A Study of Socio Economic Status in Relation to Employability of Engineers in India

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India is very rich in diversity which even extends to the engineering graduates across states. Technical education, during the last decade, was extended through 1000s of Engineering colleges spread across the length and breadth of the country producing over half a million Engineering graduates annually. The objectives of this study are to find out the relationship between socio-economic status and employability skills among the engineering graduates in India, particularly in Tamil Nadu. As reported in Times of India dated Jan.30, 2016, Tamil Nadu may be known for its massive number of engineering colleges, but the graduates they produce do not top in employability. The students in most of the engineering colleges are from different socio-economic status/background coming from different places. The socio-economic status of the family plays an important role in personality development of the students. The present study tries to find the extent to which the socio- economic status is a barrier in being employable and it also aims at providing means to overcome the present day menace of unemployability.

INTRODUCTION

India is one of the largest producers of engineers in the world. In India, there are several engineering colleges imparting undergraduate and graduate courses in engineering, applied engineering and science. The Indian engineering sector has witnessed a remarkable growth over the last few years driven by increased investments in infrastructure and industrial production. The engineering sector, being closely associated with the manufacturing and infrastructure sectors, is of strategic importance to India's economy.

Today employability is far bigger a challenge than unemployment. Industry leaders feel that the "skills" and "quality" of the workforce need a lot of improvement. Plagued with problems like curriculum, lack of qualified faculty, poor quality of content, and not-so-effective examination system, technical institutions do not provide signalling value in the job market. Hence a disparity exists in the types of skills taught at colleges and those that are demanded in industry.

The globalization emphasizes the knowledge economy that's why employability becomes the central driver of the thinking business. This approach increases the attention for universities and they in turn are

also focusing on producing employable graduates through the development of skills and abilities in graduates.

India on its quest to become a global superpower has made significant strides towards the development of its engineering sector. The government of India has appointed the Engineering Export Promotion Council (EEPC) as the apex body in charge of promotion of engineering goods, products and services from India. India exports transport equipment, capital goods, other machinery/equipment and light engineering products such as castings, forgings and fasteners to various countries of the world. The Indian semiconductor industry offers high growth potential areas as the industries which source semiconductors as inputs are themselves witnessing high demand.

The capital goods and engineering turnover in India is expected to reach US$ 125.4 billion by FY17. India exports its engineering goods mostly to the US and Europe, which accounts for over 60 per cent of the total exports. Recently, India's engineering exports to Japan and South Korea have also increased with shipments to these two countries rising by 16 and 60 per cent respectively. Sri Lanka, Nepal and Bangladesh have also emerged as the major destinations for India's engineering exports. According to the India Electronics & Semiconductor Association, the Indian Electronic System Design and Manufacturing (ESDM) market is expected to grow at a CAGR of 16-23 per cent to reach US$ 228 billion by 2020 from $100 billion in 2016-17 (Indian Brand Equity Foundation, 2017).

The electrical equipment industry observed a growth of 9.7 per cent during April-September 2017. Also, growth of India's mining and construction equipment sector is expected at 13-17 per cent in 2017 driven by increase in infrastructure spending. According to a study by The Associated Chambers of Commerce of India (ASSOCHAM) and NEC Technologies, the demand for electronic products in India is expected to grow at a Compound Annual Growth Rate (CAGR) of 41 per cent during 2017-20 to US$ 400 billion by 2020 (ASSOCHAM, 2017). According to the data from the Engineering Export Promotion Council of India, engineering exports from India grew 11.33 per cent year-on-year to reach US$ 65.23 billion in FY 2016-17. Exports of electrical machinery rose to US$ 4.6 billion in FY 2016-17 from US$ 3.7 billion in FY 2015-16. India's engineering exports recorded a growth of 22.75 per cent to reach US $ 56,091.89 million during April-December 2017. Exports during December 2017 grew 25.41 per cent year-on-year to US$ 7,133.93 million from US$ 5,688.32 million in the same period a year ago. The engineering sector is a growing market. Spending on engineering services is projected to increase to US$ 1.1 trillion by 2020 (Indian Brand Equity Foundation, 2017).

Study Objectives

This study analyses trends in engineering to better understand in what ways engineering represents space for progress in India:

1. To find out the relationship of socio-economic status with employability among engineering students
2. To study the effect of family educational background and family income (first generation college goers from low economic status) on the employability
3. To study the effect of native place i.e., students from rural/semi urban background on the employability
4. To provide effective measures to make the engineering graduates employable

Study Design and Results

A questionnaire was designed to collect data from engineering population at the college level. The sample consisted of students who were recruited from different states and tier of colleges. Therefore, a set of questionnaire was prepared and distributed randomly to the students. It may be mentioned that questionnaires were distributed to final-year engineering students. A total of 864 engineering candidates took the questionnaire. Out of them, 163 candidates were interviewed. The purpose of this study was to examine the socio-economic status and employability skills of engineers. The variables representing the

general factors of socio-economic status were gender, age, religion, mother tongue, nature of family, size of family, educational qualification, technical qualification of the engineering students, and monthly income of their family members. To identify the nativity of the engineering students, the variables were identified as migration status, years of living, reasons for migration, and type of migration.

Based upon the results of this study, it appears that an improvement in professional preparation and mathematics training supported by improved teaching and more interest in student learning will most likely increase academic achievement of engineering students. Such relationship needs further study. However, since an increased knowledge of mathematics enhances professional preparation, the importance of implementation of such a program is evident for engineering students.

TABLE 1
SOCIO-ECONOMIC STATUS OF EMPLOYABILITY OF ENGINEERING STUDENTS

		IT	**Core**	**Non-Core**	**BPO**	**Others**	**Total**
Age	Below 20 Years	16 (24.2)	6 (9.1)	21 (31.8)	14 (21.2)	9 (13.6)	66 (100.0)
	21 and Above	21 (21.6)	9 (9.3)	30 (30.9)	24 (24.7)	13 (13.4)	97 (100.0)
Gender	Male	23 (27.4)	13 (15.5)	23 (27.4)	17 (20.2)	8 (9.5)	84 (100.0)
	Female	19 (24.1)	7 (8.9)	21 (26.6)	15 (19.0)	17 (21.5)	79 (100.0)
Religion	Hindu	25 (24.5)	13 (12.7)	20 (19.6)	23 (22.5)	21 (20.6)	102 (100.0)
	Muslim	8 (25.0)	6 (18.8)	5 (15.6)	6 (18.8)	7 (21.9)	32 (100.0)
	Christian	7 (24.1)	6 (20.7)	7 (24.1)	5 (17.2)	4 (13.8)	29 (100.0)
Mother Tongue	Tamil	19 (24.7)	16 (20.8)	15 19.5)	14 (18.2)	13 (16.9)	77 (100.0)
	Hindi	10 (20.8)	11 (22.9)	10 (20.8)	9 (18.8)	8 (16.7)	48 (100.0)
	Malayalam	5 (21.7)	4 (17.4)	5 (21.7)	5 (21.7)	4 (17.4)	23 (100.0)
	Others	2 (13.3)	3 (20.0)	5 (33.3)	5 (33.3)	0 0.0	15 (100.0)
Nature of Family	Nuclear Family	25 (21.7)	19 (16.5)	32 (27.8)	24 (20.9)	15 (13.0)	115 (100.0)
	Joint Family	12 (25.0)	8 (16.7)	11 (22.9)	9 (18.8)	8 (16.7)	48 (100.0)

		IT	Core	Non-Core	BPO	Others	Total
Size of Family	Three Members	3 (7.9)	5 (13.2)	11 (28.9)	10 (26.3)	9 (23.7)	38 (100.0)
	Four Members	16 (24.2)	10 (15.2)	17 (25.8)	12 (18.2)	11 (16.7)	66 (100.0)
	Five Members	12 (27.3)	8 (18.2)	11 (25.0)	7 (15.9)	6 (13.6)	44 (100.0)
Educational Qualification	UG	40 (31.7)	19 (15.1)	25 (19.8)	22 (17.5)	20 (15.9)	126 (100.0)
	PG	11 (29.7)	6 (16.2)	8 (21.6)	7 (18.9)	5 (13.5)	37 (100.0)
Technical Qualification	Diploma	20 (25.3)	11 (13.9)	21 (26.6)	18 (22.8)	9 (11.4)	79 (100.0)
	Remedial Classes	23 (27.4)	12 (14.3)	19 (22.6)	17 (20.2)	13 (15.5)	84 (100.0)

(Notes: Core: One who gets employed in the same streamline of his course. Non-core: Those who do not get employed in their streamline of their courses. BPO: Business Process Organisation like an outsourcing student agency.)

The survey throws light on the perception of employers as well as students towards employability skills. It is found that employers give importance to personal and behavioral attributes of a candidate whereas students give more importance to their technical skills. Further, there is significant difference between the perception of students with work experience and the ones without work experience. Gender difference also affects the perception of graduates towards employability skills (Chithra, 2013).

The above table reveals that a majority of engineering students were found to be in the age group between 21yrs and above. The engineering students were aged above 20 years as very high in the field of IT. According to the HRD ministry, India has 6,214 engineering and technology institutions which are enrolling 2.9 million students. Around 1.5 million engineers are released into the job market every year. But the dismal state of higher education in India shows that they simply do not have adequate skills to be employed (Puri, 2016).

Out of the total 163 engineering students interviewed, 84 engineering students were male and 79 female. Nearly 27.4 per cent of the male students were in IT and Non Core, while females were high in the field of Non-core jobs. Here girl students were lagging technical skills and also not ready to migrate from their place to another place to work.

This study also attempted to know the religious background of engineering students, which was classified into three categories as Hindu, Muslim and Christian. Out of the 163 students, the majority of them (102 students) were Hindus, and nearly 25 of them (24.5 per cent) were in the field of IT, 23 (23.5 per cent) in BPO. There were 32 Muslim students and 29 Christian students.

Among the total engineering workers, the majority of the students (77 students) speak Tamil, and nearly 25 per cent of the Tamil speaking students were in the field of IT, and next to that is in the field of Core Job. Next to Tamil speaking were Hindi and Malayalam respectively.

On analysing the engineering students' type of family, 115 students belonged to nuclear family, and 48 (18.8 per cent) students came from joint family. Out of 33 the students selected by BPO, 24 (20.89 per cent) belonged to nuclear family and 9 to joint family. Most of the engineering students came from large

families. Out of the 163 students, 66 had four family members (17 of them had non-core jobs and 16 of them were in IT field), 38 had three family members, and 44 had five family members.

The technical qualification of the engineering students was divided into two categories: Diploma and Remedial Classes. They had almost the same number of students. There were 23 engineering students who took remedial classes and were working in IT sector, while more diploma students (21) had non-core job. Employability skills and placement rate becomes the buzz words to benchmark for the quality of engineering education among the technical institutes in the country. The gap between pass out ratio and placement ratio among the engineering graduates is alarming and indicating the poor levels of skill set of the engineers (Rani and Babu, 2018). The reasons for the same are numerous. The present paper is focused on studying the role of personal factors, life skills factors, teaching and learning factors, and evaluation systems and improvement practices environment in the employability of the engineering graduates from Hyderabad city.

The study results reveal that life skill factors, teaching learning and evaluation systems are highly important in employability skills of the engineering graduates. In the past two decades, engineering education in India has been transforming significantly with meteoric rise in the supply of engineering graduates to the market. However, the perceived gap between Indian industry, which is the largest demand for these graduates, and the capability of graduates seems to be increasing.

TABLE 2
FAMILY MEMBERS' ECONOMIC STATUS OF ENGINEERING STUDENTS

		First Person	Second Person	Third Person	Fourth Person	Fifth Person	Total
Age	Less than 20 Years	14 (11.6)	26 (21.5)	19 (15.7)	46 (38.0)	16 (13.2)	121 (100.0)
	20-40 Years	59 (19.4)	48 (15.8)	39 (12.8)	87 (28.6)	71 (23.4)	304 (100.0)
	40 and Above	23 (10.6)	32 (14.7)	60 (27.6)	49 (22.6)	53 (24.4)	217 (100.0)
Gender	Male	76 (19.7)	69 (17.9)	77 (19.9)	89 (23.1)	75 (19.4)	386 (100.0)
	Female	51 (19.8)	41 (16.0)	60 (23.3)	61 (23.7)	44 (17.1)	257 (100.0)
Educational Qualification	Illiterate	42 (55.3)	34 (44.7)	0 (0.0)	0 (0.0)	0 (0.0)	76 (100.0)
	Primary	56 (40.9)	58 (42.3)	23 (16.8)	0 (0.0)	0 (0.0)	137 (100.0)
	Secondary	49 (26.1)	57 (30.3)	38 (20.2)	26 (13.8)	18 (9.6)	188 (100.0)
	Higher Secondary	14 (18.7)	13 (17.3)	23 (30.7)	3 (4.0)	22 (29.3)	75 (100.0)
	Degree	10 (7.6)	16 (12.1)	29 (22.0)	41 (31.1)	36 (27.3)	132 (100.0)

		First Person	Second Person	Third Person	Fourth Person	Fifth Person	Total
Occupation	Agriculture	131 (65.2)	70 (34.8)	0 (0.0)	0 (0.0)	0 (0.0)	201 (100.0)
	Professionals	32 (36.4)	9 (10.2)	22 (25.0)	12 (13.6)	13 (14.8)	88 (100.0)
	Business	21 (24.7)	19 (22.4)	12 (14.1)	18 (21.2)	15 (17.6)	85 (100.0)
	Students	37 (22.7)	15 (9.2)	51 (31.3)	38 (23.3)	22 (13.5)	163 (100.0)
	Others	32 (30.2)	14 (13.2)	22 (20.8)	25 (23.6)	13 (12.3)	106 (100.0)
Monthly Income	Less than Rs. 20,000	19 (26.4)	13 (18.1)	11 (15.3)	15 (20.8)	14 (19.4)	72 (100.0)
	Rs. 20001 to 40000	29 (35.4)	14 (17.1)	17 (20.7)	13 (15.9)	9 (11.0)	82 (100.0)
	40001 to 60000	61 (26.1)	51 (21.8)	37 (15.8)	39 (16.7)	46 (19.7)	234 (100.0)
	Above Rs. 60001	18 (19.8)	16 (17.6)	21 (23.1)	17 (18.7)	19 (20.9)	91 (100.0)

The economic status of the engineering students' family members is given in the Table-2 as first graduate from the family, second graduate from the family, third graduate from the family, fourth graduate from the family and fifth graduate from the family. The Table-2 shows that a majority proportion of the engineering students' Third graduate from the family (304 persons) were found to be in the age group between 20-40 years, with 87 persons in the fourth person category, accounting for 28.6 per cent. In 40 and above age group, there were more family members in the third category, about 28 per cent.

Among the engineering students' family members, there were 386 male and 257 female. The male dominated in the fourth person category with 89 persons (23.1 per cent), and the female dominated the fourth person category with 61 persons (23.7 per cent).

The educational qualification of the engineering students' family members is categorised into Illiterate, Primary, Secondary, Higher Secondary and Degree. The number of Secondary educated persons was the highest in First Person with 49 (26.1 per cent) family members. The illiterate persons appeared only in First and Second Person categories with 42 (55.3 per cent) and 34 (44.7 per cent) persons respectively. There were more degree holders (41 persons) in the fourth person category, accounting for 31 per cent.

There are different types of occupation engaged by the family members of the engineering students. As shown in the table, 201 persons were engaged in Agriculture, with 131 persons (65.2 per cent) in First Person, and no one in Third, Fourth and Fifth Person. For professional category, only 9 persons (10.2 per cent) were in Second Person.

The Monthly Income of the 234 family members of the engineering students was between Rs. 40001 to Rs. 60000, with 61 persons (26.1 per cent) in First Person. There were 29 persons (35.4 per cent) in First Person category having monthly income between Rs. 20001 to 40000.

TABLE 3
GEOGRAPHIC AREAS OF ENGINEERING STUDENTS

		IT	Core	Non-Core	BPO	Others	Total
Migration	Migrated	27 (26.5)	19 (18.6)	23 (22.5)	15 (14.7)	18 (17.6)	102 (100.0)
	Not Migrated	16 (26.2)	9 (14.8)	13 (21.3)	14 (23.0)	9 (14.8)	61 (100.0)
Years of Migration	Less than 10 years	8 (18.2)	7 (15.9)	10 (22.7)	14 (31.8)	5 (11.4)	44 (100.0)
	11-20 years	8 (19.0)	10 (23.8)	9 (21.4)	8 (19.0)	7 (16.7)	42 (100.0)
	Above 20 years	18 (20.7)	19 (21.8)	13 (14.9)	16 (18.4)	21 (24.1)	87 (100.0)
Reasons of Migration	Education	7 (28.0)	6 (24.0)	5 (20.0)	4 (16.0)	3 (12.0)	25 (100.0)
	Employment	17 (27.0)	13 (20.6)	12 (19.0)	9 (14.3)	12 (19.0)	63 (100.0)
	Family Migration	4 (28.6)	0 (0.0)	6 (42.9)	4 (28.6)	0 (0.0)	14 (100.0)
Type of Migration	Urban to Rural	0 (0.0)	4 (21.1)	7 (36.8)	0 (0.0)	8 (42.1)	19 (100.0)
	Rural to Urban	17 (39.5)	8 (18.6)	7 (16.3)	6 (14.0)	5 (11.6)	43 (100.0)
	Rural to Rural	0 (0.0)	0 (0.0)	7 (53.8)	2 (15.4)	4 (30.8)	13 (100.0)
	Urban to Urban	7 (25.9)	3 (11.1)	4 (14.8)	9 (33.3)	4 (14.8)	27 (100.0)

There were more migrated students engaged in IT field (27 per cent) and Non Core (23 per cent). Nearly half of the engineering students were migrated at their early ages and had lived more than 20 years in Coimbatore. Half of the students migrated because of the family members' employment. Among them, more family members were engaged in IT and Non-Core job categories. Out of the total 102 migrated engineering students, 43 students were migrated from rural to urban to improve their economic status. More IT students were migrants, with 17 persons (39.5 per cent). Next to that, 9 BPO students (33 per cent) migrated from urban to urban areas.

The engineering undergraduates are not well aware of certain skills need to be acquired for engineering profession as they underestimate the importance of communication skills in their future work. Several studies demonstrated that communication skills, problem solving and interpersonal skills are among the most valued employability skills or generic competencies considered more important than hard skills in engineering profession (Markes, 2006). Regarding the corporate expectations of the graduates in terms of skills from the corporate industry, they gave approximately 40 skills which were grouped into 20 distinct classes so that the analysis would be simplified. Domain Knowledge got the highest votes accounting for almost 50% of all the responses i.e. 359 out of 779 (Murali, 2015).

On getting their degree, contrary to their expectations, most of the graduated engineers feel disappointed and dejected. The main reason is that they are not employable, as they are not adequately equipped to meet the demands of the job portals. As poorly equipped both in hard skills and soft skills, they are ready to take up careers which are far below their technical qualifications. Most of the graduates have

taken up jobs even in BPO units, in call centres and as sales executives, where they could not find any link between their career and studies. And in the long run with disuse of whatever the engineering knowledge they gained in colleges, they tend to forget it and continue to remain under-employed or unemployed. Thus it becomes the universal cry that the quality of the engineers is quite poor (Srividhya and Vijayakumari, 2017).

The study shows that there is a strong need for raising awareness among the Indian graduates to know the employability skills required by the global talent market. We cannot blame the graduates for this reason. It is necessary to update the curriculum at regular intervals to cater the needs of the industry. Further, there should be long and sustainable plan to train our young graduates to raise their bar attaining jobs in the global talent market. It is essential to increase the industry-academia coordination. This will assure regular supply of talent to the global talent workforce. The research shows that the students with work experience have better awareness of the employability skills than the students with no work experience. Enhancing the skills and application of knowledge through specific training will enable the workers to perform their jobs in the best possible manner and that is the need of the hour (Chithra, 2013).

CONCLUSION AND RECOMMENDATIONS

The study and the responses got from the questionnaire it can be established that contrary to the 20th century when the corporate industries used to hire fresh graduate engineers based on their academic qualification shown through their marks and technical skills, now there is need for the graduate engineer to have other skills which may be categorized as soft-skills.

The findings of this study reveal the career needs of students in engineering who belong to the low socio-economic status. Strategies that were reported to increase the effectiveness of career development for university students with low socio-economic status included person-centred counselling skills, careers education across all courses to familiarize and normalize careers planning process, avoidance of jargon or assumptions of implicit knowledge regarding students requirements, ensuring careers practitioners aware of the experiences of students with low socio-economic status, up-to-date labour market information, and extending career support to students for at least two years after the completion of their studies. Parents' income levels exert sufficient influence for engineering schools and have considerable effect on the students.

India is one of the rising markets in the world. India's change from agrarian economy to an industrialized economy is lagging due to lack of skilled labour. Even in India, which produces 400,000 engineers yearly, corporations are searching it gradually more difficult to find the skilled workers they actually require. It is found that 75% of the Indian graduates are unemployable. There are a number of studies conducted in India to identify the employability skills of the students. Companies in India are finding that they have to promote people faster than ever before to meet their growth needs. At the same time, they are finding that the candidates do not have the necessary skills to make the transition from a technical or functional specialist to a team leader, supervisor or manager. Hard skills & soft skills both play different & important roles for your career. Hard skills are what will spark an employer's attention & get you an interview, while soft skills will help you advance once you're part of the company. A person can't grow in his job without a combo of both the skills (Santosh Mishra, 2016).

As a result of the findings of this study, we suggest the following recommendations. At education level, institutes should take initiatives to build employable engineering talents by:

1. Emphasizing on teachers training under 'train the trainer' programs.
2. Focusing on teaching methods/pedagogy mandatory for engineering college and university teachers. Moving out of the student friendly examination and assessment pattern.
3. Areas of the curriculum encompassing professional training and mathematics need to be reinforced and supported by appropriate teaching techniques along with increased interest in the student as a learner to increase the placement process.

4. Exploring the techniques of teaching by engineering education teachers and administrators emphasizing the core subjects to face the competitive exams.
5. Incorporating other opportunities into the curriculum for students to practice self-assessment, especially as this is pivotal to Personal Development Planning.
6. Initiating apprenticeship programs by Corporate that would allow students to experience real life work environment for enhancing their skills. The senior and middle-level managers can adopt students as a part of mentorship program, wherein the students can benefit in both their academic and professional lives.
7. Getting the best minds of the field to share their knowledge with the students enhancing the assessment and accreditation system to ensure quality in the Higher education programmes.

ENDNOTES

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