

Chapter IV

Conclusion & Recommendations

The study has thrown light on the experiences and difficulties of the R&D centres in conducting R&D in India and their abilities for capacity building in India.

Some specific conclusions and recommendations arising from this study are made here.

1. It has been observed that among the four ways of making contribution to the capacity building (research for manufacturing units, training programs, collaboration with host country institutions and contract research) collaborative research of the foreign R&D centres with Indian institutions / universities are not many in number. On the other hand, foreign R&D centres engaging in research for their own manufacturing units makes the process of technology transfer slower. However, collaborations / collaborative research can be a source of technology transfer to Indian industry. Thus there is need for policy that would create incentives for more collaborative research. Such incentives could include tax exemptions, grant as partial payments for research etc. Establishment of sophisticated facilities available at national laboratories could also foster such collaborative research.
2. It is found that collection of data from R&D centres was very difficult, since even public domain data is not easily accessible and foreign firms are not readily willing to supply the same. In fact there is no database or an organised system available in the country for interfacing or dealing with activities of R&D centres in India. Therefore suitable database, research and analysis facility and a pro-active action from Indian side needs to be set up, particularly if India is to be presented as a real R&D hub for the world.

3. It is observed that in these foreign R&D centres, the entrepreneurial activities are very limited and practically negligible as against the trends in countries like USA, Korea, China and Japan. Therefore, the Start-up entrepreneurship should be encouraged for the S&T personnel of the foreign R&D centres. The services of Indian scientists and technical personnel in foreign R&D centres may be encouraged to be availed by Indian corporate sector in their respective areas wherever feasible, though some initiatives have now been taken by the government in this regard.
4. The study shows that the foreign R&D centres in India have marginally impacted the S&T capacity building in India. however, the diffusion of technologies has been highly limited. Therefore, FDI along with technology flows should be encouraged in high technology areas as well as in traditional sectors through appropriate policy mechanisms. Setting up of collaborative R&D centres with Indian companies may be promoted through FDI. Large R&D projects of strategic importance through collaborative and networking arrangements may also be encouraged consistent with identified thrust areas for national development.
5. Customs clearance is a major challenge for many pharmaceutical and biotechnology sector firms. A common laboratory equipment or input commodity is held for clearance for weeks. This is especially a problem in case the R&D centre is working on micro-organisms specified in pharmacopoeia. Even though there is import duty exemption on laboratory inputs, procedural / executional delays dampen the spirit. Hence there is need for policy intervention for speedy customs clearance.
6. It has been found during the course of study that there is expected to be enhanced research activity in the following specific areas.

Agricultural Sector:

1. Plant breeding.
2. Germ Plasm Development .
3. Crop genetics.

Automobile Sector:

1. Signal processing
2. Mechanical Analysis like – stress analysis, vibration dynamics, injection mold flow, thermal analysis.
3. Manufacturing enterprise modelling.
4. Virtual manufacturing.

Biotechnology and pharmaceutical sector:

1. Neuroscience
2. Oncology
3. Paediatrics
4. Women's health
5. Diabetes
6. Tuberculosis
7. Phage therapy
8. Alzheimer disease
9. Epilepsy
10. Ophthalmology
11. Transplantation
12. Hepatitis
13. Non-Hodgkin's Lymphoma
14. HIV
15. Psychiatry
16. Cardiology
17. Infectious diseases
18. Metabolic diseases (Osteoporosis)
19. Respiratory diseases (Asthma, Bronciotis)

Chemical Sector:

1. Polymer research

Computer Hardware and Software Sector:

1. User interaction technologies
2. E-Commerce

3. Life Science / Clinical Research related Software
4. Network management software

Therefore there is a need to develop research skills in these area and churn out a larger number of Ph.Ds in these areas so that when R&D centres in India demand these skills they do not face shortage of research professionals.