ESTABLISHING SUSTAINABLE INDUSTRY INSTITUTE PARTNERSHIPS- CASE STUDY OF AN ENGINEERING COLLEGE

Ramaswamy. C
Dr. Brahadeeswaran. D

Abstract

The need for establishing partnerships between Industries and Engineering colleges is brought out by review of relevant literature. The Case studies of two centers established by Dr.Mahalingam College of Engineering and Technology, Pollachi in collaboration with leading industries namely Sakthi Auto Component Limited (SACL) and BOSCH Rexroth have been described in this paper. For each case the profile of the partnering industry, objectives of the partnership, inputs provided by the college and the industry, activities carried out, results accomplished and benefits to the college, industry & the society are described. Further the challenges faced and lessons learned and their usefulness to other educational institutions & industries have been highlighted

Key words*: Industry Institute Partnership, AICTE – CII survey , SACL,BOSCH Rexroth.*

1.0. Introduction:

The National Association of Software and Services Companies (NASSCOM)[1] in its 2011 report has stated that 75% of Indian engineering students are not fit to be employed. Technical education institutes have to partner with industries to improve the relevance and quality of education especially its practical component. This will help to educate and prepare students to be future-ready. Engineering colleges and industry which for long have been operating in separate domains, are rapidly moving closer to each other to create synergies. The theoretical strength of the institutions and the practical experience of the industry will be synergized when they join hands. A productive interface between academia and industry is a critical requirement for the development of any nation in this era of knowledge economy.

2.0. Need for Industry Institute Partnership:

The journey of cooperation between industry and educational institute has taken different forms at different times. Historically, it started with simple interaction and gradually evolved to very close partnership overtime. According to Majumdar (2008a)[2], there has been a wide variety of interactions practiced among industries and institutes which includes problem solving, curriculum development, study visits, scholarships, and apprenticeship training and incubation centre. However, until the time that the concept of public private partnership has evolved, industry, has, by far, not been involved in taking sustainable financial, technical and operational risks in the design, financing and building and operation of educational projects. Therefore, public-private partnership has been regarded as a natural progression of relationship from interaction elevated to structural partnership where the private sector assumes substantial operational risks in the design and implementation of educational projects.

Researchers like Chakravarty (2006)[3], Murty (2002)[4], Shollapur (2008)[5] and Ghatol et al.(2004)[6] have elaborately described the need for Industry Academic Partnership for sustainable development of technical and vocational education training.

Corporate Social Responsibility is defined by the World Bank as "the commitment of businesses to behave ethically and to contribute to sustainable economic development by working with all relevant stakeholders to improve their lives in ways that are good for business, the sustainable development agenda, and society at large".

The debate around CSR is gaining full momentum and is increasingly relevant for economic development of the Asia-Pacific region (Larsen, 2007)[7]. The growing importance of CSR has made many industries in India willing to establish partnerships with the technical education institutions.

Atienza (2008)[8] has stated that Industry-Institute interaction sets the momentum for engaging into public-private partnerships to map out strategies and initiate an integrated approach to technical and vocational education and training for socio-economic development. The shift from labor-intensive to knowledge-based economy reinforces the academic component that needs to be considered in the business models implemented by industries, while industrial processes, skills requirements and business models need to be well-accounted for in educational and training planning and implementation.

As observed by Majumdar (2008b)[9], the perennial and persistent cry of most of the industries in the Asia Pacific Region is that engineering graduates turned out by the system lack in the requisite skills, knowledge, attitudes or values to meet their needs.

The importance of education as a strategy in skilling the future workforce for industries is vital, as industry training is inextricably linked to industry practices (Fien et al., 2008) [10].

The All India Council for Technical Education (AICTE) and Confederation of Indian Industry (CII) conducted a survey (AICTE – CII, 2012)[11] of Industry – Linked Engineering Institutes with the objective of showcasing best practices of Industry partnerships across AICTE approved Engineering Institutes in India. 156 Engineering colleges participated in the survey. The evaluation was done across seven parameters – governance, curriculum, faculty, infrastructure services, entrepreneurship and placements. The survey identified the key characteristics and best practices of the Institutes featuring on the top of the scoring ladder and areas of concern & common traits among those lower on the ladder. Key trends across the parameters have been brought out through this report. Linkages have been identified to study the relationships and interdependence across the key parameters. The report concludes by identifying a three-stage process of movement towards establishing a strong industry-institute linkage based on an understanding of the identified relationships. According to the report of the survey (AICTE – CII, 2012, p.15)[11] "to ensure active participation from industry, efforts should be made to initiate interactions at the operational level than just securing representation as member in the Board of Governors. Such operational – level interactions will enable more tangible rewards mutually".

2.0. Profile of MCET:

Dr.Mahalingam College of Engineering and Technology (MCET) was established at Pollachi in 1998, by Arutchelvar Dr.N.Mahalingam who is the Chairman of Sakthi group of industries. It is a self-financing co-educational, autonomous Institution, approved by AICTE and affiliated to Anna University. It conducts 9 UG & 6 PG programmes.

The college has been accredited by NAAC with 'A' Grade in 2012 and 6 UG programmes of it have been accredited by NBA. The college has established 14 value added training centres & 6 centres of excellence in collaboration with industries. AICTE funded Entrepreneurship Development (EDP) cell and Industry Institute Partnership (IIP) cell are functioning in the college.

3.0. Past achievements of MCET in partnering with industries:

3.1.1. Particulars of Partnerships with industry:

MCET has established partnerships with a total of 40 industries. It has signed MoU with 14 industries. The particulars of MoUs signed are presented in Table 1:

A generic list of activities carried out by MCET in collaboration with industries is listed below:

- Industrial visit and training for faculty and students
- Student In plant training
- Industry based project work of students
- Consultancy services
- Joint Research activities.

Table 1: Particulars of MoUs signed with Industry

S. No	Industry	Year of signing MoU	Purpose
1	Accel IT Resources Ltd, Chennai	2000	Training course on Computer Hardware & Networking Embedded Design
2	Cisco systems, Chennai	2002	Training in Networking
3	TUV Academy, Bangalore	2004	Training courses on TPM & Kaizen
4	Oracle India (P) Ltd., Bangalore	2008	Oracle 10G: PL/SQL Course on Oracle10G:Database Administration Fundamentals-I
5	Yokogawa India Ltd, Bangalore	2009	DCS and PLC training course
6	Altair Engineering, Bangalore	2009	Training in Design Concepts
7	EMC^2 Corporation, Bangalore	2009	Training course on Information Storage & Management(ISM)
8	Kriatec Service (P) Ltd, Chennai	2009	Course on Edge CAM 2012R1
9	G Quotient Systems (P) Ltd, Chennai	2011	Course on Green IT
10	Bosch Rexroth India Ltd, Bangalore	2011	Training in Industrial Automation Technology
11	Sakthi Auto Components, Perundurai	2011	Training in Design concepts
12	Caresoft Global Ltd, Pollachi	2012	Software development under AICTE-NVEQF
13	Microsoft, Bangalore	2012	An innovation centre for Windows Mobile Application development
14	TUV Rheinland Centre for Advanced Training and NDT, Bangalore	2013	Training course on Welding technology

3.1.2. Unique features/key accomplishments of partnerships established:

1. Establishing state of the art facilities on campus to enable the students to undergo industry relevant specific specialization courses as electives or extra credit courses.
2. Opportunities for staff and students to do product oriented virtual analysis, software testing and testing components as per the parameters specified by renowned industries.
3. Providing opportunities for the students to develop their skills in IT enabled applications helping them to become entrepreneurs.

4. Opportunity for doing research with creative ideas for industry relevant applications covering varieties of domains viz., Hydraulics, Pneumatics, Sensorics, PLC, CNC, Motion Logic Devices & Mechatronics.
5. Study and application of PLM concepts relevant for manufacturing industries with specific focus on improving the life cycle of products and cost optimization.
6. Designing & organizing customized training programmes to fulfill the specific training needs of industrial personnel.
7. Awards and recognition for students' work by renowned industries.

4.0. Specific cases:

The case studies of two centres established by MCET in collaboration with leading industries namely Sakthi Auto Component Limited (SACL) and BOSCH Rexroth, are described in this section

4.1.0. CENTRE FOR DESIGN ANALYSIS & TESTING

4.1.1. Introduction:

Centre for Design Analysis & Testing (C-DAT) was established in 2011 by MCET in collaboration with SACL.

It provides "Concept to Product Design" solution to Automotive & Industrial Domains. Activities of CDAT include Design Engineering & Modeling, Computer Aided Engineering, Analysis & Testing. It is a ISO 9001:2008 certified testing center

4.1.2. Profile of the partnering industry:

Sakthi Auto Component Limited (SACL) is one among the multi-faceted Sakthi Group of organizations. SACL is manufacturing S.G iron castings and Gray Iron casting for Automotive industries and supplies fully machined and assembled condition parts to car manufactures like General motors, Volvo and exporting auto components to many countries including USA.

4.1.3. Objectives of the center:

1. To identify industry relevant projects and transfer them from SACL to MCET for mutual benefit.
2. To participate and help SACL in their Research and development activities.
3. To promote consultancy and training activities for the benefit of SACL personnel and to other engineering industries.

4.1.4. Inputs from MCET and SACL:

1. MCET has invested ₹2 crores.
2. SACL has made a capital investment of ₹2 crores besides providing technical inputs.

4.1.5. Methodology followed:

1. Setting up of the testing centre in an area of 4000 sqf.
2. Training of faculty of MCET and SACL by the supplier M/S Instron Pvt Ltd.
3. Imparting knowledge to faculty and students for conducting analysis and testing at CDAT.
4. Practical experience for students of mechanical and automobile branches through hands on training and learning experience
5. Virtual design, analysis and optimization of Auto components in "Altair Center of Excellence" at CDAT-MCET.
6. Testing and validation of the design at CDAT Developments of new materials for the cost benefit design. Research is going on in developing the automobile steering knuckle made up of Aluminum Metal Matrix composite and A
7. Us tempered Ductile Iron.
8. Sharing test results and R&D outcomes with SACL.

4.1.6. Results accomplished & Benefits to stakeholders.

4.1.6.1. Results accomplished:

1. Nearly 20 different types of testing projects related to automobile components of SACL worth of ₹40 lakhs have been completed so far.
2. Guided students' research and project work.
3. Testing services provided
4. Two faculty members are doing their PhD research work using the testing facilities
5. Three batches of undergraduate and two post graduate students have completed their academic project using the facilities.
6. One batch of undergraduate and three post graduate students are doing their academic project using the facilities

4.1.6.2. Benefits to stakeholders:

MCET:

1. Practical training experience to students of mechanical and automobile branch.
2. Guidance and in house support for the R&D activities of students and faculty members.
3. Publication of research papers (5 papers have already been published).
4. Generation of revenue through testing service.

SACL:

1. Validation of their components by CDAT for enacting them to ensure better customer satisfaction and relationship.
2. Students of mechanical and automobile branch become job ready.

4.1.7. Challenges faced and lessons learned:

1. Commissioning and establishment of testing center at rural location, breaking the mind set of creating these type facilities at cities only.
2. Updating the softwares.
3. Meeting the latest global requirements of the engineering industries expansion has to be done with large investment.

4.2.0. MCET BOSCH REXROTH REGIONAL CENTRE OF COMPETENCE IN INDUSTRIAL AUTOMATION TECHNOLOGIES (M-BRAIN)

4.2.1. Introduction:

MCET Bosch Rexroth Regional Centre of Competence in Industrial Automation Technology (M-BRAIN) was established in December 2012.

4.2.2 Profile of the partnering industry:

Bosch Rexroth (BR) is one of the German based world's leading drive and Control Company. The company provides customized solutions tailored to the needs and specifications of individual markets in 80 countries, with Indian Head Office at Bengaluru.

4.2.3 Objectives of the centre:

1. To train the students and staff (both internal and external) in industrial automation
2. To train industry personnel in the areas of Hydraulics, Pneumatics, Sensorics, PLC, CNC, Motion Logic Devices and Mechatronics
3. To pursue Research in Industrial Automation
4. To facilitate student's projects..

4.2.4. Inputs from MCET and the Industry:

- Bosch Rexroth : ₹2.5 crore
- MCET : ₹1.5 crore
- MCET provides space, human resources and other technical amenities
- Bosch Rexroth supplied hardware trainer kits, software, courseware manuals and teach ware modules.
- Training before installation and Refresher training after installation was offered by BR to faculty members

4.2.5 Methodology followed and activities launched:

4.2.5.1 Methodology followed:

The six phases are described below:

Phase 1: Bosch Rexroth trained the 12 faculty members of MCET from different disciplines at VTU – BR CoE, Mysore for one month in the areas of Industrial Automation technologies.

Phase 2: Erection and commissioning of trainer modules, coursewares and other related accessories in MCET premises with suggested layout by Bosch Rexroth Engineers.

Phase 3: Refresher training on the above said areas after having completed the commissioning of equipment.

Phase 4: Launching the centre and registering for courses on different individual or combined modules.

Phase 5: Organising training programme for students, staff (both internal and external) and industry personnel as an ongoing activity.

Phase 6: Research is carried out as a parallel activity.

4.2.5.2 Activities launched

The four activities are highlighted below

1.ReCAP-D- Research Capability Demonstration Initiative

In this initiative M-BRAIN will create R & D projects to show cause Bosch Rexroth capabilities and at the same time create artifacts useful to Bosch Rexroth in

1. Matlab & Simulink-xPC Block sets for Rexroth products.
2. LABVIEW simulation components.
3. Enterprise Architect based UML Patterns.

2. Stud Pro – Student Project Initiative

1. Provide students opportunity to use artifacts of Re Cap in Bosch Rexroth relevant projects.
2. Students can also try out their ideas with assistance from faculty members.

3. Mini StudPro – Student Mini Project Initiative

1. Provide student with varieties of short term project development.
2. Provide internship opportunities for student at M-BRAIN

4. Sci Base-E- Scenario Based Experimentation

Through this initiative one can create and innovate solutions to many Bosch Rexroth problems by applying block sets, Components and patterns created at M-BRAIN

4.2.6 Results accomplished & Benefits to stakeholders:

4.2.6.1Results accomplished:

Targets Achieved:.

1. 12 faculty members were trained through Train – the Trainer programme
2. Installation completed, ready to offer training at three levels- Modules, Certificates & Diplomas.

Targets estimated:

1. Training to internal students : 400 per year
2. Training to internal faculty members : 40 per year
3. Training to external faculty members : 20 per year
4. Training to Industry personnel : 50 per year

4.2.6.2. Benefits to stakeholders:

MCET:

- MCET students have enhanced their competency in industry automation technology.

- Students utilize the facility for their project (both software and hardware) work.
- Students perform experiments with the trainer kits for their mini project and extra credit courses.
- Faculty enrich their knowledge and expertise by utilizing the facility, learning the software and correlating this facility for the courses they teach.
- Faculty utilizes the facility for effectively pursuing their research.
- Faculty uses the facility to provide consultancy

Bosch Rexroth:

- Training of its future work force in a cost effective way.
- Creating interns.
- Availabilty of a platform for exhibiting its Product Development and R&D efforts.
- Creation of a rich library of block sets, components and patterns..

Society:

M-BRAIN is a value addition in this region, since it is one of the three centres in Tamilnadu. Technicians, entrepreneurs, small scale industrialists make use of this facility for their competency development and increasing productivity.

5. Conclusion

The two cases presented in the paper highlight the strategies to be adopted by Engineering Colleges and Industries to establish sustainable partnerships for their mutual benefit and for the development of the society.

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About the Authors

C. Ramaswamy, Secretary,
NIA Educational Institutions, MCET-NPTC campus, Pollachi- 642 003: secretary@drmcet.ac.in.

Dr.Brahadeeswaran D, Former Professor & Head, Dept of Policy Planning & Educational Research, NITTR-Chennai- 600 113: unnamala1947@gmail.com