

Title of the Project: Value Addition to the Human Capital of India – Compatible to Liberalisation - With special focus on IT education
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Implementing Agency : Group for Economic and Social Studies (GESS)
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To prepare a directory of industries who have a paid-up capital of Rs. 50 lakhs and above and are performing R&D activities but have so far not got themselves registered with and recognised by the DSIR. The industries which are already registered with and recognised by the DSIR for this purpose will also be included in the directory so as to make it a comprehensive list.

Study to emphasize on quantum of R&D for the industries, R&D projects sponsored by industry, major facilities set up, composition of R&D, expenditure on advertisements and the reasons of not availing DSIR recognition.

Executive Summary :

1. A study on 'Value Addition to Human Capital of India - Compatible to Liberalisation with special focus on IT education' was undertaken by The Group for Economic and Social Studies (GESS), New Delhi in the sponsored mode from NSTMIS Division of the Department of Science & Technology, Government of India.
2. The study was undertaken through the structured questionnaire targeted at the Educational Institutions. Data was collected through desk research, questionnaires, opinion surveys and individual interviews.
3. Information Technology has revolutionised the world in a short span of a couple of decades.
4. IT and IT related services contribute over 7.5 % of the overall GDP growth of India. IT exports are expected to account for 35% of the total exports from India. There is potential for over 4 million jobs in IT and ITES by 2008, according to NASSCOM. The National Plan for e-governance has also given IT a big boost.
5. A number of global Fortune 500 corporations have made India their preferred location for IT operations and have set up business outlets in Bangalore, Hyderabad, Chennai, Mumbai, Pune, Gurgaon, Noida and Delhi.
6. India's cost advantage makes it an attractive outsourcing destination and a source of IT manpower. In turn, factors such as multicultural exposure, global mobility and conducive work environment attract the young generation to IT education. To attract the 'best talent', companies offer highly competitive salary packages which no academic institute or any other industry offers.
7. Most of India's student population is keen to pursue IT education which has surpassed other streams of education in popularity.
8. IT manpower development is not only crucial for sustaining the growth of the Indian economy, it is also important for maintaining the country's edge in the global market.
9. A rapidly growing sector which generates employment on a large scale needs strategic manpower planning and world-class education. It also needs a Nodal Agency for maintaining IT standards and planning IT manpower requirements on a sustainable basis.
10. The challenges for IT education in the wake of globalisation of Indian economy have been dealt with in this Study. Issues such as research in IT sector and faculty development related issues also form part of the Study.

11. A road map for IT education has been suggested for maintaining India's image and identity as a destination for high quality IT education. The suggestions include creation of a large pool of skilled manpower including students from rural sector.
12. The report also highlights the importance of knowledge sharing among leading industry experts, industry associations, analysts and regulatory authorities. The need for alignment of course curriculum with industry requirements has been analysed and suggestions offered in the Study.
13. The role of MHRD, MIT, UGC, AICTE, AIU, and NASSCOM has assumed a great degree of importance in strengthening an impressive global brand image of Indian IT. Active support of these agencies will also help in strengthening existing learning centres in the post-liberalised environment.
14. Monitoring the quality of IT education, developing industry oriented curriculum, faculty development and improvement of infrastructure have all been emphasised in this report.

Recommendations:

1. Stress on quality of education

The quality of IT education must be upgraded according to the changes in industry and the requirements of users. This upgradation may include using new technology. Weightage should be given to practical work and the course design should incorporate more practical work. Online teaching methodology should be promoted using tools like teleconferencing, web etc. The system of gradation and ranking should be strengthened to maintain the quality of IT education.

2. Focus on R&D

In order for India to remain a centre of knowledge having the largest pool of IT professionals on the world scene; research and inventions in IT education should be accorded priority.

3. Collaboration between corporate sector and academic institutes

i) Curricula Development Curricula Development

Interface between the IT industry and academia should be encouraged for the development of IT professionals. Industry needs in terms of manpower, skill sets and quality of professionals in various disciplines and at different levels can also be identified through collaborative efforts. This will help realise the synergy between the two and strengthen Indian professional education through improvements in curricula, faculty, infrastructure and pedagogy. This interface can be initiated through organisation of specific seminars, programmes and focused research. Measured initiatives are also needed to bring about a paradigm shift from generalized courses to specialized and inter-disciplinary subjects.

ii) Faculty Development

IT faculty should be trained with the help of the IT industry. Technocrats and personnel from IT Industry should interface with the faculty members of Universities, Deemed Universities, IT Institutes and Colleges. This would help in bridging the gap in teaching and will be an effective device in promoting regular interaction between academic institutions and the industry.

iii) IT Related Research

IT Industry should take greater part in the promotion of IT-related research. The industry can be advised by the Government to provide scholarships and sponsor students to undertake research.

4. Faculty Development

The ongoing quality improvement programme for serving teachers should not only continue but should be more vigorously promoted. The number of teachers deputed for studies and research should be fairly large. The student-teacher ratio should be ensured in proportion to the prescribed ratio.

5. Faculty Remuneration

There is a need to revisit the faculty remuneration which is not attractive. It should be comparable with Industry salary. This will help attract the best talent in the industry to the teaching profession.

6. Sharing of talent between institutes

There should be a system where national resources created at different points either by national institutes or by companies should be made available to the other engineering institutes in the region, for use by students of IT.

7. Ph.D Programme

There is a general shortage of students for doctoral programmes. Teachers should also be encouraged to undertake research leading to Ph.D. This can be done by providing incentives such as scholarships, sabbaticals and other financial support.

8. Frequent Course Revision

IT courses need to be taught differently from conventional courses due to their high technical contents, fierce competition and fast changing nature. The course curriculum should be revised regularly.

9. Ranking of Institutions

There should be a mechanism to rank institutions. This will provide more clarity on the value of the degrees for students.

10. Manpower Forecast Mechanism-- Data Bank

Establishment of a Manpower Information System for the IT sector is crucial for forecasting sufficiently in advance, the required number of IT graduates, post graduates & professionals so as to have a balanced growth of IT education. This requires a strong data bank to be built right at the education institutions and shared with the industry to understand the demand and forecast the future manpower requirement.

11. IT Council

An autonomous body may be constituted exclusively to oversee the various facets of IT education in India. The Study team recommends establishing an 'IT Council' on the lines of the Medical Council of India.

12. IT Infrastructure

There is a need to improve IT infrastructure for better networking and connectivity between academic institutes which are not fully equipped with IT teaching tools and facilities.

13. Penetration of IT education at school level

IT education should aim to "catch them young" - right from the school age.

14. Stress on English and foreign languages

Fluency in English and other foreign languages should be targeted at the school level as it has become a necessity due to globalisation and interdependence of countries.

15. Software technology parks

More software technology parks should be established in cities across the country.

16. India's Brand Image : Role of Indian Missions Abroad

Indian Missions abroad can help reinforce global perceptions about the high standards of India's IT education through education counsellors and an information network on IT education in India by organising IT education fairs, seminars and workshops in the context of globalisation of Indian economy

17. Integration of IT in rural sector

Efforts should be made to cover the rural segment of population in the shortest possible time. To bring the rural sector into the mainstream IT revolution, the entry level for IT education should be made affordable for this sector.

18. Continuous updation of website

The objective of making an IT website, a comprehensive central repository can be achieved only by periodic updation of the proposed website with the help of providers of IT education across the country. This needs consideration of DST, MIT MHRD and other concerned authorities. The team recommends providing links to this site (www.iteducation.in) on the website of Department of Information Technology <http://www.mit.gov.in>

19. Continuity of Study Project

A Study Project covering IT education and industry in the entire country may not be comprehensive due to fast changes and entry of new institutes. The objective of the Study was limited to IT education at degree and post graduate level. A further Study can contribute to building the balanced approach required in the wake of entry of foreign institutions after the opening of the Indian economy.

Road Map:

Information Technology is an established and developed sector in India. However, India's IT education needs to be stabilised and its quality needs to be improved. The key areas which need to be addressed are government focus on IT industry, industry standards pertaining to goods and services, governance, infrastructure, integration with other sectors and development of a brand image. The need for continuous monitoring of the key areas of development in this sector is depicted in the 'Development Wheel' (Refer the detailed Project Report).

A Road Map for revamping IT education is closely linked with these key factors. Hence all the fronts need adequate focus to ensure rapid growth of the Industry.

India faces several bottlenecks in its race to success. Infrastructure needs improvement. Power, water, roads, airports need to be improved for IT to climb for higher peaks. In order to achieve this, active support of the Government is a must. Educational institutes and Universities imparting IT education will have to gear up in the changing scenario. Until now, the success of Indian IT has been outside the country. The time has come for it to be replicated in India. India has a huge potential both for Indian industry as also to create a pool of IT professionals.

IT Education

- ▶ Course material needs to be upgraded periodically to meet industry standards and requirements.
- ▶ Training methodology should be at par with the developed nations
- ▶ Training to trainers to be provided by industry experts
- ▶ Early faculty induction to attract and build a strong faculty team.
- ▶ Adjunct Faculty - Bring back experienced professionals in the main stream.
- ▶ Sharing of Faculty - A consortium of colleges to be formed to pool senior level faculty for imparting IT education in advanced areas.

- ▶ Research and Development
- ▶ Consortium of institutions and industry players
- ▶ Exchange of education programs with developed IT nations

Industry Standards & Practices

- ▶ World class software development
- ▶ Ensure zero defect delivery
- ▶ IT industry should provide feedback through ongoing interaction with academic institutes to improve the quality of IT manpower.
- ▶ IT industry should have a regular training programme on co –operative basis as prevalent in USA, UK, & Australia.

Governance

Data Bank of IT skills and resources - A joint effort by education institutions and industry

Education Council - An IT education council is required to monitor the education standards and quality

Infrastructure

- ▶ High speed internet connectivity
- ▶ Software Parks in less developed IT zones - To promote IT education in these areas.

Integration with other sectors

- ▶ IT enabled processes should be promoted.
- ▶ Every sector and industry should be automated as far as possible and have the capability to share information and data on a single platform

Brand Image

- ▶ Brand image of India as a centre of knowledge having a pool of highly skilled world class engineers and IT experts.
- ▶ India needs to be projected as a solution center and a one stop shop for all IT needs.

Government Focus

- ▶ Government focus at state and national level is required to promote this sector.
- ▶ E-Governance - National E-Governance plan (NEGP) should continue its thrust in the state level and identify more and more states and areas which can be computerized.