

S&T in the post-liberalization era: Role of the government and the industry

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The main concern at this point of time is that many organizations are finding it difficult to garner adequate financial resources to fulfil or to carry out the research programmes they have chalked out. It is true that at no point of time was there an indication that unlimited resources were available for R&D activities and in a developing country like India there are always priorities which need solutions on a very urgent and emergent basis. This in fact results in lower allocations for science and technology (S&T). Having said this, it is necessary to recognize that since independence, the successive governments have always looked at S&T as a potential tool for economic development. Allocations in the successive 5-year plans is a clear indication of the importance given to S&T and the recognition of the need for enhanced resources for this sector. However, by the time we reached the operational phase of the seventh 5-year plan, a widespread feeling had gained ground that the resources provided for S&T were sizeable and the returns therefrom have not been adequate. In fact, it is now assessed that about Rs 14,000 crores was spent on R&D during the seventh 5-year plan period (1985-90). It is during this period that the expenditure on R&D exceeded 1% of the GNP.

However, at the beginning of the eighth 5-year plan, the S&T scenario had changed. During that period, following the new liberalization procedures brought into being in 1991, the overall environment has also changed. The annual plans 1990-91 and 1991-92 did not provide for any significant escalation in the budget allocation for S&T compared to those reached in the final year of the seventh 5-year plan (1989-90). During these two annual plan periods there was considerable uncertainty about the extent of allocation that would be possible during the eighth 5-year plan. No doubt, many research organizations had expected that the trend of allocations would continue to be such that there would be a considerable increase compared to those provided in the seventh 5-year plans and the allocations would be such that the R&D expenditure would certainly continue to increase from 1% GNP. These expectations, however, turned out to be unrealistic for the eighth plan period. The total allocation for many scientific agencies may not even be equal to five times the allocation for 1992-93. This no

doubt has sent some shivers down the spine of the scientific infrastructure. One feeling was that we need at least Rs. 1,000 crores more to keep to the levels at the end of the seventh plan period.

We have addressed the industries to be more responsive to the role of S&T in the industrial transformation; cooperating with the scientific research organizations in taking their outputs in developing indigenous technologies and effective commercialization of some. Here one may recognize that the industry is not too well placed to respond to this request. Primarily, many industries have not geared themselves to use S&T as a competitive initiative in their marketing strategy. They have relied on their market forces in determining their sales and profit. The present liberalization and the overall change in the economic environment has no doubt altered the situation but it does not mean that the industry is now looking towards the R&D institutions for help. It is true S&T could provide some answers. Since they are not used to this as the main tool they will look around for other options first and only later revert to S&T options. One may, therefore, not expect a major change in the way industry contributes to R&D and in particular provide resources for R&D organizations in the immediate future.

At this stage it may be interesting, perhaps necessary, to look at the other policies of the Government which have a bearing on the present situation. One may look at our finance policy and the vast disparities it brings about in the overall position. Perhaps each financial year, the additional taxes imposed by the Finance Ministry to mop up revenue have been to the order of Rs. 2,000 to Rs. 3,000 crores. It is, therefore, unlikely that they will accept proposals for increased budgetary support for S&T. But one may also ask whether the financial policies are the right ones or the best ones. In terms of numbers just quoted, it also looks that we tax the responsive segments of the industry and take away their ability to support other activities including S&T. At the same time, financial institutions and other agencies working under the administrative control of the Finance Ministry have also not performed well. It is they who are supposed to support S&T particularly at the stages closer to commercialization. While one may

put forward arguments of the present approach of the financial institutions in dealing with S&T, as independent observers one may also comment whether these financial institutions have performed their own jobs well? They have not looked at S&T to protect the advances or investments they make. Do they look at industrial sickness as attributable to technological inadequacies?

One may now look on our defence policies. Our defence budget is of the order of Rs. 15,000 crores a year. Most of the technological breakthroughs in many countries where defence expenditure has been large, have come as spin offs. One need not go far to justify this statement. Most of the advances in telecommunications, electronics and space in developed countries have arisen as spin offs from the defence budget. In this context one may question what is the contribution of our defence institutions in supporting S&T. Here is a vast potential. Unfortunately even routine things are sealed inside boxes marked 'secret'. Unless procurement contracts, development contracts, and promotional contracts are planned by the defence with the industry itself, it is unlikely that S&T in the defence sector would blossom to its full potential.

Closely related to the above, perhaps, one may also look at our foreign policy and its implication on the S&T budget. For quite sometime there has been a clear recognition that foreign policies determine the defence budget particularly relating to the vulnerability from neighbouring countries. Similarly, foreign policy influences the investment climate. Well disposed developed countries of the world harp on this again and again. To give an example of technology oriented foreign policy issues, it may be useful to take the example of India's relation with the US. There is now great expectation that following the victory of the Democrats in the US, India is comfortably placed in its bilateral relations with the US. But it looks that inspite of democracy as the binding factor between the countries and our favourable record with the past Democratic Presidents of the US, there are still several factors which may be considered irritants in the Indo-US relationship. Four major irritants could be identified as: (i) Nuclear non-proliferation treaty; (ii) Intellectual property rights; (iii) Missile control technology regime; (iv) Human rights. Perhaps, three out of the four major irritants are technology related. Could a technological solution be found for these three major concerns so that acceptable compromise positions are reached? If yes, one could expect much greater flow of investment, technological collaborations and technological upgradation and possible increase in our bilateral trade.

In view of the fact that intellectual property rights are very closely related to R&D activities, perhaps a little more elaboration of the Indian stand on the

intellectual property rights could be made. One may recall that the Scientific Advisory Council to the Prime Minister during the latter part of the 80s did examine the Indian approach to the Paris Convention. At that stage the observation of many other departments in the ministries were so conflicting, the recommendations of the SAC-PM did not go far. All that was required at that time was to examine whether the Indian Patent Act was compatible with the Paris Convention and if India were to join the Paris Convention whether any revision to the Patent Act was necessary. I gather that the recent thinking is that the Indian Patent Act and the Paris Convention are compatible and in the event of India joining the Paris Convention there may be no need for India revising the Patent Act. However, since the time India started examining the issue of joining the Paris Convention way back in 1974 a lot of water has passed under the bridge—even floods have come and gone and a final decision is yet to come. Today, whether the Indian Patent Act has really supported our scientific activity is still a very serious question. It looks that the patents filed by India are still of the order of about 1,000 and this figure has been so during the last 20 years. The question is when R&D has increased several fold in 20 years, the patents by the Indian scientists have not increased at all. Does it not mean that the Indian scientists look for alternative means of reward for their work and recognition rather than patents? Does it also imply that the work carried out in India is not patentable or they are not close to commercialization. Some reflections on this would certainly be useful.

Today, joining the Paris Convention is no longer a critical issue. Are we ready to deal with the Dunkel Draft? In the Dunkel Draft the requirements are far too constricting compared to what the Paris Convention had envisaged. For example, the Paris Convention had left the grant of patents to products, processes or both, to the decision of the State. The Dunkel Draft goes far beyond; similarly, the Paris Convention had left the duration of the patent to be determined by the State. The Dunkel Draft expects a harmonization on this. There are many other factors which are more stringent in the Dunkel Draft than what the Paris Convention had envisaged. Perhaps, even if we join the Paris Convention today the pressure on the system will be to look at how to handle the Dunkel Draft and the Indian position on this issue at the GATT negotiations.

Notwithstanding the above, which appear as somewhat of a difficult situation in which we are placed where the resource flow for S&T is not likely to be very large, I am still suggesting a few small steps which we can take in dealing with the present situation.

(a) There is a definite role for scientists and technologists in the country in assisting entrepreneurs with

acquiring technology. The industries which seek foreign technology often do not have adequate understanding of the technology or the potential for the technology in full.

This is very much of a problem for small industrial units who are free to acquire technology from where they like. If assistance is provided to them to choose the technology, there is a very good chance that the linkage between an industry and science institution would get properly cemented. There is a lot for the industry to gain, may be not that much for a scientific institution at this stage. Even so this is a convenient beginning in which the scientific institution could build in such expertise which is directed to specific technology acquisition activities.

(b) Currently a substantial part of the industrial production in the country takes place through the technology that is imported. *Prima facie*, these are technologies having proven market capabilities. At this stage, the R&D institutions could associate themselves with the technology acquiring company and take part in the technology absorption programme. In addition through such activities the laboratory itself should reassess its work programme so that the research outputs would be of relevance to the industry. Perhaps the simplest choice for choosing a research programme in a laboratory could be based on items for which technology imports are taking place. With the lead that would be thus established the improvement of such technologies can be possibly provided by the R&D institutions. Such a process could enhance the commercial utilization of the research results from the laboratory.

(c) Another factor which the laboratory and the research institution could consider in choosing R&D projects of commercial relevance could be an analysis of the patents that are being filed in two or three developed countries in certain areas of interest. Normally in a period of three to five years these technologies get well established in the market and

thereafter technology transfer takes place through normal commercial channels. Since patented inventions have higher commercial potential such a survey and analysis of the same should form a valuable input in preparing the programmes to be undertaken in the research institutions.

(d) Yet another factor that could be recognized in the new liberalized environment is that foreign collaborations are easily accessible not only to industries but also to R&D organizations. Research organizations can identify appropriate R&D collaborations with any agency considered the best in the world. Such a step should shrink the time required to reach targets of commercial interest. In fact many countries of late have emphasized international R&D collaborations as a very important channel for technological development.

(e) R&D institutions at the stage of development of technology should look at the potential market. Very often they are dampened with the feeling that the domestic market is small and economies of scale would not enable them to compete. But what is really true in this situation is not so much the size of the domestic market that one has to look at but the possible commercial market beyond the domestic front. It is often said that 'economies of sale is what is more important'. It is possible that many of the research laboratories in India in particular, would find themselves relatively comfortably placed with respect to the market potential in the neighbouring countries. If any of the institutions in India need any help in this matter, the Asian and Pacific Centre for Transfer of Technology (APCTT) would be happy to provide information about the potential in the Asia Pacific region and also render any further assistance in reaching this vast zone for the mutual benefit of the countries concerned.

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