

Industry-University Symbiosis

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In the wake of significant reforms in the Indian economic system and in the face of increasing global competitiveness, Indian industry and universities need to collaborate and co-operate more strongly than ever before. In this context, the Confederation of Indian Industry has taken engineering education as a major thrust area, and has sought to intervene in decision making throughout the country through its regional offices. This paper suggests a methodology to be implemented by industry, institutions and government for achieving overall improvements in productivity and economic gains. It is pointed out that while industry derives its direction from industrial policy, academic institutions draw their mandate from educational policy. Specific proposals are made to delineate the role government must play in promoting industry-institution interaction. The conflict arising out of a mismatch between job profiles and the manpower recruited, and the brain-drain of high quality manpower to greener pastures are discussed, and steps are suggested for mitigating their ill effects. It is noted that even educational institutions should change from being a cost-centre to a profit centre.

THE NEW THRESHOLD

IT IS a truism that a broad congruence of social interests governs the interface between industry and educational institutions. The goals and activities characterizing industry and education have a great deal of mutual interest deriving from the larger cause of national development. At a different level of segmentation, the question of how constructive and innovative patterns of interaction can be achieved between industry and engineering education has long been a subject of debate. Nor has this quest been merely idealistic; substantial progress has been achieved, on the ground, in bridging the gap in mutual perceptions and expectations. Despite this, however, the immense possibilities of a more dynamic and mutually reinforcing pattern of integration between industry and education have yet to be grasped. The challenge has assumed a critical new dimension in the wake of dramatic reforms in India's economic system. Indian industry must gear itself to operate in a highly competitive global milieu. Judged in this light, engineering education in India has to be put at a much higher level of global compatibility than ever before.

INDUSTRY-INSTITUTION INTERFACE

Figure 1 seeks to capture the trends and imperatives involved in the changing configuration of interrelations between industry and engineering education.

MAKING LEEWAY

Industry and education are two sides of the same coin and unless they are viewed together, their

effective impact on national progress cannot be optimized. In a developing economy such as India, this is much more pertinent. Since India gained independence in 1947, both educational institutions and industry (research and development) have, by and large, tended to remain theoretical rather than move closer to the realities of industry. It is equally true that industry, for its part, has not been ready to recognize the abundant potential available in institutions. This has resulted in industry investing substantial resources to retrain the new products of engineering colleges to make them deliver the goods in a real-life industrial situation. It is obvious that industry and academia now need each other, as never before, in view of the new global challenge that India has taken up. It is in this context that the Confederation of Indian Industry (CII) has taken engineering education as a major thrust area and accordingly has sought to intervene in decision making throughout the country, through its regional offices. In a country where financial constraints are agonizing, the advantage accruing to industry and to the institutions through close collaboration can hardly be overstated. Moreover, it is this fusion between education and industrial progress that can help India emerge as a global player in the not too distant future.

SOURCES OF HIGH-CALIBRE MANPOWER

Engineering skills come through the three streams of the educational system: (i) engineering graduates; (ii) polytechnic and diploma holders; and (iii) vocational trainees. These three streams have unfortunately got meshed somewhat dysfunctionally in the last few years, with polytechnic and vocational students vying for engineering jobs, while engineering graduates are forced to accept

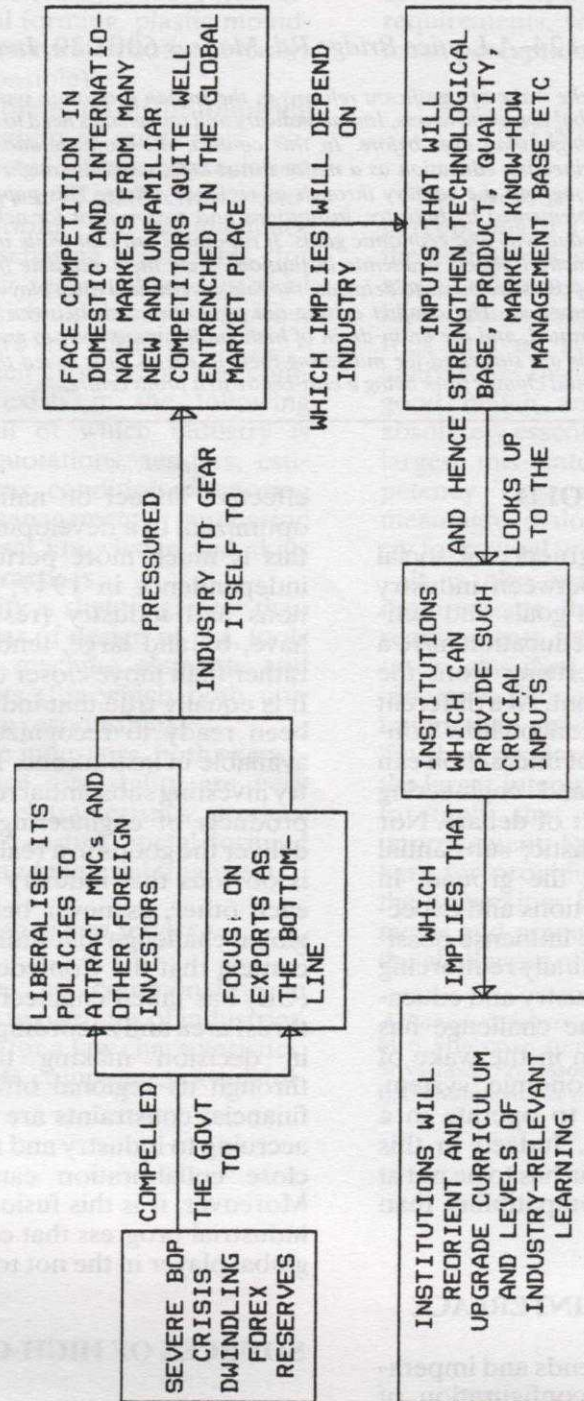


Fig. 1. Industry-Institution Interface. BOP, balance of payments; FOREX, foreign exchange; MNC, multinational company.

Table 1. Industry-institution mutual tasks

To provide relevant output to industry, institutions need	To ensure that institutional output is relevant industry can
To modify the existing curriculum to reflect the changing needs of industry by: <ul style="list-style-type: none"> — phasing out irrelevant courses — incorporating contemporary dimensions/new disciplines — emphasizing practical exposure 	By virtue of its 'practical experience' provide necessary inputs for restructuring the curriculum
To revamp and modernize institutions' workshops/laboratories and to enhance effectiveness of the teaching-learning process through use of TV, VCR, computers	Keep up an active line of communication with the institutions for sharing the latest know-how
To provide systematic training for faculty to help them acquire through familiarity with state-of-the-art technology	Provide financial and technical support for the modernization process
To provide real-life industry exposure to students as an integral part of the formal learning process	Evolve a system for sharing laboratory and testing facilities as between industry and institutions
	Provide on-the-job exposure to faculty members by: <ul style="list-style-type: none"> — involving them in R&D projects — assigning consultancy projects — sponsoring them for seminars and conferences
	Provide summer placements for faculty through project works in the areas of design and development, production, supervision, maintenance, productivity control, value engineering, etc.
	Depute technical executives to serve as visiting faculty in the institutions

merely repetitive or routine chores in industry. The distinctiveness of these three streams has to be recognized. It is the fundamental responsibility of industry to relate avenues of employment and placement to the levels of skills represented by these three different, though cognate, streams of engineering education.

THE ROLE OF THE CII

As an 'apex institution' designed to promote rapid progress of engineering industries in the country, the CII is interacting with engineering education institutions in their 3Is programme—industry-institute interaction—to help keep pace with emerging new technologies and meet the needs of engineering industry in terms of competent manpower, on an ongoing basis. Realizing that a close and continued interaction between academic institutions and industry is vital for achieving excellence, not only in imparting education in engineering disciplines but also in manufacturing technologies and in upgrading quality and productivity, the CII has been actively searching for such synergic co-operation.

OPERATIONALIZING THE NEW COMPACT

A suggested methodology to be followed by industry, institutions and the government is indicated in Tables 1 and 2.

One other precondition for ensuring greater 'industrial relevance' of engineering education is

Table 2. The government's role in promoting industry-institution interaction

- 1 A state-level body should be set up to promote and, if necessary, fund industry-institution interaction
- 2 Governing bodies of professional institutions should have at least 50% representation from industry
- 3 Institutions should be allowed to license products developed by them
- 4 Necessary amendments to the rules to enable faculty members to act as part-time consultants for industry without having to surrender to the institution a part of the remuneration received.
- 5 Institutions should be given autonomy to evolve specialized courses tailor-made for industry
- 6 In-plant training for a prescribed period should be made mandatory for all students

that all institutions should provide their students with adequate training in advanced computing technologies and organizational behaviour. This factor assumes importance in light of the decisive moves made by the government towards globalization of the economy. Indian industry and the services sector, while absorbing sophisticated new technologies, will demand, on the part of their employees, advanced technological application skills as well as managerial expertise comparable to the best that is available in the industrially mature countries.

MOVING FROM DISPARITY TO CONSISTENCY IN EDUCATIONAL STANDARDS

Symbiotic industry-institutional interdependence, for all its manifest urgency, has to contend against the prevalent bewildering disparity in standards among the institutions. The sheer enormity of India's system of engineering education and the diversity of the industrial landscape provide a daunting challenge in this regard. There might be a way out if consistency can be maintained in the common operating platforms of industry and the institutions. The situation is inherently complex. Industry derives its direction from industrial policy while the academic institutions draw their mandate from educational policy. If consistency in the provisions of these governing policies can be ensured, it might be possible to bring about uniformity in the pattern and quality of interaction between industry and academic institutions.

ROLE OF GOVERNMENT IN PROMOTING THE NEW SYNERGY

Since independence, government has played a pre-eminent role in the creation and nurturing of engineering colleges and related technological institutions. Policy instruments used hitherto, however, would require considerable readaptation to the new economic dispensation. Table 2 sets out six specific suggestions concerning the policy requirements of the synergy advocated in this paper.

All said and done, the government can provide only a macro-level focus and an enabling environment. Micro-level implementation, however, has to be carried out by industry and institutional personnel.

WHAT SHOULD INDUSTRY CONTRIBUTE?

The role of industry does not end with its financial, technical and advisory support to the institutions in providing total quality education. It is also the responsibility of industry to devise employment strategies that would accord with the global quality levels attained by the graduates turned out by the institutions. It is extremely important that the pursuit of a new model of industry-institution synergy does not create new mismatches between education and employment. Two manifestations of such incongruence already prevalent on an alarming scale are role conflict and the brain-drain.

ROLE CONFLICT

The phenomenon of the professional inadequacy of graduates in terms of job requirements

has, in the past, arisen mainly because of the economic preference for the 'second best' candidates to opt for industrial employment. Role conflict occurs quite often in industry because organizations, in their haste to meet their manpower requirements at the lowest cost, recruit students with inappropriate qualifications for the job, since such students prefer to accept whatever comes their way, rather than remain unemployed. The fault lies at both ends but is perhaps more attributable to industry. Organizations should ensure that the role evaluation and job description processes are carried out rigorously and that recruitment is strictly in accordance with the profile of the candidates thus arrived at. Otherwise we will continue to have diploma holders performing the engineer's job and engineers performing the diploma holder's job!

BRAIN-DRAIN

Brain-drain is a crippling phenomenon that has disabled industry from utilizing optimally the output of the institutions. It has been a common observation that the cream of graduating professionals prefer to go abroad rather than serve in their own country. Brain-drain is a world-wide reality—the Indian experience has by no means been unique. Lack of technical advancement, initiation, lack of R&D activities, disproportionate rewards (both in terms of compensation and growth) for efforts and a constraining work culture are some of the factors that force these young professionals to look for greener pastures abroad. It is time industry woke up to the fact that it is its failure to provide an invigorating working atmosphere that contributes to this tremendous loss year after year. Industry should reform its attitudes if it has to acquire and retain the quality output of the institutions that it so badly needs in its efforts to achieve global competitiveness.

PUTTING THE STRATEGY TO WORK

What is really required is not the frequent reiteration of the need to forge meaningful links between industry and the institutions, but an agenda for change which will involve all the players in industry as well as education. Industry should spare time for institutions in the belief that such time is a valuable investment for enhanced efficiency. On the other hand, the main problem in engineering education is our faculty and their general insularity of outlook, which regards education as a close preserve. The faculty in our engineering colleges must accept the bottom line, which is that the goals of engineering education are co-terminous with those of industry, and that the engineering graduate is a crucial agent of change on the shop floor. Interestingly the same phenomenon is applicable even in developed countries. The

chairman of a leading information technology company, in a recent article, has explained that the reason for the Japanese division of his group recording higher productivity was the involvement of more graduates on the shop floor. We have a problem in India in this regard, with accomplished graduates either opting for work abroad or succumbing to the easier alternative of service jobs offered in the country such as in banking. While these avenues are no doubt important, their pursuit should not be at the expense of manufacturing and therefore of the nation, in the long run.

THE IMPERATIVES

Quality in education is another very critical issue. If Indian companies aspire to become global, and accordingly institute total quality management, it can be done only by raising quality standards in our educational system. Total quality is not a cosmic ideal; it should commence even at the school level and be carried over to polytechnics and engineering colleges.

Placement of the products of institutions in line with the skill-profiles required by industry is another key area. Basically, graduates form the backbone of the engineering industry, with diploma and vocational people working in areas such as services and production supervision—guided by engineering staff. The vocational stream is very important and engineers will not be able to participate effectively in these spheres of work as their educational skills would be different. Industry, institutions and governments have to devote a good deal of attention to this stream. The Community Colleges in Canada provide a good model in this task of tapping post-schooling youth and the new World Banks scheme being introduced in India for revamping polytechnics would be an effective strategy.

The post-graduates, on the other hand, should constitute the research wing in the R&D areas and help engineering students with their theoretical and analytical ability. These postgraduates mostly work in R&D departments and with the added advantage of management education, they secure vantage positions in areas of business, such as marketing, finance, production and planning.

THE FLIP SIDE

There is considerable unease that the new liberalization policy and also the introduction of new technology such as CAD, CAM, etc., will lead to labour redundancy and retrenchment. I believe that the fears are highly exaggerated. But the need to upgrade labour and skills can hardly be over-emphasized. Rather than displacement of skilled labour, there has inevitably to be a progressive redeployment of labour with well-organized re-training facilities.

Reforms in engineering education, contrary to our expectations, will materialize only through a process of perseverance. Waiting for the institutions of the government to solve the problem would not be a realistic response to this crisis. The slippage in our educational system is primarily a cultural problem and these proffered solutions cannot be legislated. While the Indian business community has little direct control over cultural and sociological phenomena, top corporate executives are well positioned to play an important interventionist role in improving our educational system. To begin with, companies must adopt personnel policies that encourage more parental involvement in children's education. High-technology companies, in particular, need to target charitable donation policies towards education. For example, companies should establish grants for students in science and engineering as well as provide financial support for these departments at local colleges. It is often said that industry-institution interaction does not obey any rigid formula and that the process changes only over a period of time. This may be true in the generic sense, but it is important that the process of globalization of Indian industry is not hampered by the educational institutions adapting slowly to the demands of rapid industrial modernization.

A FINAL COMMENT

The process of reform discussed earlier calls for allocation of adequate funds to the institutions. However, the need to reduce the fiscal deficit has prompted the government to moot the idea of privatization of education in lieu of larger budgetary allocations.

Though privatization might help bring in the much-needed reforms in the institutions, it certainly calls for massive investments on behalf of industry. It may be argued that such investments will certainly bring in social and economic returns in the long run; nevertheless, it is a fact that not all organizations can provide for such investments as a matter of course. Thus the reach of privatization could get severely restricted and the objective itself defeated.

It might not be out of place to suggest that this problem could be solved if the existing concept of 'institutions as a cost centre' is altered to the more self-sufficient concept of 'institutions as a profit centre'. The institutions should be looked upon as corporate entities that earn revenues by imparting education to the students; by providing consultancy services; by obtaining royalties on products developed in house; etc. This would not only incorporate automatically the approach stated earlier in this paper but also increase the productivity of the faculty members who get additional compensation from the institute for additional services rendered.

If such an idea sounds rather radical, it might not be wrong to state that the institutions will always

remain dependent on either the government or industry for their survival, which would imply that the reform process cannot be carried out efficiently on a continuing basis. There is no question that it will be industry which will be the loser if the

reform process fails. If, on the other hand, the concept of financial self-reliance of institutions is put into effect, our educational system as a whole will be toned up and our technological future made secure.

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