

Bridging Academia and Industry

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Very often people with degrees in engineering, who are employed in different industries don't go in for research and technology development, even though they may have a talent for it. Further, industry is not keen to invest in R&D unless its innovations are adequately protected and rewarded by way of assured Return of Investment. This has now become critical in the era of globalisation. In these changed circumstances, it will become even more essential to encourage R&D funding by industry. Hi-tech industries in advanced countries are allowed to generate investable surpluses through their own rational pricing structure and profit margins. This way they are able to meet a substantial part of their R&D investments through internal accruals.

The purpose of technology development is to create national wealth; to improve the quality of life, particularly of the disadvantaged sections of society. Industry has an important role to play in developing technology, encouraging indigenous technology development and exporting indigenous technology products and services.

Alvin Toffler the famous American writer, known for his works discussing the digital revolution, and communication revolution said that "Yesterday, violence was power, today wealth is power and tomorrow knowledge will be power". It is of no doubt that technical knowledge and the ability to develop and adopt technology is now dominating the market. Industry investment in fundamental R&D undertaken in academic institutions is crucial for establishing rapid product development cycles and for introducing new products. Many companies have reengineered themselves to fulfill this objective, but are worried how to transform the knowledge and the ideas generated into rapid product development, since immediate assistance from academia is not always available for the latter. Strategic relationships with what can be termed "Research Universities" have successfully provided human and knowledge capital to the industries in USA and other developed countries. This is a model we may consider in India also. In the US, there has been phenomenal growth in industry-funded R&D in educational institutes. Even the private sector's contribution is now greater than that of the Government in universities like MIT. Though industry participation has increased, academia has continued to remain in the forefront by developing a range of flexible. Innovative approaches tailored to the interests of industry. This has not unfortunately happened in India.

A radically new approach is required to correct this trend. To get a direct bearing on their business results, the industries should give emphasis on using academic institutes to undertake research on their behalf. Academic institutes, on their part, must get ready to face this challenge. Renewed

emphasis on maximising value generation from this type of cooperation, which can be amicably distributed since it would have a positive impact on the bottom line of companies, may be the answer. Undoubtedly, In India, there is little doubt that knowledge, which is not available anywhere else, exists at least in pockets. However, such knowledge in isolation cannot be used due to lack in communication – to be precise technology communication. The National Laboratories, the Universities and even some local level NGOs and Artisans are storehouses of technical knowhow. This type of expertise needs to be nurtured and encouraged if it has to be converted into wealth i.e. by closing the loop and making the results of research applicable to society as well as industry. There is no doubt that in this area, industry has a role to play. The establishment of adequate communication channels between scientists, professors, technology-developers and industry is the need of the hour. To begin with, it may be beneficial to identify product and technology based expertise available in the country in different institutions and other corners of the country and make this known to industry. Industry, instead of having a self-motive and product-centric approach should encourage wider coverage and have the genuine desire to promote R&D infrastructure development in laboratories/educational institutes. Enhancement of industry's R&D infrastructure both in the private and public sectors, would add to the effectiveness of the industry's involvement in the total programme. This may lead to Centres of Excellence emerging in selected disciplines and a "win-win" situation for the nation.

It may be noted that the large enterprises generally have their own R&D centres, but Small and Medium Enterprises do not have the resources for trying out a new idea or process and for carrying out R&D. Thus, the concept of 'incubation centres' can be tried for those do not have large capital-base. For such 'incubation centres' the academic institutions have to come forward by creating a user-friendly database of professors and scientists, who are willing and capable of interacting with industry. These centres will operate on an iterative process of Industry to Laboratory and again to Industry and so on.

There is need for development and adoption of technology in Rural or Cottage Industry Sector also. The approach that can be adopted for them is

1. To collect information on successful dissemination of technology in rural areas. The National Institute of Rural Development or NIRD, The Council for Peoples Action in Rural technology or CAPART and the CSIR have published directories of Rural Technologies.
2. To find the problems in the field and identify technology solutions

The ideal thing is for the two approaches to converge. We can have on the one hand a list of all technologies that have been successful, at least in the laboratory, which will hopefully be successful in the field or at least may be tried at field to evaluate whether any modification is needed or not. On

the other hand, there are a large number of non-governmental organizations and governmental agencies, which are familiar with rural problems, which require introduction of science and technology to solve them. These classes of efforts have to be brought together. The Academia can play a major role in it by partnering with the stakeholders i.e the users and the developers. Reduction in wastage of raw materials, providing cost-effective solution for upgradation of production process, value addition to products etc. are some of the key factors that has to be looked into for such industries.

In this regard, the basic point, which we from The Institution of Engineers (India) would highlight that a national policy should be created so that the working engineers employed in the industries are deployed by the industries to different R&D Institutes and Universities to undertake applied research on product and process development. The engineers associated with the industries, who have the best and up-to-date knowledge about the requirement of their respective industries, must be involved along with their counterparts in the academic institutes in the form of collaborative researches so that the outcomes are tested on real-time basis and there is no hitch between the developer and the user. Even when a technology is imported, academia expertise should be utilized by industry for technology assessment, upgradation, and absorption to ensure that the acquired technology is suitable for indigenous raw materials and indigenously fabricated equipment.

In today's globalised world, competition is unavoidable. The customers cannot be taken for granted. Each of them has a very wide choice of goods and services. To exist in this situation, we need to work together. To provide better and improved products and services, we have to form Research Groups which must have dedicated members from academia, research institutes and industry to work continuously on innovation and development. Development is a continuous process, which changes with time and perception. Therefore, instead of sporadic or spontaneous efforts, the Research Groups have to be a permanent and dedicated body of each industry and academia where newer problems will be dealt with innovative ideas and solutions.