Skill Development in Electronics Sector: A Tool for Employability

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Abstract- The demand for electronic products in India has been tremendously increased and it is projected to increase in the next decade also. The education/skill development system in India at both formal as well as non-formal level needs the improvement to meet the emerging requirement of the electronics sector. The Government of India has initiated several initiatives for the development of electronics sector in the country for both domestic as well as to serve the International market by creating an enabling environment for increasing the numbers of skill providers (both in public and private domain) to address the emerging human resource requirements for electronics sector. Also, India has large young talent and low wage costs, needs improvement to meet the emerging requirement of the electronics sector, to give a unique opportunity to consider India as a destination in this sector and be part of the next largest Electronic Manufacturing Hub of the world and also provide value added manufacturing, involving medium and high technologies. This paper discusses on the effectiveness of aiding students/unemployed youth through skill development training in electronics sector to increase their employability to work in 'Manufacturing' and 'Service support' functions. This paper also discusses the best practices for a training provider in terms of the growth of electronics Sector, whether it makes a difference to people, groups, organizations or communities.

Index Terms- Electronics System Design and Manufacturing, Skill Development, Employability, growth of ESDM sector, Electronics Manufacturing hub.

I. INTRODUCTION

Education, skill development and continuous learning are the three drivers of employability (ILO, 2011). They not only reduce unemployment but also improve the living standard of the workers and in turn improve the economy. In education, the large drop outs are at an age of 15 years, largely females. Besides, the low literacy and obsolete training results in the failure to meet industry requirements and offer jobs to the people. India is one of the largest and fastest growing electronics markets in the world with a Compound Annual Growth Rate of around 66.1% and is expected to grow to 30%. In India, the electronics market is divided into 6 segments viz. Consumer electronics, Industrial Electronics, Computers, Communication and broadcasting equipment, Strategic electronics and Electronic components. The Indian Electronics System Design and Manufacturing (ESDM) industry is at a huge inflection point. From being predominantly consumption driven, the Indian Electronics industry has a major potential to become a design led manufacturing industry. The employment in the Electronics industry is estimated to grow phenomenally.

India is at its middle of skill development initiative in the electronics sector, to improve the unemployment ratio and improve standard of living, the industry has already partnered through government with National Skill Development Corporation (NSDC) and Sector Skill Councils (SSCs) in designing course curriculum, creating standards and course content (Tara, S.N. et al, 2016). The industry has been already using National Skill Qualification Framework (NSQF) for designing course curriculum and deciding the levels of learning outcomes. To transform India into a premier ESDM hub, Government of India had taken an initiative, to create an eco-system for a globally competitive Electronic System Design and Manufacturing sector in the country and to achieve a turnover of USD 400 billion by 2020 and employ 27.8 million (approx.) at various levels by 2022. ESDM is of strategic importance, not only in internal security and defense but also in the pervasive deployment of electronics in civilian domains such as telecom, power, railways, civil aviation, etc. The government had also set up an Electronics Development Fund to support innovative start-ups in the industry and established partnerships with state governments, industry bodies, and foreign partners to develop a strong ESDM industrial base. Various departments in Government of India took the initiative for skill development, e.g. Pradhan Mantri Kaushal Vikas Yojana(PMKVY), Deen Dayal Upadhyaya Grameen Kaushalya Yojana(DDU-GKY), Pradhan Mantri YUVA Yojana(PMYY), Pradhan Mantri Kaushal Kendra(PMKK).

II. RESEARCH METHODOLOGY

This study was conducted by collecting data through surveys and interviews. The structured questionnaires were designed for the survey

and aligned to specific stakeholder(s) of Skill Development. Two separate questionnaires had been designed to focus two different categories of stakeholder of Skill Development: (1) Students/unemployed youth who availed Skill Development training: 1,95,440 trained and certified through assistance by Government, (2) Training Providers: 1900 who have trained students/unemployed youths, and demand of the industry in electronic sector was also reviewed to compare the course trained and need of Electronics industry.

The questions captured the relevant aspects of social-economic impacts. Structured and semi-structured interviews were conducted. Parameters considered to analyze are: trainings process followed by the Training Providers, ICT infrastructure at the centres, involvement/development of number of students, methodology used for training by faculties, Course selected for training, requirement of industry, employment created. The data collected through the survey was studied, analyzed using statistical technique and conclusions were drawn. For analyzing the socio-economic impact(as shown in Figure-1), the entire data were converted and transformed into ordinal and nominal scales. The independent variables include: Training Partner (Infrastructure) Support and Student (Trainee) Satisfaction were measured using five-point Likert Scale (where, 1: Highly Satisfied and 5: Highly dissatisfied). The dependent variables considered for the study were Employment Status and Socio-Economic Status. Employment Status was measured as a nominal scale with categories as Suitable, Suitable but not best and Unsuitable. Socio-Economic Status was measured using five-point Likert Scale (where, "1"indicates Highly Agree and "5" indicates Highly Disagree). Keeping in view the objective of the study, the statistical test used for analyzing the data were Chi-Square test and Multi-Regression.

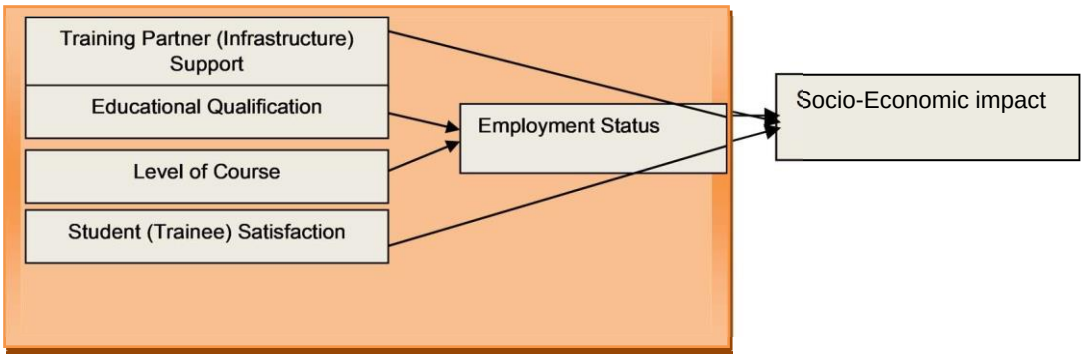

Figure 1: Conceptual Framework: Socio-Economic Impact

III. DATA ANALYSIS AND FINDINGS

In order to understand and integrate various perspectives, to bring Best Practices has to be followed by a Training Provider. The training courses being imparted at the Training Center are chosen based on the baseline data and skills gap assessment done by them. All the courses offered by the training providers are to be at appropriate NSQF levels. The courses conducted at the Training Centres had an adequate mix of technical skills, soft skills and field exposure needed for the job. Also, the open-ended questions through semi-structured interviews provided rich information for this study, and was analysed on multiple dimensions using both quantitative and qualitative methods.

A Quantitative Approach: Training Providers for the skill development in the electronics sector should follow the methodology as best practices to fill the gap of trained manpower requirement. They have to facilitate the students with Computers lab, Qualified faculties/trainers, fully equipped classrooms and associated course labs as per requirement of course.

- Training Partner has to maintain tie-ups and networks with Industry for respective Courses. They have to actively search and initiate for placement drives. Training Partner can align with Industry for apprenticeship programmes to provide hands-on experience to aspirants. They should provide necessary support to promote Entrepreneurship / Self Employment.
- Placement Policy: One of the major requirements is employability. The training partners in coordination with industry are responsible for arranging the placement drives. This may include: participating in job fairs, tie-ups with industries for regular placements.
- Infrastructure Facility: All the training centers reviewed across the nation were equipped with necessary infrastructure such as required classroom, comfortable seating arrangements to students, computer & projector for teaching, internet facility, white boards & accessories to conduct the class, medical facility, cafeteria and other basic facilities required as a Training Centre. It was observed that some of the training providers arranged boarding and lodging facility for the students who are from far-flung places.
- Laboratory and tools: The objective of the Skill Development in the Electronics Sector will lead to employability. Accordingly, all the courses in this scheme are practical and industry-oriented courses. All the training centers reviewed during the conduct of training period were equipped with necessary laboratory equipment such as computers hardware and tools as per requirement of the courses. It was specifically noted during the interaction with the students that more than employment or new skills learned, students are motivated due to improvement in handling the tools and experiments with them. Even though the tools, equipment and knowledge required for the courses in L4 & L5 such as Solar Panel Installation Technician, Embedded System Design using EIGHT-bit Microcontrollers, etc. are sophisticated, Training Partners made those available for the students for better understanding and learning.
- Courses Offered: The list of the courses offered by the training partner is found to be varied and intended for enhancement of skills and competencies. The linkage between industry and training partners, the commitment of industry to provide employability in terms of market demand increased motivation among the students. Majority of the courses are from Computer Applications, promotion of electronics skills and service-oriented courses. The quality of the courses reflected in terms of

coverage of syllabus, duration of the course, assessment, feedback, employment opportunities, job opportunities in employment market etc., are found to be adequate. During the operation of curriculum, adequate practical training, home assignments, need based curriculum and practical aspects have been taught.

- Students satisfaction: Students felt that the courses enhanced their skills and competencies leading to their employability and securing the jobs and also in performing jobs that they have acquired. Students are confident enough to get gainful employment after completion of the course and one fourth each felt that it paves a way to enter into the self-employment. The quality of the courses in terms of coverage of syllabus, generation of employment skills, hands-on training, assessment, arranging resource persons, feedback, extent of employment opportunities, scope of the job in the local market etc., is satisfactory. It is also observed team that most of the students want to pursue the job in their hometown, mainly students from West Bengal and North East are more inclined towards job opportunity at their native place.
- Trainers Quality: Trainers were having minimum of three years' experience in the relevant field, Computer Science/Information Technology, Mechanical Engineering, Electronics Engineering, required for the course. They were diploma holders, graduates/engineering graduates or MCA graduates. Trainers were also exposed to the industry for understanding current practices followed by them. Largely the feedback from the students about the trainer is the satisfaction in terms of content delivery, providing practical exposure, clearing the doubts, providing enough time in laboratory work, quality of assignments. It is observed that the prime motivator for the enrollment is trainers followed by parents and friends. The motive for their enrollment is to enhance their employment opportunities followed by to secure employment and enhance managerial skills to support their families. Apart from regular trainers, industry experts are used frequently to provide practical knowledge in the courses taught. Also, in some Training Centres, ex-students were motivated to become trainer in their centres.

B. Quantitative Approach: The findings of the Quantitative Approach are discussed in respect of Socio-economic aspects. A total of 2,83,634 students were registered for the skill development in electronics sector and 66% of students, i.e.1,95,440 students, could be certified after successful completion of training and assessment.

Table 1: Status as per Level of Courses out of total

Percentage of Students in Scheme 1 & 2	Level 1 and Level 2 (%)	Level 3 (%)	Level 4 (%)	Level 5 (%)
Registered Students	20.89	27.49	39.01	12.59
Certified Students	19.28	30.14	37.97	12.60

Registration and Certification for Level 3& 4 courses are more in comparision to Level 1,2 and 5 courses. There were 59 courses offered by the Training Providers for the Skill Development and 70% of the total enrolled students, i.e.1,98,848 students are enrolled in 20 courses only.

Table 2: List of top 20 courses in terms of students' Registration

Course Name	Course Level	Students Registered	% of Registration out of total registered students
Installation Technician - Computing and Peripherals	L3	42317	14.92
Field Technician Computer& Peripherials	L4	29459	10.39
Handset repair Engineer (Level II)	L4	24599	8.67
Assembly & Maintenance of PCs	L1-L2	23898	8.43
Field Technician Networking and Storage	L5	15029	5.3
DTH Set-top-box Installer and Service Technician	L1-L2	9566	3.37
Installation & Maintenance of Photocopiers and Printers	L1-L2	9415	3.32
Telecom Technician- PC Hardware and Networking	L4	5874	2.07
Optical Fiber Splicer	L3	5013	1.77
Repair & Maintenance of Power Supply, Inverter & UPS	L3	4667	1.65
CHM - A Level	L5	4351	1.53
Optical Fiber Technician	L4	4231	1.49
Broadband Technician	L4	3740	1.32
CHM- O Level	L4	3358	1.18
Field Technician AC	L3	3065	1.08
Repair & Maintenance of Power Supply, Inverter & UPS	L4	2605	0.92
Field Engineer RACW	L5	2511	0.89
Installation Engineer SDH & DWDM	L5	2243	0.79
Field Engineer RACW	L4	1503	0.53
DTH Set-top-box Installer and Service Technician	L3	1404	0.5
Total		**198848**	**70.11**

Multi-Regression Analysis were conducted out to analyze the effect of independent variables (Training Partner (Infrastructure) Support, Student (Trainee) Satisfaction and Employment Status) on the dependent variable (Socio-Economic Status). The results are indicated in table 1(k) with model equation as show in (a). The table indicates p-value less than 0.05 with t- value = 48.088 and level of significance = 0.05) for Employment Status, t (17.613, 0.05) for Training Partner (Infrastructure) Support and t (71.647, 0.05) for Student (Trainee) Satisfaction. Hence, rejects the Null hypothesis. The beta values indicate the Standardized Coefficients with Y-intercept = 0, the slope of regression line is 0.280, 0.098 and 0.415. The regression model indicates total of 0.027 random error.

Table 3: *Regression Analysis*

Coefficients								
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**95% Confidence Interval for B**	
			Std. Error	**Beta**			**Lower Bound**	**Upper Bound**
1	(Constant)	0.150	0.021		6.973	.000	0.108	0.192
	Employment Status	0.271	0.006	0.280	48.088	.000	0.260	0.282
	Training Partner (Infrastructure) Support	0.278	0.016	0.098	17.613	.000	0.247	0.309
	Student (Trainee) Satisfaction	0.371	0.005	0.415	71.647	.000	0.360	0.381

a. Dependent Variable: Socio-Economic Status

Model Equation: Socio-Economic Status=0.280ES+0.098TPS+0.415SS---------- (a)

Where, ES: Employment Status; TPS: Training Partner (Infrastructure) Support; SS: Student (Trainee) Satisfaction

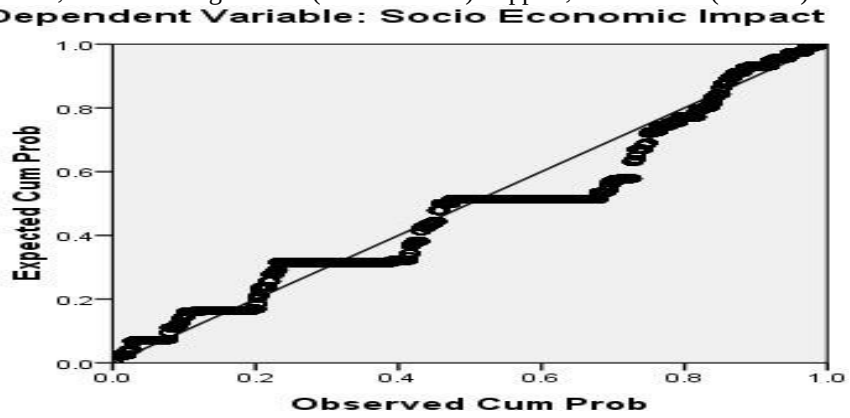

Figure 4.32: Normal P-P Plot of Regression Standardized Residual

The result implies a positive linear relationship between Employment Status, Training Partner (Infrastructure) Support, Student (Trainee) Satisfaction and Socio-Economic Impact. The line equation indicates that with a percentage increase in Student (Trainee) Satisfaction will lead to about 41.5% increase in the Socio-Economic Status. Similarly, with a percentage increase in Employment, it will lead to 28% increase in the Socio-Economic Status.

IV. CONCLUSION

As students' mobilization is one of the key activities to encourage candidates to avail the opportunity to develop skill in the electronics sector, it is concluded that building ecosystem for skill development in electronics sector through Training Providers by supporting them for student mobilization and job opportunity. The prime motivator for the enrollment is trainers followed by parents and friends. The major issues with Training providers in respect to placements is that even though they possess Letter of Indents (LoIs) for industry linked batch allotments but these LOIs are not approved by authority which leads to failure in their efforts and discontent among them. It is also concluded that Semiconductor industry is right now trending in electronics industry, but when while compared with skilled manpower in semiconductor domain, it is nearly negligible.

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