

THE STATUS OF HIGHER ENGINEERING EDUCATION IN INDIA & CHALLENGES AHEAD

*Meena Panse, M.E. (Elect.)

Introduction :

Ever since the first five year plan the primary objective of Govt. of India has been rapid development of Science & Technology & its application to the growth of economy & welfare of our masses. The Govt's commitment to Science & Technology was enunciated in the 'National Science & Technology Policy Resolution' which was adopted by Parliament in 1958.

The Indian Universities & Institutions providing higher engineering education have a great role to play for effective implementation of this policy as the development of necessary human resources depends chiefly on the quality of higher education.

Higher Engg. Education & Research & Development - Need for an Integrated Approach

India's stock of technical manpower has been growing at the rate of about 9% per year for the last 20 years

and is now estimated to be about 2.5 million. After U.S.A. & U.S.S.R., India today ranks third in the world as regards qualified technical manpower. But hardly 6% of this is engaged in R & D in India compared to 32% in the U.S.A. & 14% in the U.S.S.R.

India's investment in R & D is only 0.7% - 0.8% of GNP as compared to U.S.A. (2.5%), Japan (2.4%), U.K. (2.2%), U.S.S.R. (4.9%).

The Indian Government has always emphasized on indigenous technology development for self-reliance and reduced technology imports to save precious foreign exchange reserves. On the other hand, the industry has never been in favour of massive investment in R & D for dearth of financial resources. Therefore a multi-pronged approach is needed in managing the R & D in India with the active participation of Universities & Institutions providing higher engineering education.

Various attempts are being made

to promote industry sponsored 'Applied Research' at the University levels. This will also help develop only the 'Appropriate Technologies' in Indian context. With the purely 'Basic Research' centres run by Government, this integrated approach is the key to India's economic growth.

Higher Engg. Education - Financial Aspect.

Financing higher education is a tough job, especially for a developing country like India faced with a multitude of socio-economic problems. The New Education Policy (1986) is categorical about resource allocation to education & by the beginning of eighth five year plan at least 6% of national income would be spent on education. But out of the total allocation to education only a small percentage comes for technical education, especially higher technical education. At the time when we are standing on the threshold of 21st century this financial allocation for higher technical education seems inadequate.

Critics of our top-heavy educational system urge diversion funds for primary & secondary schools. With India poised to be a nation with over 50% illiterates by the turn of the century, perhaps their fear is justified.

Nearly 75 to 80% of the finances of universities & colleges come from Central & State Govts. Fees, endowments & philanthropic contributions constitute the smaller portion of the budget. Most universities & colleges are forced to

function with deficit budgets because the Govt's assistance has not increased commensurately with the rise in the enrolment & the additional requirements for modernisation & diversification. Between 1970-71 & 1983-84, while the expenditure on higher education grew at the rate of 6.3% per annum, the corresponding increase in enrolment was 4.1%. Thus, there was only a marginal increase in expenditure on real terms.

The role of the Centre in funding higher education is also declining. Contributions of the Centre & the States was roughly in the ratio of 23 : 77 in 1982-83 against 39 : 61 in 1972-73.

Suggestions :

- (1) The Central Govt. provides assistance to State universities through UGC. However, universities & colleges are not fully aware of the various UGC schemes & guidelines for granting assistance. Therefore, regional or zonal UGC offices be established. Besides, setting up state councils of higher education would also facilitate better co-ordination between the UGC & Universities. Also, the college development council should be strengthened.
- (2) The time has now come to take some positive & decisive steps to streamline the funding of state universities. The Govt. is advised to set up a committee of academic experts, economists & representatives of the Ministry of

HRD/UGC to review thoroughly the 'Public financing' of education in the country. The committee should also evolve a strategy whereby the triangle of quantity, quality & equality could be squared as far as possible, keeping in view the financial constraints.

- (3) Though the state is the main fund-giver for education it should perform the role as a facilitator of democratic self-governance rather than the controller of education. The faculty committees & faculty - student committees should govern the institutions. The self governing institutions at every level - college, department & university will not only ensure high standards but also be open to public scrutiny. Steps towards a self governing educational system would perhaps reverse the process of alienation of teachers & students.
- (4) Stringent financial management would stop mismanagement & misappropriation of funds, delays in Project Completion resulting in cost escalation & would ensure rational & objective expenditure.
- (5) Banks, Housing Finance Corporations & other such financial institutions can help meet the capital requirements for buildings & equipment. The govt. could stand surety & the repayment can be assured either through Govt.

grants or special fund raising campaigns, which is a revolutionary idea in Indian Context.

A Case Study of Direct Central Govt. Assistance to Engg. Institutions in India.

In India the ministry of human resource development is giving assistance to engineering institutions under the following schemes -

1) Thrust Areas -

A) Areas of Weakness :

These are areas in which the country is in need of large manpower, e.g. Electronics, Computer Science, etc. Under this scheme, for institutions which already have some infrastructure, assistance is limited to Rs. 20 lakhs in the plan period. Wherever no infrastructure exists upto Rs. 40 lakhs is given.

B) Emerging Technologies :

Under this some 11 areas are identified such as Microelectronics, CAD/CAM, Robotics etc. for which manpower is needed urgently. Here the maximum limit of assistance can be upto Rs. 1 crore in the plan period.

(C) New Areas :

About 30 new areas such as Superconductivity, Ocean Engg. etc. are identified & assistance is offered upto Rs. 1 crore to an institution. Many of these areas are interdisciplinary. Assistance under this scheme is given only to reputed institutions with good faculty position.

2) **Modernisation :**

Under modernisation and removal of obsolescence, assistance is given to one department upto Rs. 20 lakhs.

3) **Network Scheme :**

The scheme is for modernisation of laboratories with the collaboration of an institute of repute like the IITs, industrial concerns, research establishments etc. Here the assistance is of the order of Rs. 2.5 lakhs for a laboratory with an equal matching grant from the management of the institution.

In all the above schemes, the period allowed for utilising the grants is one year with a grace period of 3 months.

4) **Research and Development :**

Assistance is given under this scheme to develop infrastructure and create manpower for R & D. No limit has been fixed for the amount of assistance under this scheme. Time limit for utilising the grant is 3 years.

Higher Engg. Education & Employment - Need for Optimal Manpower Planning

India today ranks third in the world as regards qualified technical manpower after the U.S.A. & U.S.S.R. Considered populationwise these figures are not really so impressive. The number of scientists & engineers per 10,000 population in India is hardly 22 & technicians number around 8, but the corresponding figures in the U.S.A. are 83 & 43, and in the U.S.S.R., they are 311 &

456 respectively.

Various studies conducted in India have highlighted the paradoxical manpower situation of surplus labour in certain categories co-existing with shortages in others. There is unemployment among technically qualified persons on the one hand, while there is a shortage of persons possessing specific skills a training. This clearly shows the urgent need for optimal technical manpower planning to overcome the unemployment maelstrom.

As the scope for employment generation in organised sector is limited, Govt. of India has attached great importance to the Small Scale Industries (SSI) sector starting from the 'Industrial Policy Resolution' of 1958 for economic decentralisation & planned regional development & also because of less capital requirements, high employment generation potential & relatively short gestation period.

The New Education Policy (1986) has called upon the technical education institutions to enlarge their scope to cover R & D, Innovation & Entrepreneurship. It has recommended a change in the attitude of authorities of technical education institutions in favour of initiating a trend of self employment among the engg. students. The Universities and Institutions can play a key role in this context, for which they should modify themselves as the prime information centre for prospective entrepreneurs.

Higher Engg. Education & Brain Drain

According to the definitions of the United Nations (UN), the flight of talent that is required for a country's development to another country is 'Brain Drain'. In India, an estimated 35% of engineering graduates from the IITs go abroad.

Measures taken to persuade them to return home have not yielded much positive results. Even incentives offered have not evoked adequate response. The seventh five year plan has laid stress on the evolution of suitable mechanisms to bring back these talents. It has proposed that consultancy in industry & assistance in setting 'Pilot Projects' in India should be considered together with more flexibility in administrative procedures. Some hardliners even suggest instituting compulsory national service for a limited period of time for those

desirous of going abroad, otherwise pay the full cost of their higher technical education to the Govt. of India before leaving the country.

With Government's keen interest in the problem of brain drain there are signs of early solution.

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