of Engineering Graduates in Different Roles

The employability of engineering graduates in different roles is shown in Figure 1. The following observations can be made:

Software Engineer - IT Product: A worryingly low employability percentage of 3.67% has been observed for this role. This is because jobs in IT product companies require a strong understanding of computer programming and algorithms. The study found that candidates strongly lacked the required skills: around 90.72% of graduating engineers do not have the desired programming and algorithm skills required for IT product companies, whereas 72.77% show lack of soft-skills and 59.40% lack cognitive skills. There have been new innovations to test programming and algorithms using compiler-integrated programming assessment² to find the right candidates quickly and effortlessly. Other than finding whether a program is

2. http://www.aspiringminds.in/researchcell/articles/aspiringminds_launches_automata_pro_the_worlds_most_advanced_simulated_programming_assessment.html

correct or not, these tools can automatically find code complexity and programming practices used. One may note that the skills required by IT product companies at the entry-level are very much a part of the curriculum of engineering colleges, which is a worrying sign for higher education. Using assessment tools, as mentioned, can also serve as a boon for students to start assessing their programming skills early-on in their engineering education.

Software Engineer - IT Services: The employability of engineers in IT services companies is 17.91%. It should be noted that this has been calculated according to the current hiring philosophy of IT Services companies, where the candidate is not expected to already possess the required software skills or soft skills, but is imparted the training over a period of 3 to 6 months. The hiring criterion for this industry, thus, is that the candidate should be trainable in technical and soft skills. This requires both a basic command of language and technical skills, together with requisite cognitive skills to respond to training in a short period of time. Considering these rather lax requirements, the fact that only 17.91% of the graduates are trainable into software engineers within a period of 3 to 6 months, is alarming to say the least.

The research further shows that approximately 52.21% engineers are rejected because they are not soft-skill trainable in a short period of time, whereas around 49.28% lose on technical trainability.

The IT Services industry is not growing at the same pace as before and the growth of entry-level jobs is diminishing. Given that companies have lower requirement and want to reduce training cost, there is a slow but definite trend towards hiring candidates who already have decent expertise in programming. At least three out of the top ten IT Services companies in India have already started using programming assessment in their entry-level process. Secondly, IT Services companies today realize that within two years of the job, the candidate will have to communicate with international customers. This makes English a much more important parameter right at the time of entry-level hiring. As these trends catch up across industry, the employability for IT Services sector, which is the largest employer in engineering will diminish further. To remain competitive in the job market, colleges and students both need to have a sharp focus on programming and English (both written and spoken).

Small and Medium Sized Enterprises (IT): Whereas large companies invest considerably in trainings, small and medium sized enterprises (SMEs) do not find it viable to build training facilities or invest time in it. For them, the engineering graduates should be able to learn on-the-job and start contributing effectively as soon as possible, typically in a month's time. This requires substantial competence in domain skills. Whereas these companies do not expect the person to bring in in-depth knowledge of computer science, the minimum expectation is to be able to write a decent piece of code for a given problem and the ability to debug and submit a working program. Only 4.51% of candidates possess such skills and are software-industry ready. This explains why the hiring process for SMEs is so hard and time-consuming.

SMEs in the IT domain have been growing considerably fast which is also because of the recent boom in e-commerce companies. This has also led to an improvement in the salary provided by SMEs. Secondly, as observed above, the positions in large IT-Services companies are not growing like before. Thus, SMEs today form an extremely important component of entry-level hiring which candidates should not miss. On the

other hand, it won't be long when the SME sector growth shall be impeded by lack of talent available, if the employability problem isn't addressed.

Startup Ready - IT Services: Investments and growth of technology startups is the new business story in India. Ratan Tata recently said that India is becoming the Silicon Valley of the 1990s. To sustain this growth, we need candidates with high technology caliber, comprehensive understanding of products and the attitude to work in a startup. With this in mind, startups want to hire ready-to-deploy manpower. Unfortunately, we find that only 3.84% of engineers qualify for a startup technology role. This is a big concern and would surely hamper the growth of startups in India.

Design Engineer - Non IT: We use the term Design Engineer for all core engineering roles, such as those in the semiconductor industry or the automotive industry. In these roles, the candidate basically applies his or her core engineering knowledge towards solving real world problems, for e.g., an Electronics Engineer designing a digital library of components for a new chip technology or an automotive engineer designing an automobile or its engineering sub system. Design Engineers may even be involved in the entire lifecycle of a product/service, be responsible for making corrections and requested changes and for providing support and maintenance services. These roles require high analytical skills and good command over the domain. It is important that the candidate has more than rote learning and can actually apply the domain knowledge to solve problems. Good command over English is required so as to understand instructions and be able to respond to them, but not as high as the IT services role which requires communicating with international clients. The need of such a diverse skill set makes the employability in this role one of the lowest at 6.56%.

Within this job role, we tried to investigate trade-specific employability. The engineers belonging to civil, chemical, electrical, electronics and mechanical backgrounds were analyzed for their employability for a Design Engineer role. Herein, the engineers with electronics background were found to be the most employable of the lot (7.07%), followed by engineers with a civil engineering background. The least employability amongst these roles was recorded for Chemical Design Engineer (1.64%). The reasons for the same can be attributed to the current industry and market needs which in effect decide the prospects and pursuits of these trades.

On an average, 60% candidates lose out because of not having requisite domain knowledge, something they should learn in college. There is a general argument that this is because of the outdated courses. This is a misnomer since the basic concepts in most of these fields have remained same over the years and industry can quickly train candidates in emerging technologies, if their basic concepts are clear. The industry has no further expectations from the candidate than a clear understanding of the fundamentals of the topic. Unfortunately, most students do not know the same.

Sales Engineer - Non IT: In this profile, a candidate has to sell, market or assist in selling a technical product. Here, buying decisions are based more on technical information and rational analysis rather than style,

fashion or impulse. Therefore, selling in these markets relies heavily on technical information and problem-solving to convince buyers that they should spend money on the seller's products or services, in order to meet a business need. A Sales Engineer is hence both an engineer who understands and can apply concepts of engineering and a salesperson who knows how to sell engineered systems. The Sales Engineer thus not only sells but also provides advice and support. Such a role requires an individual to have technical understanding of the complexities of what his/her company supplies together with excellent communication skills. Besides these, the role requires an individual to have a pleasing personality, an ability to build trust with the client and be dependable at work. Sales being a customer oriented skill directly correlates with agreeableness and conscientiousness – two of the five big five personality traits. Only 19.08% of the candidates are employable in this role given the role requires good English communication, reasonable analytical skills and domain skills together with a sales oriented personality.

Business Analyst - KPO: As revealed by the research, the Knowledge Process Outsourcing (KPO) industry is likely to find only 11 out of every 100 engineers employable for analytics roles. Highly developed written communication and analytical skills are a must for this sector. While most engineers (72.77%) do not exhibit the required competence in English communication, a considerable number (59.40%) miss out on analytical and quantitative skills. The analytics sector is growing and getting fresh impetus with the success of companies such as Mu-Sigma. To continue to remain competitive in this new emerging industry, a fundamental shift in college instruction and assessment methodology is required which is more inclined towards developing analytical thinking and critical reasoning than learning by rote.

Associate - ITeS Operations (Hardware and Networking): The Hardware and Networking sector comprises of roles involving technical support and network management. Candidates employed in this sector manage ITeS operations within corporations or carry out servicing roles providing support to consumers. A good 37.06% candidates are employable in roles in the hardware and networking sector, according to the study. A person trainable in this role should exhibit basic understanding and usage of computers—both hardware and software—as well as be comfortable in English and exhibit a problem-solving approach.

Associate - ITeS/BPO: A large proportion of candidates (40.57%) are eligible for the BPO industry, both in tele-calling and backend processes. However, graduate engineers do not form the preferred employable group for these companies due to the belief that these roles cannot match their expectations, both in terms of remuneration and job satisfaction.

Technical Content Developer: A technical content developer is responsible for managing the technical aspects of content. He/she may be responsible for writing manuals that explain the technical complexities of products, technical terminology or training content in the technical domain. A technical content developer is required to possess reasonably good technical knowledge of his/her domain subjects and a flair for writing. With just under 64.05% engineers possessing the required domain knowledge and about 21.50% possessing the required English skills, the employability in this role stands low at 11.66%.

Creative Content Developer: Creative content developers deal with the non-technical or creatively challenging aspects of content. Depending on the company and requirements, a creative content developer is expected to create new content from scratch, re-write existing content or proof read content. He/she might also be required to manage content on social media and develop new ideas for web content. The role requires a person to have exceptional command over written English, basic analytical skills, an eye for detail and to be high on Openness to experience – a personality trait associated with being broad-minded, unconventional, curious and imaginative. With just about 21.50% engineers exhibiting the required competence in English, an employability percentage of 16.72% in this role is not surprising.

For most roles, there is a slight change in the employability compared to last year. This is as per expectation since it would not vary largely in a single year. To summarize, it is evident from these grim employability figures that there exists a deep chasm between the actual skills of engineers and the skills expected from them on the job. The chasm, if not overcome timely will result in an inevitable loss of human resources. There is thus a dire need of assessments that can be used to test engineers, provide them with relevant feedback and help them improve their skills.



EMPLOYABILITY BY GENDER

In India, there are 104 males for every 100 females making the male-to-female ratio (MFR) 1.04. In contrast, the MFR in engineering colleges is 1.68. This shows that a lower proportion of females make it to engineering courses as compared to males. This ratio is better as compared to last year's MFR of 1.72.

Apart from discussing the proportion of males and females in the engineering discipline, throwing some light on the comparative analysis of their scores and employability figures would be interesting. The table below illustrates the same.

ROLES	MALE	FEMALE
IT ROLES		
Software Engineer – IT Product	4.52%	2.71%
Software Engineer – IT Services	18.16%	17.50%
Associate – ITes Operations (Hardware and Networking)	36.69%	37.68%
ENGINEERING ROLES		
Design Engineer – Non IT	6.63%	6.38%
Sales Engineer – Non IT	18.44%	20.15%
NON-TECH ROLES		
Business Analyst – KPO	11.26%	10.20%
Associate – ITes/BPO	40.21%	41.19%
Creative Content Developer	11.46%	12.00%
Technical Content Developer	16.25%	17.50%

Table 3: Employability Percentage – Males vs. Females

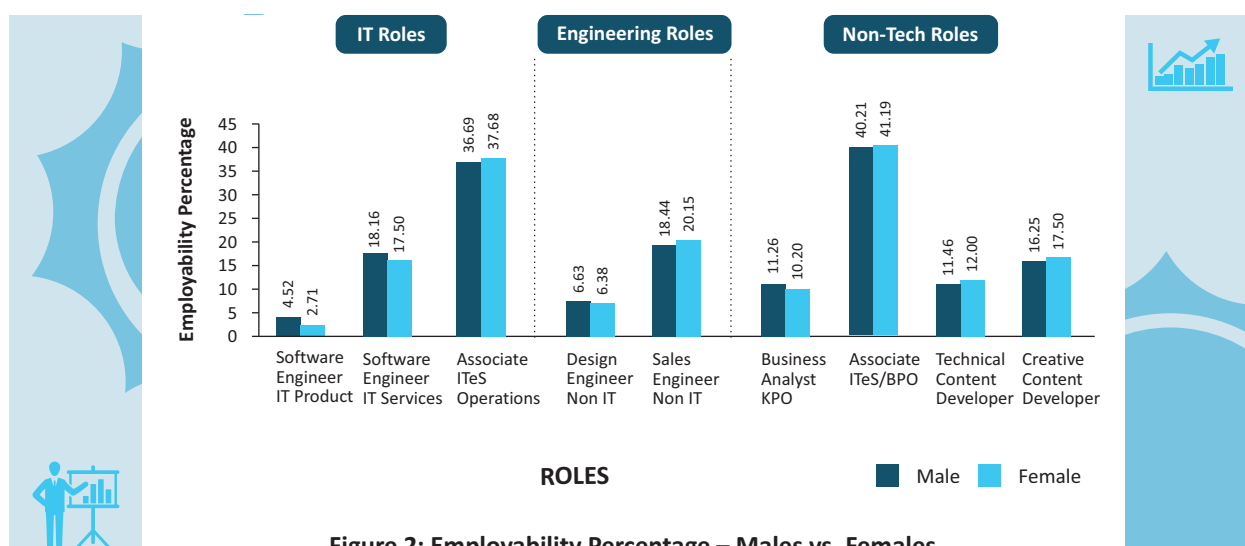


Figure 2: Employability Percentage – Males vs. Females

The analysis shows that employability for males and females is almost equal, making each role bereft of any gender-bias. This is a healthy trend and is in stark contrast with that in US as explained in Widening the Net: National Estimates of Gender Disparities in Engineering.

The reason for employability of males being slightly better than females might be attributed to their performance on cognitive skills. The following table shows the mean scores of male and female engineers on AMCAT modules which test their English comprehension skills, cognitive skills and domain knowledge. A 28-point difference is observed between the Quantitative Ability score of males and females (this figure is similar to last year's observations). Though these results show the same trends as observed globally, they need to be interpreted from a nuanced perspective, given the debate on the bias of standardized testing scores with regard to gender.

AMCAT MODULES	MALE	FEMALE	DIFFERENCE
English	479	484	-5
Quantitative Ability	495	467	28
Logical Ability	472	472	0
Computer Programming	441	424	17
Mechanical Engineering	385	389	-4
Electronics & Semiconductor	334	327	7
Telecommunications	333	329	4
Civil Engineering	359	360	-1
Electrical Engineering	414	402	12

Table 4: Average AMCAT Scores³ – Males vs. Females

3. All scores in AMCAT modules are on a scale of 100 to 900

In spite of the equal employability of males and females, the ratio of males and females in the national workforce is about 2.57⁴. This is higher in comparison to the ratio found in engineering campuses. While the MFR in IT Services companies is about 3.54 (Data Quest's Best Employer Survey 2012⁵) it ranges from 9 to 12⁶ for workforce in many core industries. This shows that fewer proportion of female engineers are employed in IT as well as core industry as compared to males with the difference being many folds higher in the core industry. The reasons for this—an analysis of which is beyond the scope of the report—could be many, such as lower proportion of females opting for a professional career; females not being comfortable with relocation; preference of males by corporations; biases in hiring processes etc.

In summary, we find that the ratio of male-to-female engineers is 1.68, which is almost 1.6 times the population ratio (1.03) but much lower than that of other countries such as United States of America (4.43). Though the employability of male and female engineers is similar, the current ratio of employed males to females in the workforce is higher than that of the engineering population.

4. http://www.telegraphindia.com/1130716/jsp/jobs/story_17120499.jsp#.UiuQSH8saSo
5. <http://www.dpindia.com/dataquest/news/121130/gender-inclusivity-key-challenge>
6. http://www.telegraphindia.com/1130716/jsp/jobs/story_17120499.jsp#.UiuQSH8saSo



EMPLOYABILITY BY REGION

By examining the employability of a region we can widen our understanding on employability and decipher the answers to certain critical questions such as: Do the demographic factors of a region influence its employability? Do certain cities exhibit very different employability patterns than their state? This section looks at employability percentages by grouping campuses (and students' permanent address) by their region, the regions being defined according to different demographic parameters. In cases where significant differences emerge, an attempt is made to understand the causes. Very likely, the observation of these differences will prompt other studies to find the causes for these differences, leading to proposals of intervention.

Herein is studied the employability by tier of city, across states and the employability variation between metros and non-metros and some key large cities.

A. Employability by Tier of Cities

It may be argued that colleges located in Tier 1 cities provide better exposure to students. They may also be the preferred destination for students who have the luxury of choice (and are hence academically superior) and probably the first choice for candidates permanently residing in Tier 1 cities. Tiers were allocated to cities according to population, with the following benchmark (Table 5):

TIER	POPULATION
1	Greater than 2.5 million
2	0.5-2.5 million
3	0-0.5 million

Table 5: Tier of Cities

For the analysis, the top 100 campuses were removed from the data set, since these have their own brand presence attracting students from across the country, and are therefore outliers in their respective cities. Most of these colleges are the IITs and NITs which source candidates through a nationwide exam.

The results of the analysis are presented in Table 6.

ROLE	TIER 1 CITIES	TIER 2 CITIES	% DECREASE (T1 to T2)	TIER 3 CITIES	% DECREASE (T2 to T3)
IT ROLES					
Software Engineer – IT Product	4.65%	3.48%	25.13%	2.31%	33.64%
Software Engineer – IT Services	18.99%	17.70%	6.77%	16.24%	8.25%
Associate – ITeS Operations	37.91%	36.70%	3.21%	36.00%	1.89%
ENGINEERING ROLES					
Design Engineer – Non IT	6.65%	6.61%	0.70%	6.32%	4.31%
Sales Engineer – Non IT	19.62%	18.82%	4.12%	18.43%	2.06%
NON-TECH ROLES					
Business Analyst – KPO	11.88%	10.88%	8.38%	8.99%	17.36%
Associate – ITeS/BPO	41.62%	39.96%	4.00%	39.48%	1.19%
Technical Content Developer	12.59%	11.79%	6.37%	9.79%	16.94%
Creative Content Developer	17.84%	16.75%	6.08%	14.64%	12.64%

Table 6: Employability Percentage across Tier 1, Tier 2 and Tier 3 Cities

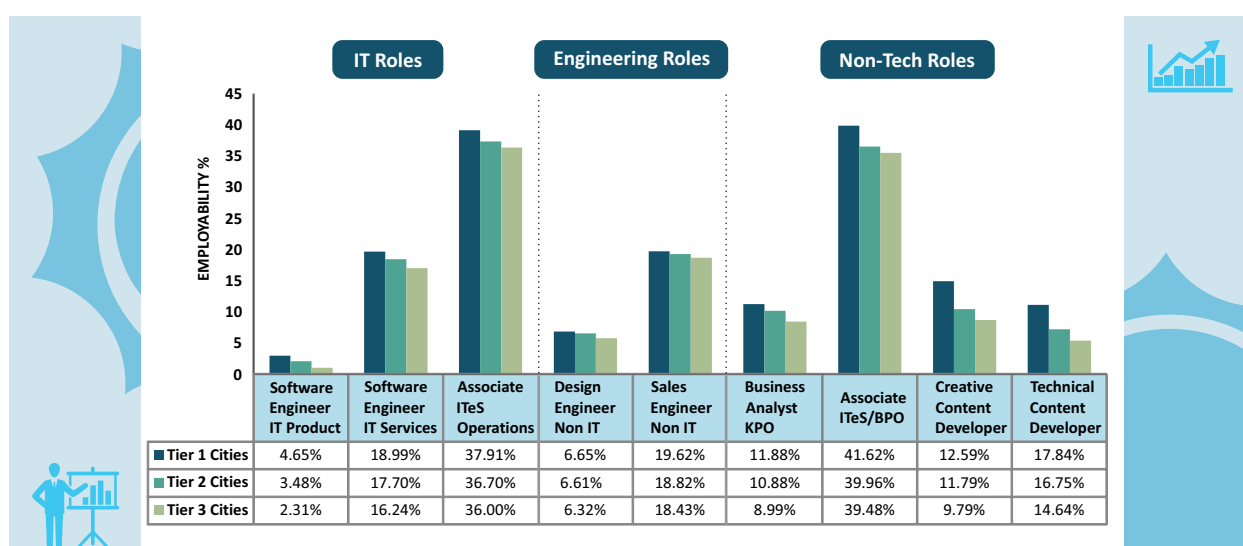


Figure 3: Employability Percentage across Tier 1, Tier 2 and Tier 3 Cities

As expected, a significant drop is observed in employability in all roles according to the tier of city of the campus location from Tier 1 to Tier 2 cities and similarly from Tier 2 to Tier 3 city of campus location. Compared to last year the employability in Tier 1 city colleges has marginally increased in all roles except Sales Engineer. The employability in different roles apart from IT Product is quite similar in absolute terms across cities. This clearly shows that Tier 3 cities cannot be neglected from a recruitment perspective. The data shows that at least one out of every six engineering colleges is in a Tier 3 city. This means that at least 17% of engineers employable in IT Services are in Tier 3 cities – an absolute number of approximately 17,500. These candidates could possibly fill up entry-level hiring needs of several IT Services companies.

AMCAT MODULES	TIER 1	TIER 2	TIER 3	DIFFERENCE BETWEEN TIER 1 & TIER 2	DIFFERENCE BETWEEN TIER 2 & TIER 3
English	487	479	468	8	11
Quantitative Ability	490	483	474	7	9
Logical Ability	475	471	468	4	3
Computer Programming	442	430	420	12	10
Mechanical Engineering	389	384	381	5	3
Electronics & Semiconductor	332	329	330	3	-1
Telecommunications	331	331	332	0	-1
Civil Engineering	359	357	361	2	-4
Electrical Engineering	413	405	415	8	-10

Table 7: Average Scores across Tier 1, Tier 2 and Tier 3 Cities

The table above shows mean scores in aptitude and domain modules across the three tiers of cities. The gap in Computer Programming is wider between tier 1 and tier 2 in comparison to tier 2 and tier 3 city students. This explains the pattern of gap in employability seen above.

The study also investigated the skills deficient among students in Tier 3 cities (see Table 7). Contrary to popular opinion, English language is not the only area with the widest gap. English along with Computer Programming make these students ineligible for employment. We find there is not much difference in the scores in other core engineering modules across cities. Given the low average scores in these modules across cities, it may be the case that none of the colleges are doing a good job in imparting these skills. The difference in English and cognitive skill modules may only be a function of the input quality of the students. When compared to the 2014 report, there is a consistent trend that the maximum gap (between tier 1 & tier 3 cities) is in computer programming, followed by English & cognitive skills and least in other domain skills.

B. Employability across States

The research looked at the employability according to states where the different engineering campuses are located. The states were placed in four bins in the decreasing order of employability i.e. the states with highest employability percentages were placed in the Top 25 percentile bin while those with lower employability percentages were placed in following bins. We also wanted to see how the results compared vis-a-vis the findings of the previous study⁷.

The observations are given in table 8

SOFTWARE ENGINEER – IT SERVICES	2016*
Top 25 Percentile	Bihar+Jharkhand Delhi Kerala Orissa
75 to 50 Percentile	Haryana Karnataka Punjab West Bengal
50 to 25 Percentile	Andhra Pradesh Chhattisgarh Uttarakhand Uttar Pradesh
Bottom 25 Percentile	Gujarat Himachal Pradesh Maharashtra Rajasthan Tamil Nadu

*States in each quartile mentioned in alphabetical order

Table 8: States categorized in 25 percentile bins basis employability in Software Engineer - IT Services role

As compared to the report of 2014, Bihar + Jharkhand and Delhi have managed to retain their positions; Punjab has fallen to the 2nd Quartile (75 to 50 percentile bin) and Uttarakhand to 3rd Quartile (50 to 25 percentile bin). Kerala and Orissa are the new entrants in the Top 25 percentile bin. Tamil Nadu continues to lurk in the bottom 25 percentile bin, given the sheer number of engineering colleges. While Karnataka and Haryana have shifted from the 3rd quartile to the 2nd Quartile (75 to 50 percentile), Maharashtra has moved two quartile down to 4th quartile.

7. National Employability Report - Engineers 2014

It may be observed, like the previous employability reports, that states with the highest number of colleges show the lowest percent employability. We find a correlation⁸ of 0.76 between the logarithm of number of colleges and the percent employability in the state. This is in sync with Arrow's hypothesis, that higher education acts as a filter and if everyone starts becoming an engineer, the percentage of employable candidates will sharply decrease.

Based on these observations, in 2014, we had recommended that there is a greater need for improvement of the quality of education in colleges rather than concentrating on building new colleges. Capacity building in engineering education with 3000+ colleges will pay a long-term dividend only if there is healthy competition leading to improvement of education. Interestingly, in the last couple of years, the same opinion has been echoed by several stakeholders. Whereas several states have requested AICTE to reject proposals⁹ for new colleges, colleges have shut down in certain areas and the media has actively championed the cause of better education rather than focusing on number of engineering colleges. In our own interactions with colleges, they show deep interest in improving employability and are adopting the idea of employability assessment from the first year onwards to identify gaps and fill them.

8. Correlation is a statistical measure that indicates the extent to which two or more variables fluctuate together

9. http://articles.timesofindia.indiatimes.com/2012-02-28/news/31107310_1_aicte-engineering-colleges-management-colleges

C. Employability in Metros vs. Non-Metros

The research brings forth the employability of candidates graduating from colleges in metro cities, in comparison to those in non-metro cities. The general view remains that colleges in metros produce more employable candidates due to better exposure and education, which explains why parents often prefer colleges in metros as opposed to others while making an admission decision. The employability figures based on the analysis are reported in Table 9:

Metro vs. non metro by college city

ROLE	METRO	NON METRO	% DECREASE FROM METRO TO NON-METRO
IT ROLES			
Software Engineer – IT Product	5.07%	3.18%	37.36%
Software Engineer – IT Services	22.95%	16.46%	28.31%
Associate – ITeS Operations	41.55%	35.76%	13.92%
ENGINEERING ROLES			
Design Engineer – Non IT	9.54%	5.76%	42.55%
Sales Engineer – Non IT	23.22%	17.88%	26.49%
NON-TECH ROLES			
Business Analyst – KPO	14.96%	9.68%	35.31%
Associate – ITeS/BPO	44.68%	39.38%	11.84%
Creative Content Developer	16.13%	10.36%	35.76%
Technical Content Developer	22.16%	15.14%	31.65%

Table 9: Employability Percentage: Metro vs. Non-Metro Colleges

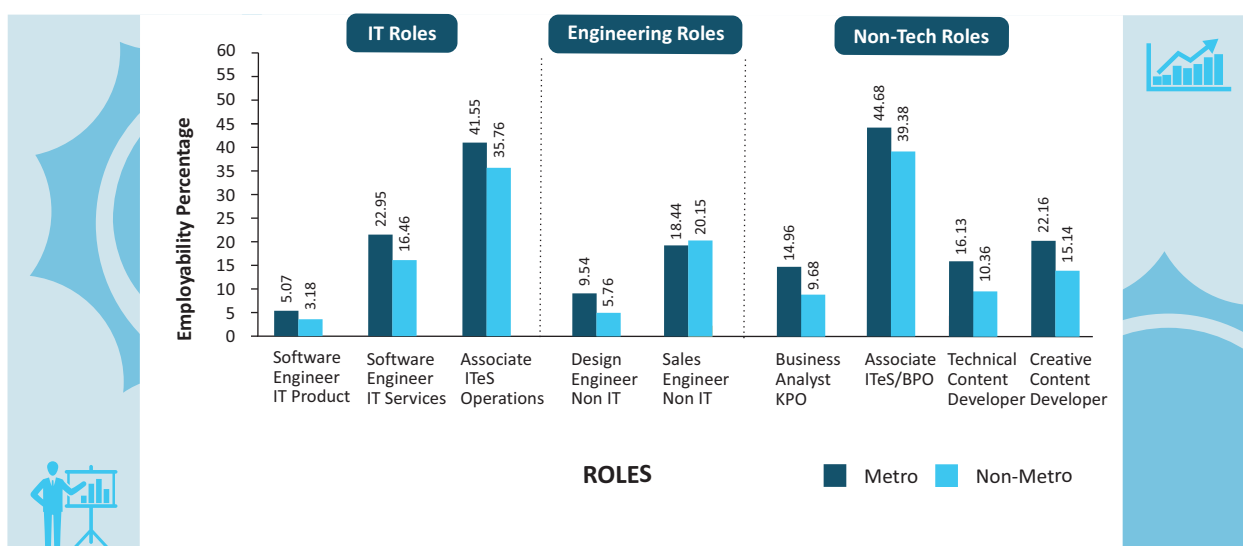


Figure 4: Employability percentage: Metro vs. Non-Metro Colleges

It may be noted that even though colleges in non-metro cities have lower employability, the difference is not too much. Only the decrease in employability in Software Engineers – IT Product, KPOs, Content developer and Design Engineer roles is much higher. We investigate the reason for this in the table below which shows the difference in mean AMCAT scores between Metros and Non-Metros.

AMCAT MODULES	METRO	NON METRO	DIFFERENCE
English	507	472	35
Quantitative Ability	501	479	22
Logical Ability	483	469	14
Computer Programming	444	429	15
Mechanical Engineering	394	383	11
Electronics & Semiconductor	336	329	7
Telecommunications	332	330	2
Civil Engineering	360	359	1
Electrical Engineering	414	410	4

Table 10: Metros vs. Non-Metros: Mean AMCAT scores by city of college

From the table we can see that students studying in Metro cities have higher scores in all modules than students studying in Non-Metro cities. We also observe that the widest gap is in English scores whereas the

gap in other modules is very less. This can be attributed to the fact that the campuses in Metros have better exposure to English. Since English comprehension and writing skills are very important for KPO, Technical and Creative Content developer roles, difference in English scores explains for the gap in employability. Strong hold on domain knowledge along with basic to advanced English are a must for those in Design Engineering roles. Employability gaps in these roles can be attributed to the differences in English scores as well as minor but existent difference in domain modules.

Metro vs. non metro by permanent residence

ROLE	METRO	NON METRO	% DECREASE FROM METRO TO NON-METRO
IT ROLES			
Software Engineer – IT Product	4.80%	3.32%	30.85%
Software Engineer – IT Services	23.80%	16.45%	30.87%
Associate – ITeS Operations	42.96%	35.59%	17.16%
ENGINEERING ROLES			
Design Engineer – Non IT	9.58%	5.91%	38.35%
Sales Engineer – Non IT	22.70%	18.18%	19.94%
NON-TECH ROLES			
Business Analyst – KPO	15.86%	9.62%	39.34%
Associate – ITeS/BPO	46.29%	39.15%	15.42%
Creative Content Developer	16.99%	10.33%	39.17%
Technical Content Developer	24.01%	14.90%	37.95%

Table 11: Metros vs. Non-Metros: Employability by city of permanent residence

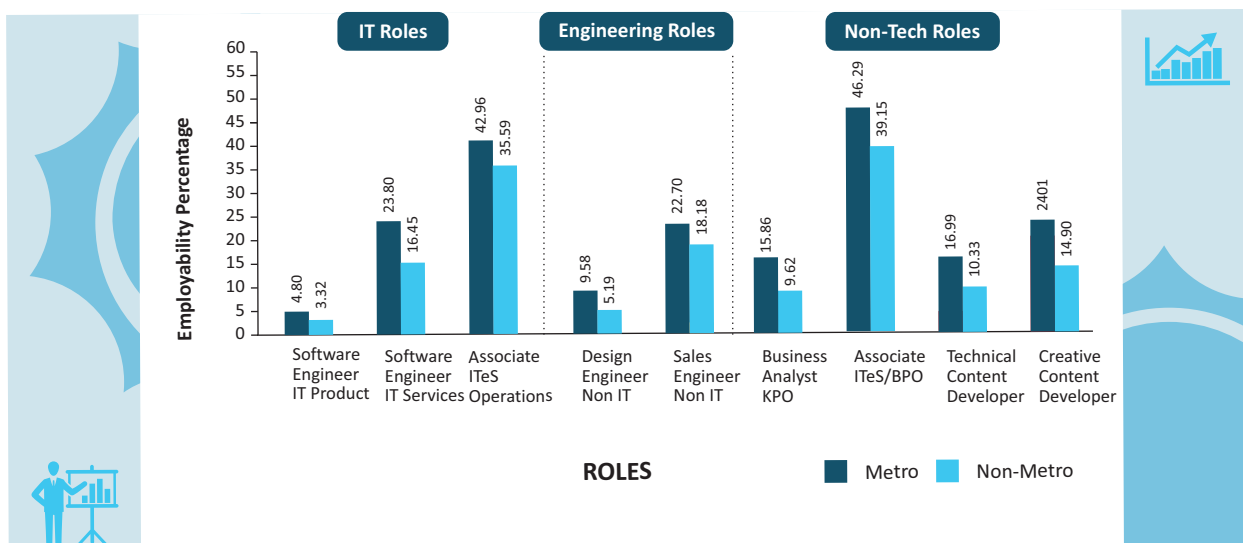


Figure 5: Metros vs. Non-Metros: Employability by city of permanent residence

When the average AMCAT scores of candidates with permanent residence in metros and non-metros was compared (see Table 12), the trends came out to be quite similar as that of candidates with college location in metros and non-metros. There is an appreciable gap in employability for all roles except ITes roles and Sales Engineers. On looking at the mean scores in the table below, it can be seen that difference in English, Cognitive skills and Computer programming modules has also gone up.

AMCAT MODULES	METRO	NON METRO	DIFFERENCE
English	520	472	48
Quantitative Ability	499	481	18
Logical Ability	485	470	15
Computer Programming	444	430	14
Mechanical Engineering	392	384	8
Electronics & Semiconductor	335	329	6
Telecommunications	334	330	4
Civil Engineering	362	359	3
Electrical Engineering	413	411	2

Table 12: Metros vs. Non-Metros: Mean AMCAT scores by city of permanent residence

There are two potential hypotheses to explain this. Firstly, candidates born and brought up in metros have better exposure to computers and in particular, computer programming. Thus, they are more employable than their non-metro counterparts. If the colleges were imparting computer programming education adequately, this gap due to intake impact should have narrowed. Secondly, English language skills are very important for KPOs and Content Developers. Candidates born and brought up in metros seem to acquire better English skills due to day-to-day exposure to a larger English speaking population. This clearly shows that students coming from non-metros are at a disadvantage to a certain extent.

D. Employability in Key Cities

The study also compared employability within students graduating out of different metro cities in the country. The results are reported in Figure 6.

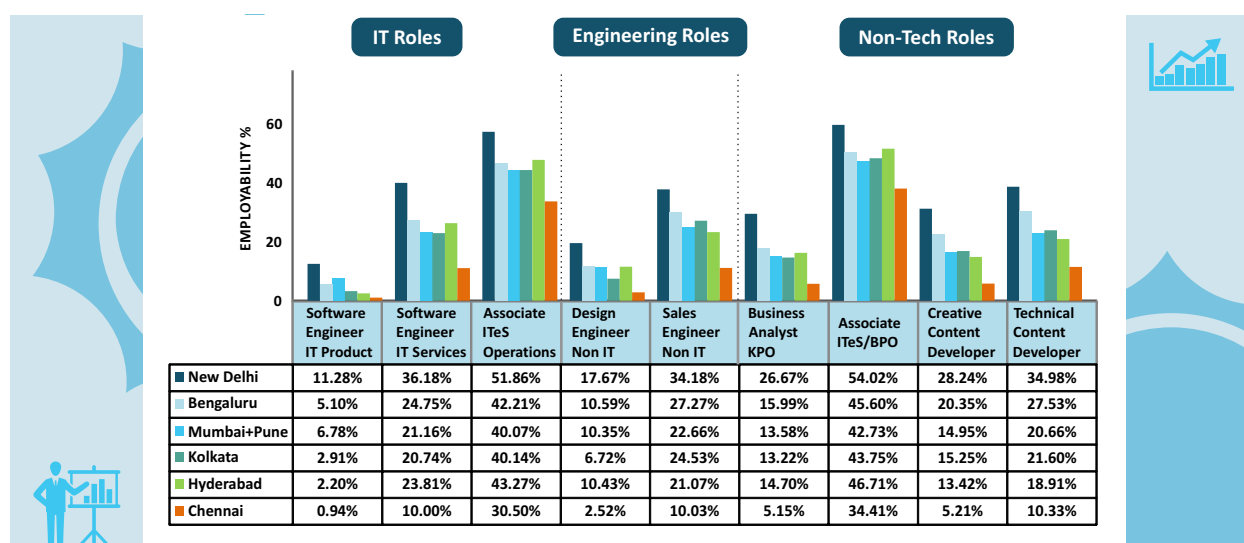


Figure 6: Employability Percentage in different Metro cities

The following observations are made:

The trends are similar to those with regard to employability in states. Delhi (North) shows the highest employability, followed by Bengaluru and cities in the West. The lowest employability figures were observed among colleges in Southern cities. The skew in employability is quite high, for instance, the IT product employability in Delhi is as high as 1 in every 8 candidates and as low as 1 in every 100 in Chennai. Even though Mumbai + Pune have similar IT services employability as compared to other Southern and Western cities, the city shows much higher employability for IT product companies. This indicates that candidates in Mumbai + Pune do much better at computer programming and algorithms, even though they show similar English and cognitive skills. This could be due to better exposure to computer programming either at home, schools or colleges.

The reason for this skew in employability is explained again by the trend in number of colleges in each of these cities (see Table 13). The proliferation of engineering colleges in Southern and Western India has brought down the employability figures. In comparison, there are far fewer engineering colleges in Delhi. This is despite the fact that Delhi's population is much more than Southern cities, compared to that of Mumbai (see Table 13).

City	APPROXIMATE NUMBER OF COLLEGES	POPULATION
Bengaluru	80	5,438,065
Chennai (including Thiruvallur)	87	4,616,639
Delhi	35	12,565,901
Hyderabad	90	4,068,611
Kolkata	58	5,138,208
Mumbai and Pune	151	17,277,214

Table 13: Number of colleges and population in major cities

In summary, the study found that employability trends show significant variation with respect to the location of the campus. The employability gap was found to be substantial between Tier of college cities (classified by population). The major gap in skills was observed in computer programming skill rather than logical reasoning and command over English language. With regard to employability percent in different states, it was found that employability decreases logarithmically with the number of colleges in the state (in sync with Arrow's hypothesis). Also, whereas there was no appreciable difference in employability of students coming out of colleges in metros and non-metros, there was a significant difference between employability of candidates living in metros versus the rest. This clearly shows that candidates who have spent a significant part of their lives in metros gain better exposure to English and computer education, helping them become more employable.

The key learning of this study is that we need to emphasize more on quality than number of colleges.



EMPLOYABILITY VARIANCE IN CAMPUSES

Across more than 3000 engineering campuses in India, the employability varies dramatically. This can be accredited to the synergic effect of multiple parameters viz. the quality of intake, education, infrastructure, location and the likes. Understanding this employability variance, its intensity and causes is of extreme importance. The following detailed analysis throws light on this realm.

A. Employability in top-tier campuses vs. the rest

Using the campus-rankings provided by various credible public surveys, we analyzed the employability on engineering campuses in India and segregated the top 100 campuses from the rest. The following tables present the comparative analysis of the employability for Top 100 colleges versus the rest.

ROLE	TOP 100 COLLEGES	REST OF THE COLLEGES
IT ROLES		
Software Engineer – IT Product	20.23%	3.34%
Software Engineer – IT Services	40.98%	17.40%
Associate – ITes Operations	52.68%	36.72%
ENGINEERING ROLES		
Design Engineer – Non IT	25.41%	6.08%
Sales Engineer – Non IT	38.85%	18.64%
NON-TECH ROLES		
Business Analyst – KPO	31.12%	10.42%
Associate – ITes/BPO	54.11%	40.27%
Creative Content Developer	34.92%	11.14%
Technical Content Developer	40.75%	16.19%

Table 14: Employability Percentage-Top 100 Colleges vs. Rest

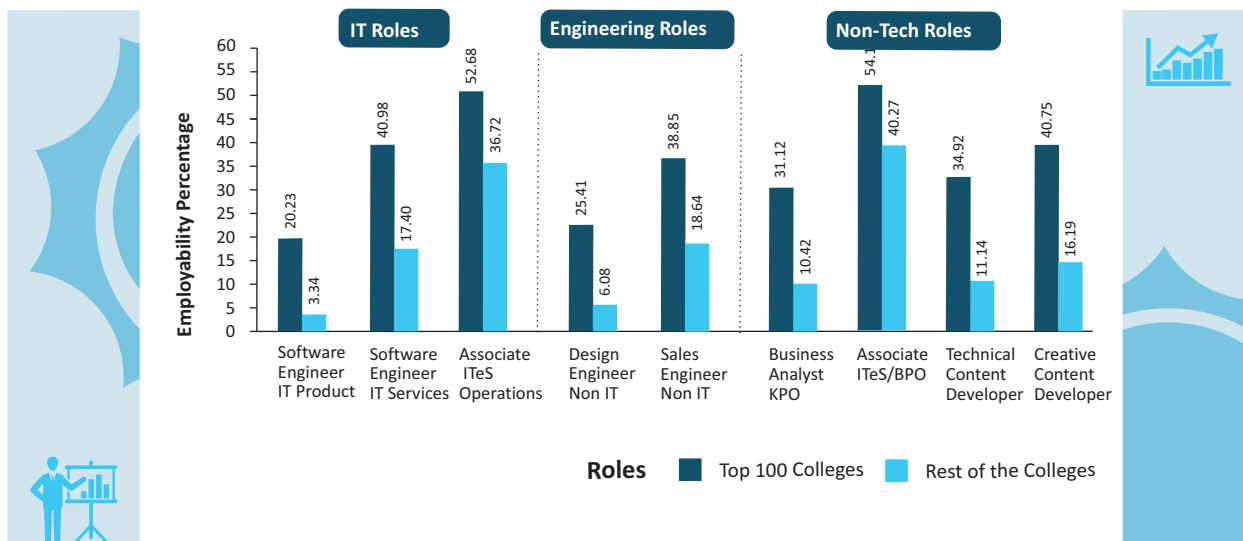


Figure 7: Employability percentage: Top 100 colleges vs. Rest

The following trends were observed:

i) The maximum drop in employability figures for Top 100 campuses vs. the rest has been observed in the following sectors: IT Product (six times) followed by Design Engineer (four times), Business Analyst (three times) and Technical Content Developer (three times), while the minimal difference is observed for Associate – ITes/BPO.

ii) Given that the ratio of the number of top 100 campuses to the rest is almost 1 is to 10, one can conservatively estimate that more than 70% of the employable engineers for the IT product role and more than 80% for IT services and KPO, are in the so-called Tier 2 campuses. According to current trends, IT product and KPO companies do not source candidates from Tier 2 campuses which creates a large artificial dip in the supply of eligible candidates. This is in line with what was reported in the 2011 and 2014 National Employability Reports for engineers by Aspiring Minds¹⁰.

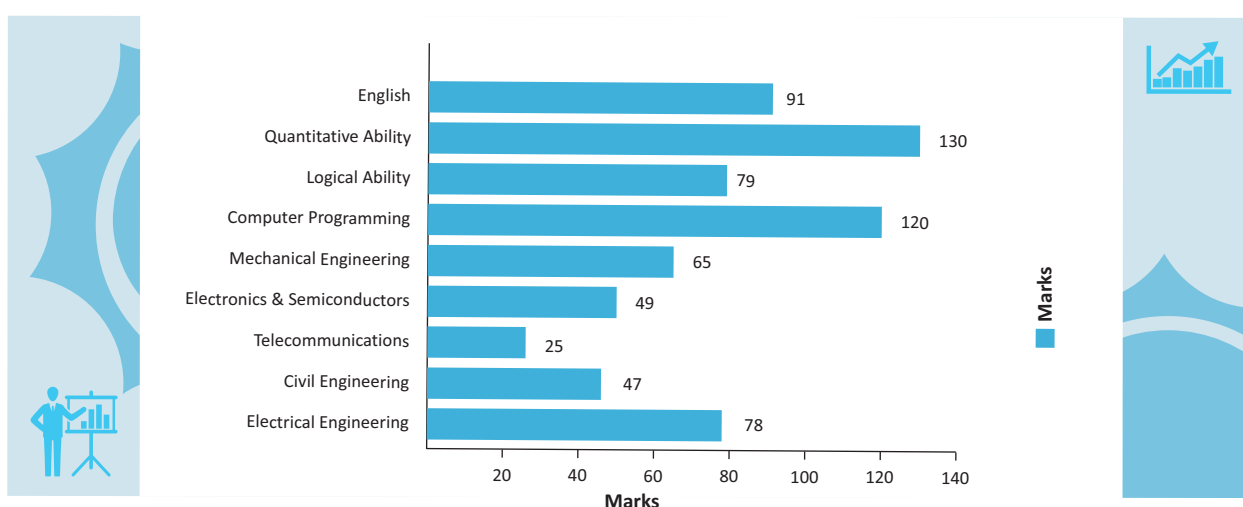


Figure 8: Skill Gap: Top 100 vs. Other Campuses

10. National Employability Report (Aspiring Minds), 2011; National Employability Report Engineers 2014

The study also investigated what skills are lacking in students of Tier 2 campuses (see Figure above). There is a gap of 91, 79 and 120 marks in English Communication, Logical Ability and Computer Programming, respectively, whereas the gap in Quantitative ability is 130 marks. In other domains like Civil, Electrical, Mechanical and Electronic the difference is around 25-80 marks. This clearly shows that maximum effort is required to hone mathematical skills of the students, whereas consistent effort is needed in other areas as well. These results are congruous to last year's observations.

B. Employability Variance across Colleges

In this section, we study the distributional properties of employability across colleges.

IT Services

The employability of each college for the IT services industry was determined and arranged in order of its rank (See figure 9).

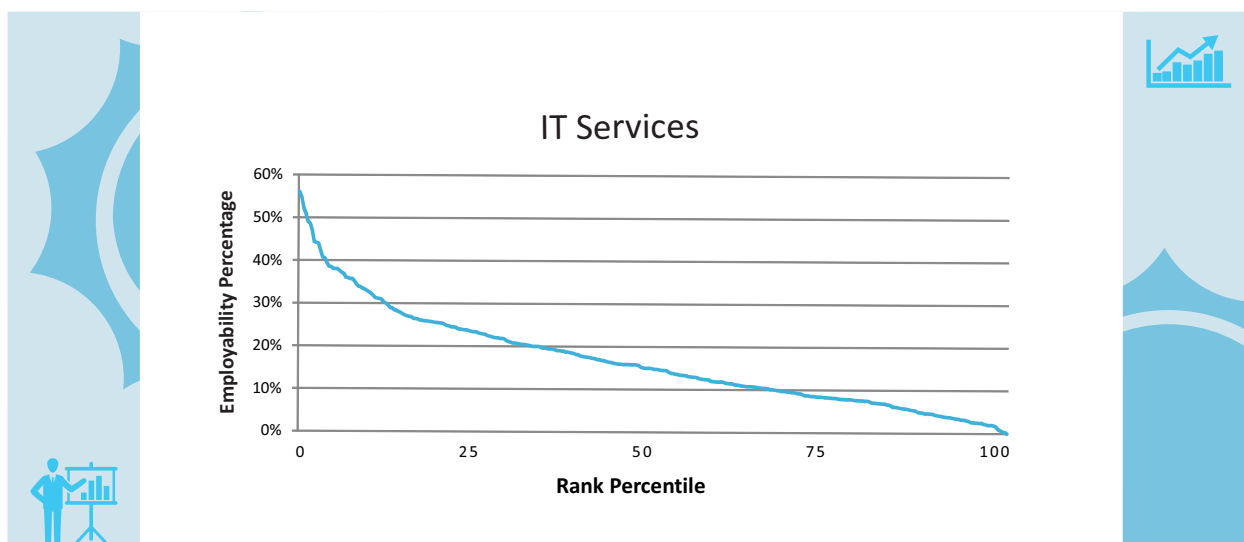


Figure 9: Employability Percentage of Students across Colleges for IT Services Companies

The following observations can be made:

The best of colleges have employability only as high as 56% whereas the bottom 30 percentile colleges have employability of less than 10%. Approximately, 40% colleges have employability more than the average figure of 17.91%, whereas the majority (60% colleges) have it close to or lower than 17.91%. This clearly shows that there are only a handful of colleges with very high employability followed by a high number of colleges with very low employability. Thus, even though the mean employability is ~18%, the median employability is much lower.

Some simple calculations show that average employability in colleges in the top 30 percentile (around 750 colleges) is 29%, whereas it is around 12% for the rest of the colleges. This implies that almost an equal number of employable candidates are there in the top 750 campuses as compared to the rest. Considering that no IT company in India has a campus recruitment program beyond the top 750 campuses, almost half of the employable pool i.e., around 60,000 employable candidates in the country are invisible to recruiters.

IT Product

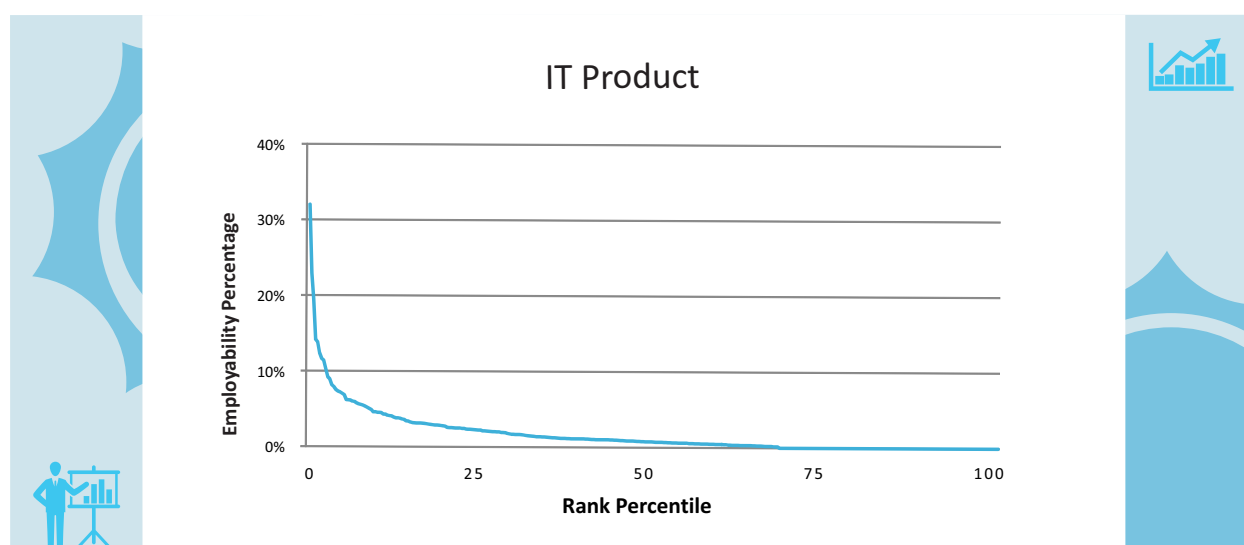


Figure 10: Employability Percentage of Students across Colleges for IT Product Companies

The best of colleges have employability as high as 32%, whereas the bottom 45 percentile colleges languish at less than 1%. This figure degrades to zero employable candidates for the bottom 20 percentile colleges. Around 15% colleges have employability more than the average figure of 3.67%, whereas the majority (75%) colleges have it close to or lower than the average figure.

	TOP 30 PERCENTILE CAMPUSES (750)	REST OF THE CAMPUSES (2250)
IT Services Employability	29.26%	11.95%
Percent Employable Pool	59%	41%
IT Product Employability	3.98%	0.53%
Percent Employable Pool	82%	18%

Table 15: Top 30 percentile campuses vs. the rest

The following conclusions are drawn:

One may observe that employability falls drastically towards the beginning and more gracefully towards the middle. This clearly shows that there are certain colleges which have excellent employability; however, other colleges even with close ranking show a drastic drop in employability. This is in line with the perception that certain colleges, such as the IITs and state-run colleges, are much better than others, which may be ranked just as highly. This is not a healthy trend, implying that deserving students in the other colleges find themselves cut off from better opportunities.

To further analyze this hypothesis, the study looked at the employability for the IT product role. One would expect to see a steeper trend, since IT Product employability is more strongly influenced by college education quality (rather than just intake) as compared to employability for IT Services companies. The variation is shown in Figure 10.

One can observe that IT product employability falls to less than 10% at Rank 10, down from 32% at Rank 1, which is a fall of three times. On the other hand, for IT Services companies, this fall was only around 1.5 times. Similar trends continue throughout the graph and confirm the hypothesis that the quality of education falls steeply as one goes down the list of the so-called top colleges, with close neighbors having substantial differences in quality.

In summary, the study found that the ratio of employability in top 100 colleges versus the rest is between two to six times depending on the role. In spite of this, more than 70% of employable candidates for any role are in campuses other than the top 100. With regard to employability distribution among campuses, the quality of education falls steeply among the top-ranked colleges which implies that colleges that are neighbors in rank have a very different quality of education. There are a large number of colleges with exceptionally low employability: bottom 32 percentile campuses have less than 1 in 100 candidates employable in the IT Product role and the bottom 20 percentile campuses have no candidate employable in the IT product role. Finally, we find that almost 41% of employable candidates for IT Services companies and 18% of employable candidates for IT Product companies are enrolled in campuses ranked beyond the top 750, thus forming an invisible pool to most employers in India.



Job Aspirations of Engineers

After studying the employability trends of engineers across roles and sectors, we will now delve in to aspirations of engineers in terms of the job function, type of company, sector and compensation strived for by engineers. We devised a scientific survey to understand the kind of jobs students look forward to, the roles, type of company and compensation. The survey was conducted on a stratified sample of 27,000 engineering students across India who graduated in 2015 during May 2015 to July 2015. We further investigated how job aspirations of students change with their branch of study, gender and tier of city among others and came up with following set of interesting inferences.

Brief explanation of classifications used in the sections below:

Branch of Study:

- Computer/IT includes engineers in Computer Science & IT branches
- Circuit Branches include Electronics Engineering, Electrical Engineering, and Instrumentation Engineering
- Core Engineering includes other branches like Mechanical Engineering, Civil Engineering etc

Tier of City

Tiers were allocated to cities, where the colleges were located, according to their population with the following benchmark:

TIER	POPULATION
1	Greater than 2.5 million
2	0.5-2.5 million
3	0-0.5 million

Table 16: Tier of Cities

Tier of College

All the colleges were ranked basis the employability of their students. Those in the top 33 percentile were considered as tier 1 colleges, those in mid 33 percentile range were considered as tier 2 colleges while those in the bottom 33 percentile set were taken as tier 3 colleges.

A. Type of company

Here we asked students about their top preference among a large company, an SME (less than 100 employees) and a startup.

2015 Batch Engineers

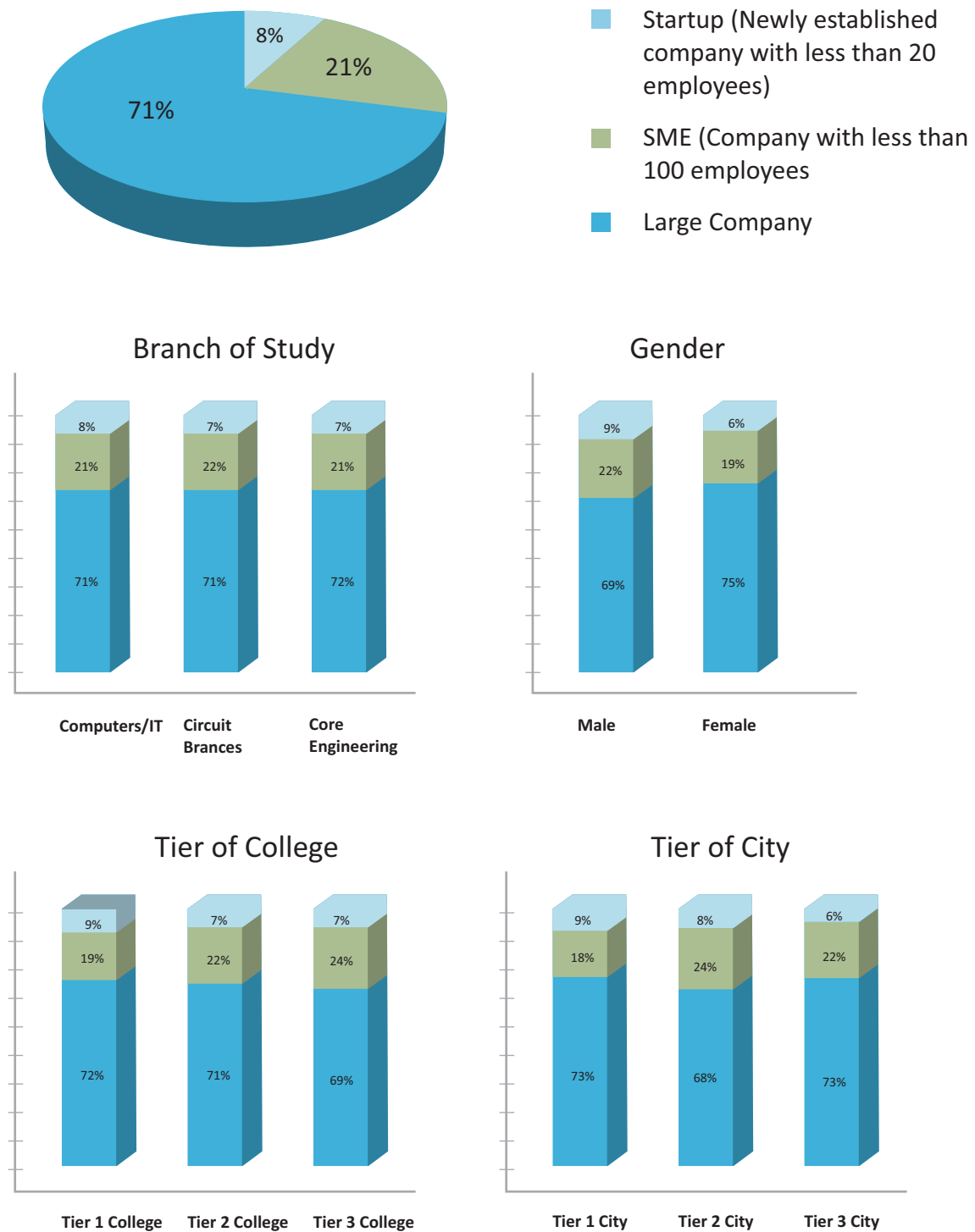


Figure 11: Preference among a large company, an SME and a startup

Observation

In comparison to last year, the aspirations of engineers to work for a large company has increased by 14%. A slight increase is also observed in the inclination of students towards startup jobs relative to last year. Given this evident trend and the rapidly blooming startup ecosystem in the country, the aspirations of engineers to work for startups is bound to increase.

By Branch of Study: The aspirations of engineers across all three branches of study are similar. Irrespective of the branch of study, maximum engineers opt for a job with a large company while a small but appreciable set of engineers opt for jobs with startups.

By Gender: Females strive to work for a large company more than their male counterparts while an opposite trend is observed for SMEs and startups wherein inclination of males is strikingly higher than that of females.

By Tier of College: Similar to last year's observations, we find that students from lower tier institutions are less interested to work in larger companies. This is mostly because they believe that while getting a job in a large company would be difficult, the probability to get the job at an SME is fairly high. On the other hand, the tier 1 college students show maximum inclination towards startup jobs.

By Tier of City: One finds that students from tier 2 cities want to work for large companies less often than others while students from tier 1 are most motivated to work for a startup.

B. Role Aspirations

We asked the students what is their top preference in the kind of job role: Software Development, Core engineering jobs (like mechanical, electrical, electronics or civil engineer) and management related jobs.

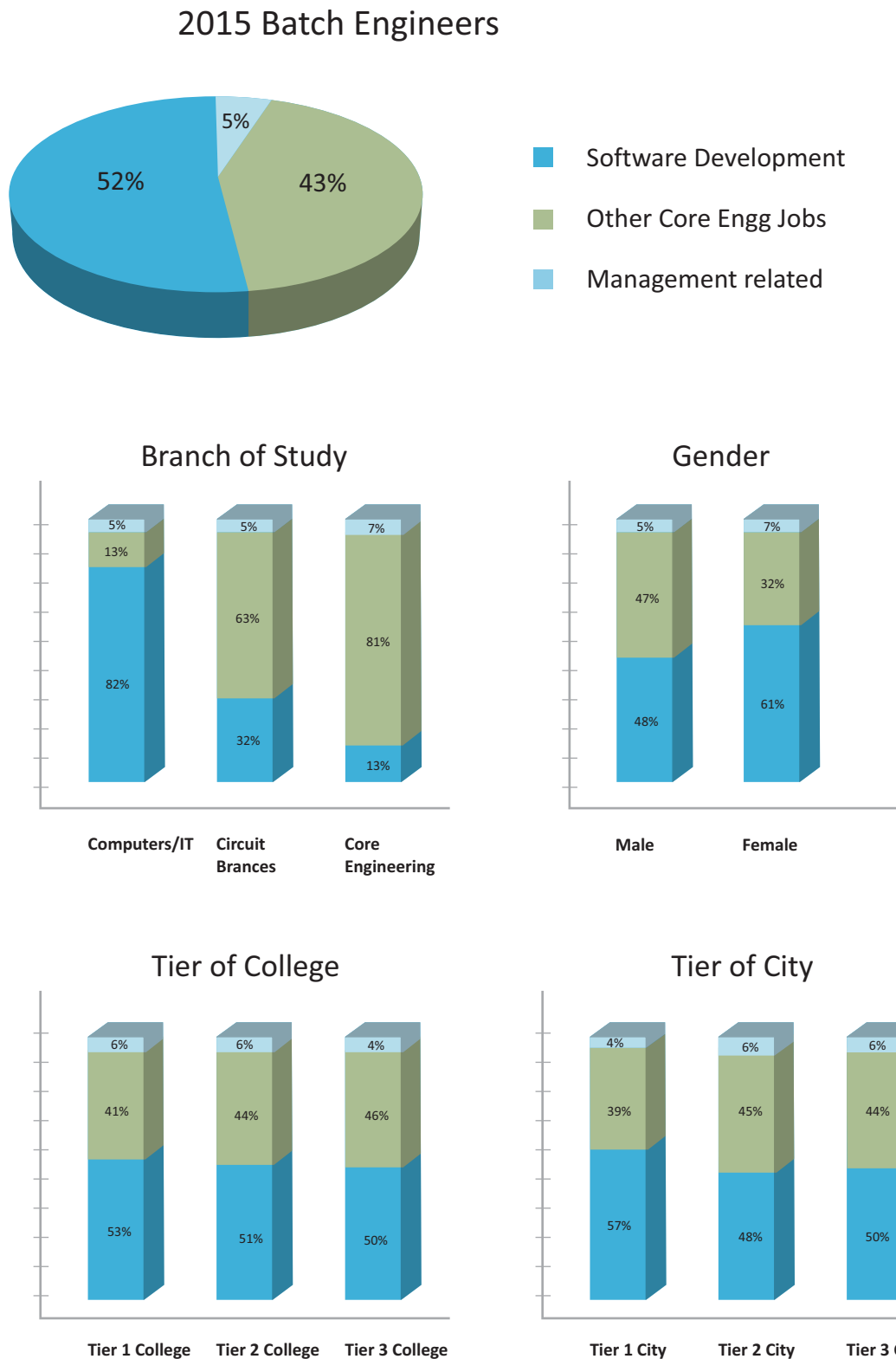


Figure 12: Job-role preference among Software Development, Core engineering jobs (like mechanical, electrical, electronics or civil engineer) and management related jobs

Observation

More than fifty percent of engineers seek software jobs followed by core engineering jobs. Despite of the mushrooming job opportunities in managerial roles like technical sales, marketing and content development, engineers do not seem to prefer these jobs as yet.

By Branch of Study: Students with Computer/IT background are mostly interested in software jobs while students with core engineering and circuit branches prefer core engineering jobs. This aspiration fails to appear rosy as the employment statistics for core engineering jobs are grim.

By Gender: While females are more inclined towards software developer roles and managerial roles; males seek core engineering roles. This trend is in-line with last year's observations.

By Tier of College: Students from tier 1 institutions opt for software development roles more than other tiers. Whereas core engineering roles are preferred more by students from lower tier 1 colleges. Likewise for management related roles, students from tier 1 colleges show maximum inclination.

By Tier of City: Engineers from tier 1 city aspire for software development roles more than those from tier 2 and tier 3 cities. Interestingly, students from lower tier cities aspire for management related roles more than the students from tier 1 cities.

C. Salary Aspirations

We asked the students what is the salary they expect to get.

EXPECTED SALARY (INR '000)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM
2015 Batch Engineers	340	124	1800	100

Table 17: Salary expectation of students

I. By Branch of Study

EXPECTED SALARY (INR '000)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM
Computer/IT	344	125	1800	120
Circuit Branches	333	114	1800	120
Core Engineering	352	146	1500	100

Table 18: Salary expectation of students of different branches

Observation:

Consonant with last year's inferences, core branch engineers aspire for a higher salary than other engineers. Though this is not in-line with market trends as it is well known that Software Development jobs are the ones that command the highest pay.

II. By Gender

EXPECTED SALARY (INR '000)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM
Male	341	128	1800	100
Female	339	114	1800	100

Table 19: Salary expectations of males and females

Observation:

On an average, females aspire for a slightly less salary than males do. This shows females are less ambitious, as congruous to other studies in the world¹¹. It is also in contrast to our finding that females on an average get lower salaries.

11. <http://www.telegraph.co.uk/women/womens-business/10116221/Female-grads-expect-to-earn-less-than-men-prompting-concerns-they-are-less-ambitious.html>

III. By Tier of College

EXPECTED SALARY (INR '000)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM
Tier 1	360	140	1800	100
Tier 2	334	110	1800	100
Tier 3	313	098	1000	120

Table 20: Salary expectations of students of different tier of colleges

Observations:

- Engineers from tier 1 colleges aspire for a much higher salary in comparison to tier 2 and tier 3 college engineers.
- This is in-line with our observation on role aspirations wherein tier 3 students don't opt for large companies simply because they think they won't make it. They limit their salary aspirations likewise and don't aspire for a good pay.

IV. By Tier of City

EXPECTED SALARY (INR '000)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM
Tier 1	335	130	1800	100
Tier 2	347	127	1800	120
Tier 3	337	106	1000	100

Table 21: Salary expectations of students of different tier of cities

Observation:

- Mean salary which engineers from tier 1 and tier 2 cities aspire for are relatively similar while it is lower for those from tier 3 cities.



Employability vs. Employment

Despite of a good percentage of engineers being employable, only a fraction of the lot is actually employed. Our last two editions of National Employability Report have successfully thrown light on the abyss between employability and employment of engineers. On similar lines, we have analyzed this variance for the 2015 batch of engineers who had taken AMCAT¹² during their final year.

The analysis has been done on a sample of 27,000 engineering students across India with a good mix of engineers from different tiers of colleges, tiers of cities, metros/non-metros, engineering disciplines and other demographic schisms. A questionnaire pivoted around parameters affecting employment outcomes of engineers was designed and rolled out to this sample during May-June'15, at a time when bulk of entry-level employment had taken place.

A significant part of this analysis revolves around examining the percentage of engineers at various stages of the selection process beginning from getting an interview opportunity to finally getting the job in-hand. We thereafter study the gaps across the stages and try to see them across the prism of demographics like branch of study, gender, tier of college and tier of city of the candidate.

A. Employability vs. Employment Outcome

	Employable ¹³	Got an Interview Opportunity	Reached Final Round	Employed	Average Salary (INR '000)
Engineers	19.11%	72.64%	51.66%	19.91%	313

Table 22: Employability vs. Employment Outcomes

Observation:

- A total of 19.91% engineers get employed despite of only 19.11 % engineers being employable.
- About 27% of the engineers did not even get an interview opportunity and this figure increases for the percentage of engineers who could make it to the final round.

12. <https://www.myamcat.com/engineer/>

13. Employable here refers to the percentage of surveyed candidates who are employable in the Software Engineer-IT Services role. Employability in IT Services was chosen as the employability criteria as Large IT Services companies hire engineers for this role from all branches and hence, all engineers qualify to be placed under this category.

B. By Branch of Study

Branch of Study	Employable	Got an Interview Opportunity	Reached Final Round	Employed	Average Salary (INR '000)
Computer/IT	18.37%	75.27%	53.83%	22.38%	308
Circuit Branches	19.53%	71.83%	51.03%	18.35%	308
Core Engineering	20.00%	67.86%	47.62%	17.26%	341

Table 23: Branch-wise Employability vs. Employment outcomes

Observation:

- The employability of engineers from all branches is similar and so is the corresponding average salary for the three branches. The slight increase towards the higher side in employable and average salary figures for Core Engineering branch might be a function of a lesser sample size (relative to sample size for the other two branches).
- Despite similar employability of engineers from all the branches, computer/IT engineers get hired the most.
- The percentage of engineers getting an interview opportunity, reaching the final round and finally being employed is the highest for engineers from Computers/IT background, followed by Circuit branches.

C. By Gender

Gender	Employable	Got an Interview Opportunity	Reached Final Round	Employed	Average Salary (INR '000)
Male	18.74%	71.02%	51.17%	20.00%	318
Female	19.97%	76.40%	51.17%	19.69%	303

Table 24: Gender-wise Employability vs. Employment outcomes

Observation:

- Males and females are equally employable and have similar employed percentages though the hiring practices seem to be skewed in favor of females as the percentage of females getting an interview opportunity and reaching the final round is more than that for males.
- The average salary figures for males are slightly better than those calculated for females. This trend is in-line with last year's analysis.

D. By Tier of College

Tier of College	Employable	Got an Interview Opportunity	Reached Final Round	Employed	Average Salary (INR '000)
Tier 1	24.57%	75.60%	56.79%	24.29%	337
Tier 2	16.24%	71.91%	49.34%	16.74%	302
Tier 3	13.06%	68.06%	45.37%	16.44%	277

Table 25: College tier-wise Employability vs. Employment outcomes

Observation:

- There is an evident difference between the percentage of students found employable across the tiers of colleges. A difference of about 8% is observed in the employability percentage of tier 1 and tier 2 colleges. The employability gap increases furthermore when tier 1 colleges are compared with tier 3 colleges. A similar trend is observed for percentage of students employed across the tiers of colleges.
- The average salaries too vary considerably within tier 1 and tier 2 colleges. In terms of employment, similar job outcomes are seen for tier 2 and tier 3 colleges even with such distinct employability. One hypothesis for this could be that companies can't distinguish between tier 2 and tier 3 colleges. This makes sense also because there is no ranking beyond top 100 colleges. Thus, the largest sufferers here seem to be the tier 2 colleges.

E. By Tier of City

Tier of City	Employable	Got an Interview Opportunity	Reached Final Round	Employed	Average Salary (INR '000)
Tier 1	19.95%	74.85%	53.62%	21.23%	321
Tier 2	18.70%	72.10%	51.98%	19.26%	308
Tier 3	18.22%	69.41%	47.49%	18.49%	308

Table 26: Employability vs. Employment outcomes as per tier of city

Observation:

- While the difference in employability between tier 1 and tier 2 city students is slightly more than 1%, the difference in percentage of candidates actually employed is about 2%. It is anomalous that Tier 2 has a higher percentage of candidates actually employed.
- A higher percentage of tier 1 city candidates got an interview opportunity in comparison to the rest. This is because the number of opportunities available in tier 1 city is higher in general.
- Now, if we compare tier 3 city students with those from tier 1, we can see that the difference in employability is about 2% while the difference in percentage of candidates who actually got a job is 3%
- Broadly, we can conclude that the tier of city does not cause much bias in the hiring process.

A. Employability variance across campuses

I. ITeS/BPO

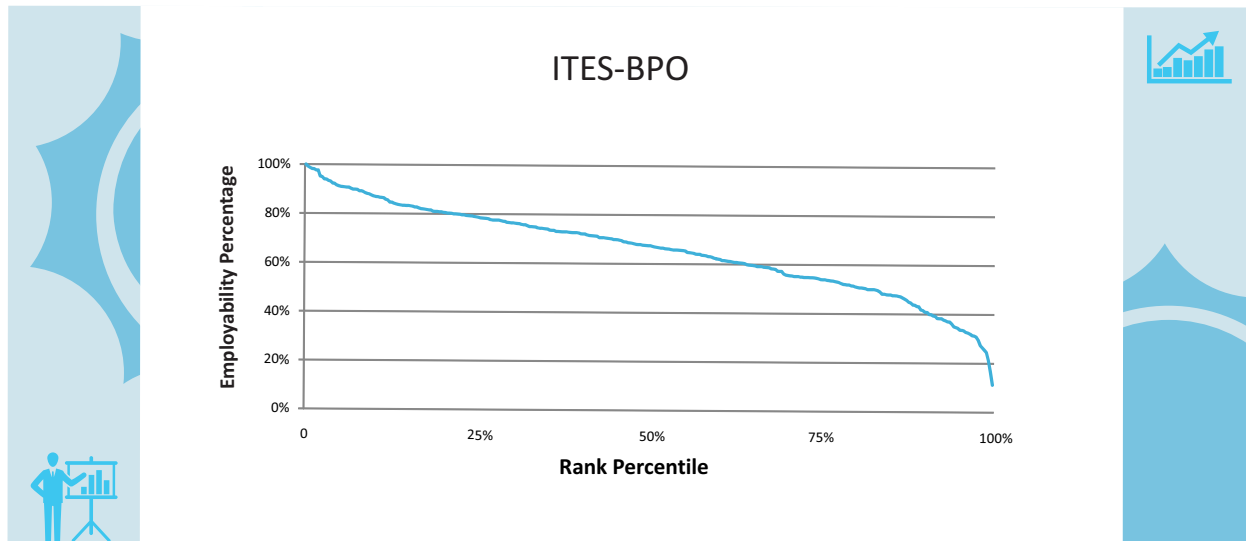


Figure 13: Employability variance in the ITeS/BPO sector

- The best colleges have employability as high as 99% and the bottom 20 percentile colleges have employability as low as 40%, more than 5 times lower than the top percentile colleges.
- About 10% colleges have employability lower than the average employability of 40.57%.

II. Business Analyst

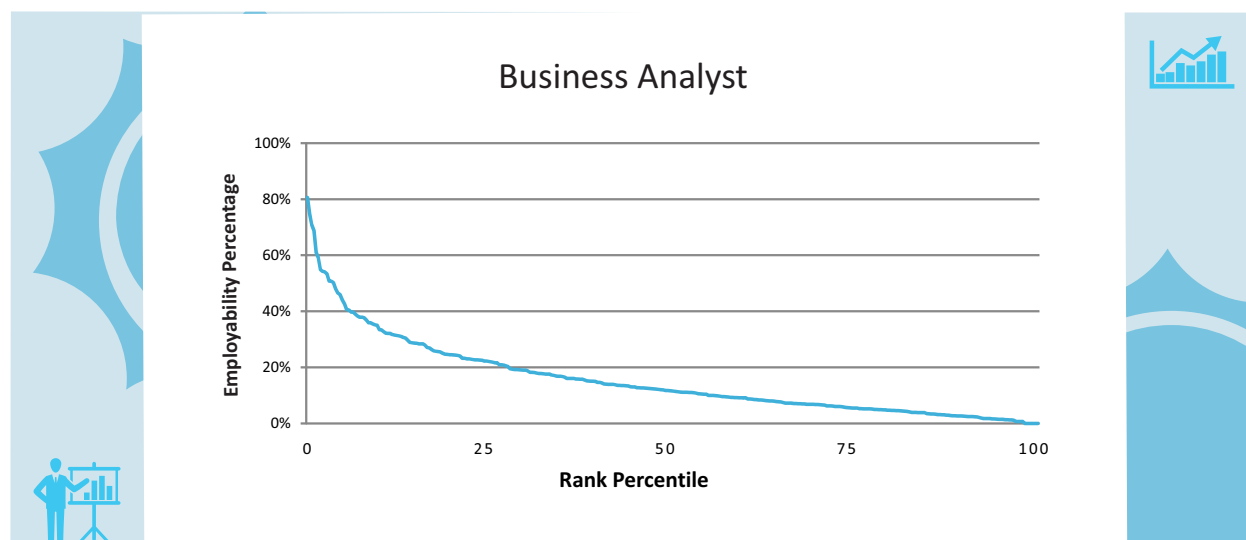


Figure 14: Employability variance for the role of Business Analyst

- The top colleges have employability as high as 81% whereas the bottom percentile colleges have it as low as 1-2% with some colleges recording 0% employability as well.
- It is disheartening to see is that almost 45% colleges have employability lower than the average employability figure of 10.86%.
- The curve clearly shows the drastic drop in employability as we move from top ranked colleges towards the bottom ranked colleges, highlighting the employability variance among the campuses.

III. Design Engineer

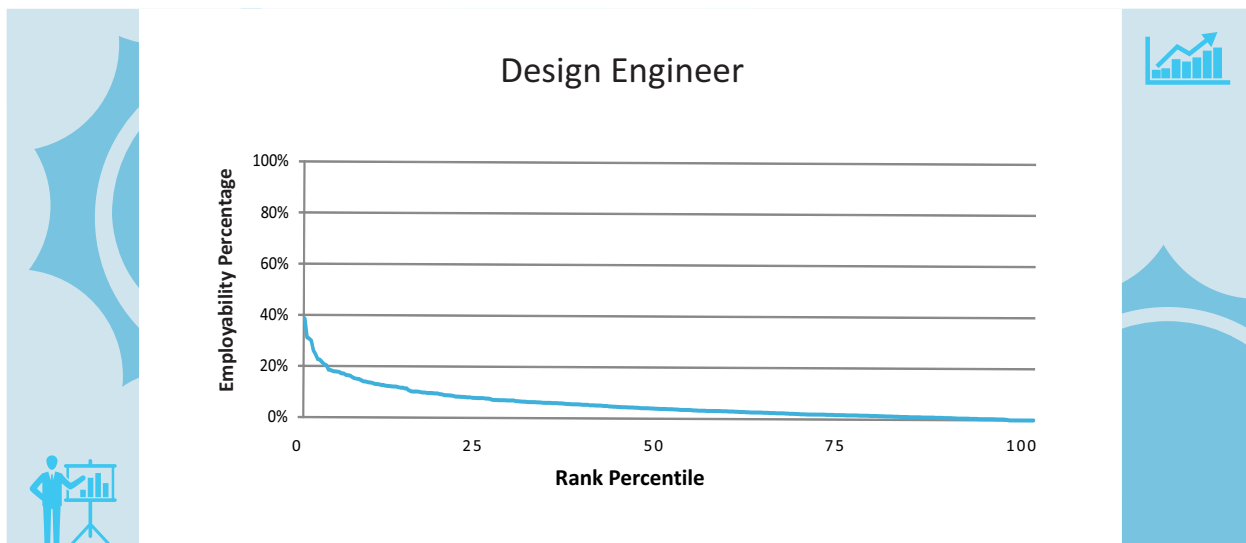


Figure 15: Employability variance for the role of Design Engineer

- The top percentile colleges have employability figures ranging between 30-39% whereas a major chunk of the bottom ranked colleges have employability figures of less than 2% with many colleges having 0% employability.
- The steepness of the curve is indicative of how varied the employability figures are among the various engineering campuses.
- The average employability is a dismal 6.56%, however, what is even more shocking and disheartening is that more than 70% of the campuses are below this average employability mark.

IV. Sales Engineer

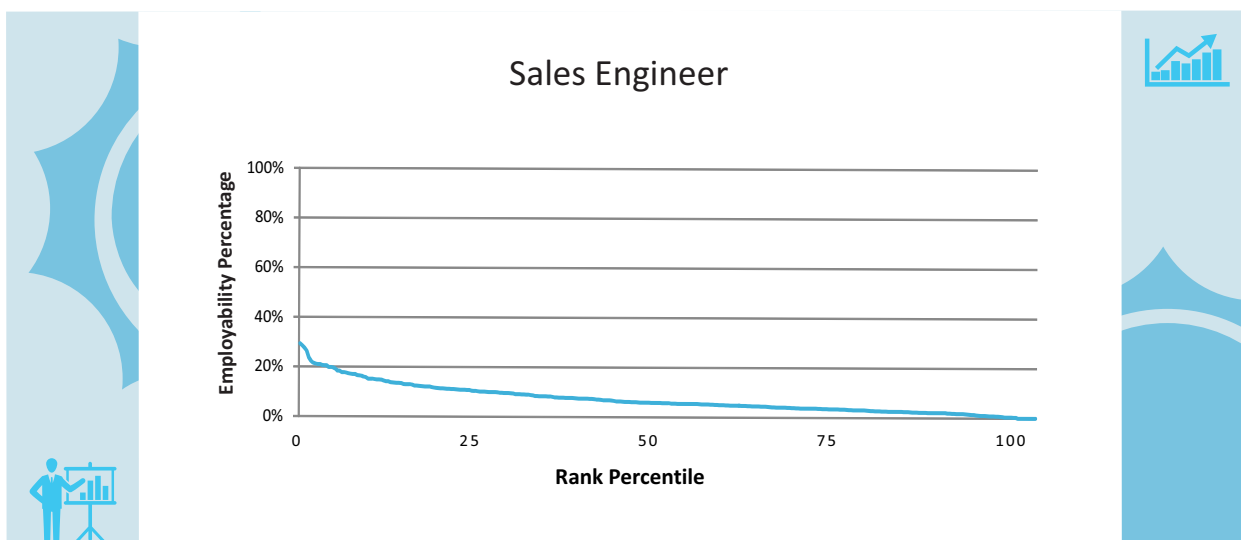


Figure 16: Employability variance for the role of Sales Engineer

- The top percentile colleges have employability figures around the 30% mark. The drastic drop in employability is clearly visible among the top campuses suggestive of how varied the campuses are in terms of employable candidates despite being closely ranked.
- The bottom ranked colleges have employability figures lower than 3% with many colleges having no employable candidates. The drop in employability for the lower ranked campuses is not as drastic as the top ranked campuses but this cannot be interpreted as a positive sign as almost all bottom ranked colleges have very low employability figures.
- More than 95% percent colleges have employability lower than the average figure of 19.08% which in itself is a very low percentage.

V. Hardware & Networking

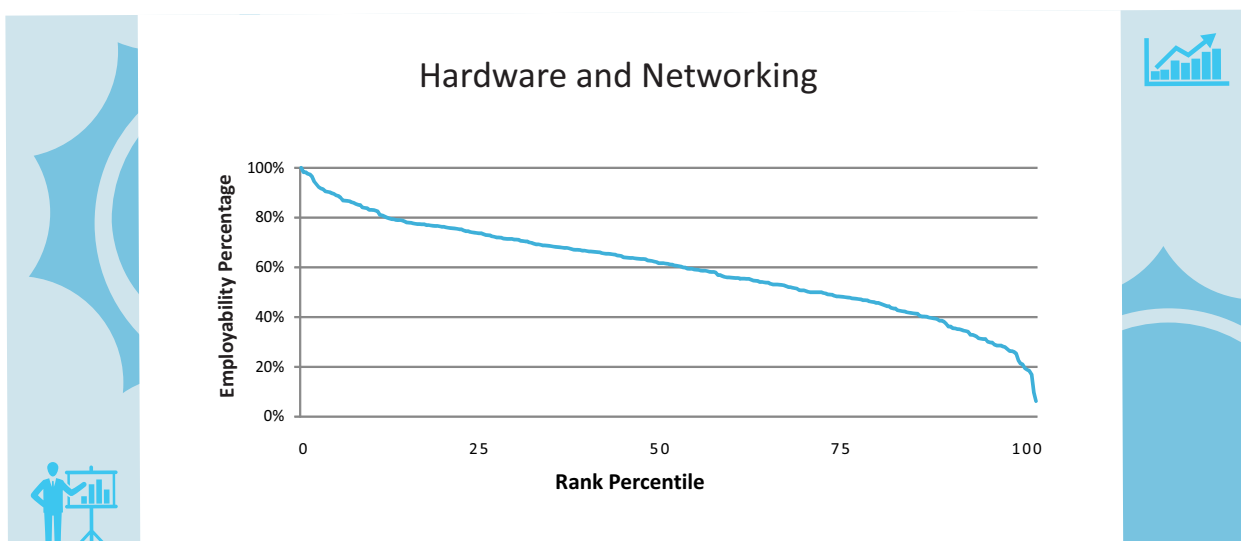


Figure 17: Employability variance for Hardware and Networking sector

- The top ranked colleges have employability figures as high as 99%. It can be observed that the drop in employability for the Hardware and Networking role is not as drastic as it is for other sectors. The figures fall gently as we move from the top percentile colleges towards the bottom percentile colleges.
- We can also observe that every college has at least 6% employable candidates including the bottom ranked campuses which is a positive sign for corporates looking to hire for this role.

VI. Creative Content Developer

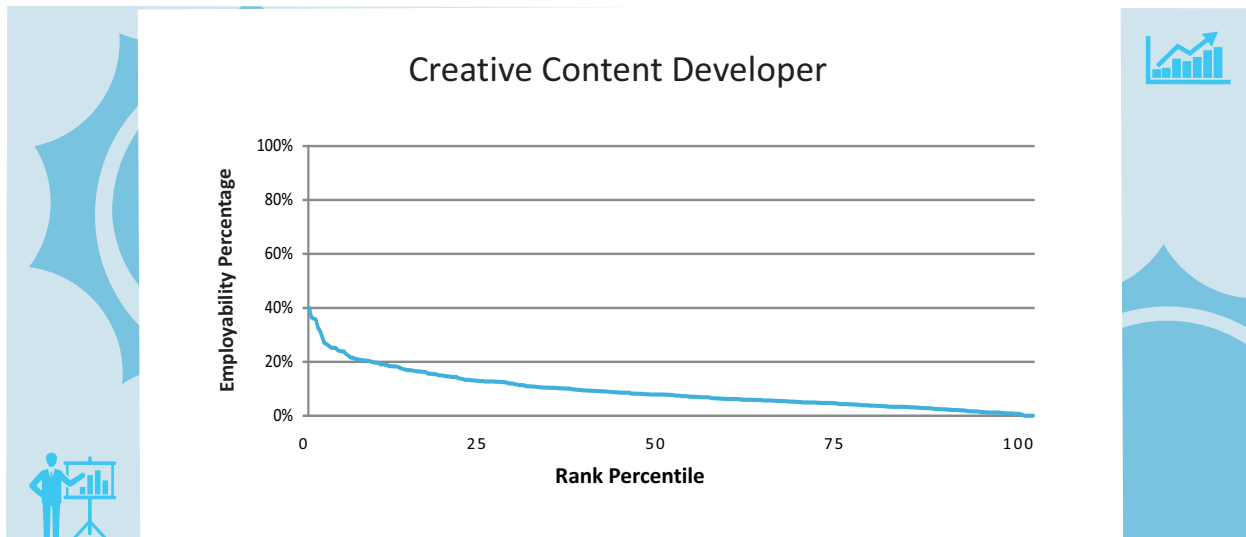


Figure 18: Employability variance for the role of Creative Content Developer

- For the top percentile colleges the employability lies between 35% and 40%, which itself is not very high. The employability figure drops drastically from 40% to less than 20% as soon as we go beyond the top 10 percentile colleges.
- The bottom percentile colleges have employability figures as low as 0%. More than 25% colleges have employability figures less than 5%. Around 85% colleges have employability lower than the average figure of 16.72%.

VII. Technical Content Developer

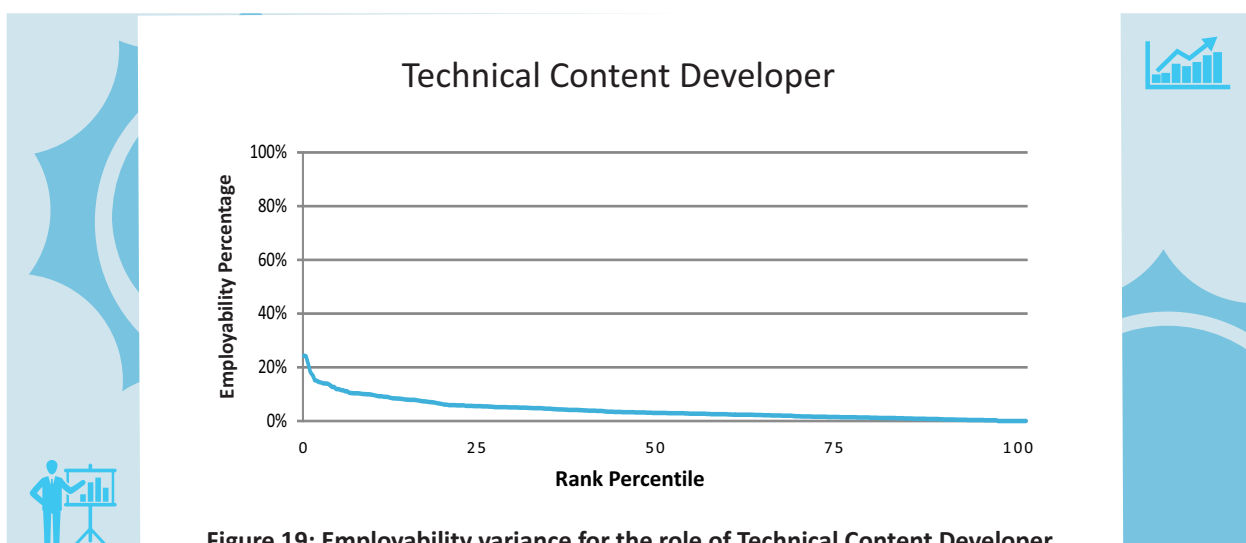


Figure 19: Employability variance for the role of Technical Content Developer

- The statistics for the technical content developer profile paint an even grimmer picture. The employability, even for the top percentile colleges, does not go beyond 24%. This figure falls drastically as we move towards the middle and the bottom percentile college.
- More than 90% colleges have employability lower than the average figure of 11.66%; with some colleges even recording 0% employability.

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