

Job opportunities and challenges to the employability of Fresh Diploma Engineers of West Bengal state in the emerging sector

Suman Sikdar, *Department of Mechanical Engineering,*
Technique Polytechnic Institute,
Hooghly, West Bengal, India
sikdar.suman@gmail.com

Abstract— Advancement in technology is creating new job opportunities as well as new challenges to the employability of the Fresh Diploma Engineers. Rapid advancement in technology in emerging sectors like solar energy, electric mobility, automation, artificial intelligence, financial technology will affect every occupational group in the future. It has been estimated that 47 % of the current jobs are expected to be taken over by machines and devices during the next two decades. On the other hand, 65,000 (sixty-five thousand) new IT jobs will be created by 2024, mostly in cloud related fields. Changes in consumer behavior generate new opportunity for entrepreneurship in the engineering, technology and management fields. This ever-changing technology creates “skill gap” between the desired skills sets and the available skill sets. This skill gap has to be compensated by learning new skills – both technical skills and professional skills. I have taken into account the following 3 objectives to study the opportunity and challenges in the emerging sector.

Objective of this research is

- To estimate the current number of graduating Diploma Engineers from polytechnics in West Bengal and rest of India.
- To find out the emerging sectors of Indian economy where job opportunities are created for Diploma Engineers.
- To find out the challenges to the employability of Fresher Diploma engineers from West Bengal state in those emerging sectors

Diploma Engineers, Institute Faculty, Placement agency, Government and Private Skill development agency will be benefited from this study.

Keywords— *Employability, Polytechnics of West Bengal , Diploma Engineers, job opportunity, challenges to employability, emerging sectors*

I. INTRODUCTION

Employability :

Employability is the quality of being suitable for paid work.

The Confederation of British Industry (CBI) (2009) defines employability as: “A set of attributes, skills and knowledge that all labour market participants should possess to ensure they have the capability of being effective in the

workplace – to the benefit of themselves, their employer and the wider economy”.

Emerging Sector :

An emerging sector is one that is new or relatively new, is growing fast and is expected to become an important sector in the future. This sector is rising due to the evolving change in the needs, taste and preference of the changing population. This sector is likely to generate higher employment and self-employment for the Engineers and Technocrats. I have identified 10 major emerging sectors of our economy where fresher diploma engineers can secure jobs. These emerging sectors are expected to generate larger employment and better income opportunity . Career growth is faster in these sectors.

Diploma Engineering Programmes :

Diploma Engineers are those who have completed 3 Years Diploma Engineering course from the polytechnics. Major Diploma Engineering courses are Mechanical engineering, Electrical engineering , Civil engineering , Electronics & telecommunication engineering, Computer-Science & Technology, Mining engineering , Architecture engineering, Metallurgical engineering, Footwear Technology, printing technology etc. There are also special Diploma Engineering Courses which can be studied.

Polytechnics in West Bengal :

I have studied about the Polytechnics system education in West Bengal state. All these polytechnics, Government, Sponsored, centrally funded and Self-Financed, are affiliated to West Bengal State Council of Technical and Vocational Education and Skill Development (WBSCT&VE&SD) and approved by All India Council of Technical Education (AICTE). There are currently 183 polytechnics in West Bengal. Every year approximately 25,000 Diploma Engineers complete their courses from polytechnics in West Bengal are ready for jobs or entrepreneurship. This study will guide the budding diploma engineers to acquire jobs in the emerging sectors. They can acquire the skill-sets as per the demand of the job market.

Self-employment / Entrepreneurship :

Entrepreneurship refers to all those activities which are to be carried out by a person to establish and to run the business enterprises in accordance with the changing technological, social, political and economic environments. Entrepreneurs introduce new business ventures to meet the expectations of the changing consumer demands.

Challenges to Employability : The emerging sector comes with new challenges. This ever changing technology creates more Skill Gap. Skill gap is the difference between the desired skill and available skill of an individual / group of individual / employees. This skill gap has to be compensated for through learning new skills – both technical skills and professional skills. Desired skills will not be sufficient to match with the available skills. One has to be a lifelong Learner to remain updated. I have studied those skills to be acquired as well as the challenges faced by the engineering students in the post Covid-19 world.

II. LITERATURE REVIEW

- *PWC Report. Will Robots really steal our Jobs ?*

“any job losses from automation are likely to be broadly offset in the long run by new jobs created as a result of the larger and wealthier economy made possible by these new technologies. We do not believe, contrary to some predictions, that automation will lead to mass technological unemployment by the 2030s any more than it has done in the decades since the digital revolution began”

- *India Skills Report 2021, Powered by Weebox . KEY INSIGHTS INTO THE POST-COVID LANDSCAPE OF TALENT DEMAND AND SUPPLY IN INDIA*

“Forbes states that the online learning market alone is estimated to grow to \$350 billion by 2025. With the connectivity of the internet and online learning, a vast Indian talent pool stands to benefit by acquiring skills necessary to the changing employability landscapes.”

- *India Skills Report 2022, Powered by Weebox*

“Maharashtra, Karnataka and Tamil Nadu were identified as the top states where maximum hiring activity will occur in the coming year”

III. 1ST OBJECTIVE OF THE RESEARCH

To estimate the current number of graduating Diploma Engineers from polytechnics in West Bengal and rest of India.

THE POLYTECHNIC SYSTEM AND DIPLOMA ENGINEERING EDUCATION OF WEST BENGAL

The 3 Years diploma engineering courses of West Bengal is under the affiliation of West Bengal State Council of Technical and Vocational Education and Skill Development (WBSCT&VE&SD). This can be studied in polytechnic

colleges. 40 Diploma Engineering courses are run by the State Council in the Polytechnics under their affiliation. Furthermore, all these polytechnics are approved by All India Council of Technical Education (AICTE). AICTE is the national-level apex body for promotion and development of technical education in the country in a coordinated and integrated manner. AICTE was vested with statutory authority for planning, formulation, and maintenance of norms & standards, quality assurance through accreditation etc.

As on 1st June, 2011, West Bengal had a total number of 65 Polytechnics, 40 being Govt. & Govt. Sponsored and 25 self-financed. Total intake was 17,185 before 1st June, 2011. Substantial growth has been registered and now the total number of Polytechnics across the West Bengal State has reached to 183, out of which 73 are Govt. Polytechnics, 3 are Govt. Sponsored, 2 are Centrally Funded Diploma Institutions and 105 are Self-Financed. The intake capacity in Polytechnics has now gone up to 39,955 in 2020-21.

Major Diploma Engineering course :

Mechanical, Electrical, Civil, Electronics, Computer-Science, Mining, Architecture, Metallurgical, Footwear Technology

Special Diploma Engineering courses :

Automobile, Survey, Instrumentation & Control, Packaging Technology, Geographic Information System and Global Positioning, Chemical, Food Processing Technology, Cyber Forensics and Information Security, Renewable Energy, Printing technology , Photography, Multimedia Technology.

Number of Polytechnics in West Bengal, courses and total intake as on 2020 – 2021

Number of Diploma Engineering courses run by Polytechnics of West Bengal	40
Number of Government Polytechnics (A)	73
Number of Government sponsored Polytechnics (B)	3
Number of centrally funded Diploma Institutions (C)	2
Number of Self-Financed Polytechnics (D)	105
Total Number of Polytechnics In West Bengal (A+B+C+D)	183
Total Intake Capacity of all the polytechnics	39,955

The following chart provides data about the Number of AICTE approved Polytechnic Institutes, approved intake, student passed and the recorded placement of the polytechnics in West Bengal and rest of India.

Year	India / West Bengal / Maharashtra	Number of Institutes	Approved Intake (A)	Student passed (B)	Passed / Intake % (B / A)	Placement (C)	Placement % (= C / B %)
2017 - 2018	All India	3,921	12,11,811	4,58,520	37.8	1,95,379	42.6
2018 - 2019	All India	3,783	11,28,167	4,48,379	39.7	2,04,052	45.5
2019 - 2020	All India	3,711	10,46,335	3,67,279	35.1	2,02,257	55.1
2020 - 2021	All India	3,667	10,11,323	-		1,75,716	
2017 - 2018	West Bengal	150	38,828	26,101	67.2	10,911	41.8
2018 - 2019	West Bengal	149	38,740	27,142	70.1	12,141	44.7
2019 - 2020	West Bengal	159	40,080	21,711	54.2	11,421	52.6
2020 - 2021	West Bengal	183	39,955	-		8,728	
2017 - 2018	Maharashtra	460	1,53,190	60,389	39.4	11,717	19.4
2018 - 2019	Maharashtra	424	1,33,297	61,217	45.9	15,601	25.5
2019 - 2020	Maharashtra	402	1,18,059	44,049	37.3	14,914	33.9
2020 - 2021	Maharashtra	393	1,11,637	43,000	38.5	12,345	

Interpretation of Data

- *West Bengal:* Out of 40 thousand Diploma Engineering seats in West Bengal, 25 thousand are passing-out every and only 11 thousand are getting placement immediately after completion of the course.
- *Maharashtra:* Out of 1.1 Lakh Diploma Engineering seats in Maharashtra, 43 thousand are passing-out every and only 14 thousand are getting placement immediately after completion of the course
- *All India:* Out of 11 Lakh Diploma Engineering seats All India, 4 ½ Lakh are passing-out every and only 2 lakh are getting placement immediately after completion of the course.
- *Placement:* Finding placement immediately after completion of course may be difficult. This placement data is essentially for those who have secured jobs through campus recruitment.

IV. 2ND OBJECTIVE OF THE RESEARCH :

To find out the emerging sectors of Indian economy where job opportunities are being created for Diploma Engineers.

10 EMERGING SECTORS IDENTIFIED AND CLASSIFIED

Emerging Sector: An emerging sector is one that is new or relatively new, is growing fast and is expected to become an important sector in the future. This sector is rising due to the evolving change in the needs, taste and preference of the changing population. This sector is likely to generate higher employment and self-employment for the Engineers and Technocrats. 10 emerging sectors of Indian economy have been identified here. Matching disciplines of the 3 Years Diploma Engineering courses are shown in the chart.

Employment in Emerging Sector : With respect to the job market scenario, it has been observed that courses like Diploma in Mechanical, Electrical and Electronics engineering are a major beneficiary in these emerging sectors. 25,00 Diploma Engineers are passing-out every year from West Bengal currently. These sector, all put together, is able to absorb almost all these Engineers who have the required skill sets and attitude. Example: Mechanical and

Electrical students can find jobs in Electric mobility, solar technology, automobile and auto-ancillary, battery technology etc. Computer science / IT / Electronics students can find jobs in Cloud computing, Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), Blockchain, Data Science etc.

Self – Employment in Emerging sectors: Emerging sector provides new opportunity for self-employment. Innovation is the buzzword now. The talented engineers who are able to develop innovative products and services and are able to form a company, can get self-employed. They can turn out to be good Entrepreneurs. Entrepreneurship refers to all those activities which are to be carried out by a person to establish and to run the business enterprises in accordance with the changing technological, social, cultural, political and economic environments.

Sl. No.	Emerging Sectors	Matching disciplines of 3 Years Diploma Engineering
1	Electric Mobility, Battery operated vehicles, Battery Charging & Infrastructure	Mechanical, Electrical, Automobile, Electronics, Mechatronics, Instrumentation
2	Automotive engineering / Auto-Ancillary	Mechanical, Automobile, Electrical, Electronics
3	Solar Technology, Bio-Fuels	Electrical, Electronics, Instrumentation, Mechanical, Renewable Energy
4	Environmental engineering and sustainability, Survey, GIS / GPS, Mapping, remote sensing, agricultural engineering	Survey, Civil, Geographic Information System and Global Positioning
5	E-commerce, Supply Chain Management	Any Diploma
6	Telecommunication Infrastructure & Hardware, wired and wireless communication	Electronics, Electrical, Instrumentation,
7	Robotics and Automation, Sensor Networks, Drones technology	Mechanical, Electronics, Instrumentation, Mechatronics
8	Cloud computing, Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), Blockchain, Data Science, Cyber Security, Educational Technology, Apps Development, Virtual reality, Image and Video Analytics	Computer Science, Electronics, Cyber Forensics and Information Security
9	3D Printing, Modern Manufacturing processes	Mechanical, Electronics, Instrumentation, Mechatronics
10	Financial Technology	Computer Science, Any Diploma

V. 3RD OBJECTIVE OF THE RESEARCH:

To find out the challenges to employability of Fresh Diploma engineers from West Bengal state in those emerging sectors.

THE CHALLENGES TO EMPLOYABILITY FACED BY FRESH DIPLOMA ENGINEERS OF WEST BENGAL

- 1) *The pandemic effect:* With the coming of the pandemic Covid-19 and lockdowns from March, 2020 till February, 2022, the engineering education has suffered badly. Classes were held online in this period. Engineering streams like mechanical, electrical, electronics, civil, survey, mining where practical classes are much needed, was not held. Consequently, there is a learning gap of 2 years or less for the batches taking admission in the year 2017, 2018, 2019, 2020 and 2021. This has badly affected the skill-sets of the students both in terms of social skills and technical skills. Many of these students are also not willing to relocate to other places due to memory of lockdowns. Also, due to bad health conditions and lethargy some of them are unwilling to take –up field jobs like survey or mapping or machine operator in factory.
- 2) *The problem of Migration:* Gurgaon, Noida, Delhi-NCR Region, Pune, Chennai, Hyderabad are the geographic locations where majority of the companies are currently located. Also, new factories, service centers, distribution networks are coming up in these geographic locations. Therefore, students of West Bengal will be required to migrate to these places for career opportunities. In most cases the migrating students need to arrange for their own accommodation near the factory; they are required to adapt to the local language, food habits and culture. The starting salary / stipend they get minus the living expenses may not be sufficient for them to save money. Therefore, these students from West Bengal expect a good starting salary. Those who do not get a good starting salary and don't want to migrate may not find suitable and matching job in West Bengal state. This creates unemployable educated youth.
- 3) *Only One Child of the Parents:* Most students nowadays are from a family where he / she is the only one child of the parents. Some parents, especially from well-to-do families, are reluctant to send their only child to other states for better opportunity. Whatever job they get in the West Bengal state, they adjust to the situation.
- 4) *Widening Skill Gap:* Skill Gap = Desired Skill Minus the Available skill. The skill gap gets widened with the rapid increase of technology. Engineers unable to upgrade their skills, fall back. New courses will have to be learned, good habits to be cultivated to work in the emerging sectors. This skills gap needs to be reduced as much as possible through continuous skills training programmes.
- 5) *Need for Skills Training:* It has been estimated that 47% of the current jobs are expected to be taken over by Machines during the next 2 decades.

Advancement in technology will affect virtually all occupational group in the future. Skills Training, both soft skills and domain skills, is necessary to work in these emerging sectors. Since the technology used by emerging sectors is new, availability of the good Training institutes and Trainer/Teacher aware of this new technology are very few. These Diploma Engineers will have to self-learn these technologies and make them ready for the industry. Therefore, continuous learning, skilling, re-skilling, upskilling is mandatory for Engineers in the emerging sector.

- 6) *Newer Professional Skills gaining value:* Professional skills are essentially those related to personality, behaviour and health. These are the professional skills which continue to be in demand both in the current and future job market. Some of the Diploma Engineers lack these skills.

- Teamwork, collaboration, social skills & Emotional balance
- Communication skills & story telling – both written and verbal
- Planning, organizing & problem-solving skills
- Innovation and Creative thinking
- Leadership and Influencing ability
- Good Health and fitness

VI. CONCLUSION

Trust this study gives a clear picture in the minds of the reader about the future job market in the emerging sectors, the current number of graduating Diploma Engineers from polytechnics in West Bengal and the challenges to the employability of Fresher Diploma engineers. This study is expected to benefit fresher Diploma Engineers and those agencies and institutions engaged in technical education and skill development.

REFERENCES

- [1] PWC, Impact of Automation on Jobs. Will Robots really steal our Jobs ?
- [2] India Skills Report Weebox – 2020, 2021, 2022
- [3] A Study On Employability Of Engineering Students In Mumbai And Pune Region, KEERTHI MENON
- [4] Role Of Employability Skills In Management Education: A Review Dr M Nishad Nawaz, Dr.B.Krishna Reddy
- [5] CURRENT SITUATION OF SKILLS AND EMPLOYABILITY IN INDIA: ENGINEERING EDUCATION PERSPECTIVE. Jagdeep Singh and Mamta Kumari
- [6] <https://www.mckinsey.com/> Demand for technological, social and emotional, and higher cognitive skills will rise by 2030. How will workers and organizations adapt?
- [7] EY , Future of Jobs in India – A 2022 Perspective
- [8] Entrepreneurship Management, MBA study material , Pondicherry University
- [9] Economic Times
- [10] Business Standard
- [11] <https://webscte.co.in>
- [12] <http://www.wbtetsd.gov.in/>
- [13] <https://www.aicte-india.org/>