CHAPTER-II

REVIEW OF RELATED LITERATURE

2. INTRODUCTION

The success of any research study depends on the extent to which the advances, both empirical and the theoretical have been made by the previous researchers and authors. Since survey of related literature helps us to show whether evidence already available solves problems adequately without further investigation and thus may also suggest the method of research appropriates. Therefore, it has been thought to be appropriate to shift the relevant facts regarding the present study from the mass of research evidence to this chapter so as to formulate the proper objectives in order to provide an outline for the successful execution of the investigation.

The review of the literature promotes a greater understanding. It also provides comparative data on the basis of which to evaluate and interpret the significance of one’s findings. It also helps the investigator to acquire better knowledge of the methodology and procedures followed and create confidence in carrying out his/her research. Best (1977) has said, “man builds upon the accumulated and recorded knowledge of the past...a familiarity with the literature in any problems area helps the students to discover what is already known, what others have attempted to find out, what methods to attack have been promising and problems remain to be solved”.

Indeed, a review or related literature provides the academic guidance to the researcher. According to C. V. Good (1959), “Survey of related literature helps us to know whether evidence already available to solve problem adequately without further investigation and thus may save duplication. It may contribute to general scholastic ability of investigator by providing ideas, theories and explanations, help in formulating the problem and may also suggest the appropriate method of research”.

In the previous introductory chapter, some references were made to the
existing literature on educational financing. These highly selective references were made just to situate the present study in its proper context. In this chapter, the investigator proposes to make a more detailed survey of the literature on financing education in general and higher education in particular.

Here, in this chapter, an attempt has been made to present a review of the relevant and representative studies and the observations on the different fields of Technical Education conducted for the last few decades. Care has also been taken to maintain as far as possible the chronological order of the studies.

Taking into consideration the stated objectives in mind, a careful review of some related literature was done by the investigator which consists of review of research journals, books, dissertations, thesis, periodicals, and volumes of survey reports edited by M B Buch (1974, 1979, 1987 and 1992), India Yearbooks of Education, and Encyclopaedia of Educational Research. There is no dearth of related literature attempting to define and describe TE. A number of journals, books, dissertations, theses, yearbook of educational research, encyclopaedia of educational research, websites and other sources of information are used for collecting information regarding a study related to present topic. The different aspect of TE were obtained from the researchers already done by scholars both in India and abroad.

Research literature related to financing in technical education, that has been identified under the present research problem may be classified as per given below:

1. **Studies Conducted in Abroad**
2. **Studies Conducted in India.**

### 2.1 STUDIES CONDUCTED IN ABROAD

**UNEVOC-ACEID (1996)** published a report on “Case Studies on Technical and Vocational Education in Asia and the Pacific – India”. The major highlights of the report are enumerated below:

Education has a place of high priority on India's national development agenda. The educational system is of monumental size, yet the country's overall educational and training achievements leave much to be desired. The formal
schooling is referred to as 10 + 2 + 3 pattern with ten years of general, two years of diversified and three years of first degree education.

Work education, in one form or another, is an integral element of school curriculum and competency based vocational programs are offered at the higher secondary stage. Vocational courses at the tertiary stages of general education have recently been introduced. Work education is inherent in the educational philosophy of India. The TVE system in India is multi-sartorial with each ministry responsible for manpower development in that sector. The TVE programs in the formal education system are either state delivered or state financed.

The higher secondary vocational education program is the emerging mode for skill training for informal and unorganized sector and aims to the educational requirements for self-employment.

Educational policy formulation is a complex exercise, carried out at many levels by all the concerned agencies, such as National Development Council, Planning Commission, and Ministry of Human Resource Development, many national and state level institutions, mass media and many others. There is fewer legislation in the field of education in India than in many countries. The Union Government has suggested an elaborate management set up for VE which is gradually coming into existence in all the states while that for TE is well in position for a long time.

A number of steps are being taken to improve TVE in India. For TE, there is a major World Bank financed scheme which addresses the present weaknesses in this system. Vocational education being an emerging system is continuously evaluated and reviewed to bring in new features to improve its output and performance. The problems are identified by public men/women, voluntary organizations, mass media and education from various angles. This leads to development of a holistic and balanced viewpoint. Some of the future directions of improvement are: introduction of first degree level vocational courses, internal resource generation through the vocational program outreach studies in schools, creating and expanding the open learning system for greater flexibility in delivery for wider outreach and effective linkage with industry and
the world of work. These steps also address the issue of enhancing the status of TVE, more particularly, vocational education in India.

**Barr, Nicholas (2002)**, in his report on “Funding Higher Education: Policies for Access and Quality” put forward a strategy for achieving two objectives in higher education improved access and increased quality. He founds that If graduates pay an interest rate equal to the government's cost of borrowing (not the bank overdraft rate), repayments increase from about 50% of total borrowing to about 85% (the remaining 15% shortfall being mainly due to low lifetime earnings), largely eliminating the fiscal impediment to expanding loans. The move is politically less difficult than it sounds. Interest rates are currently low, so that a move to the government's cost of borrowing involves only a small increase to the rate that graduates pay. Second, a graduate's monthly repayments depend only on his/her income; thus an increase in interest rates has no effect on monthly repayments, instead affecting the duration of the loan – making it clear that repayments are simply a form of targeted income tax. He stressed that by removing interest subsidies is the single essential key to solving current funding problems. The considerable resources thereby released underwrite the strategy for quality and access. The strategy has three mutually reinforcing elements: flexible fees, a wide-ranging loan system and active measures to promote access. Flexible fees are necessary to reflect diversity, to arrest quality decline and to assist some redistribution of teaching budget towards institutions with more remedial teaching. Specifically, fees should be increased initially to £2000, but with institutions free to charge less. All fees should be fully covered by a loan entitlement. There are two impediments to access – financial poverty and information poverty. The strategy outlined to address both. He suggested:

1. Grants and scholarships for students from poor backgrounds.
2. Extra personal and academic support when students from poor backgrounds reach the university.
3. Raising the aspirations of school children.
4. More resources earlier in the system, including financial support for 16-19 year olds.
House of Commons Education and Skills Committee (2001-02) reports on “Funding higher education: policies for access and quality” and highlights the policies for access and quality in the process of funding the higher education.

Psacharopoulos, George and Patrinos, Harry Anthony (2002) in Policy Research Working Paper on “Returns to Investment in Education: A Further Update” reviewed and presented the latest estimates and patterns as found in the literature at the turn of the century on returns to investment in education and establishing related patterns.

Durango, Lewis (2002) presented a paper on “The Financing of Technical and Vocational Education and Training (TVET): Options and Challenges for Sub-Saharan Africa” in Nordic UNEVOC Network Workshop Oslo, Norway 14 – 15 November 2002. This paper examines the different systems and mechanisms used to finance TVET in Sub-Saharan Africa and the problems and challenges associated with these different systems and mechanisms. After this descriptive analysis, a model for the sustainable financing of TVET is proposed.


European Commission (2004) conducted a study on “The Financing of Higher Education in Europe”. The study aimed at collecting statistical information on the financing of higher education to provide a clear picture of the current financial flows in higher education in Europe. The study has further more looked into the examples of innovative financing mechanisms implemented in the member states to encourage peer learning activities among the countries. The study has built a rich statistical data set to carry out its quantitative and qualitative analyses of the situation in each country (for the 25 EU countries, 3 Candidate Countries, 2 EFTA countries and 4 non-European OECD countries) and describe the current situation and trends at a national and EU level (see
Volume 1: Quantitative analysis). Based on this evaluation, recent policy initiatives and promising recommendations to increase and diversify funding, make a more efficient use of resources and provide more student aids schemes on a national and European level have been clearly identified (see Volume II: Qualitative analysis). In March 2000, the European Council, set the goal for the EU to become “the most competitive and dynamic knowledge-based economy in the world, capable of sustaining economic growth with more and better jobs and greater social cohesion” by 2010.

Higher education has remained in relative terms, progressively under-funded in most parts of the European Union. OECD studies show that European universities are seriously under-funded, while a report by the World Bank indicated that some national higher education frameworks are clearly inadequate in supporting sustainable economic growth, the expansion of knowledge-based professions and social cohesion. As for funding structure and policies, these vary widely among Member States and sometimes, even within the same Member State, from one region to another.

The five key challenges faced by universities, as identified following the broad consultations on “the role of the universities in the Europe of knowledge” are, increased demand for higher education, internalization of education and research, developing effective and close co-operation between universities and industry, proliferation of places where knowledge is produced and the reorganization of knowledge. The communication from the consultation outlined three objectives that have to be taken on board in order for universities to play a role in the creation of a Europe of knowledge. These are to ensure that European universities have sufficient and sustainable resources and use them efficiently, to consolidate their excellence in research and in teaching, particularly through networking and to open up universities to a greater extent to the outside and increasing their international attractiveness. The European Union has a number of instruments and programmes aimed at assisting the development of education and training.

All the sources of funding of higher education could be broadly grouped into two: public and private. Public sources come from central, regional and
local authorities while private sources are the students (and the households) and non-governmental bodies such as foundations and charities.

The relative importance of each of the sources (public and private) varies from one Member State to another. There is the policy of free education in some Member States (such as Denmark, Finland and Sweden), while in most other Member States, students are charged tuition fees. Historical factors in the development of higher education policies largely account for the current prevailing situation.

For non-EU OECD countries, the funding system seems to be characterized by greater dependence on the private sector than it is the case in the EU. For example, in the USA only half of the total funds for higher education come from public sources, (though it must be noted that the statistics for the USA cover only public institutions).

Based on a comparison of the resources devoted to higher education in four non-EU OECD countries (Australia, Canada, New Zealand and the United States) with the EU, it was apparent that the non-EU OECD countries have been better able to diversify the sources of funding by spreading the financial burden between the public and private sector. The private sector includes households and private enterprises, organizations etc. Based on evidence in the non-EU OECD countries, tuition fees account for a significant proportion of income of higher education institutions. In some EU Member States which have a policy of free education at all levels (including higher education), this potential source of income cannot be tapped into. Despite the fact that tuition fees are charged to students in the non-EU OECD countries, public support is provided to students in various forms including scholarships, grants and loans in order to offset any negative effects arising from tuition fees. Given that the non-EU OECD countries have spread the financial burden between the public and private sector, it does not necessarily infer that they will devote less public resources to higher education.

The roles that regional authorities play in the financing of education vary from country to country. In Ireland, the Netherlands, Finland, United Kingdom, Estonia, Latvia, Lithuania, Hungary, Malta, Slovak Republic, regional
authorities play no role at all. In Denmark, Greece, France, Italy, Austria, Sweden, Czech Republic, and Poland, the regional authorities play some role while in Belgium, Germany, and Spain, they play very major role.

Nevertheless, there have been a number of important innovative mechanisms implemented in Member States ranging from increasing efficiency of higher education systems, to various forms of student support. For example, in the Netherlands is the performance-related loan by which such loans become a grant in case the student successfully completes their studies. This system maintains the public source of funding whilst increasing efficiency in the education system. In the new EU Member States, which were formerly Soviet bloc countries, the transition to market economies from centrally planned economies also included introducing radical reforms to their higher education systems. For example universities were given institutional autonomy, and in some countries this included a large degree of independence from State administration. The five key objectives set as the basis for measuring innovativeness of funding initiatives are:

1. Increasing absolute levels of funding
2. Diversifying sources of income for universities
3. Making best use of resources (increasing efficiency)
4. Providing extra funding for excellence in research and training and for increasing international attractiveness
5. Student aids (allowances, grants, loans)

In principle, most of the innovative mechanisms identified are transferable to other Member States. Indeed, some of them are already in existence in some other countries (in most cases, slightly adapted to the local situation). In practice, transferability depends essentially on a number of factors – historical, social, legal, political, and economic. Mechanisms aimed at helping students with loans to pay their tuition fees (such as the deferred repayment of tuition fees scheme -UK) would not make sense in countries with free higher education. Thus, innovative mechanisms with the objectives of providing student aids tend to be more restricted in their transferability than those aimed at making best use of resources. Mechanism aimed at providing extra funding for
excellence in research and training and for increasing international attractiveness is transferable to all Member States. They do indeed merit being considered at EU level, considering the overall objective of the Union to substantially increase resources devoted to research in the EU.

Preston, Lesley Florence (2005) conducted a study on “Reflections on South Tech and Secondary Technical Education 1960-90”.

The report entitled “Participation in Formal Technical and Vocational Education and Training Programmes Worldwide: An Initial Statistical Study”, developed by UNESCO Institute for Statistics (2006) intended as a first step in addressing this gap in knowledge and as an initial exploration of how TVET data might best be used. As for any new research, the preparation of this report has been a learning experience. It is part of on-going efforts by UNESCO to strengthen its capacity, and the capacity of its Member States, for the collection and analysis of TVET data. The report is to be read primarily as an initial survey of the available data. It is not a comprehensive description of what is actually going on “out there”. Indeed, the report stresses the gaps in data, the reliance on estimates and the shortcomings of applying conventional educational indicators in the TVET arena. This report is therefore a modest first step in using statistics on access to formal TVET and exploring their potential to better inform policy at national and international levels. As the survey points out, data on non-formal and informal TVET are not readily available. Indeed, participation in these activities is difficult to quantify in the normal ways. What does exist for many countries are data on enrolments in public general and vocational education programmes, disaggregated by ISCED level, age and gender. Whilst recognizing that enrolment in formal TVET programmes is only a small percentage of overall participation in TVET (especially in developing countries), the scope of this survey is limited to formal TVET. At the outset, the challenges of global monitoring in the field of TVET are discussed. There is not only an absence of data in many countries, but the boundaries between TVET and general education differ from place to place. Statistical indicators developed for general education assume a far closer correspondence between age and education than exists in TVET, which not only takes place prior to entry to the labour market but
includes deferred initial training, updating, upgrading and retraining. This therefore presents the long-term methodological challenge of developing new indicators that encompass public and private formal, non-formal and informal TVET. The report offers a statistical overview of formal TVET enrolments across ISCED levels from a global perspective and some regional patterns emerging from the data are discussed. Enrolments in TVET at the secondary and post-secondary levels are also discussed using Vocational Gross Enrolment Ratios (VGER). The most valuable part of the report is the presentation of the statistical tables. These tables provide the clearest picture yet of what national-level data currently exist to describe access to formal TVET programmes by level, age and gender. Despite the shortcomings in the coverage, reliability and comparability of these data, this report is nevertheless one of the most comprehensive statistical analyses to date of enrolment in formal TVET in the world. This report demonstrates how taking a statistical perspective towards TVET can provide helpful descriptions and analysis. It has also shown how data collection and analysis can reveal complexities which point to the need for more attention to methodological work and the development of more appropriate indicators for TVET. Indeed, the conclusions of the report give a clear indication of what needs to be done. Whilst statistics are important, they may not reveal significant differences between countries in the way that TVET is organized and managed. Relationships between variables can often be better understood when statistics are complemented with qualitative narratives that can put “flesh on the bones” by illuminating historical, cultural and contextual factors. As this report shows, the use of statistical data can reveal some of the distinctive features of TVET. It also shows how TVET statistics can be approached in a critical way, which can assist in the development of more relevant and appropriate indicators and analytical tools. It is hoped that this report will stimulate dialogue with UNEVOC centres on the potential and limitations of statistics in TVET. Support from UNEVOC centres can help to improve the supply and coverage of statistical data, both geographically and in terms of levels and types of TVET. They also have a key role to play in improving the quality, reliability and comparability of TVET data. UNEVOC centres can also help to ensure that
TVET is included in national and international reports on education. By looking at TVET from a research perspective, UNEVOC centres have much to offer this emerging field of enquiry.


**Asian Development Bank (2008-2009)** conducted a study on the “Financing Technical and Vocational Education and Training in the People’s Republic of China”. The aim of the study was to investigate the financing technical and vocational education and training in the People’s Republic of China. Major findings are as follows: 1) among various levels and types of Education, TVET is not prioritized, and has received inadequate funding. 2) Financial contribution by enterprises is not significant in the People’s Republic of China.

**Human Development Unit, South Asia Region, and The World Bank (January 2008)** conducted a study on “Skill Development in India: The Vocational Education and Training System”. This summary presents a brief synopsis of the different sections of the paper and highlights key constraints faced by the vocational education and training system as well as the potential options to address some of these constraints. The Government has a clear vision regarding the vocational education and training system. Recognizing that the system is out dated and resembles a closed, centrally planned system for a centrally planned economy, the Government is keen to reform the system. While the system is relatively small, it is clear that major reforms are needed before any thoughts are given to expanding the system. What is needed is the development of a system where the Government plays a key role in policy development, standards setting, financing and monitoring and evaluation, while engendering greater competitiveness and accountability by training providers. For reforms to succeed, close involvement of the private sector at all levels - from policymaking to being involved in running institutions, is critical and the Government is working closely with the private sector to move forward in transforming this vision into reality.

2.2 STUDIES CONDUCTED IN INDIA

Other studies pertaining to Technical Education in the national levels have implications for the present study. Prf. N. Sidheswar and Prof. N. Rama (1965), Prof. B. P. Sarkar (1965), Prof. J. P. Joshipara (1965), Prof. S. K. Dutta (1965), Huge Warren (1967), Prof. S. A. Balu, Prof. G. S. Chandran (1994) and Dr. Swaminandhan (1995) studied Technical Education in India. This section includes two parts i.e. a) Technical Education, b) Financing on Technical Education in India.

2.2.1 TECHNICAL EDUCATION


Ratna, K B; Adithan, M; Puri, V P and Gill, H K (1988) conducted an independent study entitled “Case Studies of the Technician Education System in States C and D (Northern Regional)” to investigate the planning processes and methodology adopted by the Directorate concerned with technician education in respect of various aspects concerning the technician education system. The Objectives of the study are (i) To study the planning process and methodology adopted by the State Directorates in respect of various aspects of the technician education system thereby bringing out its strengths and weaknesses in the states, (ii) to create an awareness amongst the senior planners and administrators of the need to adopt a scientific approach in the state level planning and management of the technician education system, and (iii) to highlight the problems faced. The key Findings are: (i) The State Directorates have become aware that they should not be merely administrative bodies but bodies involved in professional management of the technician education system in the States. (ii) The Directorate wished to strengthen themselves to undertake major activities like
monitoring, preparing development plans, inspection, evaluation, computerization, curriculum development and manpower planning.

**Pillai, S S and Srinavisan, R (1988)** made a survey on “Technician Education Students’ Priorities: A Survey”.

**Sen, Biman (1989)** while tracing the history of the development of Technical Education right the eighteenth century, has analysed the India scenario in detail with regard to the critical issues, major policy initiatives and reforms pertaining to Technical Education before independence, and after. He founds that the reforms and measures in the pre-independence days could not yield any substantial improvement in TE. After Independence, greater emphasis was laid in India on quantitative expansion of trained manpower since it was the only alternative available in the situation of paucity of funds. With the approach, shortage of specialized trained manpower was met by arranging training of technical personnel by crash programmes either in India or abroad. This policy, according to him, left a vacuum in the qualitative improvement of TE and thus affected the research and development. Sen has suggested that a critical analysis of the Indian experiences in the field of TE may be a useful guide to many developing countries for working out and appropriate strategy for developing human resources.


**Sheereen, Zeba (1989)** carried out a research on “TE and Skill Formation in the Organized Industries in India since 1961”.

**Sastry, L S and Pillai Swaminatha S (1989)** worked on a project entitled “An Action Plan to Improve the Standards of Workshop Training in Polytechnics”.

**Pillai, S S and Srinavisan, R (1990)** carried out an independent study on “A Survey of Problem of Technical Student”.


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RamnathKishan, N (1991) carried out a research on “Cost-benefit Analysis of TE in Andhra Pradesh: A study”.

Goela, Sarla (1992/93/95), studied on “Evaluation of TE in India during First Five Year Plans”.


Sharma, P B (1994) while discussing the new challenges to be faced in the process of managing the technical institutions, particularly, the need for attracting motivated faculty, has observed that highly motivated and qualified professionals can be attracted to teaching only if the educational institutions provide an environment to enable them to flourish as expert technologists alongside their teaching role. According to him, USA, UK and Japan and such other developed countries have been successful in attracting the very best to teaching by giving a high priority to this profession, as its quality and commitment directly affects industrial advancement and the quality of human resources. According to him, the reluctance to join teaching is also due to the value system of our society which does not acknowledge or recognize the value of those who create wealth, while it fully acknowledges and recognizes the role of the managers and administrators of the wealth of the nation.

Awale, Subhash D (1995) in his doctoral research on “Engineering Teachers in the Development of TE System in India”, has focused its attention on the teachers in the degree awarding technical institutions approved by the AICTE. The main thrust of the study being the entire professional life cycle of the engineering teachers, an attempt has been made to study in depth the most critical issues pertaining to the engineering teaching profession. These issues include the interest and perceptions of engineering students about teaching profession, adequacy and effectiveness of the present selection procedures of teachers and the career growth and professional development of engineering teachers the facilitators and barriers. The vacancy level in teaching positions in the degree level institutions and the necessity of long term measures to cope up with the situation are also examined. The data emerged from the opinion-survey
have been analysed and discussed in the respective chapters and the section there under supported by tables, and bar charts. The summary of findings and recommendations in the context of the research questions framed in the first chapter and the objectives of the study are presented in chapter V with the help of conceptual models by way of future strategy. The study has brought out very significant facts and aspects in the form of answers to the research questions which fulfil the objectives of the study.

Palit, Sajal K (1998), in his research article entitled “The Development of Engineering and TE in India” discusses the current development of undergraduate and postgraduate engineering education in India, and presents two case studies detailing the engineering education programmes of two nationally and internationally leading institutions: the IIT, New Delhi, and Birla Institute of Technology and Science (BITS), Pilani. The case studies focus on several important aspects, such as the administrative structures, departments and centres, admission procedures, course structures, scholarships, methods of teaching, evaluation of performances, research, practical training, industry links, continuing education and the resources available at these institutions. A unique and innovative industry-linked engineering education and training system recently adopted at BITS is also presented. IISc. Bangalore, a leading postgraduate institution, and the REC, Nagpur, one of seven NIT recently chosen by the Government of India for providing the best engineering education, are briefly discussed. Strategic plans, policies and programmes that have been adopted for implementation as the ninth five year plan of the AICTE to meet future technological global challenges are also outlined. This research article describes technological development and the engineering and vocational education systems in India. Two world-leading institutions are chosen as case studies and their administrative structures, admission procedures, curriculum development, teaching and research areas and facilities, and other professional activities are studied. The paper also includes strategic plans, policies and programmes adopted for implementation as the ninth five year plan by the AICTE to meet future technological global challenges.
**Thete, Ajit Ram Rao (1999)** undertook “A Comparative Study of the System of TE in Germany and India with Special Reference to Maharashtra State” with the objectives:

1. To investigate aims and objectives of Technical Education in Germany and to compare these with those in India.
2. To study the administrative patterns in Technical Institutions in Germany and to compare it with Indian system.
3. To study the system of Technical Education in Germany and India with reference to
   a) Admission policy
   b) Course and curricula taught.
   c) Examination system.
4. To carry-out intensive study of polytechnic institutes of Germany in terms of
   a) Curriculum development process.
   b) Course and curricula taught.
   c) Teaching methodology.
   d) Examination system.
   e) Industry institutes interaction.
5. To study the curriculum objectives of sub-system of TE related to the manpower in industry.
6. To find out the nature and extent of industry institute interaction in Germany and India.
7. To study the input of polytechnic education on industry and vice-versa in Germany and India.
8. To study the qualitative and quantitative aspects of TE system in Germany and to compare with those in India.
9. To investigate the operational aspects which maintain quality in system of TE at all levels in Germany.
10. To make strategic suggestions for the development in system of TE in India in general and Maharashtra in particular.
He found that: 1. The aims and objectives of TE in India and Germany are same, except emphasis on profession and professional training in objectives of TE in Germany. 2. The vocational schools and university of applied sciences are autonomous and 3. Vocational school in Germany adopt State-wide common curricula unlike in India which is common nationwide. The Implications of the study are: 1. For better utilization of human resources and other physical resources, the control of manpower should be developed. 2. The academic and training support to the institutes is provided to improve the quality of work in the industry and 3. Discipline was forums of technical teachers should be formed at different levels.

Tiwari, Rajiv (2005) conducted a survey on “Engineering Education in North East India: A Survey”. He reviewed the engineering education, with particular emphasis on degree level courses, in north east (NE) India with special emphasis on brief history of the NE engineering education, details of engineering colleges, courses offered by them, disciplines, number of intakes etc.

Kaur, Harpreet (2006) carried out a study entitled “Evolution of Education in India with special reference to TE-1854-1937”

Banerjee, Rangan & Muley, Vinayak P (2008) carried out a research survey on “Engineering Education in India” sponsored by Observer Research Foundation. The research survey highlighted that India has the potential to be a global technology leader.

A comparison of a few select Indian institutions - an IIT, a NIT and a private engineering college reveals some interesting results. An international comparison shows that most Indian institutions have not effectively evolved from under-graduate teaching institutions to teaching and research institutions. One of the biggest advantages of the top engineering colleges in India is the high selectivity - approximately 2-3% of the applicants are selected. This is much lower than reputed international universities. However the engineering education system has been unable to attract the best engineering students towards post-graduate studies. The IITs and IISc contribute to less than 1% of the engineering graduates in the country, 20% of the M Techs and 40% of the PhDs. Only about
1% (or less) of the graduating B Tech class of an IIT opt for an M Tech in India, while only 2% of the graduating M Tech class opt for PhD in India. About 75% of the engineering graduates are taught at the private engineering colleges.

There are more than 1100 private engineering colleges. However a ranking of the top fifty engineering colleges reveals only a small percentage of private colleges. More than 90% of the private engineering colleges are affiliated colleges that have little academic autonomy. The existing administrative structure and nature of private colleges results in very little financial autonomy with regulated fees and salaries accounting for 80% of the budget. A comparison of the Indian engineering colleges with some of the leading institutions of the world shows that it is possible for institutions to have student to faculty ratio of 15:1 or more and yet maintain a significant research output. In the report peer reviewed journal publications per faculty and UG engineering degrees per faculty are used as indicators of the research and teaching output of institutions. Most Indian institutions are improving their research output but are below the norms attained by some of the best international institutions. The challenge for our engineering education system is to make the transition from primarily teaching institutions to teaching and research institutions. We developed a normative scenario that increases the output of quality engineering graduates from Tier 1 (IITs, IISc) and Tier 2 (NITs) institutions and increases the engineering PhD output to 10,000 per year. This would involve the launch of a National PhD initiative. A series of initiatives are required to attract our brightest students to pursue research. This would need partnerships and commitment from industries, strengthening existing PhD programmes and research facilities and facilitating quality jobs for the doctoral students. One of the biggest constraints for the development of engineering education in the country is the shortage of quality faculty. This is linked to the issue of less number of PhDs, salaries and incentives for engineering educators. Steps to address this must consider incentivizing performance, enhanced societal and industry linkages and a periodic review mechanism. There is a need for the industry, government and academia to formulate a strategy for engineering and science education in India. We need to have a mechanism to identify important areas and disciplines that
should grow and develop policies and institutions that facilitate this. There needs to be a high-level think tank that reviews the higher engineering and science education system in India and provides direction for future growth. It is important to understand the actual trends in numbers, placements, salaries, employability, research output and compare and benchmark performance with other institutions. An understanding of the reality should form the basis of policy changes that ensure that the engineering education system meets the changing needs of the industry and society.

Shah, Seema & Mishra, J N (2009), carried out a survey entitled “An Analytical Approach of Faculty Members on the Frame work of TE in India”. The objective of the work is to find out dynamic matrix of embryonic technological developments with its concurrent adoption by technical institutions in India.

Kumar, Neeraj (2011) A critical study of growth and development of engineering education in Punjab after independence. On the basis of the study of policy perspective it was found that in the pre-independence period, the industrial policy of the British Government was based on the interests of British Capitalist class and required growth and development of engineering education did not take place.

2.2.2 FINANCING ON TECHNICAL EDUCATION IN INDIA

Azad, Jagdish Lal (1972) studied on the topic entitled “Critical study of financing of higher education in India in the Post-independence period”.

Jha, D (1974) found in a study on Patna University that when it became a teaching-cum-residential university in 1952, the expenditure increased. Government grants were main source and in 1964-65 itself there was a deficit of funds. The Finance Committee failed to function properly due to lack of financial Rules.

Mukerji, K M (1974) studied Calcutta University Finances and found that the administrative expenditure was 30% between 1948-49 to 1969-70. The salaries
to teachers varied from 13.12 per cent to 18.76%. The trust and endowments funds went a long way to sustain finances,

Nanjundappa, D M (1975) analysed finances of Karnataka University and found State Government financed up to 54 per cent and the income from fees was 35 per cent. There was decline in per capita grants. The per capita expenditure was Rs.80 in 1949-50 and it was Rs.3306 in 1972-73. There was enormous increase in expenditure, especially in academic departments but still the grants for teaching staff were only 13 per cent. There was need for imposing utmost economy of expenditure.

Panchamukhi (1975) examined whether the expenditure policy satisfied the objectives of democratisation and equity in higher education. He had found that the contributions from fees and private charities are on the decline while public financing is on the increase. He says that public assistance to higher education should be limited to the under privileged and the marginalised through scholarships, loans, etc. and the fee rates should be high enough to cover the full cost of higher education.

Sharma, G D (1980) examined the structure and unit 1 costs of university education. He also compared unit costs of general and professional universities.

Singh and Sbarma (1981) compiled and published the papers of National Seminar held in 1978 presenting case studies of finances of Karnataka, Bombay, Rajasthan, Baroda 2 and Delhi Universities. It also analysed funding methods of financing and suggested alternatives.

Ramachandran, M C (1981) conducted a study on the some problems of higher education in Kerala with special reference to the financing of education during the period 1957-75 and highlights most of the problems in the process of financing the higher education during the period of 1957-75.

Subrahmanyam, G (1982) studied the finances of Andhra University. During the IV Plan the income from internal sources 3 was 60 per cent. The major sources of non-academic income were Press, Publications and Interest on Corpus fund. The expenditure on general administration was 20 to 30 per cent. The
expenditure on teaching departments varied between 40 to 69 per cent and the expenditure on library varied from 2.58 to 9.12 per cent. He suggested a method for providing depreciation.

**Yadav, Ram Singh (1985)** has made a study on “Critical Study of Financing of Secondary Education in Haryana”. The study reveals that the financial infatuation influences the secondary education in Haryana.

**Balaraman and Kalyan Krishnan (1985)** while referring to the Ministry of Education sponsored views of the engineering college faculty (out of a stratified random sample of 2000 faculty members) with the Delphi study on “identification of future goals of basic engineering education” conducted in 1977 by a study group in IIT Madras. The Delphi was conducted with 109 India experts drawn from public and private sector industries, R&D organizations and engineering education institutions, to bring about a consensus on the primary question- What should be the goals and priorities of basic engineering education during 90’s. As a result, 40 most significant goals were identified.

**A study sponsored by the National Institute for Educational Planning and Administration (NIEPA)** made a comparative assessment of the financial situation of higher education in Haryana and Kerala in 1986. The major findings of the study include (1) the relationship between educational growth and reduction in equalities (2) a decline in private initiative and thereby drop in a major source of revenue. (3) The need for compensatory financing to make a breakthrough in equity. A similar decline in private initiative has been reported in Baroda and Punjab Universities. These studies had noted that the contributions of the above said sources declined over time in real terms.

**Mohammad, Muzammil (1986)** conducted a study on “Financing of education in Uttar Pradesh since 1951”.

**Singh, Lourembam Ibotombi (1986)** evaluated on topic entitled “study of the development and some problems of higher education in Manipur with special reference to financing of education since 1949”.
Mathur (1987) report reveals that the contribution of technological change in the economic growth in India has been quite significant. But the level of financing of engineering education is far from satisfactory.

Devarajan, G (1990) conducted a study on “Investigation into the financing of the Kerala, Calicut and Cochin University Libraries, during the plan period”.

The AIU (1991) in its study on ‘Financial Deficits in Universities’ collected information through a data format from eighty institutions. The study analysed the causes of financial deficits, methods of meeting the deficits and gave recommendations for improving university finance.

Agarwal, R B (1991) presented a study on “Financing of higher education in India: A case study of the Aligarh Muslim University and the Banaras Hindu University”.


Dhananjaya (1992) has given a very important suggestion regarding financing of the Indian engineering education. He is of the opinion that engineering education should be financed by a government sponsored bank called Educational Development Bank of India. It will be beneficial to both the financing institutions as well as to the institutions imparting engineering education.

Ansari, M M (1993) has made a study on Financing of higher education to developing countries with special reference to India.

Rajeswari, A R (1994) while discussing the supply and deployment of engineering manpower and their contribution in the industrial and economic development of India has highlighted among other things the employment of engineers by branch and the main activity in 1983-84. She has pointed out that while most of the engineering degree holders out of the total stock, roughly 90% degree holders were employed, maximum numbers of them were performing technical functions in the fields like manufacturing and construction activities. As per the data included in the study for the year 1983-84, 1.78% of the total
stocks of engineering degree holders were in the teaching profession. Out of this small number while majority of them were from the disciplines like Civil, Mechanical and Electrical Engineering, the percentage of engineers from other disciplines was very negligible. According to Rajeswari, the increase in technical manpower has not made an appreciable impact on India’s industrial and economic development and hence there is a need to make in depth studies on the impact of technical manpower on the industrial sector by going into the details of their employment characteristics, technology status, skill requirements etc., so that the technical manpower potential could be exploited toward national development.

Ghosh, A K (1995) while discussing the role of TE in the Economic Development of India has talked about the multiple structure of industrial enterprise scales, economic patterns and hierarchies of technological level and the need of planning and development of TE to deal with the complexity in the level of technologies needed and the mixed character of technical manpower required to deal with this. He has, therefore, suggested that the TE must generate application oriented qualifies technical personnel for the regional economic development and at the same time to foster in technology.


Bordia (2000) study reveals the trend in funding Technical and Vocational Education (TVE). Bordia finds that during the past decade, funding mechanisms for universities and technical education institutions and colleges have undergone massive restructuring in developed and developing countries alike. Governmental support has generally decreased, resulting in greater Reliance on fee-based education or creation of privately sponsored engineering/technical colleges or universities. The following are some of the trends that will likely result from changes in the funding of technical education: (1) export of education will become an important component of the economics of advanced, rich countries such as Australia, New Zealand, the United Kingdom, and Canada; (2) privatization, commercialization, and
marketing of education, especially business, commerce, and information technology will increasingly play a dominant role in developing countries; (3) quality management in developing countries will also move away from government monitoring to professional monitoring, as is now the case in developed countries; (4) the quality of education in developing countries will eventually be determined by market forces; (5) educational funding from individual family budgets will become increasingly difficult in developing countries as privatization results in increased fees; and (6) education will move from being a totally governmental activity to a more commerce and industry-based activity and will eventually become a service industry.

Hariharan (2003) is of the view that the deterioration in the standards of engineering education is primarily due to insufficiency of financial input to the system. The central and state government should take to the responsibility of adequately financing the system. The institutions and the management should also take steps to generate more funds by their own initiative. The educational authorities must study the system of regulation and accreditation of educational institutions in foreign countries.

Natrajan, M (2004) has suggested that technical education should follow all the guidelines by AICTE regarding fee structure. But all the guidelines should be in the form of suggestions and not in the form of order to the institutions. The institutions should adopt a fee structure that is viable for the institutions as well as the students.

Indersen, P V (2004) has stressed upon the need to restrict admission in technical education. He draws attention to two cross currents. One rapid increase in emoluments is tempting more and more youth to join technical education program which offers the best prospects for high wages and the second is dismal growth in employments. According to him the current enrolment should logically be round 200000 for engineering and architecture, which should correspond to an annual intake of barely 50000, seven times less than the sanctioned figure which he admits that these figures are subject to correction, there is a gross mismatch between what the economy can support and what has
been sanctioned by the AICTE and that at least in future the AICTE should as a matter of justice approve expansion of education on a rational basis, and not merely respond to speculative demand to start more courses. He further feels that fees in technical institutions should be pegged to 30% of India’s per capita income, or Rs.6000/- per year and that annual fees charged in private engineering colleges may be even described as anti-social. Such high fees he feels is the consequence of the state virtually absolving itself of the responsibility to fund technical education and handing it over to self-financing colleges where the students are expected to bear the full cost. He feels that it is unjust and even unwise to make engineering education unaffordable to able but poor students.

According to Rajpurohit (2004) the route to finance Higher Education for students is to make available abundant loans. With corporate scholarships not available in most of the Higher Education institutions and available only to a select few in the reputed institutions, educational loans from banks is the most viable option to students coming from middle income families. On bank loans the 58 Government of India in consultation with Reserve Bank of India and Indian Bank Association has framed various comprehensive educational loan schemes to ensure that no deserving student in the country is deprived of Higher Education for want of finance.

Varghese, P (2004) views that there are five different sources of revenue generation (a) Government (b) Students and their parents (c) Industries (d) Alumni and other philanthropists (e) International sources. The contributions from all these sources would include institutional contributions, tuition fees, student’s loans, sponsored activities, chair for academic positions and donations etc.

According to Sethi (2005) the review committee on revitalizing engineering education in Punjab has recommended that the engineering college fee be increased to realistic levels. The committee has suggested that the fee be revised from being barely 1 per cent of the recurring expenditure per student per year to
at least 20 per cent of the recurring expenditure per student per year. The committee has also suggested scholarship for economically weak students.

**P Geetha Rani (2006)** in her article on “Economic Reforms and Financing Higher Education in India” pointed out that it is unambiguous that Policy of the Government of India now encourages augmentation of resources for covering a larger portion of cost of higher education. Recent policy changes in India often favour to divert resources from higher to primary level of education and favours for full cost recovery from students even in public higher education institutions. Cost recovery measures comprising of increase in fees, student loans currently operated by commercial banks and privatization will exacerbate inequality in the society. Indeed, there seems to be a nexus between the present student loan scheme and full cost recovery. Increasing reliance on student fees, student loans and privatization without considering the low-income groups may produce regressive effects in the society. Under the deep waves of globalization and competition, important economic rationale for government funding especially for higher education is neglected. Public support for higher education remains essential to ensure a balanced achievement of educational and social missions, apart from surviving in the knowledge-based society. It is essential that funding sources must be diversified but cost-sharing with students has social and political limits, and excessive commercialization of higher education should be forbidden.

**Valiathan (2007)** views that due to the financial problems faced by the government; private entrepreneurs must come for opening of new engineering institutions. The government must watch the quality of these institutions and take necessary actions against sale of fake degrees. He also states that the country requires more IITs to control the student drainage.

**A report (2008)** reveals that hike in fee structure in the institutions of excellence like IITs has been approved. It has been raised from Rs. 25000 to 50000 a year. The reason behind is to facilitate better functioning and finer quality of education.
Ahir, Kinjal Vijay (2008) has conducted a study on “Shifting the burden: Public and private financing of higher education in the Philippines and implication for India”.

Yadav, Kamlesh (2009) investigated on “Study of financing of higher education in Haryana”.

Central Advisory Board of Education (CABE) (2009) in its fifty fifth meeting has noted that an allocation of Rs. 2000 crores has been provided in the Eleventh Plan and Rs. 50 crores has been allocated for 2008-09 for new IITs. One post of Director, one post of Registrar and 90 posts of faculty and 30 faculty posts, per year in the next three years have been created in each of new IITs.

Moreover it has also been noted that IISERs (Indian Institutes for Science Education & Research) at Mohali, Pune, Kolkata, Bhopal and Thiruvananthapuram have started functioning from temporary premises. The appointment of Directors of IISERs has been done and allocation of Rs. 150 crores has been allocated for 2008-09 for IISERs.


Kalia, Sapna (2011) conducted a study on “Cost of higher education and financing practices among students in Punjab: a study of professional education”. The main objective of the present study is to examine the cost of professional education and financing practices adopted by students in Punjab. The study has examined education costs and related issues in a wider and comparative perspective. An attempt has also been made to highlight the practical problems faced in measuring the costs of professional higher education in the state. From the study, it becomes clear that the practices related to fees and funds, recovery of costs, salary of the staff and above all, financing practices demand serious attention of the state. The state has to decide about the extent and modes of cost recovery. The allowing of full recovery of institutional costs would be socially hazardous step, and ultimately, it will turn out to be a phenomenon not conducive to the economic growth of state. It is also held that as is the practice in advanced countries, the recoveries from the students should
not be more than 20-25 per cent of the recurring cost from the students. The institutions/governments should bear 75-80 per cent of the recurring cost. The operation of unbridled market forces has generated a direct conflict between cost recoveries and affordability of professional higher education in the state. The level of fees and funds is very high in different trades/courses in the professional higher education. The private institutes providing professional higher education have been found to be generating huge economic surpluses, i.e. receipts were found to be much more than that of costs. Thus, keeping in view, the high cost recovery from professional education, there is a dire necessity to establish an independent regulatory commission with statutory powers and public accountability to determine, control and monitor the fees and funds charged from the students along with the payment of salary to the teaching and nonteaching staff.

It is seen from the above analysis that no full-fledged academic research study on financial administration of Central universities has been carried out. As an important link and model in the University systems, the Central University should work effectively and efficiently applying the modern principles/techniques of financial management. Thus the present study bridges a long felt gap in the field or research.

The studies which have been reviewed helped the present researcher to develop the strategies & methods for carrying out the present research which has been discussed in the next chapter.

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