CHAPTER V

SUMMARY AND RECOMMENDATIONS

5. INTRODUCTION

Present education is under of radical change in response to various factors like development in information technology, communication, privatization, globalization, etc. New areas of study are emerging in higher education in order to meet the vocational and professional needs of students. In this century, a new society is emerging where knowledge is the primary production resource instead of capital and labour. Efficient utilization of existing knowledge can create comprehensive wealth for the nation in the form of better health, education, infrastructure etc. for improving the quality of life.

“The nation’s competitiveness depends, in part, on the skills of tomorrow’s engineers”. An accelerated growth of Technical Education is imperative for developing a vision and a correct approach to ensure meaningful application of new knowledge and technology in the day-to-day lives of the people, particularly the disadvantaged sections. For this, the government has to provide adequate support for technical education and for Science & Technology. The need to support basic research in science and engineering, to find solutions to basic problems of food, drink, shelter and health had never been as pronounced as it is now.

Technical Education is the application of scientific and technical knowledge to solve human problems. It is the use of imagination, judgments and reasoning to applied science, technology, mathematics, and practical experience, which resulted in the design, production, and operation of useful objects or processes. Technical Education is a basic and essential for national development and for strengthening the industry, economy and ultimately the quality of life of people. Technical Education in India contributes a major share to the overall
education system and plays a vital role in the social and economic development of the nation.

India is at crossroads in Technical Education with events overtaking faster than we could imagine. Major critical issues are listed and comprehensively discussed in this thesis. Admission procedure, bane of multiple tests, teacher scarcity, impact of globalization and IT, resource crunch, Alumni and Industry linkage, PG and Research, Distance and Continuing Education, Infrastructure and Value education are relevant factors. Irreversible process of globalization and IT revolution will make major impact on Technical Education and intelligence lies in converting threats to opportunities to make India a leader by effectively harnessing human and material resources. There is no alternative to strengthening indigenous technology base, a challenge for technical educators.

Higher/Technical education in India has expanded at a very fast rate, in terms of the number of institutions and enrolment, during the post independence era. This is in tune with trends all over the world. It is claimed that the Indian educational network is the second largest in the world. It is also claimed that India has the third largest pool of scientists and technologists. But despite this expansion enrollment ratio remains low at about 6 percent. Technical Education plays a vital role in national development and welfare of society. Hence expenditure on technical education is considered as an investment on Human Resources Development and education expenditure has been increasing faster over years since independence. Nearly 15 per cent of total expenditure is on higher/technical education.

The present chapter is an attempt to provide the major findings of the study which were drawn after analyzing and interpreting the data collected through the exploration of documents, questionnaire and interview schedule. Finally, an attempt has also been made to summing up of the study expressing thereon personal interpretation which the investigator terms it as conclusion.
5.1 MAJOR FINDINGS OF THE STUDY

The major findings of the study are given below:

5.1.1 The Trends of Financing Technical Education in India

1. The trends of funding in education though not enough but have increased over the years. The comparison of the govt. funding of three years i.e. 2005-06 to 2007-08 shows that the expenditure on education both in the Centre & State/UTs has increased substantially.

2. The data revealed that centre had spent 4.59% of its total budget on education in 2005-06 whereas during the same period the states have spent 4.20% of their budget on education whereas the same percentage was increased to 5.78% & 5.69% respectively during the FY 2007-2008.

3. During the year 2007-08, under plan & non-plan expenditure, the elementary education had a highest share of 52.32% of the total expenditure, whereas technical education had only share of 5.33%. During the same period the technical education had received the share of 10.76% of the plan expenditure & 2.95% of the non-plan expenditure of the education budget.

4. The actual non-plan expenditure for technical education was Rs.77512.71 lakhs in 2003-04 whereas during the 2009-10, the same went up to Rs.100392.00 lakhs.

5. With regards to the grants to IITs, NITs, IIMs etc, it was found that the total actual plan grant released under technical education during the year 2003-2004 was Rs.37351.68 lakhs whereas the non-plan grant for the same year was Rs.77512.71 lakhs. This grant went upto Rs.142293.00 lakhs and Rs.100392.00 lakhs respectively during the year 2009-2010.

6. From the data collected for the year 2003-2010 reflects that though there has been a substantial increase in both plan and non-plan grant allocation for technical education by GoI. But in comparison to other sectors,
technical education was less emphasized as per the budget allocation is concerned, whereas it contributes a lot towards the growth and development of the nation.

7. In connection with Sources of Revenues for IITs & NITs, it was found that the Non-Plan grant covers the operational expenses such as salaries, retirement benefits, estate maintenance etc. Non plan grants make up for 82% of operating revenues for IITs. Whereas, the Tuition fee is earnings from UG, Masters and PhD programs. Tuition Fee contributes to about 7% on an average for established IITs. Also it is evident from the data analysis that 82% of revenue comes from government and almost all capital expenditure.

8. The analysis of the data of seven IITs shows that the plan grant released from MHRD has declined over the years. While in the year 2007-08, the total plan grant released from MHRD was Rs.404.00 crores while the same grant was reduced to Rs.108.50 crores (except IIT Guwahati). Out of the seven IITs, during the year 2007-08, IIT Kharagpur received the highest number of plan grants i.e. Rs.79.40 crores followed by IIT Guwahati i.e. Rs.77.00 crores while IIT Madras received the lowest grant i.e. Rs. 41.00 crores. While in the year 2010-11, IIT Kharagpur received the highest i.e. Rs. 24.00 crores and IIT Delhi received lowest plan grants i.e. Rs. 10.00 crores.

Revenue Generation

9. IIT Bombay had the highest internal income excluding grants in every year during 2003 to 2009 whereas IIT Guwahati had the lowest internal income excluding grant.

10. During the year 2007-08, IISc Bangalore was having the highest corpus fund i.e. Rs.21211.46 lakhs while IIT Guwahati having the lowest corpus fund i.e. Rs.2252.85 lakhs. In the year 2003-04, the total corpus fund in
IITs & IISc Banglore was Rs. 47561.47lakhs. During the year 2007-08, these went up to Rs.70933.47lakhs.

**TEQIP-I & TEQIP-II**

11. The first phase of TEQIP was implemented with the assistance of World Bank as a centrally coordinated Central and State Sector Project with a total cost of Rs.1339 crores. Out of this, Rs. 306 crore was Central Component and the remaining Rs. 1033 crores was State Component. The programme became effective in March, 2003 and the closing date of the programme was March 31st, 2009.

12. Allotment and expenditure of TEQIP-I grant for a period of six years i.e. from 2004-05 to 2009-10. An amount of Rs. 961.630 million was allotted to 112 technical institutes cover 11 states of India out of which Rs. 954.680 million was spent by the institutes.

13. Based on the achievements made during TEQIP Phase- 1, TEQIP Phase-2 is being implemented as a Centrally Sponsored Scheme (CSS) with the assistance of the World Bank at a total cost of Rs 2430 crores. The Central contribution will be Rs 1895.50 crores, out of which Rs.1395.50 crores will be reimbursed by the World Bank. The State share will be Rs 518.50 crores and the Share of Private Unaided institutions will be Rs. 16 crores. The funding pattern will be 75:25 between the Centre and the participating States. However, for the North Eastern States, the funding pattern will be on a ratio of 90:10.

**R&D Funding**

14. A total of 12523 R & D projects costing Rs. 2198.47 crores were approved by 23 central government departments/agencies during the period 2000-2005. During this period, the number of projects sponsored in a year varied from 2009 in 2000-2001 to 2749 in 2004-2005. The total approved cost varied from Rs. 286.71 crores to Rs. 570.49 crores. The R & D support reached out to 9231 scientists as principle investigators (PIs)
spread over a total of 1773 institutions including technical institutes located in 408 cities and towns in the country.

15. These institutions consisted of 156 universities, 624 science colleges, 186 engineering colleges, 143 medical and pharmacy colleges/hospitals, 45 deemed universities, 9 institutes of national importance, 306 national laboratories, 55 state government departments/state S&T councils, 47 scientific and industrial research organizations (SIRO) (recognized by the department of scientific and industrial research), 93 corporate sector companies/research institutions and 109 voluntary organizations.

16. The average cost of an R&D project during 2000-2005 was Rs. 17.55 lakhs, while during the period 1995-2000 this figure was 14.70 lakhs. Thus, the average cost of a project underwent an increase of about 19% over that during 1995-2000.

17. Subject Area-wise Number of Projects and R & D Funding: Among the subject, engineering and technology received maximum support by way of number of projects (22.2%), followed by biological sciences (17.2%).

5.1.1.2 The Criteria for Financing the Technical Education

1. Student enrolment, no. of faculty & staff, requirement for infrastructure development was the main criteria for funding.

2. During 2009-2010, IIT Kharagpur had the highest number of students and in IIT Guwahati among the seven IITs. From the data, it is found that the enrollments of the students in these IITs had increased during last eight years and IIT Kharagpur had the highest number of enrollments during the eight years.

3. During 2009-10, IIT Delhi had total 5921 students and received Rs. 37.00 crores; IIT Madras had total 5641 students and received Rs.37.00crores. Among the seven IITs, IIT Kharagpur had the highest number of students and received Rs.44.00 crores and IIT Guwahati had lowest number of
students and received Rs.31.00 crores. Among the seven IITs, IIT Roorkee had more students (i.e. total 5433 students) and total grant received only Rs.24.44 crores whereas in IIT Kanpur had less number of students (i.e. total 4434 students) and received Rs.35.00 crores. It was clear that there was inadequacy in financing in all IITs in India.

5.1.1.3 The Utilization of Funds in Technical Institutes

1. The aided institutions had received 50 to 70% of the capital cost and 80 to 90% of the recurring cost. The analysis of the expenditure of IITs from 2003 to 2007 reveals that the major part of IIT expenditure is Salary & wages followed by retirement benefits. However, the academic activities like library service & departmental expenditure including lab development are in the bottom of the expenditure list.

2. The analysis of the expenditure of IITs from 2003 to 2007 reveals that while in 2002-03 most of the IITs had surplus budget, during the year 2006-07 most of the IITs had deficit budget except IIT Kanpur.

3. The highest fund had released in 2009-10. In 2008-09, IIT Bhubaneswar had received highest fund i.e. Rs. 11.5 crores whereas IIT Patna received lowest in terms of Rs.7.7 crores. In 2009-10, IIT Patna had received highest amount of fund i.e. Rs. 52.5 crores and IIT Mandi had received loest amount of fund. IIT Hyderabad had received highest amount of fund i.e.Rs. 27.50 crores in 2010-11 and IIT Patna and Indore had received the lowest amount of fund.

4. IIT Bombay had the highest expenditure i.e. Rs. 17824.14 lukhs in 2008-09 whereas IIT Guwahati had the lowest expenditure i.e. Rs. 5134.17 lakhs in 2008-09. However, the total expenditure in the seven IITs during 2008-09 was Rs. 90061.27 lakhs.

5. IIT Khargpur had the highest non-plan expenditure (i.e.18%) whereas IIT Guwahati had the lowest non-plan expenditure (4%) and 13% non-plan
expenditure in IIT Roorkee, 15% in IIT Bombay, 16% in IIT Delhi and Kanpur.

6. In 2008-09, the total expenditure of the seven IITs had 34365 lakhs in which the average cost of per student was 2.62 lakhs. In comparison to the seven IITs and IISc Bangalore, IISc Bangalore had the highest total expenditure and the average cost of per student.

5.1.1.4 The Financing in Technical Education in the Five Year Plans

1. The analysis of Plan budget of Planning Commission reveals that the 1st first five year plan had highest budget allocation i.e. 7.86% to higher & technical education while 5th plan had lowest allocation i.e. 2.7%.

2. In Technical Education, the enrolment growth was targeted at 15% per annum during XIth five year plans. The expansion objectives were to be achieved through a multipronged strategy. The overall plan expenditure in higher technical education had Rs. 800000.00 lakhs in Xth plan on the other hand, the overall plan expenditure in higher technical education had Rs. 8494300.00 lakhs in XIth five year plan.

3. Government of India envisioned a bold scheme in the eleventh five year plan. This plan document has been approved. It envisages establishment of 8 new IITs, 20 new IIITs, 20 central universities and several world class universities. The funding required for such an expansion has also been provided in the eleventh five year plan. In fact, the outlay in this plan period for higher education has been enhanced by an order of magnitude.

5.1.1.5 The Problems Financing the Technical Education

1. Financing of technical institution is one of major concern nowadays. In government and Government aided institutions the fee charged is ably 2/3 percent of the annual recurring cost per student per year. Most of the Government and Government aided institutions are finding it difficult to allocate funds for developing, maintenance and day to day running of the
institution. The increased allocations to education alone will bring in different kinds of qualitative inputs through project works, field visits, in-house training, etc. The required resources should come largely through Government finding.

2. In the total (plan plus non-plan) expenditure on education, the relative share of higher education, has been a little bit stable around ten percent; similarly the share of technical education remained stable at a low level of about four percent. The overall funding for higher education in India is grossly inadequate.

3. There is a general deterioration in the standard of technical institutions. It is partly due to political pressure on the universities and the Government, lack of qualified staff, poor equipment etc. There is no incentive of terms of pay and prospect for teachers as the AICTE pay scale is yet to be implemented fully in certain institution resulting in resentment and disinterest looming large amongst the experienced senior teachers. All the engineering institutions of our country-private or affiliated are currently facing different types of problems from all corners in terms of quality and presence of in experienced faculty, infrastructure facilities, admissions, etc.

4. There has been a decline in the funding of TE in comparison to the higher education. The tuition fee in the TE sector is very high & therefore not affordable for all.

5. Some technical institutions were inadequately equipped with infrastructures. The maintenance of IT infrastructure was very poor due to lack of skilled technical manpower and financing. Significant up-gradation of academic infrastructure in many institutions was urgently required.

6. The most serious causality of this decline in expenditure on technical education had been the quality of education, as investment in those inputs that had stronger relationship with quality, such as research was reduced. The reduction in expenditure on education first resulted in the fall in
investment in books and journals in the libraries, consumable material in the laboratories, infrastructure and other quality improvement programmes in colleges and universities. Further, quality of education may deteriorate with increased number of students per teacher, with reduced number of books in libraries, etc.

7. There was an acute shortage of qualified faculty members in large no. of technical institutes mainly private due to resource crunch.

8. Some technical institutions were inadequately equipped with infrastructures. The maintenance of IT infrastructure was very poor due to lack of skilled technical manpower and financing.

9. Absence of systematic planning and designing for development of infrastructure, financing and learning resources.

10. The inter-networking among the institute was very limited and there was no exchange programme due to limited funding.

11. Some of the institutes lack transparency, accountability, monitoring, evaluation & feedback mechanism in the matter of financial transitions.

12. Even with the present level of subsidised fees, many potential students cannot afford engineering education as fees constitute only a small portion of the cost. There are non fee academic costs and maintenance costs.

13. The ways of mobilising resources for technical education leads to more than one possible solution. As there are more than one reason for the financial crisis a combination of solutions is more effective than a single solution.

5.2 CONCLUSIONS

Although investment in the Indian technical education sector is plagued with challenges, it offers great opportunity to investors. A number of studies and reports indicate the strong returns that could be expected from the sector. With about 50% of India’s population being younger than 25 years of age and the
presence of a severe shortage of institutions delivering high quality education and training across segments, what is present before the investors is a timely opportunity. The regulatory issues associated with investing, extracting returns are indeed significant. However, with foresight strategic planning and by retaining legal counsel with prior experience in dealing with these issues, investors interested in investing in education can overcome these challenges and generate favorable returns even in an unfavorable economy (Nishith Desai Associates, 2010). Though substantial development in the field of technical education has been made so far, there are lots of things needs to be done specifically in relation to quality concern. Specialized institutions like IISER, IIIT and SPA need to be established in India to overcome the national imbalances. While infrastructure needs to be improved in certain institutions and universities, major incentives for the technical institutions are to be given to attract qualified faculty members. If technical education and training is to contribute to the development of a country, it must be responsive to the needs, technological advancement and globalization trends for which adequate financing is needed.

5.3 RECOMMENDATIONS

Based on the analysis & interpretation of the data, based on major findings and discussion with experts in the field; the recommendations are presented.

Financing, Governance and Management

- An autonomous higher Education Council/Commission, consisting of prominent stake holders, is needed to act as a national think-tank for planning a world class higher and technical education in the country. Further, Roles of UGC and AICTE need to be redefined and confined to development, standardization, monitoring and regulation with proper financial assistance.

- GoI should increase the funding to technical institutes. More subsidies on education should be given. More stipends should be given.
• Along with financial autonomy, there is a need for greater accountability of the IIT’s to the government and the taxpayer who have funded the establishment of the IIT’s. Autonomy and Accountability are two sides of the same coin. Accountability is to be ensured by governmental audit and the fact that the accounts of every Institute are to be audited by the CAG and laid before each House of parliament.

• AICTE should develop and establish a consortium of engineering institutions devoted solely for encouraging, fostering and supporting innovative ideas generated by students and faculty and converting them to commercial products with the support of interested industry through venture funds.

• India needs a large number of world class institutions which would require participation and collaboration of public, private, and foreign players for which a suitable legislation and level playing field need to be in place.

• Reforms in our educational systems require, inter alia, restructuring of institutions. This is not easily achieved. The following four items are required to be addressed immediately, viz., (i) public-private partnership; (ii) effective regulatory authority particularly where private sector is involved; (iii) measures to attract foreign students and teachers and (iv) building bridges between technical institutions and R&D agencies.

• An effective regulatory authority, as well as an accreditation system, has to be crafted whose role should be focused on universities and institutions where the private sector is involved.

• Emphasis must be given on Technology Transfer with proper financing planning.
- A National Education Development bank should be set up to provide loans to students at normal rates of interest, with judicial empowerment to recover loans.
- The cost of Technical Education should be reduced through optimum utilization of infrastructure.
- Reforms like resource diversification and more efficient use of resources can be achieved only with greater institutional autonomy.
- Multiplicity of funding sources is desirable because it helps safeguard autonomy and act as a buffer against government. Very often, the government funding may have strings and the commitment of the government may change, with voter preferences. This should be changed.
- The present educational policies of subsidization imitating it to fees alone are inadequate means for reducing inequality of educational opportunities.
- The advocates of self-financing education argue that at this time of government's fiscal crisis, the state's capacity to spend on education on the past scale is almost exhausted. It is pointed out that the state has reached the upper limit in regard to mobilization of resources for public expenditure, that the deficit of the government has reached alarming levels, and that one of the causes of the fiscal crisis is the high level of public expenditure on social services in general and education in particular. On the other hand, it is argued that the state will be taking a major risk if it changes its past expenditure pattern to solve its present fiscal crisis.

**Research & Development (R&D)**

- R&D priorities should be fixed in four thrust areas: globally competitive basic research, mission-oriented research, industry-oriented research and country-specific research.
The progress of R&D activities in engineering and technology has not kept pace with the ever-changing national and global requirements. 57% of college professors lack either a master’s or PhD degree. The technical institutions should make the best efforts to develop the R&D culture through various AICTE funded R&D schemes like MODROBs, TAPTEC etc. Research publication, Patents, Consultancy etc. by the faculties are the assets of any institute. The faculty members should also explore the possibilities of getting R&D grant from other funding agencies like DST, CSIR and DRDO etc.

- Facilitating global engagement through Govt.-to-Govt. agreements, exchange of researchers, participation in international projects, technical mission, licensing of technology, purchase of equipment, publications, seminars / workshops / conferences etc.
- Encouraging increasingly interdisciplinary and international approach in research, coupled with greater flexibility to respond to changing requirements and opportunities.
- Allowing academic institutions and users to pursue their knowledge transfer aspirations in a flexible manner.
- Facilitating knowledge/technology transfer and commercialization of R&D
- Supporting and encouraging research community to engage meaningfully with general public including schools and young people.
- Institute-industry consortia should be formed for the technological advancement in the country.

**Quality Assurance, Accreditation**

- The quality of Technical education in India may be elevated by forming a network of technical & higher institutions.
• Engineering Institutes in India should make all efforts to obtain accreditation (programme-wise accreditation from AICTE-NBA & institutional accreditation from UGC-NAAC) from AICTE-NBA/UGC-NAAC by developing good infrastructures and qualified faculty for which liberal funding is important.

• Institutions in India which have had their programs accredited may be given more funds & autonomy.

• Extensive sensitisation of institutions/colleges particularly the top management and academic leadership on the importance of quality improvement, employability enhancement and faculty development as well as need to be customer (student and industry) oriented in their approach for delivery of technical education.

• Networking with industry- particularly IT industry such as Intel, IBM, Microsoft for the cause of quality enhancement through MOL’S and establishment of laboratories and arranging of faculty development workshops.

• The institute should involve industry in project guidance such as project co-ordination with IT companies which will led to good results.

• Mentorship of various institutes by industry through NASSCOM / CII.

• Implementing teacher-fellowship programmes to attract talented teachers to the profession enabling them pursue full time Ph.D. in one of the state funded colleges at attractive terms..

**General**

• Effective and intensive deployment of ICT for the purpose of education delivery, automation of educational administration, curriculum development, online counselling, online testing and evaluation, virtual library etc. should be adopted. ICT should also be used for promoting development of innovative global network of educational institutions.
The e-learning framework must provide access to knowledge and related data at anytime and anywhere. The e-learning framework must allow additional components to be integrated easily using open software. The e-learning framework must allow content and other data to be exchanged and shared by tools and systems connected via internet. Through the course management tools (Learning Management System), syllabi and other educational information are to be made more accessible to the students.

Initiating major curriculum review and examination process to make teaching-learning process learner centric, learning centric, flexible, holistic and cutting down response time with a six-sigma process with extensive use of technology.

Qualified faculty and competent technical staff are essential for quality education. Faculty training for post graduate and doctoral programmes should be arranged.

The recruitment of qualified teaching and technical staff should be given priority.

The Governing Body of the Institute should include Academicians of reputed organisations, Industry leaders besides Government and University representatives or nominees for corporate governance and policy formulation.

5.4. EDUCATIONAL IMPLICATIONS OF THE STUDY

The primary educational implications of the study are:

1. This type of research work provides a gateway to many challenging research questions in the area of financing the technical education.

2. The study will help the administrators of technical education, educationist & general people to know about the trends of financing the technical education.
3. It will also help the interested learners to know the trends of financing into the technical education system in India.

4. The study will be helpful for administrators to know what problems are in the process of financing technical education.

5. The study will be helpful for administrators to know what problems are faced by the institutions in facilitating quality technical education.

6. It will help in comparing the financial investments of technical education and higher education in India with other states of the country as well as with the international scenario of technical education.

5.5. SUGGESTION FOR FURTHER RESEARCH

A research being a time bound programme, often fails to comprehensively address the problem proposed to evaluate. Besides, during the process of research the investigator discovers various other dimensions that, if addressed, could have revealed a better result. But due to fear of deviation and the need to achieve the degree in the stipulated time often restricts the investigator to experiment. This leaves a great scope to progress further research from a different dimension and considering various other variables.

1. In the present research, the researcher has covered the centrally funded technical institutes like IITs, NITs & few technical institutes like BITS & MAHE under private sector. However, it is suggested that the administration and management of technical institutions in India may also be taken as a research study.

2. A comparative study on financing of technical education between India and the neighbouring countries like Nepal, Bhutan, Bangladesh, Myanmar & China will also be an interesting study.

3. Research may also be conducted by comparing the growth and development of technical education in India with other states and with national norms.
The government is still the most important financer of technical education in both developed and developing economies. But adverse macroeconomic conditions and competition for public funds have reduced the capacity of governments worldwide to support technical Education. Governments have introduced structural adjustment programmes to tide over the economic crisis in most of the developing countries including India. This has led to fiscal compression leading to squeeze on funding for education in general and higher/technical education in particular. The view that higher education is not a merit good is gaining ground. This has affected state funding of higher education. For instance, the Government of India in its white paper on subsidies has argued for reduced subsidies to "non-merit" goods like higher education. The reduced funding for higher education is taking place when new demands are placed on it.

The determination of the optimum amount of money the state should invest in education is a difficult problem. Adequate revenue provides the possibility of producing a good educational programme, but does not guarantee it. Inadequate revenue, however, will almost certainly guarantee a poor educational programme. In the absence of continuous infusion of funds, the traditional structure on which vast amount of resources have been invested over a long period of time will be enfeebled and will go out of use. This is a social wastage of colossal dimension. Its inevitable consequence is the narrowing down of the human resource.

In conclusion, it can be stated that the game of hardship with excellence and competency no doubt is a challenge before India, but nothing is activated till today. India has immense potential. Efforts must be directed to energize the human resources through quality technical education and training for equipping the skills required to participate in the growth and developmental process of nation.