SCIENCE PARKS AND ENGINEERING EDUCATION

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ABSTRACT

Development of a Nation today is more Technology Driven than ever before. Changes in economic and industrial scenario are rapid and even more rapid is the silent changes in the technology area. The revolutionary changes in technology today not only amuse us but also frighten us sometimes about our role in the future development. New technologies evaporate before they ossify. The traditional role of Engineering Educational Institutions as suppliers of human resource inputs to the industrial sector, and hence transformed as a mass production centres of teaching with little creativity, has to undergo a total reorientation to the emerging requirements and expectations. A direct linkage with the industry shall not only be useful to the industrial sector but also shall immensely help the faculty, institution and most of all the student community in their pursuit of academic excellence. The understanding of the importance of the role of Science Parks which provides the structural mechanism and direct linkages to the industry, for facilitating Enterpreneurship Development and Industry Institution Interaction is less felt in our engineering education system than in developed countries.

1. INTRODUCTION

Owing to the growing competition, globalization and subseqent changes in the economical scenario, institution of higher education, Engineering and Technical Institutions in the first place, have to prove their mettle as triggers and facilitators of suitable and efficient response for the above changes in order to occupy the place in which they are placed so far in our society. Especially in a developing country like India whcih requires higher growth rate and faster employment generation, it is quite natural to expect the Engineering Institutions to shoulder part of the responsibility of nation building by creating a dynamic entrepreneurial base. The culture, skill and attitude to be inculcated in the minds of Engineers to become an entrepreneurs, calls for an early, conscious and informed intervention strategies as a part of the curriculum. The role of Science Park is to provide an anvil for such a purpose.

2. THE BARRIERS AND THE PROSPECTS

The ultimate goal of Technical Education is to improve the industrial productivity of the nation. This necessarily implies closer cooperation

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between industry and institution which in our case in India is dismally poor without any doubt. There are lot of physical and psychological barriers for achieving this. The disbelief of the industry about the institution and its faculty to produce definitive results within stipulated time period, their aversion towards academic bureaucracy etc., can be cited examples from the industriy's side. Institutions on their part are equally good in building their own barriers such as aversion towards industry as profit oriented exploiters and inherent lethargy towards taking up risk oriented research projects, absence of evaluation and motivation and absence of suitable reward-punishment system in this area. But the time has come to overcome these situational constraints and achieve new heights. The success stories of developed countries have proved this point. The new Entrepreneurial base of these countries has given them a face lift, which would not have been possible without the conventional wisdom of its Entrepreneurial Universities. Especially in Europe and America, 10 years back, nearly 25% of the new products came from Science Parks and now nearly 50% of their new product ideas crystallize in the incubators of Science Parks. It is also estimated that 100% of all new products shall be from Science Parks by the year 2005 A.D., except ofcourse some exceptions which occur outside the Science Parks. The reasons are simple; Science Parks have technology base and support of its educational institution-the basis for any new product service today is the synergy developed in Science Parks between the entrepreneurial/industrial requirements of the industry, academic excellence of the faculty and the managerial competence of the Science Parks.

3. TUNING THE ROLE

The wheels of the world today move at a greater speed than ever before. Changes in economic and industrial scenario are more rapid. New technologies evaporate before they ossify. Empires crumble within days. Countries hitherto backward in nature get new vitality and add synergy to the global business system. The problems such as increase of population and serious unemployment also intensify. Nations demand higher growth rate and faster employment generation. Apart from the popular governmental efforts which provide first aid assistance to the situation, the time has come for careful clinical study of the situation and devising a suitable strategy. To enliven the hopes of a nation, for a higher economic and industrial growth, active participation in globalization and higher employment potential, it is necessary to create a dynamic and innovative entrepreneurial base, culture and suitable psychological frame. This entrepreneurial ventures when housed inside the Science Parks attached to an Enginnering Institution has a better chance to survive, innovate and improve newer ideas and technologies. In addition to this, the Science Park shall also provide a 'Clinic' to the faculty and the students of the institution. However, New Product/Technology Development, Transfer, Entrepreneurship Development and Support shall have to be given more thrust than piecemeal consultancy assignments to

reap multi-dimensional benefits. Though consultancy assignments are very important for a Scinece Park, their benefits are narrow and has to be treated as such.

4. THE MISSION

In a country like India, young educated youth have a natural apathy towards entrepreneurship. This might be traced to the colonial history which has routed the native industry and nibbed the bud of the indigenous R & D efforts in the recent past and to under development, especially in the areas of infrastructural development. In order to nurture the culture of entrepreneurship as a part of the curriculum in Engineering Education System, the mission package should have a software and a hardware component built into it. The software component of entrepreneurship development should consist of creation of entrepreneurship awareness among engineering students, interaction with entrepreneurs, exposure to real-life industrial ventures, achievement motivation training, managerial inputs, assistance for identifiction of viable projects and assistance to the preparation of bankable project reports. The hardware component should include venture capital and working capital assistance, nursery sheds on easy tenancy terms for product development and commercial production, central machining and testing facilities, computer network with good software backup, library, labs, Sports facilities and cafeteria.

The thrust area for the above mission should be naturally in Hi-Tech, R & D oriented business fields to justify its promotion through higher engineering educational institutions. In addition to establishing the software and hardware components of entrepreneurship development mentioned above, the engineering institution should also develop a steering team of its own faculty memebrs who primarily draw motivation from the ecstasy of creating knowledge based Hi-Tech entrepreneurial ventures. This total package is a 'Scinece Park' otherwise called as Science & Technology Entrepreneurs Park (STEP) or Incubation Centre or Technology Institution to foster effective linkages between the entrepreneurial ventures and the engineering institution. It is here that the entrepreneur plays with his ideas, sorts out problems with the assistance of the university faculty, equipment and information services and gives shape to the product/process design/computer software as the case may be. The technology is proven in bench/pilot plant scale and laboratoty tests are undertaken for improvement of the product. Mutual assistance between entrepreneurs is a useful feature. A start-up company can thus limit its organisational setup and corresponding risk involved. Tiruchirapalli Regional Engineering college has promoted such a Science & Technology Entrepreneurs Park (Trec-Step) with assistsance and motivation from the Department of Science & Technology, Gevernment of India alongwith Central and State Financial Institutions.

5. SHARING THE EXPERIENCE

TREC-STEP was established in a residential quarters of REC, Trichy in the year 1986. Later it moved to its present campus of 50 acres of land

adjacent to RECT and situated right in the middle of the industrial area of Trichy and became fully functional in the year 1990. The capital funding is partly from grants and partly by loan. As of now TREC-STEP receives funding for meeting its recurring expenditure only to the tune of 25% of its total expenditure. The rest of the 75% has to be internally generated. The campus houses 15 Nursery Sheds and a Central Workshop apart from the administrative building with necessary office available. These facilities including the General Purpose Machineries at Central Workshop are used for the requirements of the entrepreneural ventures and also by the industries around. TREC-STEP provides nursery shed accomodation for some of the ventures promoted by its Entrepreneurship Development Programme (EDP) trained enetreprenurs. So far TREC-STEP has promoted 67 entrepreneurs in its nine EDP programmes in which nearly 203 S & T persons are trained. The tenth EDP programme has been recently conducted. This leaves TREC-STEP with highest performance record of 33% at the national level. TREC-STEP with the help of faculty and facilities avaialable with REC, Trichy has developed and successfully commercialized many technologies. But efforts are on the way to improve Technology Development and Transfer both from the parent institution, RECT and also from Science Parks abroad. TREC-STEP also takes up consultancy assignments in which it directly involves both the faculty members of RECT and expertise available from the industry. The total project cost of TREC-STEP is nearly Rs.1.89 crores. Through its 67 entrepreneurs in 65 ventures (four of its entrepreneurs have started 2 joint ventures) it has promoted industries worth a total investment of Rs. 8.20 crores. These 65 ventures also provide employment to nearly 860 persons. They produce goods of estimated worth Rs. 22 crores, and paid sales Tax worth Rs. 90 lakhs per year. Apart from this, excise duty, income tax and other taxes provide sources of income to the government. Apart from enabling effective industry interaction programmes, STEP also permits the above benefits. Some more details of TREC-STEP are given in Appendix I

APPENDIX I

1. ORGANIZATION SET UP OF TREC-STEP

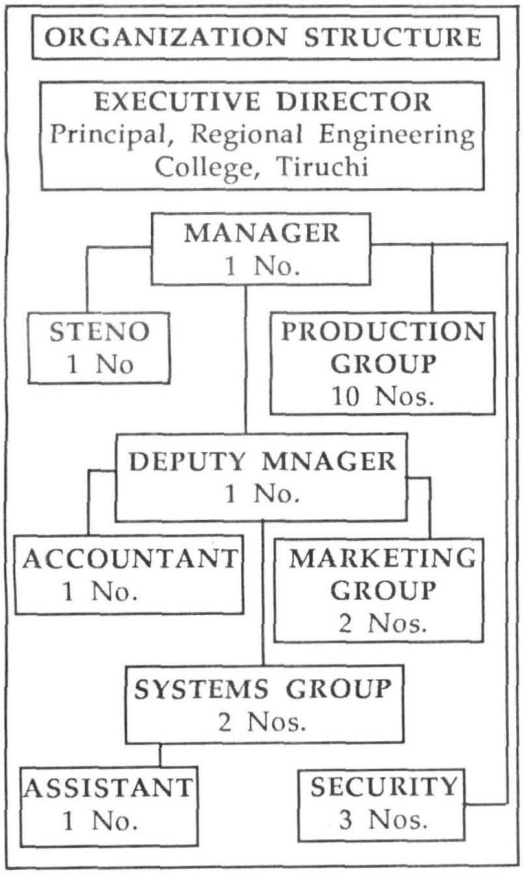
Principl, Regional Engineering College, Tiruchirappalli is also the Honorary Executive Director of TREC-STEP. Apart from the Executive Director, the organization employs only two Executives and 3 supporting staff on permanent basis. 7 Temporary staff are also employed in various project related functions. The Central Workshop employs nearly 10 workers both skilled and semi-skilled.

The System Group is responsible for the MIS related supports to entrepreneurial ventures, computer training and software development.

The Marketing Group looks after the creation and maintenance of industrial database to provide opportunity guidance to entrepreneurial ventures and for marketing technologies developed by the institution.

The Production Group looks after

the common general purpose machineries housed in the Central Workshop and supports some of the production requirements of the entrepreneurs. The Central Workshop also directly undertakes job works from local industries.



2. INVESTMENTS

In the total investment of Rs. 1.89 crores, 40% is invested in land, administrative building and infrastructural development, 35% is invested in the nursery sheds, 10% in workshop machineries, 5% in Computer System and remaining 10% forms the part of other investments. The operation cost of the project is nearly 12 lakhs, out of which it receives only one third, as grant-in-aid from Govenrment of India. The remaining two third of Rs.8 lakhs is internally generated revenue from consultancy, training and other commercial activities.

3. ENTREPRENEURSHIP DEVELOPMENT PROGRAMME

The aim of the programme is to make young Engineers and Scientists aware of business, regulatory and management requirements of commercializing their identified ventures including the process of identification of opportunities and development of products/ process and tehnologies to exploit these opportunities. The EDP programme is conducted for four weeks. The coverage of the programme includes Achivement Motivtion Training, Marketing Management, Costing. Accounting & Financial Management and Total Quality Management at the conceptual level. Case studies are used for understanding these concepts in the context of real life environment. Taxation and other statutory requirements, Project Report preparation and usage of Computers in Small Scale Industries forms the second level operational requirement inputs. The third stage of feed back from practicing entrepreneurs about the real life requirements and industrial visit to selected industries are also provided to the trainees. Interaction with representatives from Banks and Financial Investments to know about the practical expectations of Bankers from Entrepreneurs forms the last part. Interaction with the faculty of the Parent Engineering College to know about the emerging trends in their relative disciplines, technical counse-

ling and opportunity guidance also forms an integral part of the programme. The programme is a residential one.

4. ACHIEVEMENTS

TREC-STEP has trained nearly 228 S&T persons in its 10 EDP's. Among the first 9 EDPs, 204 candidates were trained and 67 trainees have started their own industrial ventures. The results of the 10th EDP are yet to be realized, since the programme was completed only recently. The performance rate or success rate i.e. number of entrepreneurs generated to number of persons trained is 33%, which is acknowledged as one of the highest performance record nationally. The average investment on fixed assets and initial working capital is Rs. 12.25 lakhs. Nearly 32% of the related fields, 23% of the ventures from Electronic Field, 22% of the ventures are Chemical and allied industries and remaining 23% of the ventures from other categories deriving equal inputs from more than one engineering field.

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