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**Research Article** 

# A Sustainable Study on Employability: The Future and Challenges Ahead in Engineering Education in India

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**Abstract:** The prominence of higher education in India has been regularly mounting since last 135 years. The significant raise of universities and institutions of engineering education in specialized areas has arisen as a result of initiatives taken by several rulers in their respective. The drive of globalization has created knowledge-based industries where technocrats are on higher demand. This research article aims to examine the enrolment and Job opportunity of student in engineering education. The study also reveals that the pass- out ratio of students in engineering education at UG, PG and Doctorate level that determines the potential employable talents and employability. The finding of the study proclaims about drop of enrolment, pass-out ratio and Job opportunity of students that crest challenges for education institutes.

Key Words: Engineering, Job, Enrolment, Education, Employment.

## **1. INTRODUCTION:**

The uproariousness of India is believed in its education system which was communicated orally by great scholars, pundits and intellectualists from ancient period of time. These scholars have participated and passed the education from one generation to the other. In earlier centuries, colourful educational institutions were formed in India in the name of pathshala, gurukul and vishwavidyala. In the original period, numerous universities flourished for feeding advanced education at Nalanda, Takshashila and Vikramshila in the field of drugs, economics, computation, law, engineering, astronomy, divination and vedics.

#### 1.1 Glance over: Engineering Education in India

In ancient era, both Hindu and Muslim rulers like Mughals, Sultan and Maharajas has encouraged the engineering and technical education to meets the needs of the manufacturing industry (karkhanas) who were involved in creation and production of textiles, handlooms, metals, paintings, enameled house-wares, gold-silver ornamentation, weapon units (knives, sword, scissor, gun). They attached training schools with workshop for imparting technical skills and vocational education.

During pre-independence, the British Government took various efforts and introduced a reform in Engineering education system of India by establishing various institute namely; Madras Survey School (1794) General Committee of Public Instruction (1823), Elphinstone Institution, Bombay (1844), Thomason Roorkee Civil Engineering College (1847), Civil Engineering College , Calcutta (1856), Madras Civil Engineering College (1859), Poona Civil Engineering College (1864), Coopers Hill College (former Royal Indian Engineering College(1870). Finally, with the increasing demand and need of engineering education, the Governor General of India has proposed establishment of Universities in July 1854, which resulted to formation of University of Calcutta, Madras and Bombay in 1857. These universities were the apex body for recognizing, examining and framing rules and regulations for degrees and branches.





**Chart 1: Engineering Education Origin in India** 

In context of engineering education, post-independent India has driven a major initiative by providing basic and essential inputs for economic development, empowering industrial growth and ultimately improving the quality of life of the people. The government had set up various committees, councils and advisory bodies under the guidance of educational experts, scholars, intellectuals and industrialist technocrats from time to time for designing best educational programmes for the advancement of country that will generate skilled workforce across nation. These efforts have churned out large numbers of skilled, potential and qualified engineers every year to cope up the

demand of global market. In 21st century, the Globalization 4.0 and Industry 4.0 have radically accelerated the pace of change in knowledge-driven, technology-driven and innovative-driven in engineering education. The creation and exchange of resources like knowledge, technology, infrastructure, money and people has helped to produce capable and aspirant engineers across the country. However, to cater to the next generation with efficient and calibre engineers, we need to facilitate quality and accredited technical education. In order to address the future prospects, phenomenal reforms have to be introduced in engineering education. This research work brings depth insight on current state in terms of capacity utilization, employability, challenges and future prospects of engineering education. This paper is grounded on substantiation of data available during Pre-COVID-19 and Post-COVID-19, still with some sapience and assiduity keeps working harmoniously in this present extremity by using the stylish practices and motivated pool and seeks to back into recovery mode.

# 2. OBJECTIVES:

The research aims to give insights on the employable population across India specifically when the Demand and Supply of talent is hugely impacted due to the pandemic.

- 1) To examine the change in enrolment of students at under-graduate, post-graduate and doctorate courses in Engineering Programme.
- 2) To analyse the pass-out ratio of students at under-graduate, post-graduate and doctorate courses in Engineering Programme.
- 3) To estimate employability–Job trends of Engineering Graduates in labour market.
- 4) To determine the challenges involved in engineering education and availability of Jobs in market.

| Research Type:      | Empirical Research.   |
|---------------------|---|
| Population:         | Engineering Student of India.   |
| Sample Frame:       | Students Enrolled for UG/PG and Doctorate Programme across various                |
| -                   | institutes/universities of India.   |
| Sampling Technique: | Convenience Sampling.   |
| Source of Data      | Secondary Source - Reports published by AICTE- AISHE Report (2015-16 to           |
|                     | 2019-20), India Skill Report (2015 to 2020), Survey Reports and other statistical |

# **3.RESEARCH METHODOLOGY / DESIGN:**

The researcher has deployed the below research design during course of work:



|                     | information.  |
|---------------------|---|
| Research Instrument | The researcher has presented the data in tabular form along with comparison |
|                     | using percentage technique Percentage Analysis                              |

# 4. LIMITATION

The study is limited to the enrolment and passes-out of students who are admitted in AICTE approved institutes or college in India.

The analysis of study is narrow based on data collected during period of 02 years i.e. 2018-19 and 2019-20 (Pre and Post-Covid)

The driven inference of study is restricted to researcher's access for information, knowledge and experience.

# 5. SCOPE

The current study can be extended to examine the enrolment and employability of various education streams in India.

Similarly, this study can be protracted to examine the enrolment and employability of various education streams across any part of country in global context.

## 6. **RESULTS & DISCUSSION:**

#### Part – I : Enrolment trend in Engineering Education:

| Level of Programme   | A.Y 201  | 9-20 (in Lak               | (hs)  | A.Y. 2018-19 (in Lakhs) |       |        |  |
|----------------------|----------|----------------------------|-------|-------------------------|-------|--------|--|
|                      | Total    | Male Female Total Enrolled |       |                         | Male  | Female |  |
|                      | Enrolled |                            |       |                         |       |        |  |
| Under Graduate Level | 37.27    | 26.38                      | 10.89 | 38.52                   | 27.40 | 11.12  |  |
| Post-Graduate Level  | 1.77     | 1.14                       | 0.63  | 1.82                    | 1.15  | 0.67   |  |
| Doctorate Level      | 0.52     | 0.35                       | 0.17  | 0.41                    | 0.28  | 0.13   |  |
| Total                | 39.56    | 27.87                      | 11.69 | 40.75                   | 28.83 | 11.92  |  |

Table .1 – Student Enrolment (Source: AISHE 2019-20, 2018-19)

**Interpretation:** From the above table, it can be concluded that the enrolment of students at UG level is higher as compared to admitted in PG and Doctorate Level. Similarly, in context of gender-wise comparison the enrolment of male students is higher (70.60%) at UG, PG and Doctorate level programmes.

**Inference:** The gross enrolment of student at UG, PG and Doctorate level in engineering programme for A.Y. 2019-20 has *decreased by 2.92%* as compared to A.Y.2018-19 which shows diversion of student's interest in engineering programme.

#### ii) Branch-wise Students Enrolment at UG Level:

| Branch                    | A.Y 2019-20<br>(in Lakhs) | A.Y. 2018-19<br>(in Lakhs) |
|---------------------------|---------------------------|----------------------------|
|                           | Total Enrolled            | Total Enrolled             |
| Computer Engineering      | 9.35                      | 8.8                        |
| Mechanical Engineering    | 6.84                      | 7.83                       |
| Electronics Engineering   | 6.11                      | 6.31                       |
| Civil Engineering         | 4.84                      | 5.37                       |
| Electrical Engineering    | 3.73                      | 3.95                       |
| Information technology    | 2.08                      | 1.87                       |
| Architecture              | 0.83                      | 0.81                       |
| Chemical Engineering      | 0.52                      | 0.51                       |
| Agriculture Engineering   | 0.22                      | 0.21                       |
| Aeronautical Engineering  | 0.18                      | 0.17                       |
| Metallurgical Engineering | 0.09                      | 0.1                        |



| Mining Engineering             | 0.07  | 0.08  |
|--------------------------------|-------|-------|
| Marine Engineering             | 0.05  | 0.04  |
| Food Technology                | 0.13  | 0.13  |
| Dairy Technology               | 0.03  | 0.03  |
| Planning                       | 0.01  | 0.009 |
| Other Engineering & Technology | 2.19  | 2.3   |
| Total                          | 37.27 | 38.52 |

Table 2 – Student Enrolment at UG Level: Branch wise (Source: AISHE 2019-20, 2018-19)

**Interpretation:** From the above table, it can be inferred that the branch wise highest enrolment of students at UG level is in Computers (23.94%), Mechanical (19.35%), Electronics (16.38%), whereas the moderate enrolment is in Civil (13.47%), Electrical (10.13%) and least enrolment is in Dairy Technology (0.08%) Planning (0.02%).

**Inference:** The enrolment of students in various courses at UG level is based on the individual interest of candidates and market trend that generates Job opportunity at global perspective. The enrolment of students at UG level has *decreased by 3.24 %* in A.Y. 2019-20 as compared to A.Y.2018-19.

# iii) Branch-wise Students Enrolment at PG Level:

|                                | A.Y 2019-20    | A.Y. 2018-19   |
|--------------------------------|----------------|----------------|
| Branch                         | (in Lakhs)     | (in Lakhs)     |
|                                | Total Enrolled | Total Enrolled |
| Computer Engineering           | 0.29           | 0.3            |
| Mechanical Engineering         | 0.27           | 0.3            |
| Electronics Engineering        | 0.24           | 0.27           |
| Civil Engineering              | 0.35           | 0.37           |
| Electrical Engineering         | 0.19           | 0.2            |
| Information technology         | 0.02           | 0.03           |
| Architecture                   | 0.03           | 0.03           |
| Chemical Engineering           | 0.02           | 0.02           |
| Agriculture Engineering        | 0.01           | 0.01           |
| Aeronautical Engineering       | 0.087          | 0.006          |
| Metallurgical Engineering      | 0.01           | 0.01           |
| Mining Engineering             | 0.00328        | 0.003          |
| Marine Engineering             | 0.00399        | 0.009          |
| Food Technology                | 0.01           | 0.01           |
| Dairy Technology               | 0.00132        | 0.001          |
| Planning                       | 0.0017         | 0.01           |
| Other Engineering & Technology | 0.23           | 0.24           |
| Total                          | 1.77           | 1.82           |

Table 3 – Student Enrolment at PG Level: Branch wise (Source: AISHE 2019-20, 2018-19)

**Interpretation:** From the above table, it can be inferred that the branch wise highest enrolment of students at PG level is in Civil (20.05%), Computers (16.43%), Mechanical (15.87%), whereas the moderate enrolment is in Electronics (14.20%), Electrical (10.86%) and least enrolment is in Dairy Technology (0.064%), Marine (0.22%) Mining (0.17%).

**Inference:** The enrolment of students in few course at PG level are lateral entry with respect to specific certification courses, diploma or bachelor or vocational degree from science and allied –engineering stream. The enrolment of students at PG level has *decreased by 2.74 %* in A.Y. 2019-20 as compared to A.Y.2018-19.

#### iv) Branch-wise Students Enrolment at Doctorate Level:

| Branch               | A.Y 2019-20<br>(in Lakhs) | A.Y. 2018-19<br>(in Lakhs) |  |  |
|----------------------|---------------------------|----------------------------|--|--|
|                      | Total Enrolled            | <b>Total Enrolled</b>      |  |  |
| Computer Engineering | 0.076                     | 0.06                       |  |  |



| Mechanical Engineering         | 0.066  | 0.05   |
|--------------------------------|--------|--------|
| Electronics Engineering        | 0.056  | 0.05   |
| Civil Engineering              | 0.052  | 0.04   |
| Electrical Engineering         | 0.052  | 0.05   |
| Information technology         | 0.005  | 0.003  |
| Architecture                   | 0.005  | 0.003  |
| Chemical Engineering           | 0.016  | 0.01   |
| Agriculture Engineering        | 0.003  | 0.003  |
| Aeronautical Engineering       | 0.006  | 0.004  |
| Metallurgical Engineering      | 0.01   | 0.007  |
| Mining Engineering             | 0.0016 | 0.001  |
| Marine Engineering             | 0.002  | 0.001  |
| Food Technology                | 0.003  | 0.002  |
| Dairy Technology               | 0.0002 | 0.0001 |
| Planning                       | 0.0005 | 0.0007 |
| Other Engineering & Technology | 0.17   | 0.14   |
| Total                          | 0.52   | 0.42   |

Table 4 – Student Enrolment at Doctorate Level: Branch wise (Source: AISHE 2019-20, 2018-19)

**Interpretation:** From the above table, it can be inferred that the branch wise highest enrolment of students at Doctorate level is in Computers (14.46%), Mechanical (12.34%), whereas the moderate enrolment is in Electronics (11.27%), Electrical (10.85%), Civil (9.78%) and least enrolment is in Dairy Technology (0.031%), Planning (0.12%).

**Inference:** The enrolment of students for Doctorate level is usually less as the demand for such qualification is mandatory only in Educational Institutes and Research Bodies. The enrolment of students at doctorate level has *increased by 23.80 %* in A.Y. 2019-20 as compared to A.Y.2018-19.

|                         | A.Y 2019-20       |              |                     | A.Y.              |              |                     |                      |
|-------------------------|-------------------|--------------|---------------------|-------------------|--------------|---------------------|----------------------|
|                         | (in Lakhs)        |              |                     | (in Lakhs)        |              |                     |                      |
| Branch                  | Total<br>Enrolled | Pass-<br>out | Pass-<br>out<br>(%) | Total<br>Enrolled | Pass-<br>out | Pass-<br>out<br>(%) | Avg. Pass<br>out (%) |
| Computer Engineering    | 9.35              | 1.72         | 18.4                | 8.8               | 1.57         | 17.84               | 27.04                |
| Mechanical Engineering  | 6.84              | 1.77         | 25.88               | 7.83              | 1.92         | 24.52               | 37.46                |
| Electronics Engineering | 6.11              | 1.34         | 21.93               | 6.31              | 1.41         | 22.35               | 33.32                |
| Civil Engineering       | 4.84              | 1.19         | 24.59               | 5.37              | 1.27         | 23.65               | 35.95                |
| Electrical Engineering  | 3.73              | 0.855        | 22.92               | 3.95              | 0.9          | 22.78               | 34.24                |
| Information Technology  | 2.08              | 0.404        | 19.42               | 1.87              | 0.37         | 19.79               | 29.50                |
| Architecture            | 0.83              | 0.137        | 16.51               | 0.81              | 0.12         | 14.81               | 23.07                |
| Chemical Engineering    | 0.52              | 0.119        | 22.88               | 0.51              | 0.11         | 21.57               | 33.01                |
| Agriculture Engineering | 0.22              | 0.043        | 19.55               | 0.21              | 0.04         | 19.05               | 28.83                |
| Aeronautical Eng.       | 0.18              | 0.029        | 16.11               | 0.17              | 0.03         | 17.65               | 25.71                |
| Metallurgical Eng.      | 0.09              | 0.027        | 30                  | 0.1               | 0.02         | 20                  | 35.00                |
| Mining Engineering      | 0.07              | 0.018        | 25.71               | 0.08              | 0.02         | 25                  | 37.86                |
| Marine Engineering      | 0.05              | 0.011        | 22                  | 0.04              | 0.007        | 17.5                | 28.50                |
| Food Technology         | 0.13              | 0.024        | 18.46               | 0.13              | 0.02         | 15.38               | 24.61                |
| Dairy Technology        | 0.03              | 0.0063       | 21                  | 0.03              | 0.005        | 16.67               | 27.17                |
| Planning                | 0.01              | 0.0018       | 18                  | 0.009             | 0.001        | 11.11               | 20.11                |
| Other Eng. & Tech.      | 2.19              | 0.5          | 22.83               | 2.3               | 0.5          | 21.74               | 33.16                |
| Total                   | 37.27             | 8.2          | 21.99               | 38.52             | 8.31         | 21.58               | 32.58                |

Table 5 – UG Student Enrolment Vs Pass-out: Branch wise (Source: AISHE 2019-20, 2018-19)



**Interpretation:** From the above table, it can be inferred that the highest pass-out ratio of students branch wise at UG level is in Mining (37.86%), Mechanical (37.46%), Civil (35.95%),

Metallurgical (35.00%) whereas the moderate pass-out ratio is in Electrical (34.24%), Electronics (33.32%), Chemical (33.01%) and least pass-out ratio is in Planning (20.11%)

**Inference:** The pass-out ratio of students in various courses at UG level has *increased by 0.46* % in A.Y. 2019-20 as compared to A.Y.2018-19. It embarks the level of primary education, teaching pedagogy, examination pattern, level of curriculum.

|                                   | A.Y 2019-20       |              | (in                 | A.Y. 2018         | -19          | (in                 |                      |
|-----------------------------------|-------------------|--------------|---------------------|-------------------|--------------|---------------------|----------------------|
|                                   | La                | Lakhs)       |                     |                   |              |                     |                      |
| Branch                            | Total<br>Enrolled | Pass-<br>out | Pass-<br>out<br>(%) | Total<br>Enrolled | Pass-<br>out | Pass-<br>out<br>(%) | Avg. Pass<br>out (%) |
| Computer Engineering              | 0.29              | 0.127        | 43.79               | 0.3               | 0.14         | 46.67               | 68.57                |
| Mechanical Engineering            | 0.27              | 0.106        | 39.26               | 0.3               | 0.11         | 36.67               | 56.3                 |
| Electronics Engineering           | 0.24              | 0.112        | 46.67               | 0.27              | 0.12         | 44.44               | 67.78                |
| Civil Engineering                 | 0.35              | 0.139        | 39.71               | 0.37              | 0.13         | 35.14               | 55                   |
| Electrical Engineering            | 0.19              | 0.069        | 36.32               | 0.2               | 0.07         | 35                  | 53.16                |
| Information technology            | 0.02              | 0.012        | 60                  | 0.03              | 0.01         | 33.33               | 63.33                |
| Architecture                      | 0.03              | 0.014        | 46.67               | 0.03              | 0.01         | 33.33               | 56.67                |
| Chemical Engineering              | 0.02              | 0.01         | 50                  | 0.02              | 0.01         | 50                  | 75                   |
| Agriculture Engineering           | 0.01              | 0.00554      | 55.4                | 0.01              | 0.005        | 50                  | 77.7                 |
| Aeronautical Engineering          | 0.087             | 0.00298      | 3.43                | 0.006             | 0.003        | 50                  | 51.72                |
| Metallurgical Engineering         | 0.01              | 0.0055       | 55                  | 0.01              | 0.005        | 50                  | 77.5                 |
| Mining Engineering                | 0.00328           | 0.00112      | 34.15               | 0.003             | 0.0009       | 30                  | 47.08                |
| Marine Engineering                | 0.00399           | 0.00152      | 38.1                | 0.009             | 0.0009       | 10                  | 29.05                |
| Food Technology                   | 0.01              | 0.00389      | 38.9                | 0.01              | 0.005        | 50                  | 69.45                |
| Dairy Technology                  | 0.00132           | 0.00057      | 43.18               | 0.001             | 0.0006       | 60                  | 81.59                |
| Planning                          | 0.0017            | 0.00057      | 33.53               | 0.01              | 0.004        | 40                  | 56.77                |
| Other Engineering &<br>Technology | 0.23              | 0.096        | 41.74               | 0.24              | 0.09         | 37.5                | 58.37                |
| Total                             | 1.77              | 0.71         | 40.11               | 1.82              | 0.71         | 39.25               | 59.31                |

## vi) PG: Branch wise Enrolment Vs. Pass out

 Table 6 – PG Student Enrolment Vs Pass-out: Branch wise (Source: AISHE 2019-20, 2018-19)

**Interpretation:** From the above table, it can be inferred that the highest pass-out ratio of students branch wise at PG level is in Dairy Technology (81.59%), Agricultural (77.70%), Metallurgical (77.50%), Chemical (75.00%), whereas the moderate pass-out ratio is in Food Technology(69.45%), Computers (68.57%) Information Technology (63.33%), Electronics (67.78%), and least pass-out ratio is in Marine Engineering (29.05%) **Inference:** The pass-out ratio of students in various courses at PG level has *increased by 2.49* % in A.Y. 2019-20 as

compared to A.Y.2018-19. It signifies the discontinuity of education and level of curriculum designed as per industry standard.

## vii) Doctorate: Branch wise Enrolment Vs. Pass out

|                         | A.Y<br>(ir        | A.Y 2019-20<br>(in Lakhs) |                     |                   | A.Y. 2018-19<br>(in Lakhs) |                     |                         |
|-------------------------|-------------------|---------------------------|---------------------|-------------------|----------------------------|---------------------|-------------------------|
| Branch                  | Total<br>Enrolled | Pass-out                  | Pass-<br>out<br>(%) | Total<br>Enrolled | Pass-out                   | Pass-<br>out<br>(%) | Avg.<br>Pass<br>out (%) |
| Computer Engineering    | 0.076             | 0.0084                    | 11.05               | 0.05              | 0.008                      | 16.00               | 38.10                   |
| Mechanical Engineering  | 0.066             | 0.0079                    | 11.97               | 0.05              | 0.008                      | 16.00               | 39.94                   |
| Electronics Engineering | 0.056             | 0.0076                    | 13.57               | 0.05              | 0.008                      | 16.00               | 43.14                   |



| Civil Engineering                 | 0.052  | 0.0043  | 8.27  | 0.04   | 0.006   | 15.00 | 31.54 |
|-----------------------------------|--------|---------|-------|--------|---------|-------|-------|
| Electrical Engineering            | 0.052  | 0.0065  | 12.5  | 0.05   | 0.006   | 12.00 | 37.00 |
| Information technology            | 0.005  | 0.0007  | 14    | 0.003  | 0.0006  | 20.00 | 48.00 |
| Architecture                      | 0.005  | 0.0004  | 8     | 0.003  | 0.0003  | 10.00 | 26.00 |
| Chemical Engineering              | 0.016  | 0.002   | 12.5  | 0.01   | 0.002   | 20.00 | 45.00 |
| Agriculture Engineering           | 0.003  | 0.0001  | 3.33  | 0.003  | 0.0009  | 30.00 | 36.66 |
| Aeronautical Engineering          | 0.006  | 0.00054 | 9     | 0.004  | 0.001   | 25.00 | 43.00 |
| Metallurgical Engineering         | 0.01   | 0.0014  | 14    | 0.007  | 0.0010  | 13.86 | 41.86 |
| Mining Engineering                | 0.0016 | 0.00009 | 5.63  | 0.001  | 0.00005 | 5.00  | 16.26 |
| Marine Engineering                | 0.002  | 0.00021 | 10.5  | 0.001  | 0.00014 | 14.00 | 35.00 |
| Food Technology                   | 0.003  | 0.0003  | 10    | 0.002  | 0.0004  | 20.00 | 40.00 |
| Dairy Technology                  | 0.0002 | 0.00009 | 45    | 0.0001 | 0.00008 | 80.00 | 62.50 |
| Planning                          | 0.0005 | 0.00009 | 18    | 0.0007 | 0       | 0.00  | 36.00 |
| Other Engineering &<br>Technology | 0.17   | 0.0174  | 10.24 | 0.14   | 0.027   | 19.29 | 39.77 |
| Total                             | 0.52   | 0.06    | 11.07 | 0.41   | 0.07    | 19.54 | 38.81 |

Table 5 – Doctorate student Enrolment Vs Pass-out: Branch wise (Source: AISHE 2019-20, 2018-19)

**Interpretation:** From the above table, it can be inferred that that the highest pass-out ratio of students branch wise at Doctorate level is in Dairy Technology (62.50%),Information Technology (48.00%), Chemical (45.00%), whereas the moderate pass-out ratio is in Other Eng.& Technology(39.77%),Mechanical (39.94%), Computers (38.10%) and least pass-out ratio is in Architecture (26.00%),Mining (16.26%).

**Inference:** The enrolment & pass-out ratio of students in various courses at Doctorate level summarizes the discontinuity of education, availability of technical support, research guide, and allied area of research. The pass-out ratio of students in various courses at Doctorate level has *decreased by 34.49* % in A.Y. 2019-20 as compared to A.Y.2018-19.

Part – II: Employability Scenario: At Present



Graph -1: Market Demand: Engineering Graduate (Source: India Skills Report, 2021)

**Inference:** The mushroom growth of engineering institutes has resulted to produce higher quantity of engineering graduates with unmatchable potentials, quality and competent with the industry benchmark. Some institute has kept up with the dynamic skill demand of market with pre-defined intake of students a lot others do not. This denotes a clear picture that a stern practice is in the need of hour; else the value of degree will diminish.





Graph -2: Employable Talents: Engineering Graduate (Source: India Skills Report, 2021)

**Inference:** As per the above graph it infers that the employable talent has declined at the proportionate of 2% during 2015-16 to 2018-19. In the year 2019-20 the availability of employable graduates has increased by 6% again it steeped down 8%. Needless to say employability among students is dropping consistently due to absence of industry awareness, core competency skill and takes-away job by ITI holders.



Graph -3: Job Trends: Engineering Graduate (Source: India Skills Report, 2021)

**Inference:** As per the above graph it infers that the highest paradigm of Job drift among engineering graduates is from the year 2019-20. It is observed from 2015-16 onwards the Job generation was static due to lack of employability workforce talents. After 2020 engineer graduates are coping with the post-pandemic situations. It is clear that external forces and shift in new technologies has affected the Job opportunity. Hence, Strategic measures should be taken care off to balance the potential employability talents and market scenario.





Graph -4 Branch wise: Job Trends (Source: India Skills Report, 2021)

**Inference:** The Job opportunity for the year 2020-21 in all the above branches has decreased by as compared to 2019-20. The decline of opportunity in Civil Engineering is due to lack of internship opportunity and industry interface, whereas the IT, Electrical and Electronics branches shown remarkable because of corporate link and promising career prospects. It solidifies the belief of exclusivity around the engineering courses had reduced with strong intake of quality students.

Part – III: Employability Scenario: In future



Graph -5: Hiring Intent: Engineering Graduate (Source: India Skills Report, 2021)

**Inference:** The hiring intent of employer towards Engineering graduate is declined consistently as compared to 2015-16 to 2020-21. The impact of pandemic and a sustainable plan to address the demand and supply of employable graduate in India has resulted to widen the intent of employer.



Chart – 2 Sectors: Employment Generation / Opportunity

**Inference:** This chart deceipts the various employment opportunities generated in various industry or sector based on the need of hour, demand and revolution of global market.

# 6.1 Challenges in Engineering Education

- i) Most of the Engineering education institute meets with serious issues like shortage of quality faculty, selffunding capability, lack of physical infrastructure, inability for maintenance of laboratory, absence of research activities and less industry-linkage.
- ii) Numerous rules and regulations of various bodies and authorities for monitoring, controlling and accrediting the education institute.
- iii) Benchmark of curriculum does not emphasis on application oriented skill and innovative approach that fails to build capabilities among students and results to mis-match with the industry standards.
- iv) Absence for research based culture among faculties, lack of faculty development, knowledge exchange programme, industry-interface, collaborative learning atmosphere.
- v) Ineffective blending of multidisciplinary knowledge, internship opportunity, project based learning; ICT engagement tools are rigorous efforts not undertaken due to unavailability of fund, human resource and technology support.
- vi) Most vital is poor learning attitude and dispassionate about career in engineering field among students.
- vii) To become Self Reliant Nation, India should inculcate more Training and Research among students as it is the biggest Challenge.

## 6.2 Suggestions: Towards Sustaining Enrolment and Job Market.

Faculty and Student Exchange or Collaboration program must be initiated between various universities at global level for resource sharing like technology, skill sets and expertise.

Institutes or universities must be committed to enhance onboarding students with various professional bodies for learning specialized courses and on-site short term projects.

Integrated or Blended or multi-disciplinary courses must be rigorously introduced in curriculum for grooming the technocrat's culture among students.

Proactive advisory body, learning center, study groups, student support system and supplementary classes must be deployed for slow learners to improve the academic performance and reduce drop-out ratio.

Pre-Enrollment Activity, Student cluster cell, Career Development cell, Placement cell and Innovation clubs must be established for enhancing the progressive culture among students.



Student Internship must be encouraged seriously by constant interaction and monitoring by mentorship program from academic institute.

Research based incubation center can be developed with the assistance of industry experts and training institutes.

Specialized laboratories can be set-up for boosting the entrepreneurial skill among students, which can be even commercialized for the welfare of society.

Skill Development courses like soft skill; employability workshops, project competition, and research based product development activity can be introduced for resolving the social or technical issue among society.

#### 7. CONCLUSION

Indian authorities, Government and various educational institutions are providing different alternatives to cope up with employability challenges. Self-Reliant India is the new vibe among nation. There is a serious urge for addressing the issues and challenges inculcated in engineering education if not resolved will lead to slow-down social and economic development of country in terms of creating talented and knowledgeable youth work force. The technical education must be more skill oriented that enhances life-skills and livelihood skills through skill development, project enhancement and internship.

As India is the most promising country with highest youth workforce with diverse skills who can substantially meet the global needs of a world. Hence, there is a need to promote collaboration between industry-students and industry-faculty to cope up the bridge the gap with essential measures as a step-stone.

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