

**STRATEGIC MANAGEMENT IN CENTRALLY FUNDED  
TECHNICAL INSTITUTIONS IN INDIA**

**Thesis**

**Submitted in partial fulfillment of the requirements for the degree of**

**DOCTOR OF PHILOSOPHY**

**By**

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**April, 2014**

## DECLARATION

I hereby *declare* that the Research Thesis entitled **STRATEGIC MANAGEMENT IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS IN INDIA**, which is being submitted to the **National Institute of Technology Karnataka, Surathkal** in partial fulfillment of the requirements for the award of the Degree of **Doctor of Philosophy** in the **Department of Humanities, Social Sciences and Management** is a bonafide report of the research work carried out by me. The material contained in this Research Thesis has not been submitted to any University or Institution for the award of any degree.

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# **CERTIFICATE**

This is to *certify* that the Research Thesis entitled

**STRATEGIC MANAGEMENT IN CENTRALLY FUNDED TECHNICAL  
INSTITUTIONS IN INDIA**

submitted by **Raghunadhan T.**(Register Number: **070519HM 07P01**) as the record of the research work carried out by him, is accepted as the Research Thesis submission in partial fulfillment of the requirements for the award of degree of **Doctor of Philosophy**.

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Chairman - DRPC  
(Signature with Date and Seal)

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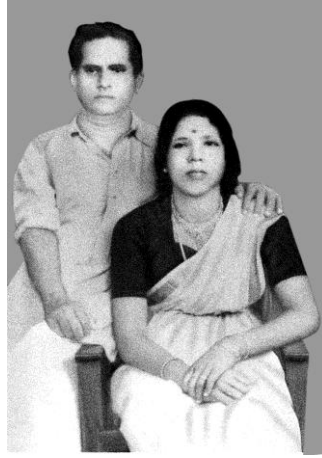
## ABSTRACT

In a globalised economy, education is seen as a service that could be marketed worldwide. Universities and other institutions have to compete with each other to attract high quality students and academic staff across the globe. A good governance system helps to create a stimulating ecosystem to attract talented students and faculty and to motivate the latter through performance incentives structure. Examination of the competitive environment of the Institution is of special importance, while planning for the future. The studies resorting to strategic management suggested to improve education and to meet the challenges of the new millennium. Strategic management in public universities help top management to align its resources in the most efficient manner necessary for the attainment of strategic milestones and to stay competitive. In this situation, the research has been initiated with the objective of identifying strategic management practices in Centrally Funded Technical Institutions (CFTIs) in India. The study also focused to find out the impeders of strategy implementation and to evolve a strategic management model for CFTIs.

The research method for this study has been carefully designed with a combination of exploratory and descriptive research design. Exploratory research design involved use of qualitative research method of in-depth interviews with educational experts, faculty and students has been instrumental in arriving at problem domain and the conceptual framework for the study, identifying research constructs and devising the survey questionnaires. Subsequently, descriptive approach has been applied using qualitative research method of survey. The survey of institutions and various stakeholders enabled the researcher to test the research framework empirically and to figure out the present level of strategic management practices in CFTIs, identifying the impeders in implementation of strategies. The research has been successful in devising a strategic management model for the CFTIs in India.

**Key Words: Strategic Management, Impeders in Strategy Implementation, Stakeholder Satisfaction, Centrally Funded Technical Institution, Technical Education**

This work is dedicated to  
All my 'Gurus'



Matru Devo Bhava, Pitru Devo Bhava,  
Acharya Devo Bhava, Rashtra Devo Bhava!

( Taittirīya Upanishad)

(Revere the mother as God, the father as God, the teacher as God, and the Nation as God".)

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## **ABBREVIATIONS**

AICTE	All India Council for Technical Education
ANOVA	Analysis of Variance
BoG	Board of Governors
BSC	Balanced Score Card
BWC	Buildings and Works Committee
CFTIs	Centrally Funded Technical Institutions
CIT	Central Institute of Technology
CSFs	Critical Success Factors
FC	Finance Committee
FGD	Focus Group Discussion
FYP	Five Year Plan
ICT	Information Communication Technology
IEST	Indian Institute of Engineering, Science and Technology
IITs	Indian Institutes of Information Technology
IISc	Indian Institute of Science
IISER	Indian Institute of Science Education and Research
IITs	Indian Institutes of Technology
IPPF	Institutional Planning and Performance Framework
ISM	Indian School of Mines
IT	Information Technology
KMO	Kaiser-Meyer-Olkin
LPG	Liberalization Privatization and Globalization
MBQA	Malcom Balridge Quality Award
MHRD	Ministry of Human Resources Development

MIT	Massachusetts Institute of Technology
MoUs	Memorandum of Understandings
NERIST	North East Regional Institute of Science and Technology
NITIE	National Institute of Industrial Engineering
NITIE	National Institute of Industrial Engineering
NITK	National Institute of Technology Karnataka
NITs	National Institutes of Technology
NITTTRs	National Institutes of Technical Teachers Training and Research
PG	Post-graduate
QIP	Quality Improvement Programme
R&D	Research and Development
RECs	Regional Engineering Coellges
SLIET	Sant Longowal Institute of Engineering and Technology
SPAs	Schools of Planning and Architecture
SPSS	Statistical Package for Social Science
SWOT	Strength, Weakness, Opportunities and Threat
TAPTEC	Thrust Area Programme in Technical Education
TEQIP	Technical Education Quality Improvement Programme
UG	Under-graduate
UGC	University Grants Commission
UNESCO	= United Nations Educational, Scientific and Cultural Organization
US	United States
VCC	Vice Chancellor's Committee
WCUs	World Class Universities

**CHAPTER 1**  
**INTRODUCTION**

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 INTRODUCTION**

This chapter outlines the background information that brings out the need for strategic management in Centrally Funded Technical Institutions (CFTIs) in India. The research gap derived from the literatures and the significance of the study have been discussed in the following sections. The subsequent section depicts the research questions and research objectives identified for the study. The final section contains the organization of the thesis.

### **1.2 RESEARCH BACKGROUND**

The ancient history of knowledge driven economy takes us thousands of years into the past. The first wave of change had occurred ten thousand years ago, with the advent of agricultural revolution. This had led to the transition from hunting, gathering and foraging in the peasant societies of the past. The second wave started in the eighteenth century when mechanization and mass production emerged as the driving economic principle, putting agriculture to the secondary level. The third wave took place in the middle of the twentieth century, initially driven through information, collection, adaptation and distribution and later thriving on knowledge transfer, exchange and creation (Tofler 1980). The important characteristics of the third wave of knowledge-driven economies are the availability of large quantities of information: there is too much rather than too little of it at hand, which travels quickly at cheaper cost. Accordingly, the knowledge resources of the country determine the success of governmental agencies and non-profit organizations to a large extent. The governmental agencies need to adapt themselves to a continuously changing and information loaded environment, anticipating new rules of the game (Martijin 2005).

In a globalised economy, education is seen as a service that could be marketed worldwide. Universities and other institutions have to compete with each other to

attract high quality students and academic staff from an international landscape. The competition is no longer limited within the national borders (Melwar and Sibel 2005).

In the global village, even leading universities confront unique challenges. The organizational complexity of the university system, its multiple goals and its traditional values, the nature of leadership in higher education is ambiguous and contested (Petrov 2006). Universities have been described as ‘organized anarchies’ with high inertia, unclear technologies and problematic goals (Cohen and March 1974). The very strength of the university system lies in the independent thought, creativity and autonomy of the people who work in them. Unilateral top down leadership is clearly at odds with traditional values of academic freedom and autonomy, democratic participation and the variety of academic interest (Middlehurst 1993). The leadership and leadership development are gaining importance, especially when university administration rests on collective decision making and how such leaders can enable quality. Quality is concerned with doing what we do well and doing better what we are doing always. It has to be the natural expression of capability in the workplace. Quality issues should not be something separate from, or added to, the work that is carried out at the university (Bowden and Marton 1998). The best place to begin is to reconsider what the university is about, and what it is supposed to do. Before attempting to improve the quality of learning, one has to find out what ‘quality’ is being referred to. A quality system for education has to identify the features of an institution which enshrines these characteristics in its entire program.

Universities have to teach tomorrow’s decision makers. The interrelationships of universities among society, economy, and the environment determine success or failure to achieve long-term prosperity. The universities have to prepare their students to cope with the problems arising in hundreds of diverse and highly specialized professional fields. Universities also have to show the way to the students towards co-operation, understanding, with a focus on the benefits and tools of collective problem solving through team work.

Many developed countries in the post modern era have already become knowledge societies, whereas, developing countries are still struggling to cultivate human potential needed for the growth of their ailing economies. It is generally accepted that the generation and dissemination of knowledge is an important facilitation of economic and social progress (Magda and Kalie 2007). We live at a time when without good training and research at the higher level, no country can assure degree of progress compatible with the needs and expectations of a society, in which economic development is carried out with due consideration for the environment and is accompanied by building a ‘culture of peace’ based on democracy, tolerance and mutual respect, in short – sustainable human development (UNESCO 1995).

In developing countries, it is crucial to tap the potential of their human endowment, which is still largely un-utilized. According to United Nations Educational, Scientific and Cultural Organization (UNESCO) policy papers, the gap between the developing and the developed countries with regard to higher education and research which is already enormous, is becoming bigger (UNESCO 1995). In the recent years, the education policy has given greater stress on institutional performance including quality assurance, management and external impact on the region (Kuttunen 2004b).

In the present scenario, the developing countries need systematic knowledge development and dissemination in those spheres of life, where major problems are observed, and noticeable efforts are required to improve the situation (Teichler 1997). More than eighty percent of the Research and Development (R&D) activities are carried out in just a handful of industrialized countries (UNESCO 1993). The R&D plans of higher education institutions are being so aligned to support implementation of the strategies at the regional level (Kuttunen 2004b).

Research and consultancy have also shown a rigid transmission or adoption of foreign models and the neglect of regional, national cultures and philosophies, which lead to its failure. In developing countries, the aim should be to make higher education more responsive to and relevant in the context of a specific region, country or community, by overcoming intellectual over dependence on more developed countries.

Universities can concentrate on concerted efforts to make their presence felt and to present their skills and special abilities to policy makers and practitioners for the development of a country like India.

The importance of education as the foundation for achieving national objectives and building a more inclusive, equitable and sustainable society is well known to every citizen of a democratic country. Education is the key to the progress of any country, which empowers the individual and nation as a whole (Singh 2010). Sustained efforts, strategic planning and creative thinking are critical to devise appropriate policies and measures to enable India to emerge as a knowledge economy to reckon with (Sibal 2010). The forthcoming sections elaborate the education scenario in India.

### **1.3 HISTORICAL DEVELOPMENT OF INDIAN EDUCATION SECTOR**

India has a unique history of education starting from 'Takzhashila', which was an early centre of learning dating back to at least the fifth century BC (Hartmut, 2002). Takzhashila was a seat of Vedic learning, best known because of the association of the strategist 'Chanakya' who later helped to consolidate the Emperor Chandragupta Maurya of ancient India. He was considered as a senior teacher of Takzhashila. It was a noted center of learning, at least several centuries before Christ, and continued to attract students from around the world, until the destruction of the city in the fifth century.

'Nalanda' was another famous university in ancient India. It was one of the world's first residential universities, located in the state of Bihar and was a Buddhist center of learning from 427 to 1197 AD, partly under the Pala Empire (Atlekar 1965). Nalanda accommodated around 10,000 students and 2000 teachers at a time.

Thus, it is quite evident that India had a flourishing heritage in the field of higher education and had contributed a lot to knowledge development. The momentum of growth in education sector continued in the later centuries.



### 1.3.1 Growth of Higher Education in India

India was economically a rich nation like China until around 1700 AD. Christopher Columbus set out to discover India in 1492 AD, because of the tales of wealth. India and China accounted for about fifty per cent of world's output, while Europe accounted for twenty per cent during zero BCE and thousand BCE, when USA had not even been born (Madison 2007). European invasions and colonization in the seventeenth and eighteenth centuries had given a serious blow to the growth of education as well as economy of India. However, the higher education in India during British colonial rule 1857-1947 witnessed a steady growth (Table 1.2). In 1857, the number of universities were three and the enrollment in higher education was 250 students, whereas, in 1947-48 the number of universities grew to twenty and the enrollment capacity rose to 215,000 students.

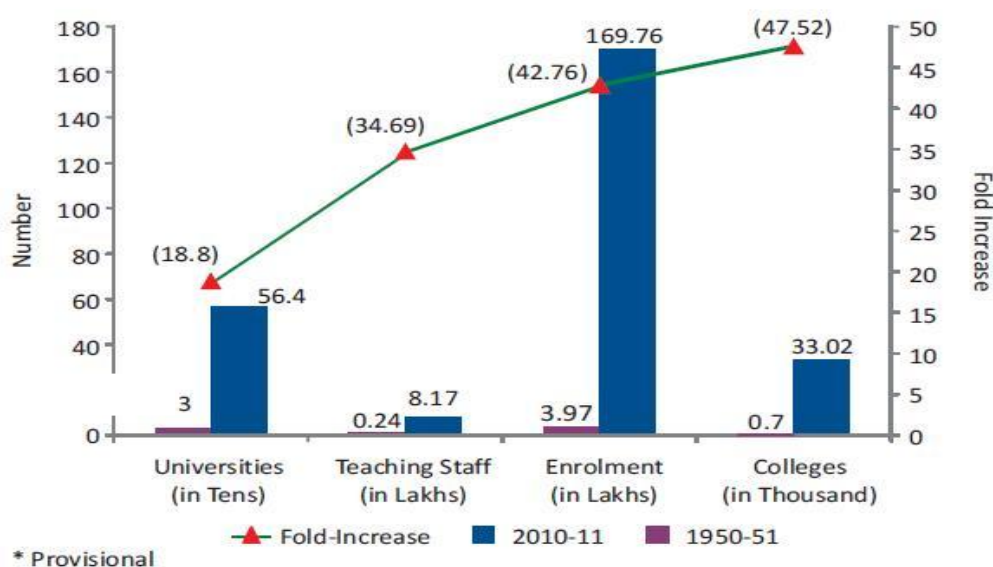
**Table 1.1**  
**Number of Higher Education Institutions in India**  
**During British Colonial Rule 1857-1947**

Year	Number of Universities	Number of Colleges (General*)	Enrollment Capacity (in Number of Students)
1857-58	3	27	250
1881-82	4	68	6000
1891-92	5	137	13000
1901-02	5	187	17650
1911-12	5	182	29650
1921-22	14	226	45200
1931-32	16	310	79140
1941-42	15	422	118750
1946-47	17	466	193400
1947-48	20	496	215000

*Note: \* General = all types of colleges offering courses in Science/ Technology/ Arts/Humanities*

*Source: Selected Educational Statistics, MHRD, Government of India (2010)*

India has made considerable progress in higher education during the post independence era (Figure 1.1)



Source : UGC Report(2012)

**Figure 1.1**  
**Growth of Higher Education in India During Post-Independence Era**

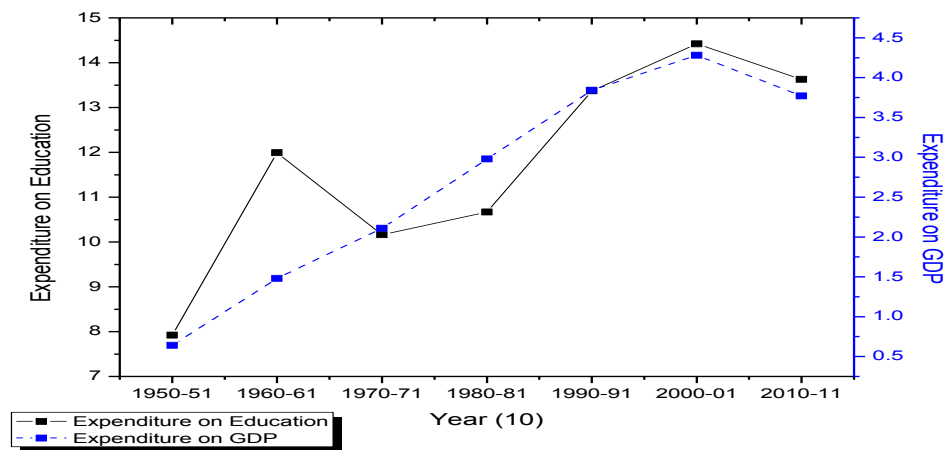
Since independence till the year 2010, there has been 47.52 fold growth in number of colleges, 42.76 fold increase in gross enrolment, 34.69 fold increase in faculty and 18.8 fold increase in number of universities.

In the year 1600, when the East India Company was formed, Britain was generating 1.8 percent of the world's Gross Domestic Product (GDP), while India was producing 22.5 per cent (William 2007). By 1870, at the peak of the Raj, Britain was generating 9.1 per cent, while India had been reduced for the first time to the epitome of a Third World Nation, a symbol across the globe, of famine, poverty and deprivation. India, in the 65<sup>th</sup> year of Independence, is now the second fastest growing economy, after China. The Literacy rate in 1950 was 17 per cent, in 1990 it was 52 per cent, 65 per cent in the year 2000; and in 2010 it is 80 per cent (William 2007).

The primary education in India is highly under-developed as compared to other developed nations. The Gross Enrollment Ratio (GER) in primary education is the

least in India, at 98.1. The highest GER is in Brazil (148.5), followed by China (116.2) and Russia (113.8). Even Indonesia (110.9) and South Africa (105.1) enjoy better enrolment ratio than India. With regard to the quality of tertiary education, India was lowest among other emerging nations, the score point on scale of two being only 0.1. The GER in tertiary education was least in India with eleven per cent. While the average share of female in tertiary education enrolment was fifty two per cent for other countries, it was only 8.1 per cent in India. The study also states that India enjoys a better ranking in quality of education at higher levels. It was at third place while China was the top performer, followed by Mexico. In demographics, India has only a lower rank, which is primarily because of the illiteracy rate in India, among its peers. Lastly, the general parity in educational attainment in India was lowest and falls under the rank of 116 (ASSOCHAM 2008).

The expenditure on education as per cent of public expenditure and per cent of GDP (Figure 1.2) give evidence of steady growth attained since 1951.



Source: Analysis of Budgeted Expenditure on Education, MHRD(2012)

**Figure 1.2**  
**Expenditure on Education as Percentage of Public Expenditure and GDP in India**

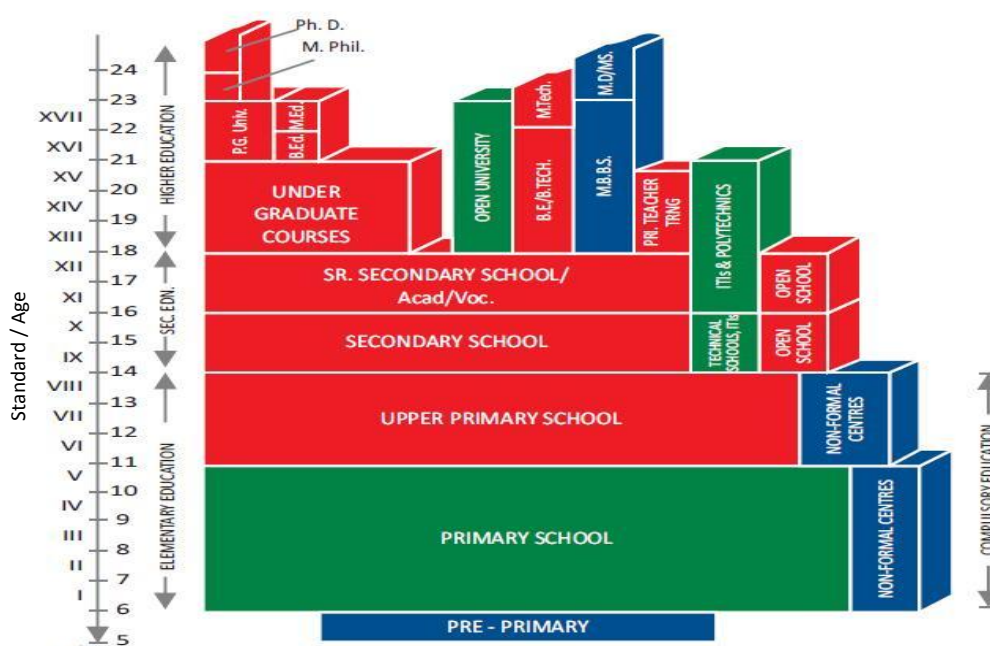
Educational expenditure as percentage of public expenditure was 7.92 in the year 1951, which rose to the highest level of 14.42 in the year 2000-01 and declined to

13.63 in 2009. Similarly, the educational expenditure as per cent of GDP was 0.64 in 1951, which attained the maximum level of 4.28 in the year 2000-01 and began to decline to 3.77 in the year 2010-11. The decline in 2010-11 in both cases is mainly due to the global recession.

Thus, it is evident that India has made a remarkable progress in the field of higher education in the post-independence era.

### 1.3.2 Current Position of Indian Education Sector

The present education system in India can be divided into three major segments namely elementary education, secondary education and higher education. Within these three major segments there are various sub divisions. A graphical representation of the education system in India showing all segments, sub divisions, arrangement into different standards vis-a-vis age factor is at Figure 1.3.

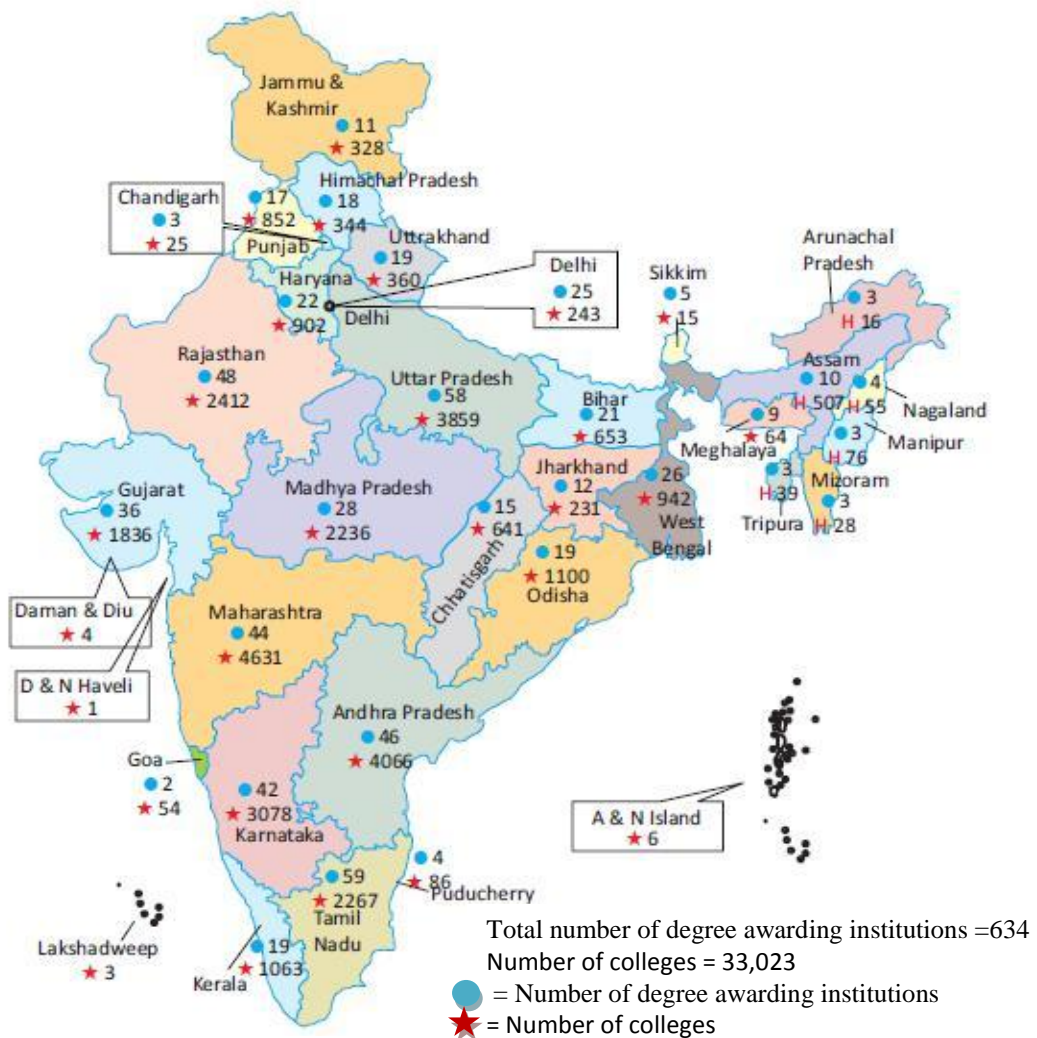


Source : Higher Education in India at a glance, UGC (2012)

**Figure 1.3**  
**Distribution of Educational Structure in India**

India has one of the largest higher education systems in the world. The growth rate in per capita income is estimated at 2.9 per cent during 2012-13, as against the previous

year's estimate of 4.7 per cent (PIB 2013). Thus, among other sectors, industrial sector has to sharpen the competitive strengths to face the new challenges. Competent technical manpower is a pre-requisite to preserve the market share and also to acquire new global avenues. Accordingly, in the developmental process, the role of higher education institutions is highly significant. Investment made in higher education since 1950s has given a strong knowledge base in many areas and contributed significantly to the economic development, social progress and political democracy in India.



Source : Higher Education in India at a glance, UGC (2012)

Figure 1.4

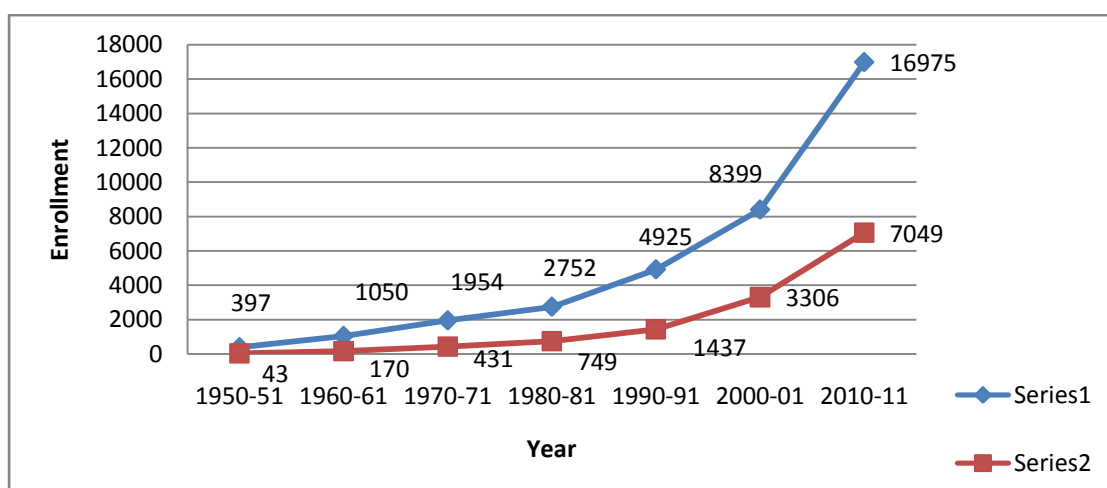
State-wise Distribution of Higher Education Institutions in India as on 2012

The statistics on the distribution of various higher education institutions among different states in India reveals that there were 634 degree awarding institutions and 33,023 colleges spread throughout the country (Figure 1.4).

Degree awarding institutions are mainly divided into various types such as institutions of national importance, central universities, state universities, deemed universities and private universities.

Student enrolment in higher education is another major factor contributing the development of the country. Enrolment in higher education has made progress during the post independence era (Figure 1.5).

*Figures in '000'*



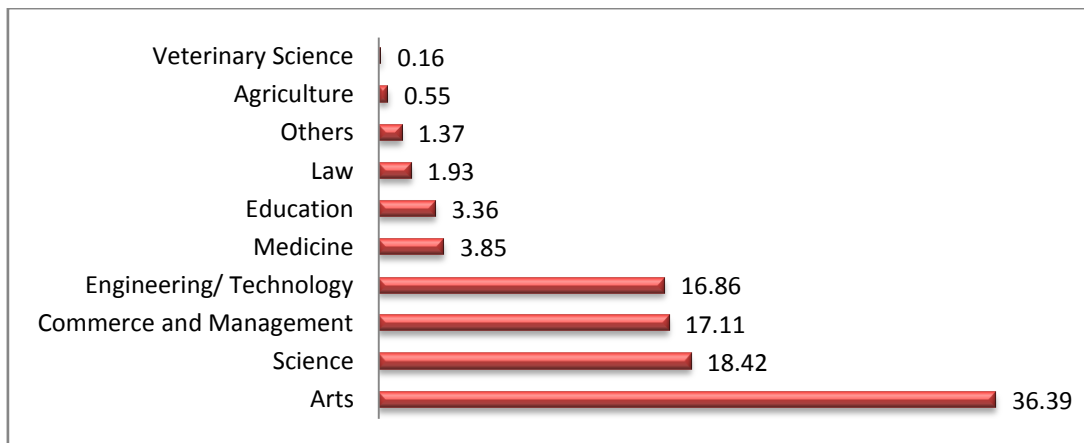
Source: MHRD Reports for 1950-51, 1960-61 and UGC for 1970-71 onwards  
 Note: Series 1= Total Student Enrolment in "000"; Series 2= Girls enrolment in "000"

**Figure 1.5**

**Gender-wise Student Enrolment in Higher Education in the Post Independence Era (1950 -2011)**

In 1950-51 the student enrolment was 397,000 which reached 16,975,000 in the year 2010-11. Female enrolment in 1950-51 was 43000 and it went up to 7,049,000 in 2011.

The statistics on faculty-wise student enrolment in higher education during 2010-11 shows 16.86 per cent enrolment in engineering/ technology (Figure 1.6)



*Note = Others includes library and information science, fine arts, journalism and mass communication, physical education, social work etc.*

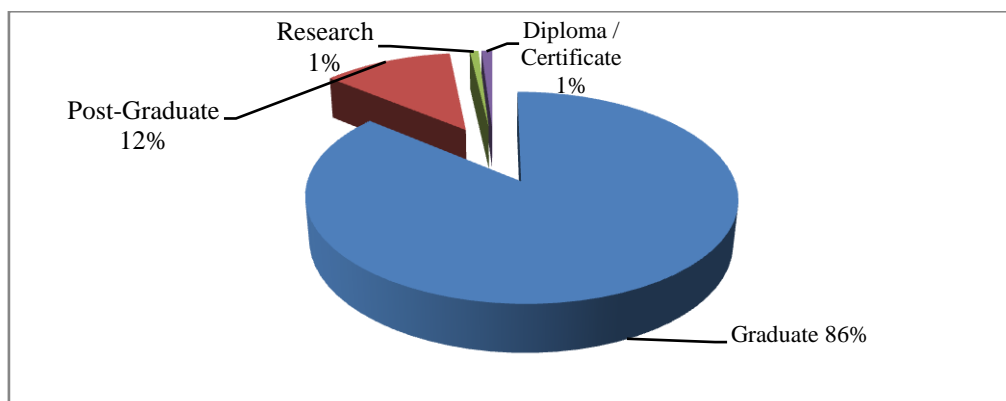
*Source : Higher Education in India at a glance, UGC (2012)*

**Figure 1.6**

**Faculty-wise Students Enrolment in Higher Education in India During 2010-11**

The highest share of 36.39 per cent enrolment is in Arts, which is followed by 18.42 per cent in Science and 17.11 per cent in commerce and management. In a developing country like India, share of engineering and technology has to be drastically improved.

A review of data relating to enrolment of students in various stages of higher education shows that 86 percent of enrolment is in graduation level, 12 percent in post-graduation level and only one percent in research (Figure 1.7)



*Source : Higher Education in India at a glance, UGC (2012)*

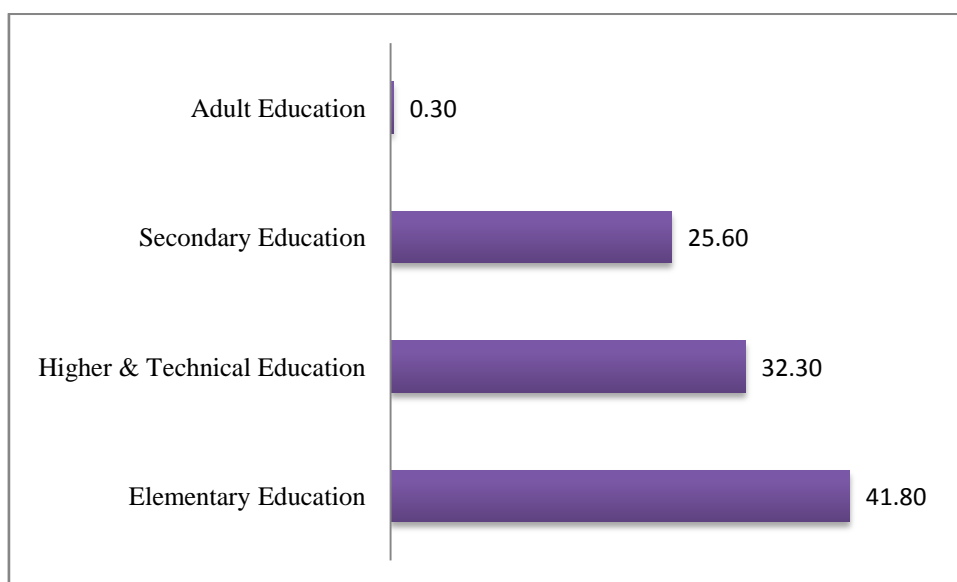
**Figure1.7**

**Programme-wise Distribution of Student Enrolment in Higher Education in India as on 2011**

The reduction in enrolment in post-graduation and research is mainly on account of lack of higher learning institutions having good research facilities as well as absence of promising career in research within the country. More than this, private participation in higher education is limited mainly in graduate level institutions.

A close examination of the data pertaining to sector-wise distribution of the public expenditure on education for the year 2010-11 highlights that major share of 41.80 percent is spent on elementary education system of the country and 32.30 percent on higher and technical education (Figure 1.8).

*(Figures in percentage)*



*Source : Analysis of Budgeted Expenditure on Education, MHRD (2011)*

**Figure 1.8**

**Public Expenditure on Education in India - Sector-wise in 2010-11**

The lowest expenditure of 25.60 percent is on secondary education. This is mainly due to the fact that the duration of secondary education system is only two years.

The above discussion indicates the fact that like every developing country, India has given due importance to higher education and technical education in particular. Next section concentrates on technical education system in the country.



### 1.3.3 Technical Education System in India

The term technical education in this study refers to the advanced level of educational process involving the study of technologies and related sciences and the acquisition of practical skills, know-how, attitudes and understanding relating to occupations in various sectors of economic and social life (UNESCO 1996). Technical education plays an important role in building up a nation's skilled labour. This can improve the quality of the skilled labour and effectively respond to the demand of labour so as to meet the needs of rapid economic development (Yuen 1993). In recognition of the importance of technical education to the economy of the country, many Asia-Pacific regions have placed increasing emphasis on technical education. This has depended on historical, social, economic and political consideration (Tilak 2002). India also has given due importance to technical education. This has facilitated steady growth of technical education system in the country (Table 1.2)

**Table 1.2**  
**Growth of Degree Level Engineering Colleges in India during Post Independence Era (1947-2011)**

<b>Year</b>	<b>No. of Institutions</b>	<b>Intake</b>
1947	28	2520
1955	47	4875
1960	102	13825
1966	117	19140
1974	138	27000
1992	200	40000
2002	1195	3,56,268
2008	2388	8,41,018
2009	2872	10,71,896
2010	2686	10,50,604
2011	3393	14,85,000

*Source : Compiled from various government reports*

During the year 1947, the number of degree level engineering colleges were 28 with an intake capacity of 2,520 which rose to 3393 institutions in the year 2011 with an intake capacity of 14,85,000 students.

The Indian technical education system consists of Institutions, which are fully funded by the Union Government namely CFTIs and Universities, Deemed to be Universities and Private Institutions etc. as in the case of other higher education streams. Institutions funded by the state governments are normally affiliated to universities working under University Grants Commission (UGC). The different types of institutions coming under CFTIs are in Table 1.3.

**Table 1.3**  
**Distribution of Institutions under CFTIs in India as on 2013**

Name of Institutions	No of Institutions
Indian Institutes of Technology (IITs)	16
Indian Institute of Science Bangalore (IISc)	1
National Institutes of Technology (NITs)	30
Indian Institutes of Science Education and Research (IISERs)	5
Indian Institutes of Information Technology (IIITs) (including 20 under Private and Public Participation)	24
Others: Indian School of Mines (ISM), North-East Regional Institute of Science & Technology (NERIST), National Institute of Industrial Engineering (NITIE), Sant Longowal Institute of Engineering & Technology (SLIET), Central Institute of Technology (CIT), National Institute of Foundry and Forge Technology (NIFFT), Indian Institute of Engineering Science and Technology (IEST)-4 and Indian Institute of Space Technology, National Institute of Science Education and Research (NISER)	12
<b>Total</b>	<b>88</b>

*Source: Selected Educational Statistics MHRD(2013)*

Among these institutions IITs are widely accepted through their research-industry linkages, institutional and organizational structures that foster innovation, including their research output trends, which are yet to receive systematic research exploration from the perspective of social sciences (Nimesh 2010).

In the beginning of the twenty first century, India is a nation of young people – out of a population of above 1.1 billion; 672 million people are in the age-group of 15 to 59 years, which is usually treated as the working age population. It is predicted that India will see a sharp decline in the dependency ratio over next 30 years, which will constitute a major demographic dividend for India. In the year 2001, eleven per cent population of the country was in the age group of 18-24 years, which is expected to rise to 12 per cent by the end of the XI<sup>th</sup> Five Year Plan (FYP) 2012-2017. The young population should be considered as a valuable asset, which if equipped with knowledge and skills, can contribute effectively to the development of national as well as the global economy (RPE 2010). Hence, it is the time to have a deep introspection into existing systems of management of CFTIs and to build new foundations for a successful tomorrow.

Globalization has thrown open the need for high quality technical manpower. India has an advantage of a great legacy and good technical institutions. This is an advantage in attracting student community from the global market. Globalization and internationalization of education augmented mobility of the human resources. Thus, the challenges before the Institute are to provide quality education and better research facilities. Planning for future require not only to make a critical study of the past, but also to analyze the general psyche of the people responsible for formulating developmental policies. This will help to identify the factors responsible for achievements and failures (Sen 1989). Planning, implementation and evaluation require an efficient governance structure.

#### **1.3.4. Governance of Technical Education Institutions in India**

Indian higher education system has the Ministry of Human Resources Development (MHRD), Government of India at the apex level and departments of higher education at the state level. The major share of funds come from the Government of India. Union Government exercises control on technical education of the country through All India Council for Technical Education (AICTE). More than this, central universities, institutes of national importance and some other institutions are directly funded by the Government of India. The institutions are divided into Government,

Private aided and Private unaided etc., based on the funding pattern. The general administration, superintendence and directions of the CFTIs are entrusted with the Board of Governors (BoG) having nominations from government and other regulatory agencies. The Chairman of BoG is nominated by the Government of India. The Director is selected by the MHRD and appointed by the BoG for a tenure of five years. The academic matters are decided by the Senate, in which the Director of the Institute is the Chairman and all Professors and some other nominated members are members. The other technical institutions, which are funded by the government, are governed by the Directorate of Technical Education of the concerned state and all academic matters are decided by the University to which the Institute is affiliated. Autonomy of the institution is an underlying factor for planning and successful governance.

### 1.3.5 Level of Autonomy Exercised by the Educational Institutions in India

The autonomy and accountability of universities have received much attention, because these are related to external revenue and regional development (Moses 2007). Different institutions such as universities, autonomous institutions, government colleges, government aided colleges, and private colleges have different levels of autonomy in governance (Table 1.4).

**Table 1.4**  
**Distribution of Level of Autonomy Enjoyed**  
**by the Higher Education Institutions in India**

Areas	Type of Institutions				
	Universities	Autonomous	Government	Aided	Private
Academic	Full	Full	Limited	Limited	Limited
Administrative	Full	Full	Limited	Limited	Full
Student Admission	Full	Full	Limited	Limited	Limited
Faculty & Staff	Full	Full	Limited	Limited	Full

*Source: Selected Educational Statistics MHRD*

Universities and autonomous institutions have full autonomy in major areas like academic, administration, admission and on service matters; whereas, private

institutions have only limited autonomy in academic matters and admission. Hence, the level of autonomy enjoyed by the institutions in India is not uniform.

In order to survive in the present environment, the universities should move from rituals of teaching to commitments on learning. This can come about only on the basis of a shared vision, with the institutions focusing on learning improvement and proficiency among key academic functions (Harvey 1996). The focus of the universities in the new era is on excellence in student learning, academic productivity and organizational performance. Accordingly, the institutions need strategic approach to achieve these goals and objectives.

### **1.3.6 Strategic Management in Higher Education Institutions in India**

In today's world, while economy is undergoing rapid changes, intense flow of information and increasing competitiveness have been removing the barriers of commercial bounds. At the same time, higher education institutions in the world smoothly changed to institutions which are led by competitive market stimulus, commercial and economical necessities and then they get away from their governmental identity (Clarke 1997).

Presently, strategic management has moved beyond for-profit business organizations to include governmental agencies, educational institutions, hospitals and other non-profit organizations. There is a revolutionary change in the internal and external environment of every institution on account of Liberalization, Privatization and Globalization (LPG). The aspirations of the stakeholders have also undergone significant change. The era of globalization has cascading effects on knowledge, education and learning in inter-disciplinary areas and research studies. The key issue is the depth to which the quality concept can penetrate to facilitate the perspectives of a range of stakeholders who have different conceptions of higher education (Cullen et al. 2003).

The newly drawn concept of accountable management in the public sector has ensured that issues related to performance measurement have been high on the agenda of higher education institutions. Several quality initiatives have been happening and at the same time the higher education institutions have been facing diminishing financial support from public sources of finance. It has been suggested that higher educational institutions have to look to private sector models of performance measurement in order to address important management and quality issues. At present, higher education institutions are being required to assess their own performance and justify their spending (Kaplan and Norton 1996). The concepts such as transparency, fiscal responsibility, alternative funding sources, enrolment, retention and providing a quality education at affordable cost have acquired greater relevance in Indian education sector.

Niculescu (2006) made a survey on the strategic position of Romanian business schools on stakeholder perspective and developed a perceptual map to evolve strategic management. Afterwards, the emphasis was made on the strategic planning in Romanian Universities (Amaratunga and Baldry 2000). Tsiakkiros and Pashiardis (2002) made a study to find out whether strategic planning can be effectively implemented in the educational system of Cyprus. This was based on the theory that the examination of the competitive environment of the organization is of special importance when the organization plans its future. Accordingly, each organization must know its strategic position in its environment before making strategic choices. The studies suggested, resorting to strategic management to improve education and to meet the challenges of the new millennium.

Strategic management typically has three main phases, namely strategy formulation, implementation and control. In western countries, thinking of strategic management began in the later part of 19<sup>th</sup> century and early 20<sup>th</sup> century. The United States is the forerunner in using strategic management techniques in the field of higher education. To summarize, the increasing competition in the higher education sector demands growing levels of quality, leadership and professionalization. In this scenario, governance requires special attention.

### **1.3.7 Governance and Performance of CFTIs in India**

CFTIs have the potential to demonstrate the capability of World Class Universities (WCUs); provided they are entrusted with a higher degree of academic, administrative and financial autonomy. Among the CFTIs, majority are established by an Act passed by the Indian Parliament, declaring them as institutions of national importance, namely, IITs, NITs and IISc. Presently, these institutions enjoy considerable degree of academic autonomy and a reasonable degree of administrative autonomy, but much lower levels of financial autonomy (Kakodkar 2011). India's progress as a developing nation requires a greater push in the frontiers of knowledge creation; developing cutting edge technologies, indulging in large scale research and achieving higher levels of excellence. In terms of research, CFTIs are continuously enhancing their research activities as evidenced by the ever increasing contribution of engineering Ph.D.s from the system. The CFTIs, being the institutions for quality education and R&D, have to take up the challenge of creating high quality technical manpower requirements of the country. The CFTIs have to be compared to other WCUs, which normally have more than 15000 student strength in every campus. Most of our IITs and NITs have only about 6000 students in the campus. USA and China produce around 8000-9000 Ph.D.s in engineering and technology per annum while in India the corresponding number presently is around 1000 (Kakodkar 2011). Keeping the National vision in mind, CFTIs are to produce a large number of talented technologists within a reasonable cost, with capabilities to contribute to the development of the nation. The CFTIs had a cumulative annual intake of about 25,000 students in the year 2010, which is about one to two per cent of the capacity of the whole technical education system of the country. Through many direct and indirect governmental initiatives, CFTIs are gaining greater attention and financial support. Hence, it is the time to have systematic up-gradation of the CFTIs and thereby augmenting the availability of high quality young scientists and technologists coming out from the CFTIs. This can contribute to science based technological research in a vibrant manner. In order to ensure a world class high quality education system, there is a need to analyze the targets set from time to time and the gap in the

performance. Analysis can also be done to assess how far the strategic management has gone in to the system and how much one can expect from these institutions in terms of human resource capabilities, research output. Except for the government commissioned studies by the educational administrators, technologists and policy makers, no academic research was reported with some significant findings in the case of CFTIs in total. The next section highlights the research gap which demands for a systematic study on these areas.

#### **1.4 STATEMENT OF THE PROBLEM**

There is a need to study the reasons for organization failures in CFTIs, primarily due to poor structure, recruitment and retention of staff, ineffective or non-existent internal control and lack of communication. These are the major symptoms of deficient strategic planning. In India, many technical institutions have been traditionally controlled by the government and hence at times strategic management and its derivative tenets are not so visible in the initiation and operation (Umashanker and Dutta 2007).

Many of the CFTIs do not have a clear vision and mission statement, properly aligned to its spectrum of activities; even if it is in existence, no strategies are evolved for achieving the objectives. Likewise, there is no clear mechanism or metrics in operation for evaluation of the performance of the institutions. Hence, the need of the hour is to ensure that such mechanisms are put in place. The CFTIs are concentrated on knowledge creation, technology and innovation. As these domains are related to human capital development, these institutions should be considered as asset builders for the nation in the modern knowledge driven economy (Kakodkar 2011).

CFTIs are now on a growth path of expansion and diversification, to cope up with the new challenges. This rapid phase of growth has caused considerable strain on the system and at the same time the brand equity and quality standards set by these institutions can not be allowed to deteriorate. Being the premier institutions of the country, the CFTIs have to setup new horizons and also mentor the total technical education system in the country. Thus, while appreciating the need to have an overall



development in technical education system in the country in terms of quality and research output, the study focuses on tracing out present strategic management practices of CFTIs and identifying its strengths and weaknesses. As there is great amount of diversity in terms of resources, autonomy and management practices; the CFTIs can be broadly classified in to three groups such as:(i) IITs and IISc, (ii) NITs and (iii) Other Institutions such as IISERs, IIITs, etc. In order to have a realistic study, even though the population spreads over the country, samples from each category of institutions representing all regions of the country were taken without limiting to any specific area. Accordingly, the research problem is stated as ‘Strategic Management in Centrally Funded Technical Institutions in India’.

### **1.5 SIGNIFICANCE OF THE STUDY**

India has one of the biggest higher education systems and there are hardly few studies made on higher education. Even though the technical education is only a part of the higher education, it has a greater role to play in the economic development of the country. The research in India, which has major focus on the crucial area of technical education, is considerably less. Technical education requires huge investments by the government. The dependence of the technical education on government funding is high as the internal revenue generation by the technical education institutions is very low. Similarly, the technical education in India is good only in few institutions. Even these good institutions are far from the WCUs. A strategic road map has been drawn up at macro level for the whole technical education system in many countries. Such initiatives are not visible in the Indian context. All CFTIs have their own vision and mission statements, and hence there is a need to evolve strategic models to achieve the strategic objectives.

Erosion of autonomy, growing distance between knowledge areas and the isolation of institutions from the real world outside are the common phenomena in the present world. Accordingly, strategic models have to be evolved to renovate and rejuvenate the present pattern of functioning. The present scenario also calls for the need to have leverage on the governance of CFTIs and to augment the institutional accountability. While mentioning the potential of IITs Yash Pal Committee (Yash Pal, 2008)

suggested that CFTIs must strive to be models of all-round excellence like the famous Massachusetts Institute of Technology or CALTECH in USA. Accordingly, identifying the components of strategic management processes in CFTIs and tracing out the short comings, will enable framing a new strategic model in line with the renowned WCUs.

Technical education system in India faces greater level of competition from private/corporate institutions within the country as well as from other parts of the world. In the new globalised economy, the legislature of the country is in the process of making laws to permit institutions from abroad to set up their campuses in India and the modalities for that are being worked out. Unless and until the CFTIs are well equipped to compete, the brand equity earned by them during the course of time may erode. Hence, an understanding of the present level of performance evaluated through various stakeholder satisfactions will enable us to understand the strengths and weakness and to work on a road map towards further progress.

In case India can set new standards in technical education and show its presence in the international educational scenario, the country will be able to attract more students and researchers from abroad. Similarly, a well-defined strategic model can make our institutions more efficient and international accreditations will become an easy task, whereby student exchange, faculty exchange and credit transfer facilities etc. can be made more effectively. This also will facilitate more international mobility of Indian students.

Precisely, we must realize our potential as competent individuals and as a proud nation capable of leading the world in frontier areas (Subbarao 2013)

## **1.6 NEED FOR THE STUDY**

In comparison with the other streams of higher education, technical education needs huge investment building up infrastructure facilities. In the new globalized scenario, the non-profit organizations have to fill gaps caused by decreasing governmental support. At the same time, CFTIs being non-profit organizations, are working in an

era of heightened scrutiny, greater demands, fewer resources and increased competition (Adams and Perlmutter 1995; Ryan 1999 and Burt and Tayler 2003).

The competition is becoming severe even in education sector. As such, CFTIs have a tough time ahead to uphold the quality and brand name. In a developing country like India, there is an eminent need for quality technical manpower. Similarly, Indian engineers are highly sought even in international market.

At present, Indian technical education sector is facing severe problem of heavy faculty shortage, poor organizational structure, ineffective control and lack of communication. As such, an analysis of internal processes and management is the need of the time. Only a few focused research studies have been done in India on technical education. These factors substantiate the need for the study.

## **1.7 SCOPE OF THE STUDY**

CFTIs consist of IISc, IITs, NITs, and other Institutions such as IISER, NITIE, SLIET, IIIT, IIST, IIMs etc. As there is great difference in the infrastructure and resource requirement between management and technical/science institutions, the IIMs were not taken up within the scope of study. As CFTIs are widespread throughout the country, reducing the scope of study to a specific region may affect the results and hence the scope of the study has not been limited to any geographical region. All CFTIs in India offering degree level/post-graduate level programme in engineering/science/ technology have been included in the scope of study.

Among the CFTIs, there are established institutions which have been long standing for more than a century and some of them have been set up very recently. The research study is on the strategic management practices which usually take longer period to evolve to their full entity and the new institutions are yet to evolve their practices. Accordingly, the scope of this study is limited to institutions which were established five years before, that is, up to the year 2007.

The indicators of measurement of performance of strategic management in profit and no profit organizations are different. This study focuses only on CFTIs fully funded

by government which are obviously no-profit organizations. As such the IITs established under Private Public Participation (PPP) have been kept out of the scope of the study.

## **1.8 RESEARCH QUESTIONS**

Based on the literature review, feedback from stakeholders and informal discussions with faculty, student and administrators following research questions were evolved.

- a) What is the governance system in CFTIs?
- b) What are the components of strategic management applicable to education sector?
- c) What is the level of autonomy granted?
- d) What is the level of awareness of strategic management processes?
- e) Which are the processes and sub-processes related to strategic management practiced in CFTIs?
- f) What are the impeters on strategy implementation?
- g) Which are the important/significant Critical Success Factors for planning strategic management?
- h) Whether the strategic intents of CFTIs are in line with the functional domain/objectives and National Vision?
- i) What is the impact of strategic management on the performance?

Based on the research questions, the variables to be measured were developed, to capture these using the questionnaires. These research questions were converted to research objectives.

## **1.9 RESEARCH OBJECTIVES**

The study envisages the following research objectives:

- (i) To identify the components of Strategic Management and its application in educational organizations
- (ii) To assess the level of awareness and practice of Strategic Management
- (iii) To identify the impeters on Strategy implementation

- (iv) To determine Critical Success Factors for planning Strategic Management
- (v) To evaluate the impact of strategic management on the overall performance
- (vi) To suggest a model for effective implementation of Strategic Management in CFTIs.

## **1.10 ORGANIZATION OF THE THESIS**

The thesis is organized into five Chapters namely Introduction, Review of Related Literature, Research Methodology, Analysis and Interpretation of Data and finally Summary of Findings and Conclusions.

Chapter 1 deal with introduction to higher educational institutions in India as well as strategic management in educational institutions, research gap, statement of problem, significance of study, need for the study, research questions, objectives of study and scope of study.

Chapter 2 focuses on the review of related literature. The literature relates to origin and development of technical education system in India compiled in a nutshell. The components of strategic management with special reference to education are traced out. The Critical Success Factors (CSFs) for implementation of strategic management have been identified from the literatures. Origin and development of various related concepts and theories, summary of earlier studies on Strategic Management are discussed in this chapter. Operational definitions of variables identified, hypothesis to be tested and a conceptual framework for the study are presented. A literature map is also added at the end of the chapter.

Chapter 3 concentrates on research methodology, which describes the approach and methodology of the study. The sample frame, selection of sample for survey, data collection and tools used for the survey are explained here. This chapter highlights the importance and relevance of various tools used for the study. The details

regarding area of study, hypothesis testing and the variables identified for analysis are also discussed here.

Chapter 4 includes detailed statistical analysis of the survey data and depicts the various frequency distributions in figures and tables. Various hypotheses developed in the course of study are also tested here.

Chapter 5 contains the summary of the findings and conclusions of the study. Recommendations are placed before the end, followed by limitations of the study and finally the directions for the future study. The bibliography and appendices are given at the end.

**CHAPTER 2**  
**REVIEW OF RELATED LITERATURE**

## **CHAPTER 2**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 INTRODUCTION**

The purpose of this chapter is to provide present knowledge level and theoretical background for the study. The chapter begins with the legacy of technical education in India. Secondly, strategic management in technical education and the strategic management models of some universities are reviewed. Thirdly, the components of strategic management as applicable to education sector have been identified. Fourthly, the CSFs for planning the strategic management are identified. Finally, the operational definitions of variables used in the study, conceptual framework for the study and the hypothesis to be tested are drawn up.

#### **2.2 LEGACY OF TECHNICAL EDUCATION IN INDIA**

The history of Indian technical education system had its beginning with the appointment of Sarker Committee in 1945 by Ardeshir Dalal, Viceroy's Executive Council, Department of Education, to consider the development of higher technical institutions in India with terms of reference such as (a) a central institution possibly on the lines of the Massachusetts Institute of Technology (MIT), with a number of subordinate institutions affiliated to it, or (b) several higher institutions on a regional basis, or (c) any other organizations. The Committee submitted its report in 1948 recommending establishment of four higher technical institutions in different parts of India. According to Deb (2004), Ardeshir Dalal's (the brainchild behind setting up of IITs who was also the Managing Director of Tata Iron and Steel Company) three-pronged strategy regarding India's capability to take lead in technology was to produce world-class engineers, set up a robust research infrastructure and create a system of scholarships to facilitate deserving students access to best education. The then Prime Minister Jawaharlal Nehru endorsed the view of Ardeshir Dalal that technology would play a critical role in building a free India. Nehru subsequently secured cooperative agreements for additional IITs; in Bombay (with partnership of Soviet Union), Madras (with partnership of West Germany) and New Delhi (with



partnership of UK). MIT organized and led Kanpur Indo-American Program (KIAP), established IIT Kanpur in 1959 with the support of eight other US academic institutions (Nimesh and Krishna 2010). Similarly RECs were also set up in each State to meet the higher technical education needs on the regional basis. The Planning Commission, Government of India, set up a task force on ‘India knowledge superpower – Strategy for transformation’, which submitted the report in June, 2001. Based on the report of the task force, all the RECs were upgraded as NITs, which were later declared as institutions of national importance under the NIT Act, 2007. Similarly, in order to meet the growing demands from the industry and towards the science and technology in particular, fully autonomous institutions like NITIE, IISERs, IESTs, IITs were also set up and were fully funded by the Union Government.

IISc mainly is a postgraduate research institution that offers opportunities for higher studies in science and engineering. In 1898, while India was under British rule, the Royal Society of London, at the request of the Secretary of the State of India, employed the talents of William Ramsey, Nobel Laureate, to establish an institution for the promotion of research in science and engineering in India. Ramsey undertook a quick tour of the country and selected Bangalore to be the best suitable place for such an institution. The Institute’s constitution was approved by Viceroy Lord Minto in 1909, and the Maharaja of Mysore laid the foundation stone of the Institute. The Institute started functioning in July 1911. Research students constitute more than 50 per cent of the total student body and each year the institute produces more than 200 Ph.Ds. In 2011, IISc was the only institute from India ranked by the Academic Ranking of World Universities (ARWU), at the band of 301–400 overall. It was also ranked 49 in Chemistry, 142 in Natural Sciences, 96 in Engineering and Information Technology and 188 in Life Sciences, without overall ranking (ARWU 2011).

### **2.3 PRESENT SCENARIO OF INDIAN TECHNICAL EDUCATION**

The USA spends highest amount of 3.1 per cent of GDP on higher education and UK spends 1.3 percent of GDP and China spends 1.5 per cent of GDP. India’s

expenditure on R&D in the year 2011 was only 0.9 percent of GDP (Wikipedia 2012). According to statistics published by Union Government's Department of Science and Technology (DST 2008), India's R&D expenditure has increased from close to Rs.162 billion in 2000-01 to nearly Rs.378 billion in 2008. China has clearly done much better, with its research outlay rising from 0.9 per cent of GDP in 2000 to 1.4 per cent by 2006. The bulk of India's research funding continues to flow from the government. However, such funding as a proportion of the country's total R&D expenditure has fallen from over 80 per cent in 1990-91 to 66 per cent in 2007-08 (DST 2008). Over the same period, research investments by business enterprises have increased from about 14 percent to around 30 percent. Reserve Bank of India data indicates that inflows of foreign exchange for R&D services have increased from US \$221 million in 2004-05 to US \$878 million in 2010-11(Hindu 2011).

Similarly, Indian institutions' capability to attract foreign students is also low. USA is attracting 0.60 million students, France 0.27 million, Australia with 0.20 million students while India could attract only 0.02 million foreign students (Jeelani 2011)

Being the prestigious institutions of India, the CFTIs receive major share of funding from Government of India to impart quality education and research in technical education (Table 2.1).

Out of the total expenditure, 79.52 per cent was spent in the year 2008-09 only on major institutions among CFTIs; it was 66.82 per cent in 2009-10 and 58.55 per cent in 2010-11. In short, the major institutions of CFTIs themselves get more than 50 per cent budget for technical education in India. Government of India now envisages reducing dependence on government funds and increasing internal resource generation through various directives. Recently, higher education has come under increasing pressure particularly in developed countries. United Kingdom is facing fundamental and unprecedented competitive pressures due to lower government funding. Higher education institutions are competing against one another for the best students, the highest quality staff and research funding from government (Lynch and Baines 2004). American higher education is also facing challenges mainly on

account of rise in tuition fees due to the cut in education funding (Rosenstone 2004). Accordingly, the CFTIs are required to devise a strategy for increasing the efficiency and accountability.

**Table 2.1**  
**Distribution of Expenditure on Major Groups of Institutions**  
**Under CFTIs (Rs. Million)**

	<b>2008-09 AE</b>	<b>2009-10 RE</b>	<b>2010-11 BE</b>
Institutions	Total	Total	Total
Grants to IITs	17900.70	17490.10	17256.60
Grants to NITs	11960.00	13869.00	14075.10
Grants to IISc.	2089.70	2452.80	2214.30
Grants to ISM	1062.00	1280.00	1224.70
Grants to IISER	1750.00	2150.00	3000.00
<b>Total</b>	<b>34762.40</b>	<b>37241.90</b>	<b>37770.70</b>
<b>Total Expenditure on Education</b>	<b>43714.84</b>	<b>55737.10</b>	<b>64515.20</b>
<b>Percentage of share to major CFTIs</b>	<b>79.52</b>	<b>66.82</b>	<b>58.55</b>

*Note: AE= Actual Expenditure, RE = Revised Estimate, BE = Budgeted Estimate*

*Source: <http://www.mhrd.gov.in/statistics>*

#### **2.4 EVALUATION OF TECHNICAL/ HIGHER EDUCATION IN INDIA**

At national level, both the higher education and the technical education are funded by MHRD, Government of India. As such the macro level analysis for the FYP is done together. The working group report for the higher and technical education for the twelfth five year plan (2012-2017) has reported the SWOT of the Indian higher/technical education system (FYP WG Report 2012) (Table 2.2)

**Table 2.2**

**SWOT Analysis of Higher/ Technical Education in India**

<b>Strength</b>	<b>Weakness</b>
<ul style="list-style-type: none"> <li>• Well established educational institutions</li> <li>• Young Population</li> <li>• Robust economic growth</li> <li>• Availability of resources in the market</li> <li>• Alert civic society</li> <li>• Large number of alumni organizations in India and abroad (Like pan IIT network)</li> </ul>	<ul style="list-style-type: none"> <li>• Shortage of faculty</li> <li>• Existence of a number of regulatory bodies</li> <li>• Regional imbalances</li> <li>• Inadequate infrastructure facilities</li> <li>• Low emphasis on research</li> <li>• Inadequate response to PPP Mode</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Young working age population</li> <li>• Sharp decline in dependency ratio</li> <li>• Invaluable asset of human resource</li> <li>• Vast scope for expansion of education</li> <li>• Global hub in education</li> </ul>	<ul style="list-style-type: none"> <li>• Commercialization</li> <li>• Deterioration in quality</li> <li>• Economic and socio-economic factors (like unemployment, shortage of technical manpower, lack of opportunities, status of women, rural-urban divide etc.)</li> <li>• External factors like – Education in the concurrent list of State and Central Government</li> </ul>

Source: XII FYP Working Group 2012

The XII Plan proposes a balanced approach towards expansion of higher education with both supply side and demand side interventions. The crucial gaps in the policy framework of higher education are: (FYP WG Report 2012)

**Policy Gaps**

- Archaic regulatory structures and bureaucratic controls on higher education leading to stifling of innovation, creativity and initiative. Inspection and approval regimes promote corruption and sloth. Accordingly, there is a need to move away from this paradigm to authentication and automatic approvals.
- Grant giving functions are not normative and lead to excessive subjectivity. Grants have to be based on entitlements and not on subjective demands.

- Education not declared as infrastructure. Many of the concessions and other benefits are therefore not flowing into higher education sector.
- Re-finance of infrastructure loans are not available. Infrastructure loans are treated as any other commercial loan.
- Requisite private investments are flowing in the higher education sector, but only for professional and technical education, and not for general education. Unbridled and unregulated privatization has led to spatial and programmatic distortions.
- Requisite attention from states on higher education is missing. Many states have left the field of higher education purely to private sector. The investments on education are actually declining in most of the states. There is a need to incentivize states to step up their investments on higher education.
- Only 0.7 of GDP is being spent on higher and technical education as against a target of 1.5 per cent of GDP (1.0% on general higher education and 0.5% on technical and professional education).
- 40 per cent of the faculty positions are either lying vacant or filled up with unqualified or adhoc faculty. This reflects on quality of education. There needs to be a mission mode project to address both the quality as well as quantity of teachers in the tertiary education sector.
- Only 0.8 per cent of GDP is being spent on R&D as of now. There is a need to ensure that at least 2 per cent of the GDP is spent on R&D.

### **Strategic Shift at National Level**

Accordingly, the XII plan envisaged a radical shift in the entire governance paradigm in the higher education sphere:

From demand based grants to normative and entitlement based grants

From inspection based approvals to independent authentication

Subjective assessments to objective assessments

Regulation by compulsion to self disclosure

Input based funding to outcome based planning

Based on these aspects, the XII Plan strategy has been envisaged focusing on governance reforms, addressing higher education financing issues along with addressing issues of equity, access and expansion. On the wake of these developments there is a need for specific study on our CFTIs to determine the constraints on governance and planning issues.

## **2.5 THE CHALLENGES BEFORE THE TECHNICAL EDUCATION IN INDIA**

The IITs have earned and sustained an international brand name for excellence in the case of undergraduate education. The major contributing factors for this are the outstanding students coming through grueling entrance examination, with the success rate of one to two per cent, which is more selective than the best institutions in the world, for example, seven per cent at Harvard (Nayer 2011); broad-based flexible curricula; inspiring teachers; open evaluation system and great autonomy (Subbarao 2013). The present need is for well-trained, motivated teachers and researchers; innovative research for societal needs and new products; joining (and partly leading) global knowledge economy; converting our unique advantages into solid strengths; gaining respect for Indian technological prowess and Indian research (Subbarao 2013).

The postgraduate engineering education is an essential ingredient for training future needs of faculty and for building up international reputation through research publications, patents and entrepreneurs. A comparison of India and China is made on these parameters (Table 2.3). The data reveals that the percentage of engineering students as a percentage of university students is dismally low in India (6 per cent) as compared to China (34 per cent). Similarly, the number of postgraduate students in engineering compared to the total postgraduate students is also low in India. The postgraduate education in engineering is low in India primarily because there is lack of private participation in the postgraduate education, on account of heavy infrastructural investment. Thus, the dependence on CFTIs for postgraduate education is more in India.

**Table 2.3**  
**UG and PG Technology Education as Percentage of Total UG and PG Enrolment - A Comparison with China**

Country	UG Engg Students	University students	% of Engg. Students of total	PG Engg. Students	Total PG students	% Engg PG students of total
India	696,609	11,777,246	6	28,000	872,161	3.4
China	4,376,167	11,334,969	34	302,296	779,408	39

*Source: Jha (2010)*

The number of engineering Ph.D.s produced in a country is a good indicator for generation of advanced knowledge and innovation. A comparison has been made on production of Ph.D.s in engineering with the population and GDP in three leading countries in 1995 and 2008 (Table 2.4).

**Table 2.4**  
**Distribution of Population, GDP and Number of Ph.Ds in Engineering and Technology in 1995 and 2008 Produced by India – A Comparison with USA and China**

Country	Population (Billion in 2009)	GDP in thousand US\$(2010)	No of Ph.Ds. in engineering and technology	
			1995	2008
USA	0.31	14.1		8,110
China	1.33	5.0	1,659	15,073
India	1.15	1.5	348	1,058

*Source: Kakodkar (2011), SEI (2012), SEI (1998), Agarwal (2009)*

China, having the comparable population to India, with three times more GDP, has produced 12 times more engineering Ph.D.s as that of India. Compared to the USA which has a quarter of population and three times the GDP, China produced nearly twice as many engineering Ph.D. as the US. The number of professionals with doctorate degree and capable of directing research is not growing at a sufficient rate to meet the requirements of academia and R&D institutions (Agarwal 2009). Considering the major global role the Indian Information Technology (IT) industry

has been playing, it is amazing that less than 50 PhDs are produced in India in computer science and engineering per year (Rao 2012). The ratio of engineering Ph.D.s to science Ph.D.s is 1:4 in India and >2:1 in Japan (Rao 2012). The country looks on CFTIs as leaders of technology education in India. Focused actions and leadership can overcome many difficulties (Subbarao 2013)

## **2.6 INDIAN TECHNICAL INSTITUTIONS AMONG WCUs**

Indian scientists hold prominent positions in United States research laboratories and in other developed countries. The IIT engineers had finally struck gold during the ‘dot.com’ boom of the 1990s and brought the final recognition and testimony for Indian competence. Of about 140,000 graduates of IIT so far, roughly 40,000 have gone to the US. They are given the credit for creating 150,000 jobs and \$80 billion in market capitalization (Kaul 2006). The states of Virginia and Maryland declared the month of May 2005 as IIT – Indian American Heritage Month. Further, 55 US Members of the House of Representatives co-sponsored Resolution 227 honoring ‘the economic innovation attributable to graduates of the Indian Institute of Technology (Kaul 2006). With so much of admiration and brand equity for Indian technology and knowledge sector, it is time for India to cash in on its advantage. This can be achieved only through a well-defined strategy for every institution to march consistently towards the national vision.

The academic ranking of world universities for the year 2010 shows that around eight percent of the universities of USA figured among the top 500 universities of the world. The others are 26 for UK, six for Japan, 8 for China, 35 for Australia, 50 for Singapore and lowest 0.5 for India. Among the 450 Universities only two Indian universities were included in the list of top 500 in the world, that too at lower ranks (Jeelani 2011). In the academic ranking of World University 2011, only one Institute from India namely IISc figured in the list in the rank of 401-500 overall and even the IITs did not figure in the first 500 ranks. The top five IITs in the QS ranking of world engineering institutions for years 2010, 2011 and 2012 is at Table 2.5 (Education 2011)



**Table 2.5**  
**Top Five IITs in QS Ranking of World Engineering Institutions**  
**from 2010 to 2012**

Institutions	2010	2011	2012
IITB	187	225 ↓	227 ↓
IITD	202	218 ↓	212 ↑
IITK	249	306 ↓	278 ↑
IIT M	262	281 ↓	312 ↓
IITKh	311	341 ↓	349 ↓

*Note: IITB= IIT Bombay, IITD = IIT Delhi, IIT = IIT Kanpur, IITM = IIT Madras and IITKh = IIT Kharagpur*

*Source: Research Survey Data*

In the QS ranking for 2011 all the IITs slipped from their positions in 2010. In QS ranking for 2012, IITB, IITD and IITK slipped further. But IITD and IITK improved their ranking. India is the only BRIC country that has not found a place in first 200. On the contrary, China, by pumping resources into select universities, has improved its position in the same period. For example, Peking University improved the rank from 47 in 2010 to 46 in 2011 and 44 in 2012 and Tsinghua University from 54 in 2010 to 47 in 2011 to 48 in 2012. In the 2012 QS world ranking, in the top 10 places, six universities were contributed by USA and four by UK. Among the top 50, Asian countries have three from Hong Kong, three from Japan, two from China, one each from Singapore and South Korea and none from India. Thus, it is important for India to realize to achieve excellence and to retain it decade after decade. Meshelkar (2011) described the criteria for this as:

- Absolutely uncompromising pursuit of excellence both in teaching and research
- Continuous thrust not only on ‘working’ at the frontier, but ‘creating’ new frontiers. This means ‘to lead’ and not just ‘follow’.
- An uncompromising insistence on selecting the very best for faculty as well as students on an international scale. The same rigor should be ruthlessly applied for promotion, so that only the most talented and accomplished faculty is retained.

- Undying commitment to true institutional autonomy in all matters, with no political interference whatsoever.

Yash Pal (2011) made recommendation for elevating the better educational institutions in India to a higher level. While agreeing with most of the recommendations, Basu (2009) presented few crucial issues. India does not have enough resources to treat all the universities on the same scale to raise their standards. A small number of better institutions have to be selected and supported on a massive scale to upgrade them. This includes giving preferential salaries (by a factor of four to five) and research support to the star professors and researchers compared to the rest. This is precisely the manner in which US built its great universities and maintains its lead. China is also doing precisely the same thing which resulted in visible results. The list of such preferred institutions can be evaluated and modified every three years, so that there is a competition and opportunity for others to join this league.

This shows the disintegrating trend on the performance of CFTIs in the core areas of academic performance and research. Hence, there is a need for a self analysis to identify grand strategies to revive the institutional strength.

## **2.7 STRATEGIC MANAGEMENT**

Since 1950s, many management scientists and consultants have developed theories, tools and models for strategic management. Gabler (2005) defined the strategic management as the ‘processes for planning, realizing and controlling of strategies’. Knyphausen-Aufsess (2006) describes strategic management with three processes (a) process of generating and evaluating new ideas (b) process of integrating resources and activities (c) process of permanent renovation. Taylor and Machado (2006) described strategic management as a ‘holistic process with many components that must effectively interact and function together’ and list of several elements such as institutional culture, strategic planning, leadership, financial management and human resource management. Strategic Management in public sector is meant to stimulate the change from a traditionally bureaucratic, hierarchical organization to one that embraces the philosophy of public and development management. Thus, public

sector will move away from formalistic rule-driven public administration towards a more development oriented administration, capable of taking into account the public interest (Fitzgerald 1995)

According to Poister and Streib (1999), strategic management leads organizations to focus on common goals; it integrates the management process and initiatives towards desired outcomes; and aligns day-to-day operations and tactical activities with the long term strategic objectives. Hence, strategic management involves a concept which embraces managerial decision and actions which determine the long term performance of an organization (Koteen 1989). The strategic management in this study focuses on all the three phases of strategic management, such as strategic formulation, strategy implementation and strategy control. The strategy formulation refers to the process involved in formulating the institutional strategy. Brews and Hunt (1999) described strategy formulation as the process involved in identifying the ends. Strategy implementation refers to the actual implementation of the strategy, referred to as means (Brews and Hunt 1999). Strategy monitoring is the process which involves questioning the ends and the means (Brews and Hunt 1999).

According to Rumelt et. al (1994), strategic management should be a primary concern to anyone seeking reasons for the success and failure of organizations. As such, organizations have strategic choices to make as they are faced with constant competition for survival, customers, and revenues. Thus, strategy can be seen as associated with decision making and planning. Mintzberg (1973) suggests that clear goals do not exist. The strategy making process is characterized by the reactive solution to existing problems. With this, strategy is viewed as a constant process of adjustment which requires a proactive response to changes in environment (Stoney, 2001).

Having described what strategic management is for the purpose of this study, the next section deliberates on Strategic Management in public sector organizations.

## **2.8 STRATEGIC MANAGEMENT IN NON-PROFIT SECTOR**

The changing political economy demands reduction of public expenditure (Ferlie 2002). This has resulted in a market-like orientation and a much more managed non-

profit sector. Along with this change, the New Public Management (NPM) has been introduced in public sector institutions (Ferlie 2002). NPM calls for more efficient public sector management. Strategic management in public sector is focused on strengthening the long term viability and effectiveness of public sector policy and management capacity (Poister and Streib 1999). The specific characteristics of public sector institutions envisage difference between the strategic management of a public sector and that of a private sector. As such, Nutt and Backoff (1995) stated that the strategic management in public sector institutions has to be different from the private sector. Thus, it is argued that the strategic management developed for private sector is potentially misleading and incomplete, considering the unique characteristics of public sector institutions (Nutt and Backoff 1995). The glaring contrast in public sector strategic management with that of private sector is separation of powers; openness of the government which reflects on the pluralism in the public sector in which it is more open to the external environment when compared to the private sector; and the bureaucratic nature of the institutions (Nutt and Backoff 1993). Ramamurti (1986) argued that externally imposed social and political agendas have contributed to the loss of strategic autonomy in public sector institutions. The stakeholders of a public sector are defined as individuals or groups that have interests in the institutions or might be affected by the institutions' actions (Perrott 1996). The openness of the government strategy has led to the politicization of issues where strategic decisions of public sector institutions are opened to debate in legislature and media (Ring and Perry 1985). Therefore, strategy in public sector institutions is suggested to be negotiated rather than formulated (Ramamurti 1986).

Most of the existing research work on university strategy is focused on strategic planning. Planning being an important part of strategic management, next section deals with Strategic Planning

## **2.9 STRATEGIC PLANNING**

Planning, in general, refers to a general mental process of thoughts about the action necessary to create a preferred future position. It is a process of establishing objectives and choosing the most suitable means for achieving these objectives before

taking an action. Ackoff (1981) described that planning is an anticipatory decision – making, a process of deciding before action is required. It allows decision to take place in advance by answering, what, how, when and who questions. Planning can be defined as a process which closes the gap from where we are today and where we want to be tomorrow. Thus, strategic planning is a disciplined effort to produce an essential decision and action that shape and guide what an organization is, what it does and why it is doing that. It is a process which defines organizations' directions and helps the decision maker in allocating resources such as capital and people to pursue its strategies. Mintzberg (1993) defined strategic planning as the process by which guiding members of an organization envision its future and develop the necessary procedures and operation to achieve that future. This vision about the future position of the institution provides a boost to initiate the vision and a direction in which the organization intends to move. In contrast to this definition, Goodstein (1993) elaborated that the strategic planning is much more than just envisioning process. It requires setting clear goals and objectives during a specified period in order to achieve the planned future state. However, Mintzberg maintained that this envisioning process is very different from long range planning. It involves a belief that aspects of the future can be influenced and changed by what we are currently doing. In order to have a comprehensive understanding of the concept of strategic planning, Mintzberg (1993) suggested six critical factors:

First, strategy is a coherent, unifying and integrative pattern of decisions. This implies that strategy development is conscious, explicit, and proactive.

Second, strategy is a means of establishing an organization purpose in terms of its long term objectives, action plans and allocation of resources.

Third, Strategy is a definition of an organization's competitive realm; which indicates what business the organization really is in.

Fourth, strategy is a response to internal strengths and weaknesses and to external opportunities and threats in order to develop a competitive advantage.

Fifth, strategy becomes a logical system for differentiating executive and managerial task and roles at corporate, business and functional levels so that structure follows functions.

Sixth, strategy is a way of defining the economic and non-economic contribution the organization will make to its stakeholders.

There is no holistic system in use in the public sector for planning. In some instances there seems to be no system of strategic plans at all. Bryson (1991) designed a strategic management model for the public sector. Fitzgerald (1995) stated that strategic management model is meant to stimulate the change from a traditionally bureaucratic, hierarchical organization to one that embraces the philosophy of public and development management. That will see the public sector moving away from formalistic rule-driven public administration towards a more development oriented administration, capable of taking into account the public interest. Bunning (1992) further elaborated that the predominant view in many government institutions is that planning is 'impossible, dangerous, or a waste of time'. However, Schiler Diane of Harvard Family Research Project mentioned further that many states in USA have developed their strategic plans to guide their result-based accountability systems. The planning process followed here involved stakeholders and requires consideration and articulation of values and priorities (Schiler 1998).

Sequeira (2010) presented a framework of strategic plan for a technical institution, wherein the various components of strategic management in a technical institution have been laid out.

The findings on research studies on various components of the strategic management with special reference to the non-profit organizations are summarized (Table 2.9)

The principle of accountable management in the public sector has ensured that issues relating to performance measurement have been high on the agenda of higher education institutions. Several quality initiatives are happening at the same time as

universities are facing diminishing financial support from public sources of finance. It has been suggested that higher education should look to private sector models of performance measurement in order to address important management and quality issues. In today's age of accountability, institutions of higher education are required to assess their performance and justify their spending (Shane 2007). Words and phrases such as transparency, fiscal responsibility, alternative funding sources, enrolment management retention and providing quality education at affordable prices are commonplace in the higher education sector.

Umashankar and Dutta (2007), focused on the deficiencies in the strategic planning and lack of internal control. On a more operational level, poor budgeting and inattention to cash flows have been identified as the causes of organizational failure. Educational institutions of higher learning are not different; it is just that in the Indian context, traditionally these institutions have been controlled by the government and hence at times strategic management and its derivative tenets are not so visible in the initiation and operation of such institutions (Umashankar and Dutta 2007).

Sridhar and Sequeira (2007) made a content analysis of the mission statement of engineering colleges in India. The focus is to find out whether the mission statements focus on the collective purpose of the institution. The paper also focuses on the aspect that the policy formulators of technical educational planners like AICTE influences the mission statement. Accordingly, there is a need to concentrate the future studies to trace the relationships between the contents of the vision and mission statement with the performance of the institutions. Ayoubi and Massoud (2007) made a quantitative evaluation of the strategic intent of internationalization by universities in UK and provided a model for analyzing strategic intent vis a vis performance.

Yash Pal Committee (2008), constituted by Government of India, has noticed poor governance of universities with their remark as most under managed organizations in our society. The committee found that the governance structures in higher education institutions are archaic and have not changed with changing environment to meet the expectations of its various stakeholders.

Thus, the exploration on the recent literatures as outlined above focuses on the need for the proposed study to appraise the shortcomings and/or informational gaps.

## **2.10 STRATEGIC MANAGEMENT MODELS ADOPTED BY THE UNIVERSITIES ABROAD**

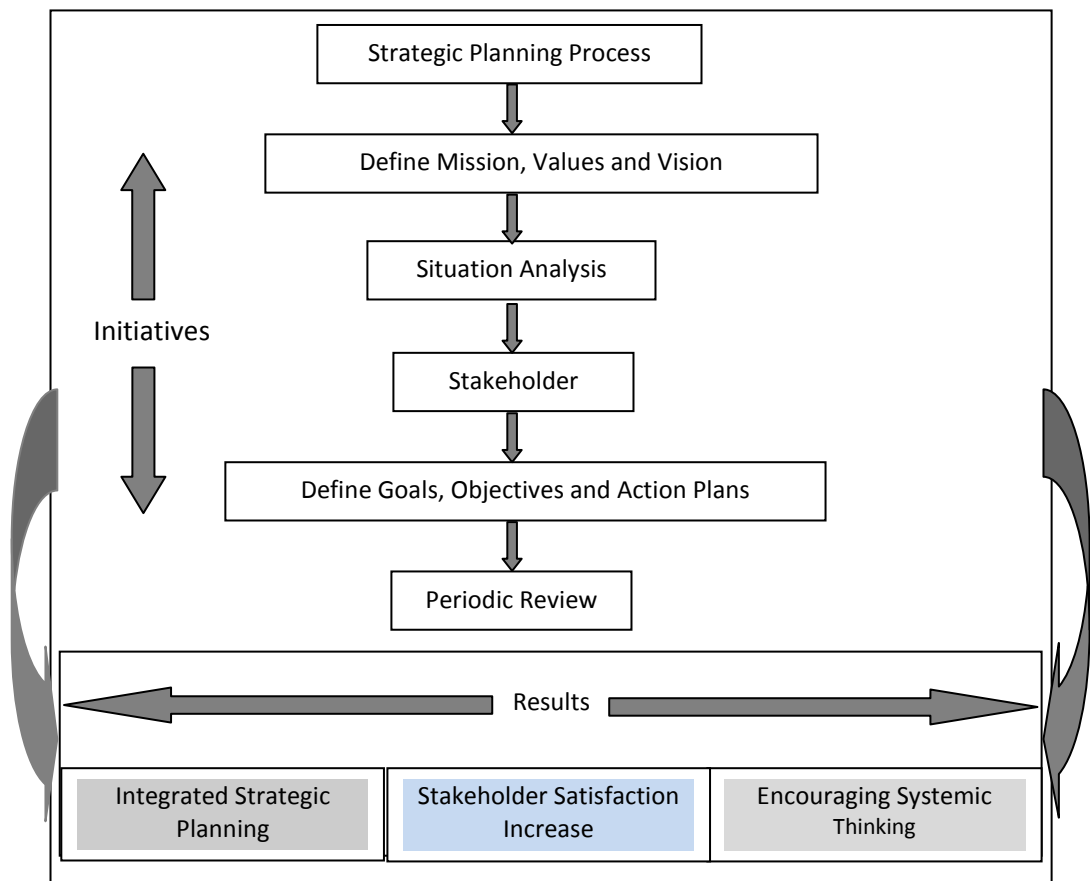
MIT is one of the most prestigious institutes established in the year 1861 with large scale support from US Government. MIT was adopted as the role model in the Sarkar Commission Report (Sarkar1948) while visualizing the IIT. Even after 65 years, MIT continued to be the role model (Yash Pal 2008).

The central features of MIT model are its course structure that integrates teaching and research with strong science base. Due importance has also been given to humanities and social science in engineering curriculum. The Institute is committed to the economic and social development of the region and contribution to the industry in particular. According to Etzkowitz (2002), MIT integrated various academic formats, including the classical teaching college, the polytechnic engineering school, the land-grant university and the research university into a unique configuration. In comparison to more traditional and prestigious US universities such as Harvard and Princeton, MIT is known for its institutional flexibility and capacity adaptation to set standards of research in both basic and applied science, including engineering (Leslie and Kargon 2006). IITs have been taking consistent steps to tune their working into the structure in terms of academic, research and allied activities. But even after the span of more than 50 years of existence, the envisaged MIT model has not become a reality.

The education system globally has moved from a push-based or producer-centric system to a pull-based or customer-centric system (Mohammed 2007). Malcolm Baldrige Quality Award (MBQA) model happens to be one of the latest additions to the pull-based models. Arif et al. (2004) documented the five processes within the University of Wisconsin at Stout system, based on MBQA consisting of (i) Strategic Planning Process, (ii) Budget Planning (iii) Career Centre (iv) Information Services (v) University Outreach Centre. The Strategic Planning



Process found at University of Wisconsin at Stout (Figure 2.1) has an all inclusive strategic planning process, which was implemented by the Chancellor.



Source: University of Wisconsin at Stout – Strategic Plan

**Figure 2.1**

**Strategic Planning Process at University of Wisconsin, Stout**

In line with the current international trends, the Denmark government introduced University Act, 2003, which changed the status of universities from being State Institutions to autonomous bodies within the public sector. Being public institutions, it was essential to ensure an adequate balance between autonomy and accountability. In order to maintain a high or even world standard, the universities were made to operate and develop, at the same time the tax payers have a legitimate right to oversee that the universities use the substantial public fund prudently. Thus, the Act provided high level of autonomy to the Universities in appropriate balance with accountability. Under the Act, the university boards consisted of representatives from the academic staff (at least one), the technical and administrative staff (one) and the students (two).

The academic council and the Ph.D Committee at the university or faculty level have representatives from the academic and students. Study boards operate at department or faculty level with academic staff and student participation. In the university evaluation report made for the year 2009, the stakeholders have expressed to the panel of evaluators that they consider the period since 2003 as representing ‘first generation university management’, which includes an insufficient level of co-determination. The stakeholders see a challenge in the need to move university governance to the next stage – second generation university management, that is, Modern management which is adequate for knowledge-intensive institutions like Universities.

The University of Adelaide, through the Vice Chancellors Committee (VCC), endorsed a project in 2009 which is known as The Institutional Planning and Performance Framework (IPPF) (Figure 2.2) consistent with the good practice in Australian higher education with the main objectives such as:

- Systematically monitoring and reporting on outcomes against the university strategic plans
- Integrating planning and resource allocation cycles for the purposes with the university’s core business activities and
- Using its performance reports and planning as the principal tools to effectively devise strategic directions, statutory obligations and quality improvements.

Under the IPPF model, the university claims to review performance and undertakes ventures guided by the major elements namely:

- i) The need to ensure that the university mission, vision and values support the commitment to excellence needed for the organization.
- ii) Its strategic goals, objectives and targets;
- iii) The external environment in which it operates;
- iv) Active collaboration and consultation with all stakeholders
- v) Integration of university level plans with Division/Unit level and faculty level
- vi) Ensuring that plans consider past performance and continuous improvements
- vii) Ensuring ongoing financial sustainability.



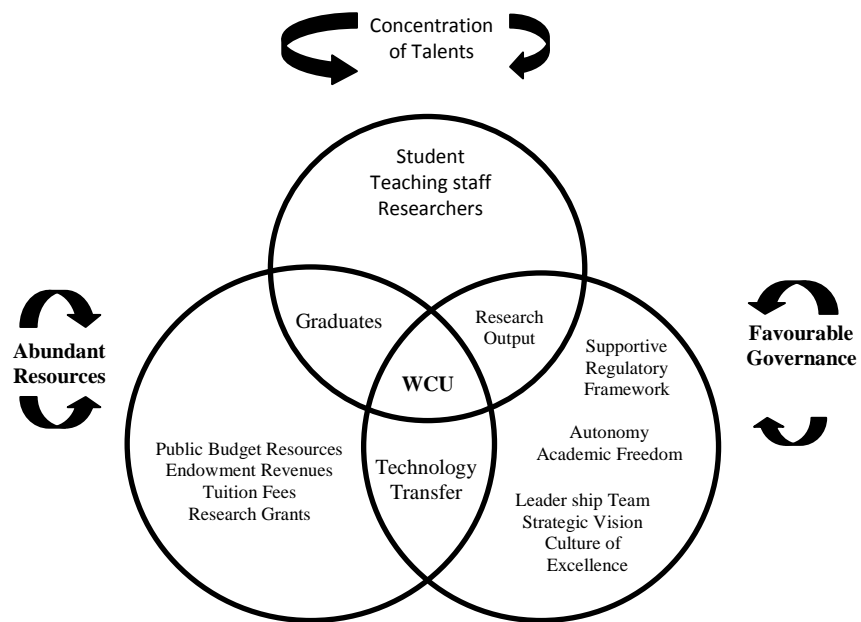
Source: University of Adelaide link Strategy and Planning

**Figure 2.2**

**Institutional Planning and Performance Framework (IPPF)**

In the past decade, the term ‘World Class University’ has become a catch phrase for not just simply improving the quality of learning and research in tertiary education, but more importantly for developing the capacity to compete in the global tertiary education market, through the acquisition and creation of advanced knowledge (Salmi 2009). Few scholars attempted to define what WCUs do possess and have identified a number of basic features, such as highly qualified faculty, excellence in research, quality teaching, high levels of government and non-government sources of funding; international and highly talented students; academic freedom; well-defined autonomous governance structures; and well equipped facilities for teaching, research, administration and (often) student life (Altbach 2004, Khoon et. al.2005; Niland 2000,

2007). In an attempt to arrive at a manageable definition, Salmi in his report makes the case that the superior results of the institutions (highly sought graduates, leading-edge research, and technology transfer) can essentially be attributed to three complementary sets of factors at play in top universities (Figure 2.3); (a) a high concentration of talent (faculty and students) (b) abundant resources to offer a rich learning environment and to conduct advanced research and (c) favourable governance features that encourage strategic vision, innovation and flexibility which in turn will enable institutions to make decisions and to manage resources without being encumbered by bureaucracy. Salmi (2009) further reiterated that establishment of world-class university requires, above all, strong leadership, a bold vision of the institution's mission and goals and a clearly articulated strategic plan to translate the vision into concrete programs and targets.

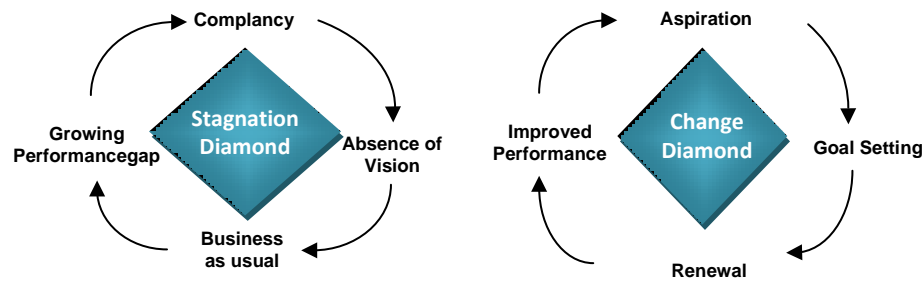


Source: Elaborated by Salmi, 2009

**Figure 2.3**

**Characteristics of a World Class University(WCU): Alignment of Key Factors**

Perry et al. (2008) attempted to contrast the dynamics of a university that is on the renewal path, with stagnation path followed by institutions unwilling or unable to challenge themselves and their performance (Figure 2.4).



*Source: Adapted from Perry and Sherlock (2008)*

**Figure 2.4**

### **Stagnation and Change Diamonds**

Recent research on university leadership suggested that in the case of top research universities, the best-performing institutions have leaders who combine good managerial skills with a successful research career (Goodall 2006). The CFTIs in India have to strive to move on to ‘change diamond’ to achieve greater performance. The next section focuses on the impeders in strategy implementation.

#### **2.11 IMPEDERS IN STRATEGY IMPLEMENTATION**

Today’s organizations work in a dynamic complex environment that continually changes. Hence, organizations are forced to revisit their strategic planning and the higher education sector is not an exception (Alashloo et al. 2005). Alexander (1991) described that the strategic management process can be compared to a two headed coin. One side is strategy formulation, which defines what an organization’s game plan will be to compete successfully within a specific context. The other side of the coin represents strategy implementation, which takes the formulated strategy as given and then decides how to achieve the goals. While strategy formulation and application are functions closely intertwined, strategy implementation is the most complex and time consuming in the process of strategic management. According to Reid (1989), strategy implementation is a vital process describing the opportunities of the future. Even the best strategies are useless unless that are applied well (Aaltonen and Ikavaiko 2002). Accordingly, strategies can be successful only through efficient

implementation. Cespedes and Piercy (1996) have indicated the formulation-implementation dichotomy as heart of the traditional approach stating that many difficulties that arise on implementation can be attributed to it. In order to resolve this problem, a different matrix of skills and abilities are needed (McGuinness and Morgan 2005) and towards this three themes were proposed. These are (a) process perspective on implementing strategy, (b) an emergence view and (c) co-aligning the organization with its environment. A process perspective of implementing strategy widens the traditional focus on organizational structure and control systems by including behavioral and interpersonal process elements (Piercy, 1998; Noble, 1999, McGuinness and Morgan 2005). This is meant to introduce psychological issues such as individual motivation and commitment; and issues relating to social and political process such as organizational culture, leadership and learning which requires consideration as a result of their complex interrelationships with organizational structure and control systems. An emergence view of strategy deliberately puts formulation and implementation together (McGuinness and Morgan 2005). They are viewed from this perspective as interactive and reciprocal processes, intertwined in a higher level process or strategy emergence, adaption and improvisation (Moorman and Miner 1998; Sahittal and Jassawalla 2001). The third theme that McGuinness and Morgan (2005) propose towards solving the formulation-implementation problem is co-alignment of the organization with its environment as a process indicative of strategic intent; noting that it involves the purposeful, adaptive coordination of organizational goals and actions over time. Thus, the failure of an organization is the impeders affecting implementation of the strategies. There are many literatures focusing on the impeders encountered while implementing strategies (Okumus, 2003, Dobni, 2003, Dooley et al. 2000, Freedman, 2003, Beer and Eisenstat 2000, Hoag et al. 2002, Galpin, 1998). For instance, Alexander (1991) mentions various reasons as obstacles: (i) Implementation took more time than originally planned, (ii) Unanticipated major problems arose, (iii) Activities were ineffectively coordinated, (iv) Competing activities and crises took attention away from implementation, (v) The involved employees had insufficient capabilities to perform their jobs, (vi) Lower-level employees were inadequately trained, (vii) Uncontrollable external environmental factors created problems, (viii) Departmental managers provided

inadequate leadership and direction, (ix) Key implementation tasks and activities were poorly defined, (x) The information system inadequately monitored activities. Wessel (1993) points out many individual barriers hindering successful implementation of strategies such as, too many and conflicting priorities, insufficient top team functions, a top down management style, inter-functional conflicts, poor vertical communication and inadequate management development. Beer and Eisenstat (2000) envisages the barriers in front of strategy implementation as ‘six silent killers of strategy implementation’ and explain them as follows: a top-down/laissez-faire senior management style, unclear strategic intentions and conflicting priorities, an ineffective senior management team, poor vertical communication, weak co-ordination across functions, business or borders, and inadequate down-the-line leadership skills development. Corboy and O’Corrbui (1999) define the obstacles as ‘deadly sins of strategy implementation’ and go on explaining them as: a lack of understanding of how the strategy should be implemented, customers and staff not fully appreciating the strategy, unclear individual responsibilities in the change process, difficulties and obstacles not acknowledged, recognized or acted upon, and ignoring the day-to-day business imperatives. More than this, according to Giles (1991) there are three reasons why poor strategic planning is an obstacle to strategy implementation: i) a strategy is not really a strategy but ‘a mixture of budgets and management wish list’; ii) a strategy is not executable; and 3) the executors do not accept the strategy as ‘their own’ because they did not participate in its formulation. Later, Alashloo et al. (2005) summarized the obstacles of strategy implementation under four headings viz. planning consequences, organizational issues, managerial issues and individual issues. Based on this categorization Koseoglu (2009) made study on the organizations from Turkey. In extending this work to the present research study with respect to strategic management of CFTIs in India, CFTIs being public institutions, the variable autonomy has been added in the organizational issues and a fifth group under the heading environmental issues has been added with three variables. Thus, the major impeters of strategy have been grouped into five main areas: organizational, planning consequences, individual, managerial and environmental (Table 2.6).

**Table 2.6**  
**Impeders of Strategy Implementation**

No	Impeders	No	Impeders
<b>P Planning Consequences</b>		<b>O Organizational Issues</b>	
P1	Lack of exact strategic planning	O1	Incompatible structure with the strategy
P2	Insufficient linking of the strategy to goals	O2	Lack of Autonomy*
P3	Time limitation	O3	Unsuitable resources allocation
P4	Lack of consensus among decision makers	O4	Lack of adequate communication
P5	Lack of identification of major problems	O5	Lack of effective co-ordination
P6	Lack of effective role formulators	O6	Lack of adequate information system
P7	Unsuitable training system	O7	Incompatible organizational culture
P8	Unclear regulation and executive policies	O8	Competing activities among people
P9	Lack of choice of real strategy	O9	Competing activities among units
		O10	Unsuitable evaluation and control systems
P10	Lack of a national attitude to strategy	O11	Unsuitable compensation system
		O12	Inadequate physical facilities
		O13	Lack of in-creative system
<b>M Managerial Issues</b>		<b>I Individual issues</b>	
M1	Unsuitable leadership	I 1	Lack of enough capabilities of employees
M2	Lack of adequate organizational support	I2	Resistance to change among people
M3	Lack of adequate manager commitment	I3	Resistance to change among units
M4	Fear of insecurity among managers	I4	Fear of insecurity in the new territory
M5	Political factors in regard to power	I5	Lack of understanding of the strategy
M6	Unsuitable personnel management	I6	Inadequate connection to the vision
M7	Uncontrollable factors	I7	Lack of enough motivation of employees
M8	Lack of enough motivation among the managers	I8	Lack of employee commitment
<b>E Environmental</b>			
E1	Uncontrollable external factors**		
E2	Unanticipated market change**		
E3	Lack of support from Industries**		

*Source: All variables except marked with \* and \*\* Alashloo et al 2005, \* variable added Nottingham (1998), \*\* variable added Aaltonen and Ikavaiko(2002), Okumus (2003), Sterling (2003)*

## 2.12 CSFs IN IMPLEMENTATION OF STRATEGIC MANAGEMENT

The CSFs play a major role in successful implementation of strategic management in educational institutions, as is the case with every organisation. Based on the literatures on strategic management applicable to education, the CSFs identified are Organisational flexibility, Planning, Faculty, Students, R&D, Placement, Infrastructure, Leadership and Quality (Table 2.7).



**Table 2.7**  
**Critical Success Factors (CSFs) of Strategic Management**

Authors	Critical Success Factors								
	1	2	3	4	5	6	7	8	9
Cohen (1974)		*							
Lawrence (1989)							*		
Sen (1989)		*							
Kaplan (1996)		*							
Clarke (1997)		*							*
Mihaly (1997)			*	*	*				
Bowden (1998)				*					*
DeCanio (2000)	*								*
Etzkotwiz (2002)	*								
Tsiakkiros (2002)		*							
Usys (2003)					*				
Cullen et al (2003)									*
Kuttunen (2004)									*
Martijin (2005)		*							*
Chhaparia (2006)				*		*			
Gyula (2006)		*							
Niculesu (2006)			*	*					
Petrov (2006)								*	
Megda(2007)					*				
Umashankar (2007)	*	*	*						
Weiser (2007)		*							
Yesh Pal (2008)	*								
Nimesh (2010)		*	*	*					*
Hitt et al (2011)			*	*					
Jeelani (2011)			*	*	*		*	*	
D'Souza (2012)									*
Total Score	4	10	6	7	4	1	2	2	8
Rank	V	I	IV	III	VI	VII	VI	VI	II

Source: Literature Survey

Note: Critical Success Factors: 1. Organizational flexibility, 2.Planning, 3. Faculty, 4. Students, 5.Research & Development, 6.Placement, 7.Infrastructure, 8. Leadership and 9. Quality

\* = indicate focus of CSF in the research study

Depending on the research findings in various literatures, CSFs identified were ranked. Accordingly, the most important CSFs in implementation of strategic management in education are (a) planning (b) quality (c) students and (d) faculty.

With this the fourth objective of the research work namely, determining the CSFs for planning strategic management in CFTIs are met.

As such the CFTIs have to pursue unique strategies at institutional level with strong determination, integrating upcoming international dimensions in teaching, research and service functions.

Next phase of strategic management is strategic control. This contain monitoring, evaluation and feedback.

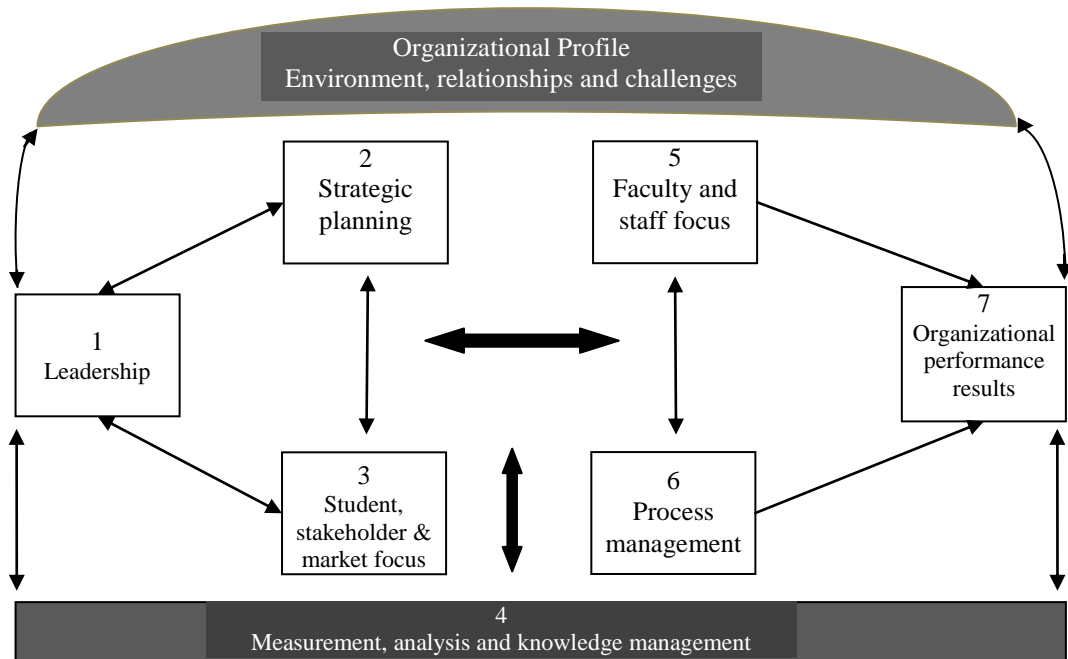
### **2.13 MONITORING AND EVALUATION FOR PERFORMANCE EXCELLENCE**

Although the concept of Balanced Score Card (BSC) has been widely adopted and used in the business sector, the education sector apparently has not embraced the BSC concept widely, as evidenced in the dearth of published research work on this topic. Cullen et al. (2003) proposed that a BSC be used in educational institutions for reinforcement of the importance of managing rather than just monitoring performance. Sutherland (2000) reported that the Rossier School of Education at the University of Southern California adopted the BSC approach to assess its academic program and planning process.

Another method is the Baldrige Criteria for Performance Excellence. The focus on measurement in the criteria first appears in the set of core values and concepts. These factors which comprise the philosophical foundations of performance excellence (Baldrige National Quality Program, 2003b) are:(i) Visionary Leadership (ii) Learning-centred education (iii) Organisational and personal learning (iv) Valuing faculty staff, and partners (v) Agility (vi) Focus on the future (vii) Managing for innovation (viii) Management by fact (ix) Social responsibility (x) Focus on result and creating value (xi) System perspective. D'Souza (2012) in his study on Indian health care organisations based on MBQA criteria indicated that there is a strong relationship between quality and performance.

The 11 core values and concepts are embodied in the seven concepts (Figure 2.5) gives the framework connecting and integrating these seven categories into a

comprehensive system known as Baldrige Education for Performance Excellence 2004.



Source: 2004 Baldrige Education Criteria for Performance Excellence

**Figure 2.5**

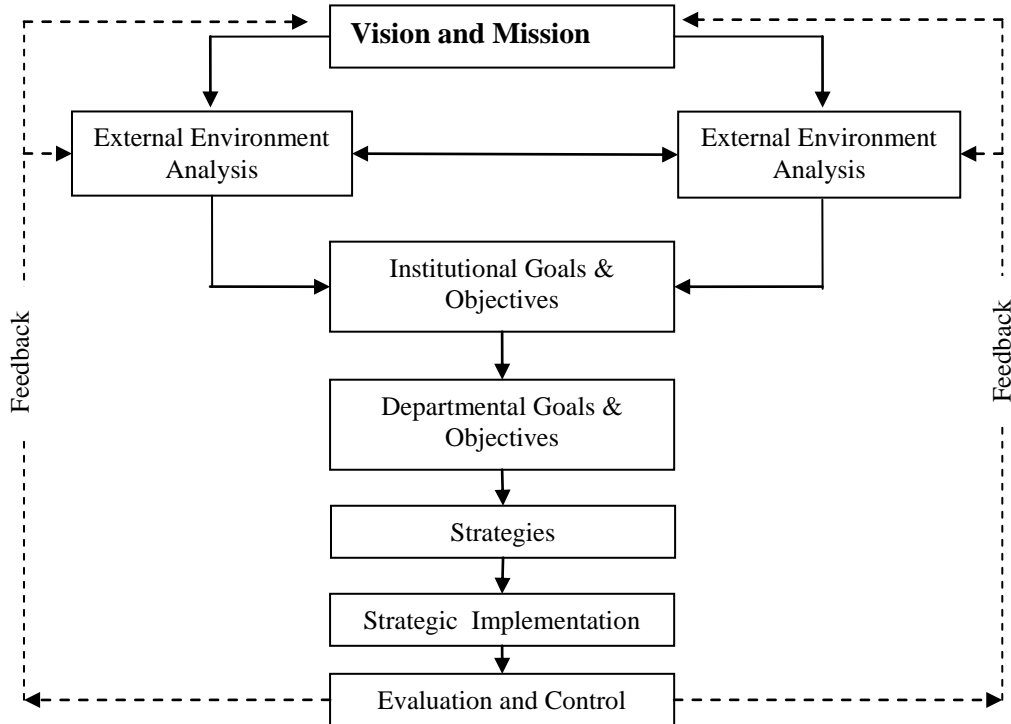
**Baldrige Education Criteria for Performance Excellence Framework : A Systems Perspective**

The budgetary, financial and market results in education differ substantially from those in the business sector. In education the expected measures are primarily internal efficiency measures, whereas in business they are the bottomline or lagging indicators (Karathanos and Karathanos 2005). Finally, review can be made on the strategic management models in Indian CFTIs

**2.14 STRATEGIC MODEL OF NITK SURATHKAL, INDIA**

Among the CFTIs, NIT Karnataka (NITK), Surathkal has made a strategic management model.. The strategic management model of NITK is designed within the theoretical framework of strategic management, with special reference to its application in Indian education scenario (Figure 2.6).

In the present research, an attempt is made to review and refine the model, so that it can be commonly used for all CFTIs in India .



Source: Sequeira A H (2010)

**Figure 2.6**

**Strategic Model of NITK Surathkal**

In the next section, the components of strategic management applicable to education sector have been identified based on the research literatures.

**2.15 COMPONENTS OF STRATEGIC MANAGEMENT APPLICABLE TO THE EDUCATION SECTOR**

Components of strategic management which are applicable to the education sector identified during the literature review compiled together (Table 2.8). Based on the findings, the most important components of strategic management have been ranked. Strategic intent has figured as first rank, followed by strategies as second and evaluation and control in the third position.

**Table 2.8**  
**Components of Strategic Management Applicable to Education Sector**

Authors	Components of Strategic Management							
	1	2	3	4	5	6	7	8
Ackoff (1981)	*							
Bryson (1991)	*	*	*	*	*	*	*	*
Mintzberg (1993)	*	*	*	*	*	*	*	*
Fitzgerald (1995)					*			
Harvey et al (1996)	*			*				
Hayes (1996)					*			
Kaplan (1996)	*	*	*	*	*	*	*	*
Clarke (1997)					*			
Amartunga (2000)	*	*	*	*	*	*	*	*
Pollit et al (2000)								*
Tsiakkios et al (2002)	*	*	*	*	*	*	*	*
Etzkowitz (2002)					*			
Fidler (2002)	*							
Jhonson (2002)	*	*	*	*	*	*	*	*
Cullen et al (2003)							*	
Davies et al (2003)	*							
Steiss (2003)	*							
Townley (2003)							*	
Karthanos (2005)							*	
Ayoubi et al (2007)	*							
Knox (2007)	*							
Shane (2007)							*	
Umashankar (2007)	*	*	*	*	*	*	*	*
Kuttunen (2008)	*	*	*	*	*	*	*	*

**Table 2.8 (Contd...)**

Authors	Components of Strategic Management							
	1	2	3	4	5	6	7	8
Hearunyakiji (2009)	*	*	*	*	*	*	*	*
Sequeira (2007)	*	*	*	*	*	*	*	*
Total Score	17	10	10	11	14	10	14	11
Rank	I	V	V	IV	II	V	III	IV

Source : Research Literatures

Note: Critical Success Factors: 1. Strategic intent(Vision & Mission) 2. Internal Scanning, 3. External Scanning, 4. Goals and objectives, 5. Strategies, 6. Implementation, 7. Evaluation and Control, 8. Feedback

\* = indicate Strategic component present in the research study

Finally, a review of the future challenges of the Indian technical education has been made in the next section.

## **2.16 FUTURE CHALLENGES OF CFTIs IN INDIA`**

Success of every instituion lies on its aspiration to achieve newer challenges with a clear vision supported by well defined strategic plan to achieve the same.

Human capital is the essence of innovation. Empowering people to innovate relies on broad and relevant education as well as on the development of wide-range of skills that complement formal education. Curricula and pedagogies need to be adapted to equip students with the capacity to learn and apply new skills throughout their lives. At the same time, education and skill development systems require reform to ensure that they are efficient and that they meet the requirements of society today. Improving teacher quality is particularly important for enhancing outcomes; this might include better initial selection of teachers, ongoing evaluation to identify areas for improvement, and recognizing and rewarding effective teaching.

In the globalised economy,to adapt the overall planning in response to the new complex market is an important factor. John Weisier emphasized that the overall planning developed must be flexible enough to adapt to the different commmunity realities (Weiser 2007). The political objectives set for the future assume that there must be effective and widely used management tools at the institutional level

(Kettunen 2008). Strategic planning produces an explicit description of how an organisation is moving from the present day described by the mission in the intended direction and towards the state expressed by the vision (Fidler 2002; Davies and Ellison 2003; Steiss 2003) The strategic management should accordingly tune to the education policy, environmental factors both in terms of external and internal and the resource potential of the institution. In technical education, when the strategic management defines strategic objectives, it should take into account national vision, international policies, global scenario and the regional needs in particular.

When performance of an institution is evaluated, along with the strategic goals and objectives, educational policy must be kept in mind, as this will reveal the performance of the institute and its compliance with the national vision. The BSC approach developed by Kaplan and Norton (2004) can be used as a tool to effectively communicate and monitor implementation of the strategic plan.

Technical education sector of every developing nation is a core sector that support tremendously in nation building. Among the CFTIs, IITs and IISc have been able to perform and establish their presence in the international education sector. With the advent of tough international competition, on account of limitations in internal and external factors, the IITs may have a tough time ahead. India, one of the biggest democratic countries, least affected by the economic recession among the third world countries, with its foresighted policies, looks eagerly towards CFTIs to prove the country's strength in quality education in international forums and to mould Indian technical education for the 21<sup>st</sup> Century. George Stigler describes a snow-balling process, where an outstanding scientist gets funded to do exciting research, attracts other faculty, then the best students-until a critical mass is formed that has an irresistible appeal to any young person entering the field (Mihaly 1997).

## **2.17 GRAND STRATEGY FOR CFTIs**

In the past, planners were advised to follow certain rules or prescriptions in their choice of strategies. Presently the experts agree that strategy selection is better guided by the conditions of the planning period and by the strengths and weaknesses of the organization.

In the case of CFTIs the institutions are not overcommitted nor there is any need for conservative strategies. Even though the IITs/IISc have achieved the level of performance and look forward for aggressive expansion, the majority of CFTIs are in its stage of infancy and it will be appropriate to follow the grand strategy of building up on the strengths with grand strategies of concentrated growth, capacity building-up, quality improvement and innovation.

## **2.18 RESEARCH GAPS**

The detailed literature survey and the feedback taken from the stakeholders as well as informal discussions with students, faculty members, administrators, regulators and educational experts reveal an urgent need for this research study. The growing importance of technical education in a globalised economy, the need for quality technical manpower and research output from the CFTIs have become an impetus for research. The intention of the legislature in setting up the CFTIs is to set new horizons in technical education in terms of quality education, high research output and better industry institute interaction, which will not only culminate with the research needs of the industry but also will concentrate on technology business incubation. The CFTIs are supposed to attain excellence and to act as a catalyst in the journey towards excellence in the total technical education system of the country. The open door policies on education and rising corporatization in technical education have created greater threat to the ever flourishing brand equity of CFTIs. Thus, the imminent need of the hour is to have introspection in the functioning of CFTIs and to suggest measures to confront greater challenges.

A good governance system helps to create a stimulating ecosystem to attract talented students and faculty and to motivate the latter through performance incentives structure (Kakodkar2011). Accordingly, the broad dimension of the research interest can be categorized in to three major heads:

- i) A study on the management practices of CFTIs, to see how far components of strategic management are present in the system.



- ii) To measure the impact of the present strategic management practices adopted by CFTIs
- iii) Derive a strategic model for CFTIs, suitable to Indian conditions, which can stimulate the efficiency and accountability of Indian CFTIs

There are only a few studies carried on Indian higher education system in general and technical education in particular. The studies carried out on these areas are very high in developing countries, as the success of any democracy depends on producing high quality talents to meet the challenges. Since inception, over the years, IITs have been reviewed thrice. The first review happened separately for each IIT. IIT Madras was reviewed by the Committee headed by Bhatnagar in 1971; IIT Bombay was reviewed by Sethna Committee in 1972. This was followed by IIT Kharagpur by Pande, IIT Kanpur by Bhagavantham and IIT Delhi by Chopra in the year 1973. The first joint review of all IITs took place in the year 1986 by a committee under the Chairmanship of Nayudamma. This committee, while appreciating quality undergraduate education system, drew attention towards improving research output and better institute-industry interaction. Second joint review of all the IITs took place under the chairmanship of Rama Rao in 2004. The committee recommendations focused on building up faculty strength, research base, brand equity, industry linkage and expansion. The latest study was done by the Committee appointed by MHRD under the Chairmanship of Kakodkar in 2010. The report indicates that the IITs have neither formulated a clear vision and mission nor implemented it. The report also recommended having regular performance evaluation, faculty building up and industry support. This study has not extended to find out the components of management systems in IITs. Thus, there is a clear need to assess strategic management practices and to identify the obstacles in implementation.

Bain and Company (2003) indicated that strategic planning in public universities helps top management to align its resources in the most efficient manner necessary for the attainment of strategic milestones and stay competitive. Thus, while analyzing the practices on strategic planning in CFTIs there is a need to analyze the alignment of the resources and processes.

Regional Engineering Colleges (RECs), set up as a joint enterprise of Central and State Governments with a view to foster national integration, have now become NITs from 2004. Only one performance review was made during the year 2010 through the Comptroller and Accountant General of India. In 2012, a Committee was set up under the Chairmanship of Kakodkar, which is making the study and is yet to submit its report. As such, an analysis of the management practices of NITs is an imperative need to find out the lacunae.

Umashankar and Dutta (2007) described that organization failures such as poor structure, recruitment and retention of staff, ineffective or non-existent internal control and lack of communication are the symptoms of deficient strategic planning. In Indian context, many of the technical institutions have been traditionally controlled by the government and hence, at times, strategic management and its derivative tenets are not so visible in the initiation and operation. The paper focuses on the way in which Balanced Score Card (BSC) concept can be applied to higher education institutions in India. In the theoretical frame work, attention has been made on the comparison of Baldrige Award and BSC criteria made by Karathanos and Karathanos (2005) in the context of education. The marketing of educational programmes has attracted attention of researchers who have identified research-based planning and programme development, relationship marketing and non-traditional methods for education delivery as key areas for future focus (Hayes et al. 1996). The schematic model proposed in the study was based on BSC criteria designed by Kaplan and Norton (2001). The paper concludes with the remarks that there is a growing popularity for Indian Engineers and graduates in job opportunities abroad (Chhaparia 2006) India has to build world-class quality into higher education. The Indian universities and other institutions of higher learning can benefit through the application of BSC to evaluate performance and design appropriate strategies. The paper which is covering more theoretical aspects has pointed out that in Indian scenario, four major perspectives can be taken for BSC study which include Customer perspective, Internal Business perspective, Innovation and Learning perspective and Financial perspective. The assessment of components of strategic management practices existing in Indian institutions had not taken up in this research

work. The assessment and evaluation of strategic management can be done through BSC only after effective planning and implementation of strategic management. Accordingly, there is a need to probe in to the subject, initially focusing on Indian CFTIs, to assess the existence of components of strategic management practices.

Government of India constituted a Committee under the Chairmanship of Prof Yash Pal, in 2008 to advise on renovation and rejuvenation of higher education. The Committee submitted its interim report on 4<sup>th</sup> March, 2009. While mentioning the challenges of the Indian higher education sector, the committee made special emphasis on erosion of autonomy, undermining of UG education, growing distance between knowledge areas and the isolation of Universities from the real world outside and crass commercialization. Accordingly, the Committee suggested understanding the issues before suggesting strategies to renovate and rejuvenate higher education in India. While mentioning the potential of IITs and IIMs, the committee pointed out that they must strive to be models of all-round excellence, like the famous Massachusetts Institute of Technology or CALTECH. The Committee also focused on the point that while the institutions were working towards their goal, each one of them should understand that different IITs and IIMs would have different strategies to expand and diversify and that the controlling authorities must refrain from issuing a uniform 'diktat' to all of them to move in a prescribed direction. Accordingly, it was proposed that while keeping intact their unique features, CFTIs should act as pace setting and model governance systems for all Universities. This provides scope for a detailed study to assess the current level of autonomy, efficiency in governance in the changing environment and to evolve a new strategic management model.

Chakrabarti (2007), emphasized the fact that, even though the modern education system in India is based on the Anglo American tradition, there is a great variety of institutional systems in higher education. Government plays a dominant role by providing funds for education and at the same time intervening in the administration and control of these institutions. Accordingly, these institutions are facing dictums from various entities that are at times confusing and contradictory. Hence, there is a

need to study the current level of autonomy in CFTIs which is a core input in strategic planning.

The World Bank report on Scientific and Technical Manpower Development in India focuses on issues related to autonomy and accountability, quality and relevance, low retention of S&T personnel, poor technology and infrastructure support (World Bank 2000). As such, it is high time to have a critical review of the existing strategic management practices of CFTIs in India, identify the obstacles in implementation of strategic management and assess the current level of performance through stakeholder satisfaction.

Higher education institutions are competing against one another for the best students, high quality staff and research funding from government and industry (Lynch and Baines 2004). Basu (2009) while agreeing upon the recommendations of Yesh Pal indicated that the country does not have enough resources to treat all the universities on the same scale to raise their standards and hence, a small number of selected institutions supported on a massive scale, which is being done by US and China with visible results, would be appropriate. It is also recommended that the list of such preferred institutions can be evaluated and modified in every three years, so that there will be competition and opportunity for others to join this league. Similarly, India opened up to foreign universities to set up campuses in India (Times 2013) through Foreign Educational Institution (Regulation of Entry and Operation) Bill 2010. This also will generate tough competition for Indian institutions. This calls for the need to develop a competitive spirit in non-profit Indian educational institutions.

The report presented by Joshi in the UNESCO World Conference (1998) on Higher Education in the 21<sup>st</sup> Century, stressed that the system of governance of higher education is undergoing increasing strain and sooner rather than later, major changes will have to be effected, not only to ensure greater autonomy and accountability but also to facilitate rapid changes in the very framework, directions and goals (UNESCO 1998). Accordingly, there is a research gap to analyze the existing system of governance with special emphasis on the effectiveness to realize the goals.

Sridhar and Sequeira (2007) made a study through content analysis on the mission statement of engineering colleges to find out its qualitative aspects and also to find its focus on the vision set out by AICTE. Ayoubi and Massoud (2007) in their study made a quantitative evaluation of the strategic intent of internationalization by universities in UK and provided a model for analyzing strategic intent vis a vis performance. Similarly, National Higher Education Action Plan 2007-2010 of Malaysia insisted the universities to craft the vision and mission of the institutions to meet and even exceed expectations of the government (NHEM 2007). These works can be extended to make a deep study on content analysis of vision and mission statement of CFTIs to trace out its focus on the activities carried out on the major themes and its congruence with national vision.

The purpose of a non-profit organization is to bring about social changes through non formal channels of governance. Towards this reason, the mission statement of a non-profit organization must be different from any typical commercial business. The mission statement of a non-profit organization must aim for creation of social benefits. Knox and Gaur suggested that a non-profit organization's purpose must be "social orientation" (Knox and Gaur 2007). Each organization should have a unique mission statement depending on the purpose of its existence. In addition to Knox and Gaur's theory, mission statement should be very specific on the long term outlooks and should be realistic. This also calls for a need to have a study of mission statement of our CFTIs.

Establishing strategic framework is about setting up goals and objectives and working towards its realization. Hearunyakij et al. (2010) described that as the market for non-profit enterprises becomes more and more competitive, the future research agenda will help the non-profit organizations to establish a more completed strategic framework. This work can be extended to find out the components of strategic management present in the governance system of CFTIs, so that the missing components of strategic management can be identified.

Kuttunen (2008) indicated that the management must be able to define strategic objectives, which are based on the strategic plans of the organization. The management must also be able to develop the internal processes and structures of the organization to achieve the strategic objectives. In addition, the management must be able to define measures (indicators) that describe achievement of strategic objectives. In short, it is necessary to probe into the strategic objectives of CFTIs, internal processes and structures to evaluate their alignment towards achieving the strategic objectives. Similarly, the indicators to measure the achievement of strategic objectives of CFTIs needs to be studied.

Accordingly, the major research gaps identified are:

- i) Organizational failures on account of deficient strategic management
- ii) Issues related to autonomy, accountability and quality
- iii) Strategic intent and its implementation
- iv) Alignment of internal processes and structures towards strategic objectives
- v) Need to develop competitive spirit in non-profit organizations

## **2.19 SUMMARY OF REVIEW OF RELATED LITERATURES**

Some prominent literatures which formed a part of this study have been compiled in the order of the publication, attributes and the findings thereon (Table 2.9(a) to 2.9(e))

**Table 2.9 (a)**  
**Key Findings on Strategic Intent**

<b>Authors</b>	<b>Year</b>	<b>Dimension</b>	<b>Findings</b>
Boyett and Finlay	1993	Planning	Educational entrepreneurs should have ten attributes viz. Vision, acceptance of responsibility and ability to allocate resources, delegate, organize, reduce individual and team stress, think long-term, motivate everybody and select and develop a good team
Tsiakkios and Pashiardis	2002	Planning	The extent to which the strategic planning can be effectively implemented to education
Umashankar and Dutta	2007	Planning	Organizational failure of nonprofit organization can be traced to deficient strategic planning
Weiser	2007	Planning	Overall planning must be flexible enough to adapt to the different community realities
Kuttunen	2008	Objectives	The political objectives set for the future assumes that there must be effective and widely used management tools at the institutional level
Sridhar and Sequeira	2007	Objectives	There is a need for change in mission statements with change in job market dynamics and societal demands. Identified limitations of mission statements that need to be addressed
Ayoubi and Massoud	2007	Goals	The study shows that 74 per cent of UK universities' mission statements include international dimensions; out of this only 48 per cent of universities are internationally active.
Chang	2008	Planning	A strategic plan in the education sector is the physical product of the strategic planning process and embodies the guiding orientations on how to manage an education system within a larger national development perspective, which is evolving by nature and often involves constraints

*Source : Literature Survey*

**Table 2.9 (b)**  
**Key Findings on Environmental Scanning**

<b>Authors</b>	<b>Year</b>	<b>Dimension</b>	<b>Findings</b>
Clarke	1997	Organization	Universities are complex organizations in which the agents have specialized knowledge about their activities that administrators do not share
Williams and Joseph	2007	Funding	The mechanism by which higher education institutions receive their funding has a powerful influence on their internal resource allocation models
Morshidi	2009	Autonomy	Several premier public universities in Malaysia have been corporatized as early as the late nineties, whereby their governance system was revamped to reflect the drive towards efficiency, transparency and accountability. However, 'university autonomy' was missing from the list
Hearunyakij et al.	2010	External Environment	As market for non-profit organizations becomes more and more competitive, this future agenda will help the non-profit organizations to establish a more completed strategic framework
Marion	2002	Leadership	Academic credibility and experience of university life were crucial for effective leadership in higher education, and continued with their research and teaching activities along with their managerial roles

*Source : Literature Survey*

**Table 2.9(c)**  
**Key Findings on Strategic Choice**

<b>Authors</b>	<b>Year</b>	<b>Dimension</b>	<b>Findings</b>
Kyvik	1991	Collaboration	Among the other factors viz. ability to do research, amount of time and energy, financial resources, mode of communication and organization; amount of international contact are the most influential variables of research production
Etzkotwitz	2002	Integration	Success of MIT depends on integration of various academic formats viz. classical teaching, polytechnic, engineering school, research university etc.
Perry and Sherlock	2008	Change Dynamic	Contrast between the dynamics of a university that is on renewal path with stagnation path followed by institutions unwilling to change
Hearunyakij et al.	2010	Integration	The balance between commercial and traditional sources of funding would help the organization become less dependent on donations and grants. Finding a sound strategic framework will help the nonprofit organization to develop a clear path to achieve its mission

*Source : Literature Survey*



**Table 2.9 (d)**  
**Key Findings on Strategy implementation**

Authors	Year	Dimension	Findings
Alexander	1991	Impeders	The “unsuitable resources allocation”, “incompatible organizational culture” and “lack of adequate communication” were indicated as the most important organizational impeders.
Ragsdell and Warren	1999	Critical Success Factors	Identified two critical success factors for strategy implementation, such as understanding of the whole; meaningful involvement by as many parties as possible
Mihlay	1997	Alignment of factors	Right university, where the most state-of-the-art research is being done in the best-equipped labs by most visible scientists, is extremely important
Ellis and Dick	2000	Organizational structure	Administrators should consider analysis of organizational structures and systems before strategy implementation, as well as the analysis of culture, power and conflict.

Source : Literature Survey

**Table 2.9 (e)**  
**Key Findings on Evaluation, Control and Feedback**

Authors	Year	Dimension	Findings
Sen	1989	Evaluation	There should be an effective and efficient monitoring and evaluation system and a flexible and dynamic approach to planning of technical education and training, not with reference to present day stagnated socio-economic system but with an eye to the social system which is going to be adopted by the country in the 21 <sup>st</sup> Century
William, F. M.	2003	Evaluation	Audits at many institutions should grow significantly in future, as they can spur improvement and accountability in flexible and inexpensive ways
Townley et al	2003	Evaluation	Public accountability conceptualized in terms of research output
Kaplan and Norton	2004	Evaluation	BSC is a widely used tool to effectively communicate and monitor implementation of the strategic plan
Nicoline	2006	Performance	Performance based allocation of funds depending on number of credits, graduates and publication etc. The funding system influences institutional strategies
Tabatoni et al	2003	Feedback	A “learning organization” should be self-reflexive, and self-critical at strategic and operational levels, a “learning university” should display a strong ability to identify, confront and resolve problems; it means recognizing its weaknesses, collectively and individually, and acting accordingly; it implies also to the use of internal competitiveness and comparisons transparently and constructively, as well as readiness to account for performance

## 2.20 OPERATIONAL DEFINITIONS

Operational definitions of the variables used in the study are tabulated (**Table 2.10**)

**Table 2.10**  
**Operational Definitions of Variables Used in the Study**

Variable	Definition
Strategic Management	Strategic management in education is the alignment of the internal processes of the institution and measurement of achievements through quality management of these key processes to create the educational value proposed to stakeholders
Autonomy	Autonomy means an un-curtailed freedom from all funding and regulatory agencies on all spheres of administrative and management processes
Accountability	Accountability is to provide performance indicators—empirical evidence of their value to government, general public, students, alumni, prospective students, staff, employers and other external stakeholders
Quality	Quality of students learning, not teaching per se, is what ultimately matters. Learning should pertain to what is or will become important for the student enrolled for the programme—not some “ideal” student.
Institutional Performance	Dimensions of institutional performance are program relevance, need, accessibility, fulfillment of expectations, value-added during the teaching-learning process, issues of equity and equality, staff and student satisfaction levels, impact and motivation for lifelong learning and employers and community satisfaction levels

*Source: Literature Survey*

## **2.21 CONCEPTUAL FRAMEWORK**

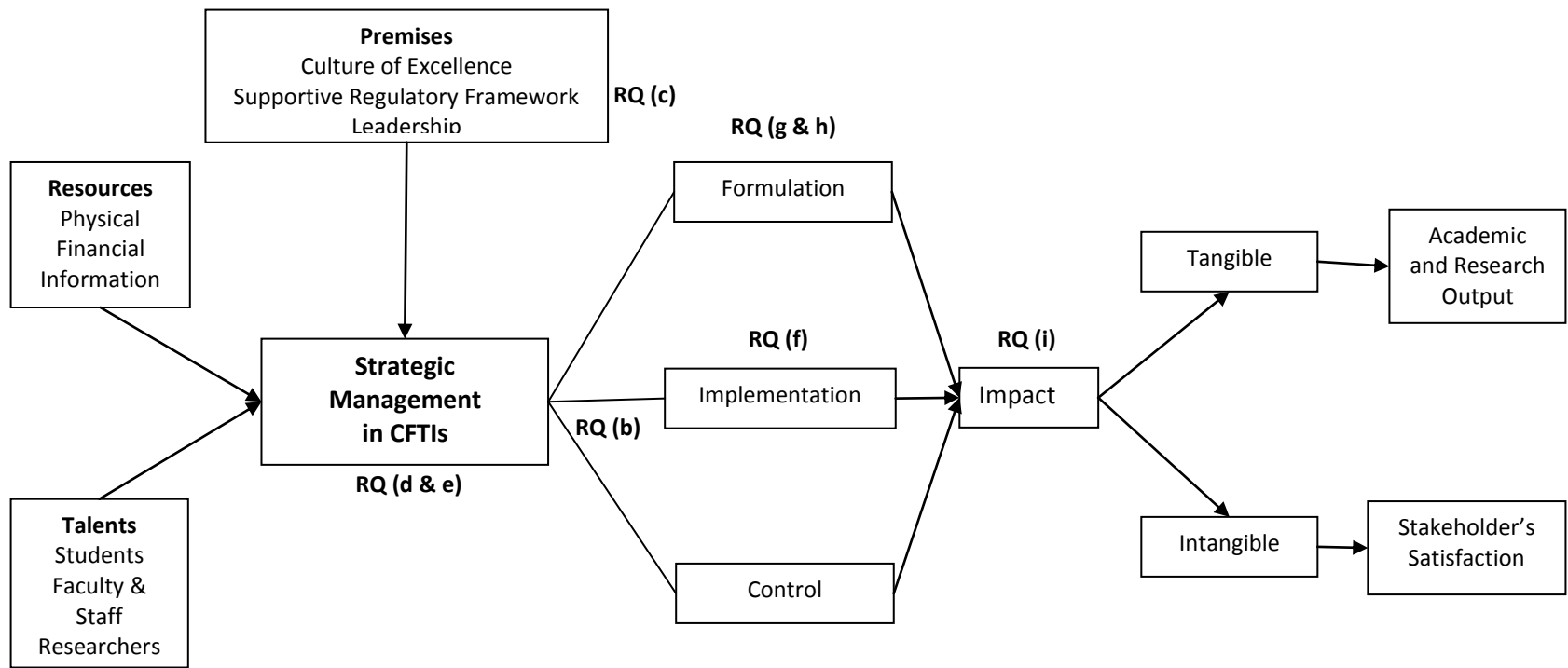
The focus is to ascertain the level of strategic management in CFTIs and to draw an integrated model of strategic management combining with other indicators and critical success factors so as to improve the institutional performance and to make CFTIs more accountable and highly competitive.

The application of strategic management in the context of educational institutions is feasible based on two premises: (i) an institution of higher education is an entity with its own goals and coherent, goal-directed actions (ii) an institution of higher education is a network of participants who use their association to pursue their individual goals (Chaffee 1984; McAleer and McHugh 1994). Teece et al. (1997) come out with the 'dynamic capabilities' framework with a view to develop a new dimension for the strategic management of a firm in a fast changing environment. CFTIs are a network of technical education institutions of higher learning having an entity of their own with their own goals and supposed to have goal directed actions. According to Teece et al. (1997), the term 'dynamic' refers to the capacity to renew competencies so as to achieve congruence with the changing business environment, and the term 'capabilities' refers to a firm adapting, integrating and reconfiguring internal and external organizational skills, resources, and competencies to match the requirements of the changing environment. The primary aim here is to view dynamic capabilities as a firm's ability to upgrade and renew its competencies to meet the rapid changes of the organization's environment and, in turn, to achieve new dimensions of growth and competitive advantage. These dynamic capabilities consist of organizational and managerial processes (i.e. coordination and integration, learning and reconfiguration), specific asset positions (i.e. technological, financial, reputation), and path dependencies (i.e. the firm's history). In the greatly changing environment of globalization, education sector, whether it is for profit or no profit, cannot be spared and kept aside in terms of institutional performance. In the recent trend of achieving self sustainability, CFTIs also have to perform and compete with the international counterparts in terms of quality complemented with the results.

Sequeira (2010) has devised a Strategic Management model for one of the CFTIs in India based on the theoretical framework which would be best suited for the Indian technical educational institutions. The initial stage of an Institute self management process is environmental analysis, in which the Institute as a whole reflects on the external and internal environments relevant and crucial to its existence in terms of strengths, weaknesses, opportunities and threats. The external environment is composed of social, political, economic, cultural and technological developments of the country, competition, expectation of stakeholders, research and development, innovation and the control and direction from the government/ controlling authority. Internal environment, in terms of an institution, consists of human resources, financial resources, physical resources, student intake, institutional climate and its various education programmes. MIT is the role model for CFTIs. Universities like MIT, Harvard and Princeton are best known for institutional flexibility. Institutional flexibility can be achieved only through an un-curtailed freedom in terms of autonomy in all spheres of administration and management process.

Kuttenen (2008) reveals that the political objectives assume that there must be effective management tools at the institutional level. Umashankar and Dutta (2007) pointed out that poor planning and control lead to organisational failure. Accordingly, all critical success factors have to be aligned properly for the excellence in Institutional performance and thereby improving the competitive advantage.

With a view to remain in step with the current literature, a conceptual framework has been drawn up integrating all theories to arrive at the mutual relationships among major concepts (Figure 2.7)



**Figure 2.7**  
**Conceptual Framework for the Strategic Management in CFTIs**

Four major constructs identified are (i) Premises (ii) inputs which include tangible and intangible resources (iii) implementation and (iv) impact. The focus on analysis of governance system mainly aims to find out the components of strategic management present in CFTIs and also to trace the bottlenecks. In the case of an educational institution, the resources, whether they are tangible or intangible, have great relevance in setting up the targets and gearing up the system towards progress. Implementation is the most crucial part in any strategic management process, particularly when it is the case of a non-profit organisation. Hence, identifying the impellers of implementation has been given a thrust in this study. Being educational institutions, the impact of the strategic management has to be reflected through academic output as well as in stakeholder satisfaction. In short, the whole study focused to find out strategic management practices of CFTIs, identifying the bottlenecks/ impediments in adapting such management practices and finally how strategic management, reflects in terms of stakeholder's satisfaction.

## **2.22 HYPOTHESIS AND HYPOTHESIS TESTING**

In social and behavioral sciences, the standard use of hypothesis testing is directed at research questions, which fragments larger investigations about the existence of some or other effect. The researcher would like to demonstrate a research hypothesis which states that the effect in question indeed exists. The negation of this hypothesis, then, is understood as the proposition that the effect is absent.

The Institutions under the CFTIs can be classified into three major categories, namely IITs and IISc, NITs and Other institutions. IITs and IISc are the pioneer institutions of the country, having comparable resources, brand equity and infrastructural facilities. The NITs have much recent origin under CFTIs, as these were under the name and style of RECs elevated to the new dimension. Other institutions include the specialized institutions in the area of science, engineering and information technology, which were set up under different names. These institutions are having more or less identical resources infrastructural facilities and student strength. While

assessing the strategic management practices and its impact in terms of stakeholder satisfaction these groups were compared each other.

### **2.22.1 Autonomy and Institutional Performance**

Autonomy has a greater role in the strategic management process of the Institute. Institution can plan the goals and objectives and can align their internal resources (Umashanker and Dutta 2007) only in case sufficient autonomy is bestowed on all internal management processes. Each CFTI has to devise different strategies to expand and diversify and the controlling authorities must refrain from issuing a uniform diktat to all of them to move in a prescribed direction (Yash Pal, 2008). Universities as an autonomous, self directing, peer-review and professional authority based institutions (Lynn 2003) try to handle the challenges of competition, commodification, accountability, efficiency of higher education (EC 2003). As such hypothesis one is:

*Hypothesis 1 : IITs and IISc have more autonomy than NITs and other group of institutions in CFTIs*

### **2.22.2 Relationship with Strategic Management and Student Satisfaction**

Institutional performance varies to some extent depending on how effectively and efficiently a firm formulates strategy (Miles and Snow 1978; Davig 1986; Smith et al. 1989, Conant et. al. 1990, Saaty and Vargas 1994; Andrews et al. 2006). The complexity and turbulence of external and internal determinants implies that strategic management of the universities turn into the complex system of decisions, which should be formulated, implemented and evaluated in order to achieve long-term objectives (Middlehurst 2002). The initial enquiry is on how far components of strategic management are present among various groups of institutions under CFTIs. As such hypothesis two to five have been formulated.

*Hypothesis 2 : Among CFTIs, environmental scanning in the strategic management process is more evident in IITs and IISc than in NITs and Other group of Institutions.*

*Hypothesis 3: Among CFTIs, the practice of setting up the strategic intent is more active in IITs and IISc, than in NITs and Other group of Institutions.*

*Hypothesis 4: Among CFTIs, the practice of strategy analysis and choice is more evident in IITs and IISc than in other CFTIs*

*Hypothesis 5 : In CFTIs, the components of strategic management practices are more evident in IITs and IISc than in NITs and Other group of Institutions*

Thomas (1980) described that the reliance on the government for resources had contributed to the pressures for resources and greater accountability for their deployment. This resulted in various performance measurements adopted to evaluate university strategy (Thomas, 1980). Nutt and Backoff (1987), proposed that strategy in public sector institutions should be treated differently from the private sector as it is potentially misleading and incomplete, considering the unique characteristics of public sector institutions. The key to successful strategic planning in a university should comprise of the alignment with the environment, resources, purpose and most importantly, the acknowledgement of the political realities of university life (Holdaway and Meekison, 1990). According to Shattock (2000) reputation can be gained through public image; the league tables; and perceptions of parents, students and employees. Among this, students are the direct stakeholder of a University system. Hence, the hypothesis to be tested is:

*Hypothesis 6 : IITs and IISc provide higher levels of student satisfaction than in NITs and Other group of Institutions in CFTIs*

### **2.22.3 Relationship with Stakeholder's Satisfaction and Environmental Facilities**

Sohail and Shaikh (2004) explored students' expectations on identified six factors, such as contact with personnel, physical environment, reputation, responsiveness, access of facilities and curriculum, which contributed to their expectations in education. Telford and Masson (2005) suggested a framework of quality values in higher education which included, course design, course marketing, student



recruitment, induction, course delivery, course content, assessment monitoring, miscellaneous and tangibles. Mustafa and Chiang (2006) identified four key factors that reflect quality in education, namely, teacher abilities, teacher attitude, course materials and course load. Begum et al. (2010), described that quality has a positive relation with infrastructure and stakeholders' satisfaction. In order to find out the relationship between the stakeholder's satisfaction and infrastructural facilities, the hypotheses to be tested are:

*Hypothesis 7 : Student satisfaction on learning environment at IITs and IISc is greater than in NITs and Other institutions under CFTIs.*

*Hypothesis 8: Student satisfaction on Library facilities and teaching learning processes are closely related in all groups of Institutions under CFTIs*

*Hypothesis 9: Student's satisfaction on creative environment at IITs and IISc are greater than NITs and Other institutions under CFTIs*

*Hypothesis 10: Learning Environment has strong relationship with overall student satisfaction in CFTIs*

#### **2.22.4 Institutional Performance and Stakeholder's Satisfaction**

Kanji (1998) proposed a business excellence model for higher education, which enunciated four principles: delight the customer, management by fact, people-based management and continuous improvement. Mergen et al. (2000) proposed a model of quality management which has three components such quality of design, quality of conformance and quality of performance. Accordingly, the relationships between the stakeholder's satisfaction and institutional performance have been assessed through quality, skill and customer delights. Hence, the hypotheses to be tested are:

*Hypothesis 11: Quality Concern has a strong positive relationship with Overall skill attainment*

*Hypothesis 12: Decision making capacity has as a strong relation with overall skill attainment of CFTIs alumni*

*Hypothesis 13: Skills and competencies attained by the graduates of IITs and IISc are higher than graduates from other CFTIs*

*Hypothesis 14: The work performance of IITs and IISc graduates are higher than graduates from other CFTIs*

*Hypothesis 15: IITs and IISc graduates are able to provide more satisfaction to the industry employing them, compared to graduates from other institutions under CFTIs*

#### **2.22.5 Gender Equality, a Social Mandate**

In a democratic country like India, gender equality especially in technical education is a highly sought social mandate. As such the final hypothesis to be tested is:

*Hypothesis 16: There is no relationship between gender and overall student satisfaction in CFTIs*

### **2.23 LITERATURE MAP**

Literature Map is one of the effective methods for identifying research gaps. A literature map is a method of visual presenting of research results and helps researchers to see how different parts of study relate to one another and whether their study fits in the borders of literature. Literature map can also help the scholars in illustrating the gaps in literature (Altinay and Paraskevas 2008). Research literature map is a model in which the researchers are able to find the relationship between different subjects of their research. Therefore, they can outline general headings and subheadings of the 'Review of Related Literature' section (Altinay and Bowen 2006). In this method, subjects of studies are shown as boxes and related subjects are connected together by lines. In this structure, the farther a box from the main subject is, the more general that subject is. Therefore, the far subjects only can be related to definitions and common classifications which are usually found in book references. On the contrary, the nearer a box to the main subject is, the more analysis and

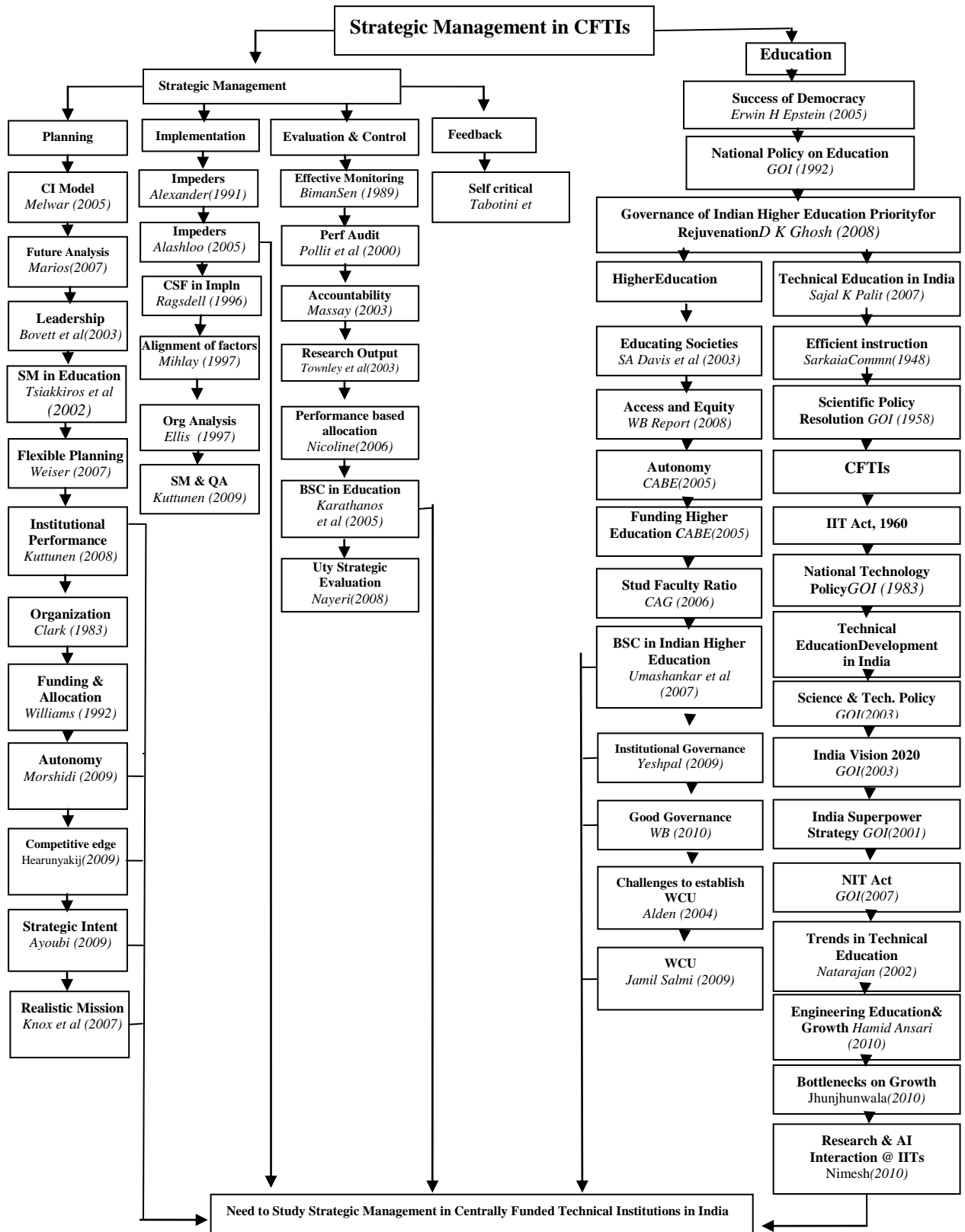
discussions are required to be found in existing studies to support their claim (Glatthorn and Joyner 2005)

A critical study of the literature was conducted and interpreted in terms of the problem domain. Large volume of literatures on the research domain has been collected and systematically mapped as Literature Map (Figure 2.8). The topic under study has been given as the caption on the top and the major concepts were divided into various heads. Under each concept, the literatures collected were systematically tabulated and the research gap has been clearly arrived at. This Literature Map contains Scientific Policy Resolution of 1953 to the latest journal published in 2013.

In the literature map, the major research work on strategic management especially in education sector has been categorized broadly in four major components, such as, strategy planning, implementation, evaluation & control and finally feedback. On the other side, work related to the higher/technical education has been categorized. Thus a proper synchronization of the strategic management in its theoretical perspective and its application in education has been attempted. Finally, the research gaps and the need for the study have been clearly identified in this literature map.

## **2.24 SUMMARY**

In this chapter, a close review of the various literatures related to the research problem has been discussed. The chapter commenced with the legacy of Indian technical education and drew up to the current scenario. The strategic management practices as well as the characteristics of various WCUs were discussed in detail. The conceptual framework and various hypotheses to be tested were also highlighted. Finally, in order to have a quick overall view, all the literatures were tabulated based on the various components of strategic management under study and mapped in to the literature map.



Source: Research Data

**Figure 2.8**  
**Literature Map**



**CHAPTER 3**  
**RESEARCH METHODOLOGY**

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter begins with the research approach adopted for the work. This is followed by scaling used, validation of research tools and the scope of the study. Finally, the use of sampling techniques, administration of survey tools, pilot study conducted and tools used for data analysis are discussed.

#### **3.2 RESEARCH APPROACH**

Mixed method research has been used for this study. Mixed method research approach has the freedom to use any of the methods, techniques and procedures typically associated with quantitative or qualitative research. The approach towards this study basically starts from exploration to find out related literatures, to trace out components of strategic management processes applicable to education sector and higher education in particular. The organization structures of CFTIs, as well as some renowned universities were also collected through exploration. Some explorative steps have also been included especially to probe into the strategic management processes being undertaken in various level playing institutions of the similar kind within the country and abroad. The literature review also is dedicated to establish the fact that there is a need to mould up the competitive strength of CFTIs with the advent of open door policy and to foster excellence. Thus, in the initial stage of study exploration was used. The study also aims to describe and evaluate the present management practices and satisfaction levels on various deliverables of the CFTIs. In order to meet this purpose, quantitative tools, which are most appropriate, have been used. Qualitative research provides meaningful and detailed information about respondents' thoughts and feelings. Quantitative research is useful in providing a demonstration of the potential relationships between variables and to arrive at a solution to the research questions through various statistical analyses.

Tashakkori and Teddlie (2003a) state that the two-stage research approach is superior for conducting academic studies because: (i) research questions can be dealt with effectively using the qualitative or quantitative approaches; (ii) it often helps scholars to generate and refine the research issues by adopting methodological approaches; and (iii) scholars are provided an opportunity to discuss and explain the results generated from different perspectives. Similarly, Neuman (2006) affirmed that using the two-stage research approach provides scholars with a better understanding to their research questions.

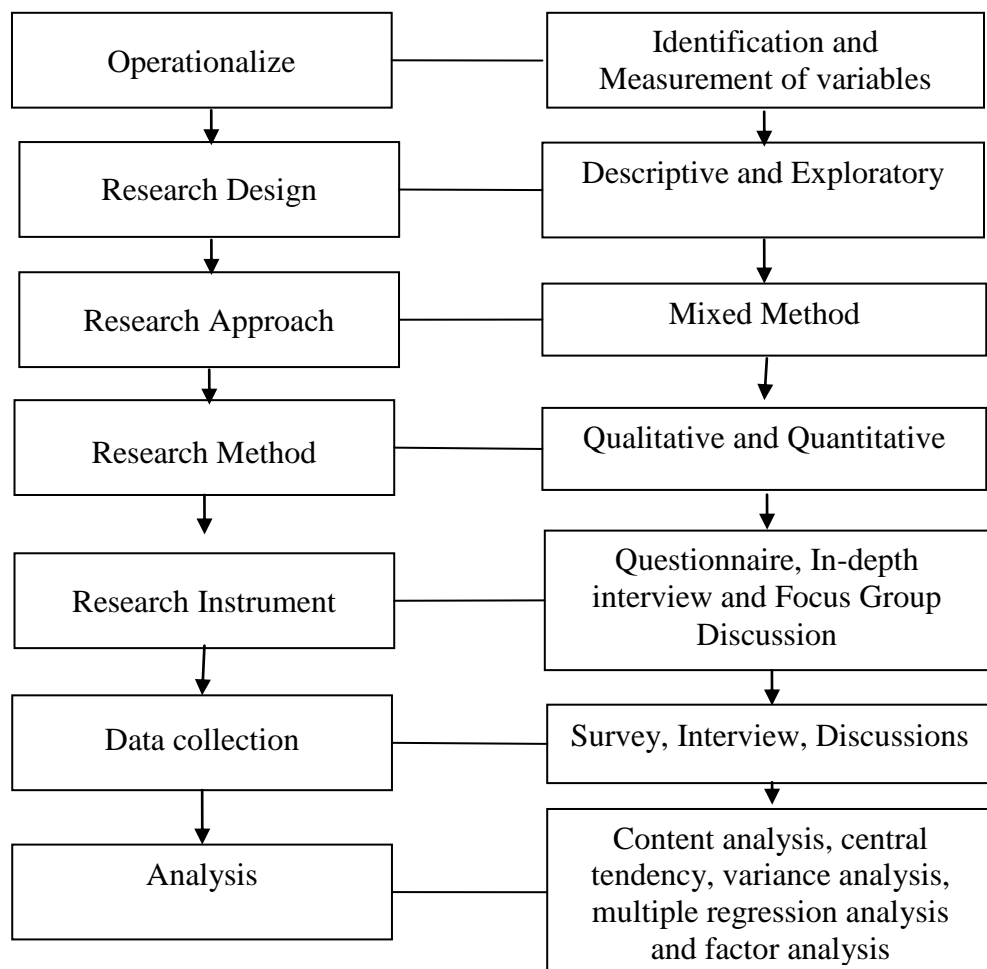
Strategic management relies on an array of complex methods drawn from various disciplines. The field is undergoing a rapid transformation in methodological rigor, and researchers face many new challenges about how to conduct their research and in understanding the implications that are associated with their research choices (Ketchen et al. 2007). Normally, strategy researchers employ both qualitative and quantitative approaches (Phelan et al. 2002; Rouse and Daellenbach 1999). In any case, although the use of qualitative methods in strategy research has lagged significantly behind the use of more quantitative approaches, significant contributions to strategy theory and practice have come from qualitative studies (Barr 2004). Moreover, with the increased popularity of qualitative research, an important methodological trend is to integrate qualitative and quantitative research methods (Hitt et al. 1998).

The call for the integration of quantitative and qualitative research methods has been carried out in the social sciences at large (Creswell 2003; Greene et al. 1989; Patton 1990; Tashakkori and Teddlie 1998, 2003a), in the management and organizational studies (Currall and Towler 2003; Jick 1979; Lee 1991, 1999) and in the strategic management field (Boyd et al. 2005; Hitt et al. 2004; Hitt et al. 1998).

Considering the need to analyze the research problem focused in the area of strategic management, the mixed method research approach has been taken up for this research work.



To facilitate a comprehensive overview of the research methodology used in the study, it is presented in the form of a schematic diagram (Figure 3.1)



**Figure 3.1**  
**Schematic Diagram of Research Methodology**

### 3.2.1 Qualitative Methods

The initial phase of study had begun with exploratory research, which has provided insights into and comprehension of the issue under study. This exploratory research has relied on secondary research such as reviewing available literature and data, informal discussions with the administrators, students, stakeholders and more formal

approaches through in-depth interviews and focus group discussions. In this study, wide range of literatures relating to the subject and more than two hundred research papers on the subject have been collected. Combining the most relevant literatures of the study, a detailed literature map has been drawn and the research gaps have been clearly arrived at. Discussions were also made with the experienced people who have in-depth knowledge of the issue. According to Cavana et al. (2001), the strength of a qualitative approach is the collection of a great deal of 'rich' information from a relatively small number of subjects, when there is little known about the concepts under investigation or about the relationship between those concepts. Therefore, qualitative research should be regarded as the primary step in a study; designed to uncover the reasons, impressions, perceptions, and ideas that relevant individuals have about a particular subject.

The initial part of the research question is to find out the components of strategic management practices applicable to education sector. In order to meet this objective, exploration into the literatures were taken up. In-depth interviews were also taken up as tools to trace out the components of strategic management process in universities abroad.

Subsequently the focus of the research was related to identifying the obstacles for the implementation of strategy. The impellers in strategy implementation were reflected in the major research works carried out by eminent researchers. Similarly, the CSFs for planning strategic management in educational sector were to be identified. To meet this purpose, exploration into the research literatures were made during the study.

In order to implement the strategic management effectively, the organizational structure of the institutions has some influence. Explorative research was used to trace out the organizational structures of CFTIs and some renowned universities abroad, so as to compare the same each other. To understand the organizational functioning in the universities abroad, in-depth interview with educational experts were also used as a qualitative research tool.

Final objective of the research was to evolve a strategic model for CFTIs. In order to finalize an effective strategic model, the expertise and experience of educational experts from abroad was found to be a valuable data. Accordingly, in-depth personal interview was used as an effective tool to probe into the various systems and practices of some international universities.

Thus, varieties of qualitative methods were taken up for the research depending on the effectiveness for this research study.

### **3.2.2 Quantitative Methods**

Creswell (1998) suggested that the best studies have a strong inquiry procedure. In the social sciences particularly, quantitative research is often contrasted with qualitative research which is the examination, analysis and interpretation of observations for the purpose of discovering underlying meanings and patterns of relationships, including classifications of types of phenomena and entities in a manner that does not involve mathematical models.

The objectives of the study also concentrated on assessing existence of components of strategic management in CFTIs and to assess the impact thereon. Unlike profit oriented organization, impact has to be measured mainly in terms of stakeholder's satisfaction. Existence of components of strategic management was measured through a self administered questionnaire to the senior administrative officers of the institute. The stakeholder's of the CFTIs include students, faculty, alumni, industry and society. In order to measure the satisfaction levels of the stakeholders, questionnaires were used as an effective tool. Questionnaires were also used to find out impeters for implementation of strategic management including the level of autonomy exercised by CFTIs. To measure the satisfaction level of variety of stakeholders and also to collect input information to identify the impeters, the questionnaires as a tool turned to be the right one. The details on the collection of primary data are discussed in the succeeding sections.

### 3.3 SCALINGS USED IN THE QUESTIONNAIRES

Scaling techniques provide researchers with a method of collapsing answers from a whole series into one indicator on how respondents really think about an issue (Salant et al. 1994). Various scales used in different questionnaires are at Table 3.1

**Table 3.1**  
**Details of Scales Used to Measure the Variables in Questionnaires**

<b>Code</b>	<b>Description</b>	<b>No of sections</b>	<b>No of items</b>	<b>Scales Used</b>
QA	To assess the level of autonomy	8	47	Nominal Ordinal
QB	To assess Strategic Management Practices	9	125	Nominal Ordinal Ratio
QC	Faculty satisfaction	5	28	Nominal Ordinal Ratio
QD	Student's Satisfaction	11	74	Nominal Ordinal Ratio
QE	Researcher's experience	2	19	Nominal
QF	Satisfaction of Parents & Society	2	7	Nominal
QG	Alumni Satisfaction	3	38	Nominal Ordinal Ratio
QH	Feedback from Industry	4	47	Nominal Ordinal Ratio

*Source: Research Data*

The Likert scale requires respondents to indicate the extent to which they agree or disagree with each of a series of statements, satisfaction levels from low to high and existence of certain practices as very active to poor. A five-point Likert scale is the most common scale, developed by Dr Rensis Likert for behavioral sciences research (Kinnear and Taylor 1996). It is widely accepted, because it offers a range of choices to fit the needs of most situations. Other types of scales, such as the seven-point scale or even a ten-point scale are also available. In this study, most questions were proposed in the form of statements using a seven-point Likert scale, asking respondents to rate the level of satisfaction from least to high. Wuensch (2005) advocated using the seven-point scale because it makes finer distinctions in the measurement of opinion. Five- point Likert Scale has also used in certain questions depending on the nature of question.

#### **3.4 PRE-TEST AND ITEM MODIFICATION**

A pre-test was conducted to assess the strengths and weaknesses of the questionnaire. As Kinnear and Taylor (1996) suggested, all aspects of the questionnaire need to be tested before the questionnaire could be regarded as ready for administration. It is also seen that pre-testing should be conducted with similar respondents to those who would be included in the actual survey (de Vaus 2002). Since part of the measurement items were developed specifically for the purposes of this study, evaluating the questionnaire was considered to be necessary to verify its clarity before it was used on the sample population. The results of the pre-test were then used to modify and add questions. The pre-test was conducted in two stages. Firstly, a draft of the version of the questionnaires were sent to some faculty colleagues, inviting them to provide feedback and asking them to look for such things as difficulties with questions wording, order mismatch, leading questions, and bias due to the order. Respondents were asked to provide a critical appraisal and to make comments with a view to amending the questionnaire. The purpose of this pre-test was not only to avoid ambiguity in the questions, but also to find out whether instructions could be followed readily by the target group of respondents, whether the questions could be easily understood, and how long it would take to complete and so on. All comments or suggestions made by respondents were taken into consideration and accordingly

some minor changes were carried out in the wording, phrasing, ordering and presentation of the questionnaire. The second pre-test was then conducted by sending the modified questionnaire to ten research scholars and the respondents were asked for their opinions and critical appraisal of the improved questionnaire. They were also asked to evaluate the questionnaire for clarity, style, meaningfulness, ease or difficulty of completion. Revisions were then made based on this feedback also to ensure consistency and quality prior to final distribution of the questionnaires. Thus, it was assured that the questionnaires were clear and well-understood by potential respondents and the ambiguities removed.

The existence of various components of strategic management has been assessed through questionnaire. Another questionnaire was developed to assess the level of autonomy being practiced by the Institute and this was also administered separately. In total eight type of questionnaires namely QA to QH (Table No. 3.2) were employed for the data collection in an orderly manner:

**Table 3.2**  
**List of Questionnaires**

Code	Particulars
QA	Questionnaire to assess level of autonomy
QB	Questionnaire to assess strategic planning process
QC	Questionnaire to assess faculty satisfaction
QD	Questionnaire to assess student satisfaction
QE	Questionnaire to assess researcher's satisfaction
QF	Questionnaire to assess parents/society satisfaction
QG	Questionnaire to assess alumni satisfaction
QH	Questionnaire to assess the satisfaction level of industry employing graduates of CFTIs

*Source: Research Data*

A compilation has been made on the different sections contained in each questionnaire and the number of questions appearing under each section. (Table 3.3)

**Table 3.3**  
**Distribution of Sections and Questions in the Questionnaire**

<b>Sec</b>	<b>Description</b>	<b>Items</b>	<b>Sec</b>	<b>Description</b>	<b>Items</b>
<b>QA</b>	<b>Autonomy</b>		<b>QB</b>	<b>Strategic Management Practices</b>	
1	General Information	3	1	General Information	7
2	Governance	5	2	Scanning of Internal and External factors	42
3	Administration and Finance	11	3	Strategic Management Processes	18
4	Human Resource Management	9	4	Administration and governance	6
5	Admissions	3	5	Strategic Intent	18
6	Curriculum and Teaching	6	6	Performance Indicators	3
7	Academic Standards	4	7	Action Plan	6
8	Research and Publications	6	8	Implementation Methods	9
			9	Monitoring and Evaluation	16
<b>QC</b>	<b>Faculty Satisfaction</b>		<b>QD</b>	<b>Student Satisfaction</b>	
1	General Information	2	1	General Information	5
2	Working Environment	11	2	Course Organization	6
3	Performance appraisals	4	3	Learning	9
4	Course Design	5	4	Teaching	10
5	Research	6	5	Library	9
6	Impeders –Planning	10	6	Computing facilities	6
7	Impeders-Organizational Issues	13	7	Laboratory/workshop facilities	6
8	Impeders-Managerial Issues	8	8	Hostel facilities	3
9	Impeders-Individual Issues	8	9	Student activities	8
10	Impeders-Environmental Issues	3	10	Institute campus	3
			11	Quality dimensions	9

*Source: Research Data*

**Table 3.3 (Contd..)**

<b>Sec</b>	<b>Description</b>	<b>Items</b>	<b>Sec</b>	<b>Description</b>	<b>Items</b>
<b>QE</b>	<b>Researchers Experience</b>		<b>QF</b>	<b>Satisfaction of Parents/Society</b>	
1	General	2	1	General	4
			2	Quality and Performance dimensions	7
2	Research Facilities	17			
<b>QG</b>	<b>Satisfaction of Alumni</b>		<b>QH</b>	<b>Satisfaction of Industry</b>	
1	General	8	1	General	7
2	Career Information	6	2	Skills and Competencies	25
3	Skill evaluation	24	3	Work Performance	13
			4	Career Growth and Retention	2

*Source: Research Data*

The questionnaire meant for the students, faculty and researchers were distributed among the respondents and the same has been collected back from those who were willing to take part in the survey. Questionnaire in respect of Alumni, Parents and the Industry were sent by post or email and responses were collected either electronically or through hard copy. While collecting the responses from the students, in order to avoid bias of any type, the questionnaire was distributed throughout the cross section of males and females and also students/ researchers doing their study/work in different years. The reliability and validity of all these questionnaires were initially verified critically through a group of students before the pilot study itself.

### **3.5 PRIVACY OF INFORMATION**

It is very important for the research to assure and maintain privacy of the information collected from the respondents. Mc Creary (2008) opines that privacy is partly a form of self-possession-custody of the facts of one's life, from strings of digits to tastes and preferences. Matters of personal health and finance, everyone agrees, are in most instances nobody's business but personal unless decided otherwise. The privacy refers to the one that people could once feel confident that what others might find out



about them would be treated with reasonable care and consideration, and thus would probably do them no harm. As per Mc Creary (2008), the face-off between information privacy and information exploitation is a storm ever in the making. Accordingly, maximum privacy was ensured to all those who participated in the FGD, in-depth personal interview and survey questionnaires. Along with the primary data secondary data has also been used for the analysis.

### **3.6 RELEVANCE OF SECONDARY DATA**

The secondary data collected includes the organizational structure of each Institute, facts and figures from various reports of the government agencies which are in the public domain. Various reports of World Bank, UNESCO and some other national and international research agencies were used for the research. The publications made by the Institutes and the MHRD were also used. In addition to this, the reports on IIT and NIT Review Committee, which are available on the public domain, were used for the purpose of study.

### **3.7 AREA OF STUDY**

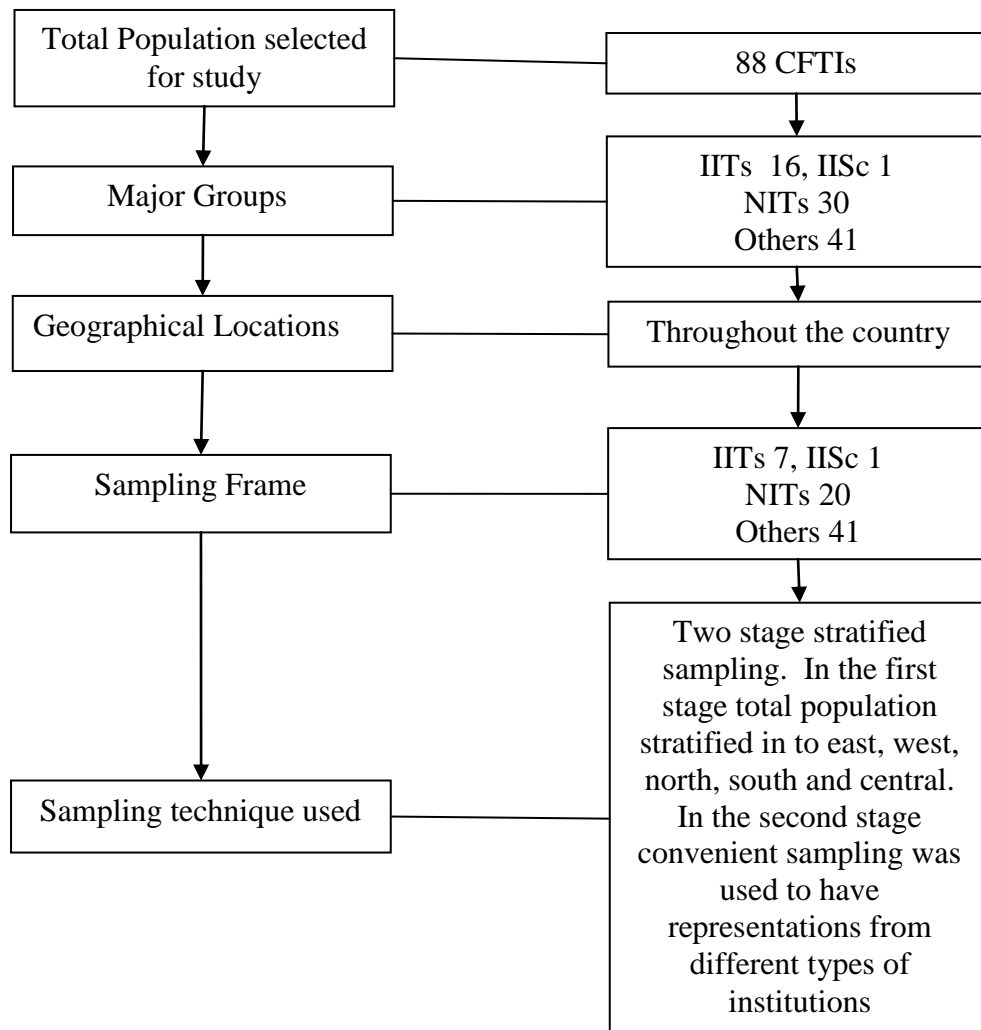
CFTIs are spread all over the country in every state and in most of the Union Territories. In case the samples are drawn only from a particular state or region it will not be a representative sample. Hence the samples were selected from throughout the country.

Initially the country was divided into stratas of five major geographical regions south, north, east, west and central, and representative samples were taken from each region. Likewise, the total number of CFTIs was grouped into three such IITs and IISc, NITs and other Institutions. Efforts were taken to avoid any bias in selecting the sample institutions.

Among the states, there is much diversity in terms of cultural, infrastructural, social and industrial developments. As the samples were mixed together from all regions it is believed that the result will not be biased on any count.

### 3.8 POPULATION AND SAMPLING

As mentioned in **Table 1.3** total population is planned to be 88 institutions of science and technology, which are directly funded by Government of India. Out of these 88 Institutions, eight new IITs, ten new NITs were kept out of the list as they are quite new and their own system of governance is yet to mature; hence it is too early to assess the performance of these new institutions. Twenty IITs established under PPP were also kept aside as they cannot be put in to the same group of non-profit institutions fully funded by the government. Thus, the total sampling frame was reduced to only 49 numbers. The sampling techniques used in the study is at Figure 3.2



**Figure 3.2**  
**Sampling Techniques Used**

In this study, stratified random sampling and two stage stratified samplings are used. As the universe selected is large and distributed throughout the country, the mass selected as sample has to be a representative of the total population.

The total population has been broadly divided into three major groups (a) IITs and IISc (b) NITs (c) All other Institutions and the representative samples were drawn as given at Table 3.4. In the study the confidence level will be kept as 95 percent and significance level will be five percent.

**Table 3.4**  
**Distribution of Institutions in Sampling Frame**  
**Vis a vis Samples Selected**

<b>Stratas/ Institutions</b>	<b>South</b>	<b>North</b>	<b>East</b>	<b>West</b>	<b>Central</b>	<b>Total</b>
<b>Total Institutions</b>	11	10	16	7	5	49
<b>Total Samples</b>	5	4	7	4	2	22

*Source: Research data*

In order to have a miniature cross-section in the sampling purpose, total universe was divided into five different strata based on geographical distribution such as East, West, South, North and Central. In the stage convenient sampling was resorted to have representation from different group of institutions. The distribution of sampling frame into three groups and per cent of sample selected is at Table 3.5

**Table 3.5**  
**Distribution of Sample Among Various Group of Institutions**

<b>Types of Institutions</b>	<b>No. of samples</b>	<b>Sample frame</b>	<b>Percentage of sample</b>
<b>IITS and IISc Bangalore</b>	5	8	62.50
<b>NITs</b>	8	20	40
<b>Other CFTIs</b>	9	21	42.86
<b>Total</b>	<b>22</b>	<b>49</b>	<b>44.90</b>

*Source : Research Survey Data*

Thus, out of the total population of 49, total 22 institutions were selected as samples contributing to 44.90 per cent, which is above the admissible limit. The names of the Institutions and locations covered under the sample are given at Table 3.6

**Table 3.6**  
**Details of Samples**

Institution	Location	Nos.
IITS& IISc	IITs Madras, Mumbai, Delhi, Kharagpur IISc –Bangalore	05
NITS	Calicut, Allahabad, Bhopal, Durgapur, Jalandhar, Kurukshetra Nagpur, Warrangal	08
Others	IISER Pune and Kolkotta ,Bhopal, NITIEMumbai; IEST Shibpur ISM Dhanbad; IIST Trivandrum; IIIT Gwalior; SLIET Punjab	09
Total		22

### 3.9 ADMINISTRATION OF SURVEY TOOLS AND DATA COLLECTION

The sample size for all questionnaires was calculated as per the statistical formula

$$ns = \frac{N}{1+Ne^2}$$

Where ns = required sample size

N = population size , e = level of precision, usually 1 to 10%

In respect of questionnaire QA and QB meant to assess autonomy and strategic management practices, questionnaires were distributed to all sample institutions and attained 100 per cent coverage

With regard to Questionnaire QC which is meant to assess Faculty satisfaction:

N = considered to be 6000 (approximately)

e = 5% , therefore n = 706

Question No. QD meant for measuring Student satisfaction

N = considered to be 70,000 students (approximately)

e = 4%, therefore n = 620

Researchers' satisfaction was measured through QE wherein

N = approximately 5000

e = 5%

therefore n = 371

Questionnaire H was used to measure satisfaction of industry employing CFTI graduates wherein

N = approximately 200 regularly visiting companies

e = 1%

therefore n = 67

The exact number of alumni, parents and members of society is not possible to be calculated, moreover the alumni were spread all over the world and hence six hundred questionnaires were distributed among the alumni of sample institutions, out of which three hundred and fifty replies were received. Likewise, 500 questionnaires were sent to members of the society and parents residing different places within India and abroad. Out of this 320 replies were received.

The total number of questionnaires served to the responded and reply received for each questionnaire are tabulated (Table 3.7)

**Table 3.7**  
**Details of Questionnaires Administered v/s Responses Received**

Index	Questionnaire Type	Questionnaires administered	Responses Received	Percentage of responses
QA	Level of Autonomy	22	22	100
QB	Strategic Management Practices	22	22	100
QC	Faculty satisfaction	500	370	74
QD	Student Satisfaction	900	666	66
QE	Researcher's satisfaction	400	380	95
QF	Parents and Society satisfaction	500	320	64
QG	Alumni satisfaction	600	350	58
QH	Feedback from Industry employing CFTI graduates	100	67	67

In-depth personal interviews/discussions were conducted with the faculty members, students and educational experts from India and abroad. The interviews were mainly focused on to get more insight to the research problem.

### **3.10 PILOT STUDY**

After the pre-test, the research tool for clarity and efficacy, two IITs, two NITs and one institution from Others were taken up for pilot study, from the sample. All the questionnaires were administered, responses thereon were coded and processed electronically for statistical analysis and confirmed that all the variables required for the study have been covered through various tools used in the study. The pilot study confirmed that the instrument was understood properly except for a few questions, which were modified suitably thereafter. As these questionnaires were presently served on to the respondents and collected back after the specified interval, the study got full response as specified for the study.

The pre-test survey carried out in the beginning was useful to validate the comprehension and understanding of the respondents to the questionnaires. As per the feedback in the pilot study, total care has been taken to incorporate all modifications in the questionnaires which were finally used for the survey. The responses were coded and processed using Statistical Package for Social Science (SPSS). It has also been ensured that the Cronbach's Alpha value is within the recommended levels of 0.7 (Nunnally 1978).

### **3.11 TOOLS FOR DATA ANALYSIS**

The quantitative data obtained through questionnaire survey were checked for missing values, inconsistencies and any other response errors. In order to have quantitative data input and analysis, SPSS was used. The coded data entered into SPSS were rechecked for the detection of any possible data entry errors. Descriptive statistics were computed for all the variables for accuracy of inputs such as: the range of each variable was checked for out-of-range values; frequency counts were performed; the distribution of each variable was analyzed to detect irregular answers and cases with extreme values; and the means and standard deviations were computed.

The major techniques were used for the analysis the data are:

**Factor analysis:** The factor analysis was used to summarize or reduce the data contained in a number of original variables into a smaller set of composite factors. There are two essential assumptions underlying exploratory factor analysis: the importance of a sufficiently large sample size and the appropriate factorability of the data. Hair et al. (1998) recommended that the sample size should be 100 or larger.

**Bartlett's test:** Bartlett's test is used to test that the correlation matrix is an identity matrix. If the Bartlett's test statistic is large and significant, then factorability is assumed.

**Kaiser-Meyer-Olkin (KMO) Test:** The KMO measure of sampling adequacy is used to compare the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. A value of 0.60 or above from the KMO measure of a sampling adequacy test indicates that the data is adequate for exploratory factor analysis (Tabachnick and Fidell 2001).

**Multiple regression analysis:** The purpose of multiple regression analysis is to identify changes in independent variables that are significant predictors of changes in a dependent variable and in so doing, build a linear model that describes these relationships. How well the resulting model fits the population is indicated by the coefficient of determination (i.e. R-square), which is actually the square of the Pearson correlation coefficient between the predicted and obtained dependent variable. The  $r^2$  is 1 for 100 per cent fit and 0 if there is no linear relationship.

### **3.12 SUMMARY**

This chapter started with research approach selected, various tools used and its suitability to the research work. Sampling techniques used for the research were also discussed in detail. The pre-test, pilot study and the administration of research tools and the responses received thereon were elaborated. Finally, the tools used for the analysis of data were also discussed.





**CHAPTER 4**  
**ANALYSIS AND INTERPRETATION**  
**OF DATA**

## **CHAPTER 4**

### **ANALYSIS AND INTERPRETATION OF DATA**

#### **4.1 INTRODUCTION**

This chapter presents analysis of data collected during the study. Focus is given to trace the awareness and presence of components of strategic management in CFTIs in India. The awareness and application of the three major phases of strategic management such as formulation, implementation and control, are analyzed in sequential manner. Final section deliberates on the satisfaction of various stakeholders of CFTIs.

#### **4.2 STRATEGIC MANAGEMENT IN CFTIs**

An organization that merely follows the classical planning process will not survive in fluid environments unless they think strategically (Deniel and Esther 2012). Strategic management is the framework within which choices are made concerning the nature and direction of the organization (Stoney, 2001; O'Regan and Ghobadian 2002; David, 2009). This framework helps in the allocation of resources in order to enhance financial and strategic performance (Bain and Company, 2003). In order to assess the Strategic management practices in CFTIs, a self administered questionnaire has been used in all sample institutions. The questionnaire contained all components to cover theoretical framework of strategic management. The focus has made to measure the presence of strategic management processes in CFTIs. The results of the analysis of responses have been categorized into three different sections. This was done using the statistical formula  $\text{Mean} \pm 0.425 \times \text{SD}$ . Since the variable is standardized, Mean is equal to 0 and standard deviation is always one; (i) if it is  $> (\text{mean} + 0.425 \times \text{SD})$  "Active", (ii) if it is between  $(\text{mean} - 0.425 \times \text{SD}, \text{mean} + 0.425 \times \text{SD})$  "Moderate", and (iii) if it is  $< (\text{mean} - 0.425 \times \text{SD})$  the "Non-existent". In order have comparison of the strategic management practices among the institutions under CFTIs, the sample institutions have been broadly classified into three different groups of institutions namely IITs and IISc, NITs and Others.

Initial analysis has made to identify whether the sample institutions are the cross section of the different age groups.

### 4.3 AGE PATTERN OF SAMPLE INSTITUTIONS

The age pattern of sample institutions is arranged in a periodical interval of 10 years (Table 4.1).

**Table 4.1**  
**Summary of Age Distribution of the Sample Institutions**

Period	IITs and IISc	NITs	Others	Total
Before 1950	1	0	1	2
1951 – 1960	3	4	0	7
1961 – 1970	1	3	2	6
1971 – 1980	0	0	1	1
1981 – 1990	0	1	0	1
1991 – 2000	0	0	1	1
2001 – 2007	0	0	4	4
Total	5	8	9	22

*Note: Institutions established before five years from now (2007) only had considered*

*Source: Research survey data*

The data reveals that, IISc was started before 1950 and all IITs in the samples were established before 1970. All sample NITs were started before 1990. Among the category of other institutions, four of them were established before 2000 and the rest five were established after the year 2000. Thus the sample size is an equal distribution of institutions under different age pattern.

The analysis for identifying the components of strategic management in CFTIs, has been worked out in three major categories such as formulation, implementation and control.

#### 4.4 STRATEGY FORMULATION IN CFTIs

Strategy formulation consists of defining strategic intent, external environment analysis, internal analysis, strategic analysis, long term objectives and finally short term objectives as a way to achieve the long term objectives. The existence of these components in CFTIs is discussed in the forth coming sections.

##### 4.4.1 Defining Vision, Mission and Values in CFTIs

Change is an essential component of strategic management. This involves moving the institution forward to attain a specified goal. Some plans are created out of the need for the institution to move in a certain direction, and other plans are developed subsequently.

The variables used to study the vision statement of CFTIs are existence of vision statement, periodical review and its relevance to the mandate of the Institutions etc. (Table 4.2)

**Table 4.2**  
**Assessment of Existence of Vision Statement in CFTIs**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	0	0	11.10	4.50
Moderate	100	100	88.90	95.50
Non-existent	0	0	0	0
Total	100	100	100	100

Source: Research survey data

*p value = 0.005 Highly significant*

The results indicate existence of vision statement in all CFTIs is either at moderate or at an active level. In an active environment of strategic management, periodical refinement and determining the re-direction is a qualitative factor. The active

category has only 11.10 per cent belonging to Other group of institutions. IITs and IISc, NITs have established long before. They are moving on the well-set vision and mission established long back. Accordingly, they remain in moderate category.

In order to ascertain the frequency of revision of vision statement, the related variable has been analyzed separately (Table 4.3).

**Table 4.3**  
**Distribution of the Frequency of Revision of Vision Statement of CFTIs**  
( Figures in percentage)

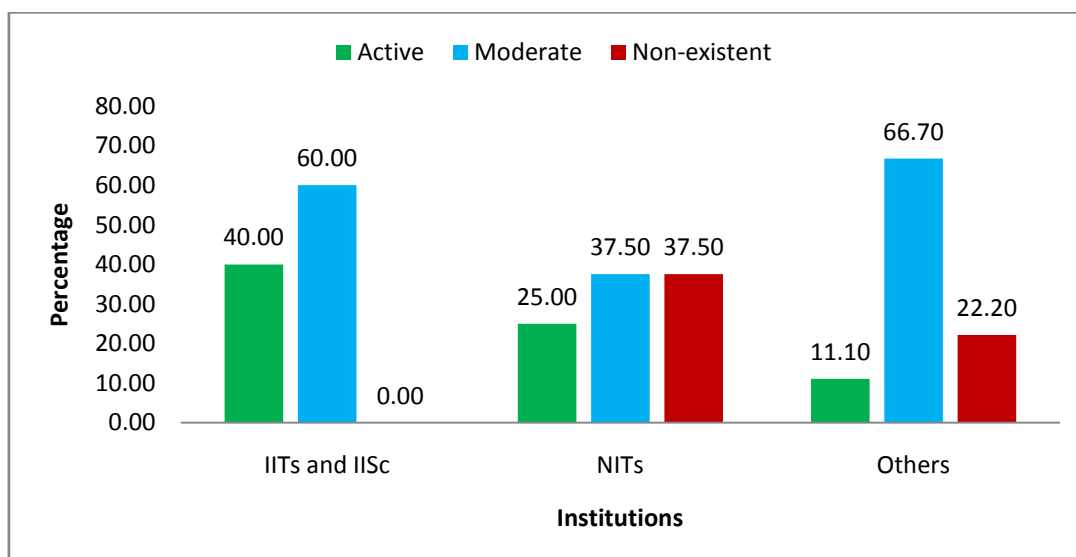
Period	IITs and IISc	NITs	Others	Total
Every year	0	0	0	0
Between 2 to 4 years	0	0	0	0
Between 5 to 10 years	0	25	11.10	13.64
More than 10 years back	0	0	0	0
Never	100	75	88.10	86.36

*Source: Research survey data*

The data indicates that 86.36 per cent of CFTIs have never revised the vision statement and 25 per cent of NITs and 11.10 per cent of other category institutions revised the vision statement within the class of five to ten years.

In order to measure existence of a good mission statement, the variables considered for evaluation are existence of mission statement, periodic review, alignment with vision, compatibility with the activities, publicizing and understandability. The results of the analysis indicate that majority of the institutions are in active or in the moderate category (Figure 4.1). Only few institutions among NITs (37.50 %) and Others (22.20%) are in non-existent category.

*Figures in percentage*



*Source : Research Survey Data*

**Figure 4.1**

**Assessment of Existence of Mission Statement in CFTIs**

The frequency of revision of mission statement of the CFTIs has been analyzed separately (Table 4.4)

**Table 4.4**

**Frequency of Revision of Mission Statement of CFTIs**

*( Figures in percentage )*

Period	IISc and IITs	NITs	Others	Total
Every year	0	0	0	0
Between 2 to 4 years	0	0	0	0
Between 5 to 10 years	0	12.50	0	4.55
More than 10 years back	0	0	0	0
Never	100	87.50	100	95.45

*Source : Research Survey Data*

The analysis indicates that 95.45 per cent of CFTIs have never revised the mission statements and only 4.55 per cent have revised the mission statements during the time span of more than 5 years.

A goal is a specific target, an end result or something to be achieved. It is a major step in achieving the vision. In the planning context, a goal is a place where the organization wants to be, in other words, a destination. The analysis of the responses received from the sample institutions describes that a total of 45.55 per cent is in active class, 50.00 per cent is in moderate class and balance in non-existent class (Table 4.5).

**Table 4.5**  
**Assessment of the Practice of Setting-up of Goals and Objectives in CFTIs**  
*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	60.00	37.50	44.40	45.55
Moderate	40.00	62.50	44.40	50.00
Non-existent	0	0	11.20	4.45
Total	100	100	100	100

*Source : Research Survey Data*

*Fisher's Exact Test p value =0 .034 significant*

Just like how mission and vision statements help to describe the organization's purpose, statements also include the organization's values. Values influence everything that an institution does, as well as its relationship with stakeholders. Values can be expressed as beliefs, guidelines or rules, and can be set-out in a code of conduct. A statement of values can provide guidance, when tough decisions have to be made.

To identify the presence of value statements, the variables such as existence of defined set of values and their periodic examinations were mainly considered. The analysis of responses gives an evidence to the fact that majority (86.40 per cent) are in moderate class (Table 4.6).

**Table 4.6**  
**Assessment of Existence of Statement of Values in CFTIs**  
*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	20.00	12.50	11.10	13.60
Moderate	80.00	87.50	88.90	86.40
Non-existent	0	0	0	0
Total	100	100	100	100

*Source: Research survey data*

Setting up of vision, mission, values, goals and objectives put together, the practice of envisaging the strategic intent in CFTIs have been analyzed based on the total score of the responses (Table 4.7)

**Table 4.7**  
**Assessment of the Practice of Formulation of Strategic Intent in CFTIs**

Type of Institution	Min	Max	Mean	Std. Deviation	Median	KW test value	d.f	p value
IITs and IISc	4	7	5.40	1.52	5	6.411	2	0.041
NIT	2	7	4.33	1.73	4			sig
Others	2	4	3.13	0.83	3			
Total	2	7	4.14	1.61	4			

Maximum score = 7

*Source : Research Survey Data*



The mean score for IITs and IISc is  $5.40 \pm 1.52$ , NITs  $4.33 \pm 1.73$  and Others  $3.13 \pm 0.83$ . The value of Kurskal Wallis (KW) test is 6.411, d.f. 2 and the p value is less than 0.05. Accordingly hypothesis tested is:

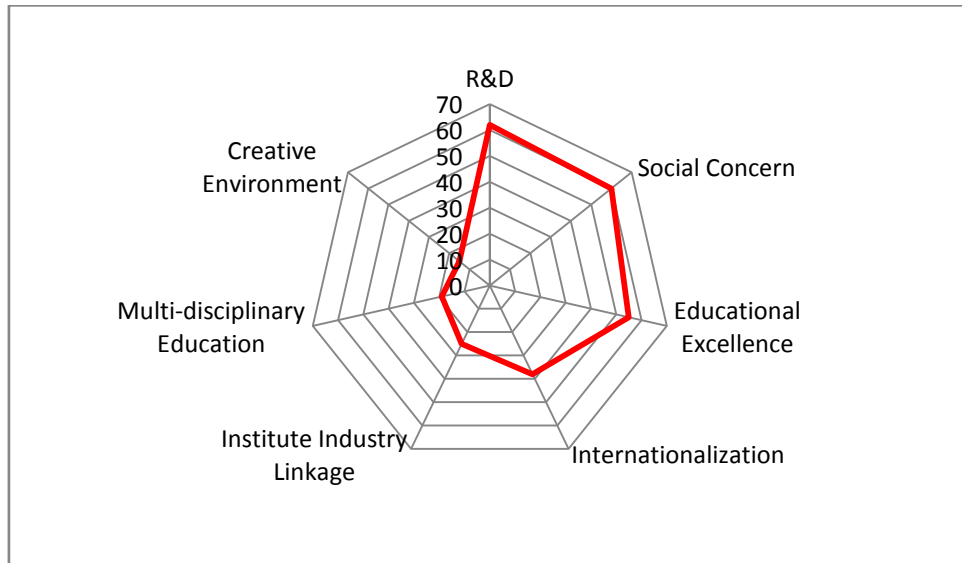
*H3 Among CFTIs, the practice of setting up the strategic intent is more active in IITs and IISc, than in NITs and Other group of Institutions.*

Having identified the presence of strategic intent in CFTIs, the researcher focused the studies on an analysis of the vision and mission statement of CFTIs. This analysis has been meant to assess whether the strategic intent of the CFTIs is in line with the national vision. Studies have also been taken to trace out some of the achievements to confirm the progress made by CFTIs towards the strategic intent.

#### **4.4.2 Analysis on Vision and Mission Statements of CFTIs**

The vision and mission statement of sample institutions were analyzed using the content analysis method to find out the focus of CFTIs. Major seven areas were identified such as research related activities termed as ‘Research and Development’, commitment to the society or the region which has been termed as ‘social concern’, matters relating to enhancing quality in imparting education termed as ‘educational excellence’, setting up international standards, collaborations etc termed as ‘Internationalization’, activities relating to interaction with industries and various supports termed as ‘Institute Industry Linkage’, offering diversified courses termed as ‘Multi-disciplinary education’; and providing infrastructure services and creating the ambience quite conducive for the education and research termed as ‘Creative Environment’. Depending on the presence of these identified focus areas in the vision and mission statement of sample institutions of CFTIs, the results were converted into percentage and were plotted in the radar graph (Figure 4.2). The result revealed that R&D has highest focus, followed by social concern, educational excellence, international excellence, institute industry linkage, multi-disciplinary education and creating learning environment at the end.

(Figures in percentage)



Source : Research survey data

**Figure 4.2**

### **Content Analysis of Vision and Mission Statements of CFTIs**

The initial task before the researcher is to find out whether vision and mission of CFTIs could be able to uphold the national vision. The vision articulated by Rabindranatha Tagore is all encompassing in every sense (India Vision 2020)

Where the mind is without fear and the head is held high.

Where knowledge is free.

Where the world has not been broken up into fragments

By narrow domestic walls.

Where words come out from the depth of truth.

Where tireless striving stretches its arms towards perfection.

Where the clear stream of reason has not lost its way

Into the dreary desert sand of dead habit.

Where the mind is led forward by Thee

Into ever-widening thought and action.

Into that heaven of freedom, my Father, let my country awake.

There are mainly eight components namely (i) peace and security (ii) self respect and self esteem (iii) availability of knowledge needed to acquire knowledge which can

convert opportunities to practical accomplishments (iv) internationalization (v) integrity and honesty (vi) productive skills combined with technological excellence (vii) adapting changes and (viii) education innovation and creativity as driving forces. As is evident from Figure (4.2), what the education can contribute towards the national vision is inclusive in the vision and mission statements of CFTIs.

In the further dimension of the analysis of the progress of the institutions towards the strategic direction, the researcher focused on some achievements made by the CFTIs in the identified seven major areas of content in the vision and mission statements.

#### **4.4.2.1 Progress made by CFTIs on R&D**

In the QS World Ranking and QS classification thereon, from the year 2011 onwards age of the institutions has been added as a new dimension, while measuring R&D. This classification stipulates five major categories, such as (i) Less than 10 years = New (ii) Less than 25 years = Young (iii) Less than 50 years = Established (iv) Less than 100 years = Mature and (v) Greater than or equal to 100 years = Historic. If we follow this classification according to the age of institutions in our sample, the only institution 'Historic' is IISc. All IITs are in the category of 'Mature'. NITs became fully autonomous and in the new elevated status, only from the year 2002. As such, NITs and majority of institutions in Others falls in the category of 'New'. Hence, it is too early to comment on the achievements on R&D of these institutions.

Research, being the major component having high weightage in the strategic intent of CFTIs, achievement thereon has been assessed with a measurable indicator such as research publication. This has been widely accepted by everyone.

Gangan (2009) made ranking of Indian engineering and technological institutions for their research publications for one decade (1999-2008) and has ranked top 30 Indian engineering and technological institutes using the performance index 'p'. Among these 30 institutions, all sample institutions under IITs and IISc are at the top rank,

followed by three NITs and two institutions from Others group (Table 4.8 and 4.9). The ranking of Indian engineering and technological institute groups using performance index p during the year 1999-2008 indicate interesting results (Table 4.8)

**Table 4.8**  
**Ranking of Indian Engineering and Technological Institute Groups**  
**Using the Performance Index ‘p’**  
**During 1999-2008 According to the SCOPUS Database**

<b>Rank</b>	<b>Institution</b>	<b>P</b>	<b>C</b>	<b>P</b>
1	IITs (7)	38134	94428	61.61
2	IISc(1)	12951	40438	50.17
3	University and Deemed University (13)	15100	29402	3854
4	Select Engineering Colleges (20)	6413	8823	22.98
5	NITs/RECs (20)	5336	5732	18.33
6	IIITs	791	637	8.01

*Note: Number of institutions is given in the brackets*

*Source: Gangan 2009*

The IITs and IISc are group leaders in terms of research performance among the other groups with the ‘p’ value of 61.61 and 50.17 respectively. The research performance of the IIITs and NITs is not an encouraging one compared to that of the technological universities and some select engineering colleges. This is mainly because these institutions are ‘New’, in their new dimension.

An analysis of number of research publications of some of the CFTIs, citations and citation per paper have been tabulated among three group of institutions along with the rank assigned in the study of Gangan I (2009) (Table 4.9)

**Table 4.9****Distribution of Research Publications of Sample Institutions under CFTIs**

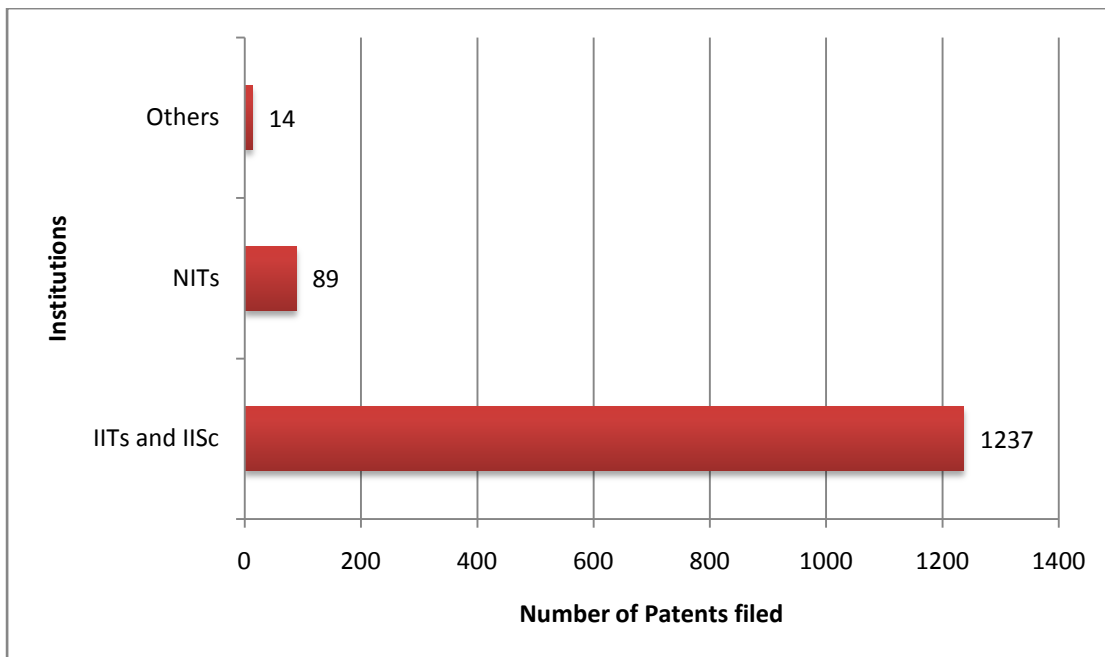
<b>Rank</b>	<b>Institution</b>	<b>No of papers</b>	<b>Citations</b>	<b>Citation per paper</b>
<b>IITs and IISc</b>				
1	IISC Bangalore	12951	40438	3.12
3	IIT Bombay	7228	18926	2.62
4	IIT Kharagpur	7370	18057	2.45
5	IIT Delhi	6520	14967	2.30
7	IIT Madras	5715	11864	2.08
<b>NITs</b>				
19	NIT Bhopal	155	385	2.48
20	NIT Rourkela	557	687	1.23
21	NIT Warrangal	388	560	1.44
<b>Others</b>				
11	IEST (CUSAT)	1625	3252	2.00
23	SLIET Jalandhar	324	496	1.53

*Source: Gangan et al (2009)*

In terms of publication also, the IITs and IISc group are the fore-runners with citation per paper ranging from 3.12 to the least of 2.08. The remaining two groups are in the citation per paper index range of maximum 2.48 and minimum 1.23 only.

It is an indicator to the fact that CFTIs put together contribute a large share to the research activities in terms of research publications. Similarly, the institutions under CFTIs together produce around 1500 Ph.D.s in a year.

Patents filed by the institutions are another indicator towards the progress made in the direction of R&D. Total number of patents filed by different groups of institutions under CFTIs indicate that compared to the other two groups, IITs and IISc contribute significantly (Figure 4.3)



Source: Research Survey data

**Figure 4.3**

**Distribution of Total Number of Patents Filed by CFTIs**

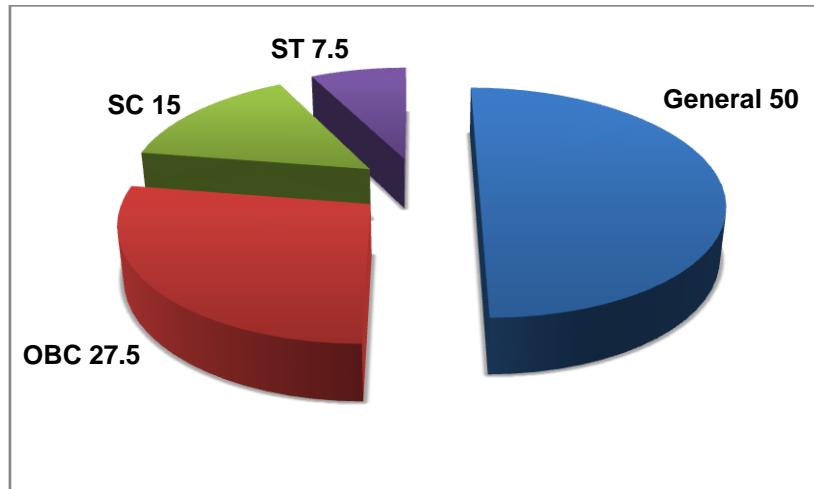
Accordingly, the data reveals that the CFTIs contribute immensely in the field of R&D in engineering and technology, primarily through IITs and IISc, which were established years ago.

**4.4.2.2 Social Outreach Programmes of CFTIs**

Through consultancy to various regulatory and public sector organizations, the CFTIs are contributing immensely to the social cause.

While striving for quality technical education, CFTIs have to keep the focus to attain social equity. Presently, fifty per cent of the admission is based on the merit and rest is reserved for socially backward classes of society such as Scheduled Caste (SC), Scheduled Tribe (ST) and Other Backward Classes (OBC), as determined by the government (Figure 4.4)

(Figures in percentage)



Note: SC = Scheduled Class, ST = Scheduled Tribes, OBC = Other Backward Class  
 General = Open merit (candidates from all other communities not eligible for reservation)

**Figure 4.4**  
**Distribution of Reservations to**  
**Backward Classes of Society for Admissions to CFTIs**

CFTIs also facilitate scholarships to the reserved categories as well as to the students admitted on merit through various governmental agencies (Table 4.10)

**Table 4.10**  
**Distribution of Major Scholarships Offered in CFTIs to the**  
**Various Category of Students**

Category	Extent
SC	Full Fees and Hostel Fees
ST	Full Fees and Hostel Fees
OBC*	Full Fees and A specified sum as Hostel fees
General	Merit based Scholarships to cover fees

Note :\*= Based on income ceiling

Source: Research survey data

All CFTIs have a National Service Scheme (NSS) and participation by the students in social service programmes is a pre-requisite for granting the degrees. IIT Madras is offering online video lectures on around 150 engineering subjects delivered by the eminent faculty members through INFLIBNET. This will enable the engineering students throughout the country to take the advantage of hearing the lectures of eminent faculty members of IITs and also to have deeper knowledge in the subject. Thus, the performances of CFTIs focus on the component of social concern. The activities undertaken by CFTIs through various associations can be broadly classified into four different areas (Table 4.11)

**Table 4.11**  
**Distribution of Social Outreach Measures Undertaken by CFTIs**

Area	Association/ Dept	Activities
Social Awareness	NSS	HIV Campaigns Vaccination programmes Family Planning campaigns
Service to Society	NSS/ Students Forums	Literacy Campaigns Women Development programmes Anti-ragging Campaign Blood Donation Remedial Classes for socially and educationally backward students
Service to Government/Industry	Consultancy and Sponsored Research and Students Forum	Industrial Planning Forum Consultancy Services R&D Programmes Continuing Education Programmes
Service to Environment	Environment Associations	Campaigns on eco-friendly activities Disaster Management Waste Management Global warming

*Source: Research survey data*



#### 4.4.2.3 Performance of CFTIs on Educational Excellence

The performance towards educational excellence has been assessed with two measurable indicators such as stakeholder's satisfaction and employability of the graduates. The stakeholder's satisfactions derived from the CFTIs have been discussed in detail in a separate section towards the later part of this chapter. In order to ascertain the position of IITs, which were established years ago in the international scenario, a comparison has been made between IITs and MIT on the basis of 2012 QS world ranking and some of the important parameters were considered for the ranking (Table 4.12)

**Table 4.12**  
**World Ranking of IITs in Comparison with MIT**

Rank	Institution	Academic Reputation (AR) Max score 100	Employer Reputation (ER) Max. Score 100
1	MIT	100.0	100.0
212	IIT Delhi	53.4	79.4
227	IIT Bombay	59.5	82.7
312	IIT Madras	40.0	73.0
349	IIT Kharagpur	34.6	42.3

*Source: QS 2012 World Ranking*

On academic reputation, MIT could score 100, whereas the IITs score within the range of 53.4 and 34.6. IITs are able to produce quality engineers and could gain comparatively greater employer reputation (79.4 score in 100). Institutions under NITs and Others groups are in the stage of growth and are yet to make their own image in the international scenario.

The employability of the graduates, which has been compiled from the responses indicates that IITs and IISc maintain the high degree of employability (Table 4.13)

**Table 4.13**  
**Assessment of Employability of Graduates of CFTIs**

*(Figures in percentage)*

	Studied in			Total
	IIT and IISc	NIT	Others	
Between 25 to 49	0	0	22.20	9.09
Between 50 to 74	0	12.50	0	4.55
Between 75 to 90	0	87.50	22.20	40.91
91 and above	100.00	0	55.60	45.45
Total	100.00	100.00	100.00	100.00

*Source: Research survey data*

The placement of NITs is better compared to Other class they are having more than 50 per cent placement.

This substantiates the fact that CFTIs are able to make sustained efforts for making academic excellence in all institutions, as envisaged in the strategic intent.

#### **4.4.2.4 Performance of CFTIs on Internationalization**

In matters relating to Internationalization, all the efforts are being made by CFTIs with the due support from the parent Ministry, through various schemes for technology transfer between country, faculty exchange programmes, collaborations and joint research programmes with many of the WCUs etc. The governmental agencies like Direct Admission to Students from Abroad (DASA) and Educational Consultants of India Limited (EdCIL) are making every possible measure to attract students from abroad to the CFTIs. Internationalization is also being taken care of by appropriate measures by the CFTIs

#### **4.4.2.5 Performance of CFTIs on Industry Institute Linkage**

Along with generating knowledge and technical know-how, all efforts are being taken by the CFTIs for Institute Industry Interaction and sponsored research programme to

facilitate the needs of the industrial sector. The industry interaction and entrepreneurial infrastructure facilities at IITs are at Table 4.14.

**Table 4.14**

**The Industry Institute Interaction and Entrepreneurial Infrastructure at IITs**

Institution	Industry Liaison agency/TTO and year	Head/Key personnel
IIT Bombay	Industrial Research and Consultancy Centre (IRCC), 1973	Dean (R&D), Associate Dean, Chief Technical officer
IIT Delhi	Foundation for innovation and Technology Transfer (FITT), 1992	Managing Director, Executives Technology Transfer, IPR
IIT Kharagpur	Sponsored Research and Industrial Consultancy (SRIC); 1971	Dean (SRIC), Professor-in-charge (IPR and IR)
IIT Madras	Centre for Industrial Consultancy and Sponsored Research (ICand SR) early 1970s	Dean; Chief Techno-Economic Officer

*Note: TTO = Technology Transfer Office, IPR = Intellectual Proprietary Rights, IR= Industrial Relations, SRIC = Sponsored Research and Industrial Consultancy*  
*Source: Nimesh and Krishna (2010)*

Similar facilities are available in NITs and Other group of institutions under the senior faculty members. Technology Business Incubation (TBI) programme is underway in CFTIs sponsored by the Department of Science and Technology, Government of India.

#### **4.4.2.6 Achievements of CFTIs in Offering Multi-disciplinary Education**

The wide spectrums of courses are being offered by CFTIs in engineering and technology but also in Science, Arts and Management (Table 4.15).

**Table 4.15**  
**Distribution of Various Courses Offered in CFTIs**

<b>Course</b>	<b>Description</b>
B.Tech./BE	Bachelor of Technology /Engineering in all specializations in engineering
M.Tech.	Master of Technology in engineering specializations
M.C.A.	Master of Computer Applications
M.Sc.	Master of Science
M.A.	Master of Arts (Integrated course)
M.S.	Master of Science (by Research)
M.B.A.	Master of Business Administration

*Source: Research Survey Data*

Various inter-disciplinary programmes are also being offered at some CFTIs. The QS World University ranking categorize Type A Institutions, which have comprehensive education system with more than 10000 students, offering courses in all 5 faculty broad areas and has a medical school. Indian CFTIs do not have strength of 10000 students in a single institution at present and do not have a medical school. This has become one of the drawbacks for CFTIs figuring in world ranking. IIT Kharagpur has put up the proposal to start a medical school, which is still under consideration.

#### **4.4.2.7 Achievements of CFTIs in Providing Creative Environment**

The campus environment is another major component in the vision and mission statement of the CFTIs. Each IIT and NIT is spread around 250 acres to 600 acres of land with excellent infrastructural facility. Other group of institutions also has well laid out excellent campus facilities. The student satisfaction on the Institution campus was measured through the questionnaire administered to the students in a five point likert scale in the order of 1 as bad and 5 as excellent. The results of the analysis are at Table 4.16.

**Table 4.16**  
**Student's Satisfaction on Creative Environment of CFTIs**

Category	Mean	SD	Median	KW test value	d.f.	P value
IITs and IISc	5.19	0.72	5.41			
NITs	4.30	0.99	4.27	90.847	2	0.000 Highly significant
Others	4.41	1.31	5.03			
Total	4.63	1.11	4.96			

*Source: Research survey data*

The highest mean value is for IITs and IISc with  $5.19 \pm 0.72$ , followed by the Others with a mean value of  $4.41 \pm 1.31$  and NITs with a mean value of  $4.30 \pm 0.99$ . The p value is 0.000 which is highly significant. Accordingly the hypothesis tested :

*H9 Student's satisfaction on creative environment at IITs and IISc are greater than NITs and Other institutions under CFTIs*

The analysis reveals that CFTIs have well defined strategic intent. This strategic intent has reflections, while formulating the plans which is evident from the results they could obtain over a period of time.

After formulation of strategic intent, next phase in strategic management is analysis of external environment.

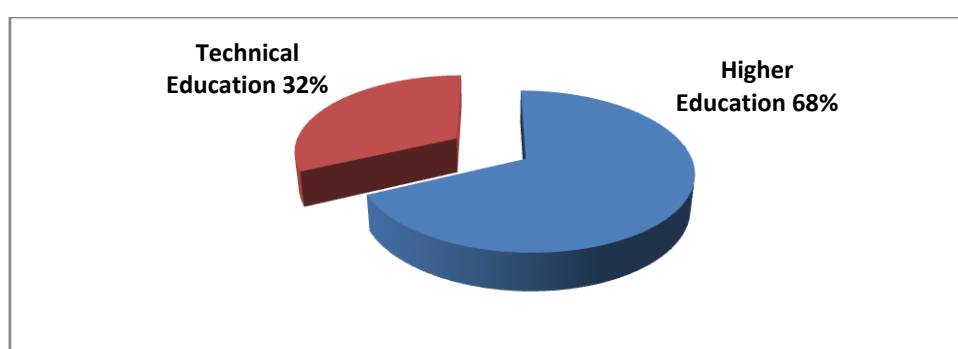
#### **4.4.3 Scanning of External Environment in CFTIs**

The external environment can be divided into three inter-related sub-categories such as remote environment, education environment and operating environment. The main aim of external environment analysis is to determine the opportunities and threats of the institution.

#### 4.4.3.1 Scanning of Remote Environment by CFTIs

The remote environment comprises of factors that originate beyond the operating situation of a single institution. This includes economic, social, political, technological and ecological factors affecting the future position of technical education in the country. Some of these factors at macro level which determine the direction of the economy and shed light on the political and technological emphasis of the country are taken up for discussion.

More than 500 universities, institutes of global standards like IITs and NITs are catering to the national needs in terms of engineering discipline. The number of students pursuing engineering need to be increased drastically, which is a pre-requisite for any knowledge driven nation like India (S&T Report, 2011). Apart from the above institutions, various other departments and organizations are supporting this ever growing demand for science and technology. Planning Commission of India reported that on account of various reasons including delay in availability of land, infrastructure etc. the pace of expenditure during the XI<sup>th</sup> FYP (2007-12) could not match up with the expectations. Out of the XI<sup>th</sup> FYP outlay of Rs. 849.43 billion (68 per cent) for the Department of Higher Education, Rs. 273.34 billion (32 per cent) was earmarked for technical education (FYP WG Report 2012). (Figure 4.5)



*Note: Higher education includes all other streams including Science, medicine, law, agriculture etc. - 2012 Statistics*

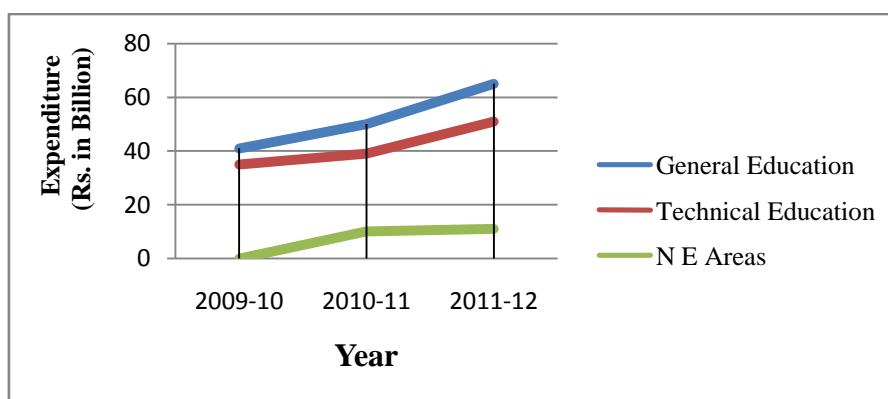
*Source: Report of the working group on technical education for XII<sup>th</sup> FYP*

**Figure 4.5**

**Distribution of XI<sup>th</sup> FYP Outlay for Higher and Technical Education in India**

The main focus of the XII<sup>th</sup> FYP (2012-17) is to consolidate achievements of the previous FYP in terms of completion of the civil works of the CFTIs. Enhancing the global competitiveness of technical manpower by ensuring high quality technical education to all sections of the society is an over-riding goal for the XII<sup>th</sup> FYP (FYP WG Report 2012). Thus, in the long term plan perspective, government has given due importance to building up technical education system in the country and quality up-gradation.

Human resource in science and technology is a major driver for India to emerge as a knowledge super power. During the year 2009-10, the expenditure on general education was Rs. 41 billion which rose to Rs. 65 billion in the year 2011-12. Expenditure on technical education for the year 2009-10 was Rs. 35 billion and it went up to Rs. 51 billion in the year 2011-12 with 45 per cent increase within a span of two years (Figure 4.6). Government of India also made consistent efforts to make special provision for development of higher education in north eastern area of the country, in order to have all-round development.

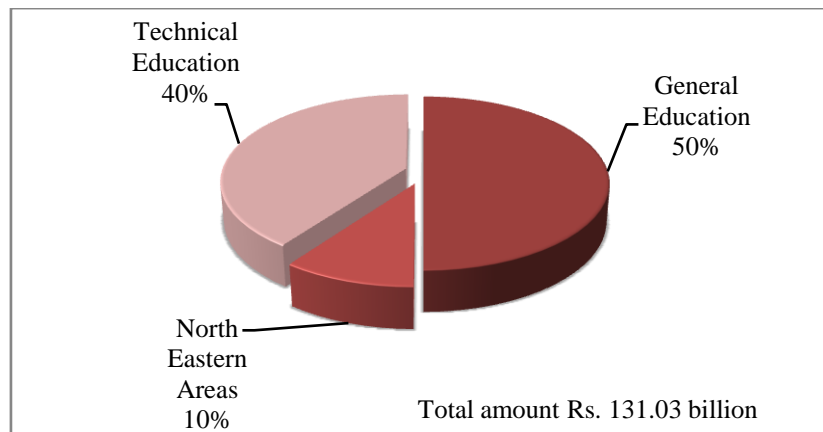


Source: Secondary data acquired from [www.indiabudget.nic.in](http://www.indiabudget.nic.in)

**Figure 4.6**

### **Expenditure Budget on Education in India 2010-2012**

An analysis of the recent higher education expenditure budget for the financial year 2011-12 indicates that 40 per cent of the budget amount has been spent for technical education alone (Figure 4.7)

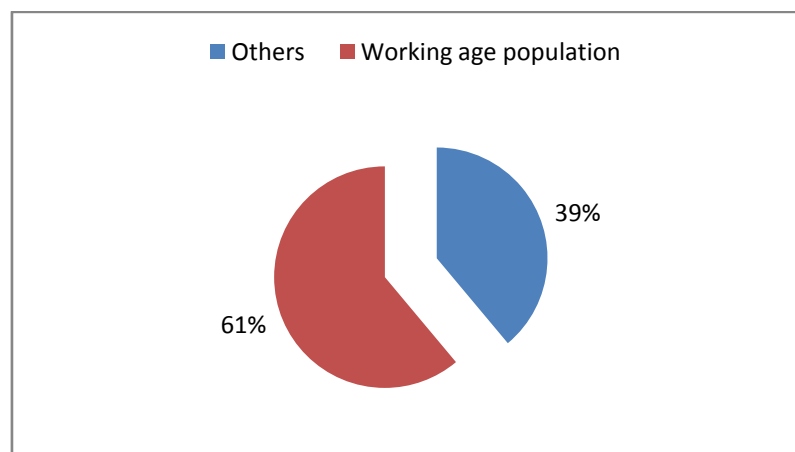


Source: Secondary data acquired from [www.indiabudget.nic.in](http://www.indiabudget.nic.in)

**Figure 4.7**

**Expenditure Budget on Higher Education in India 2011-12**

The demographic data shows that India is a nation of young people. Out of the 1.1 billion population 672 million people are in the age group of 15 to 64 years (Figure 4.8)



Source: *Statistics on demographics (2012)*

**Figure 4.8**

**Distribution of Share of Working Age Group in the Total Population in India**

Thus in India, around 61 per cent population is in the working age group. It is also reported that there will be a sharp decline in the dependency ratio over the next 30 years. This will constitute as a major demographic dividend for India (FYP WG Report 2012)



In order to contribute to educational development, civic society has to be alert, so as to monitor the development taking place in the education sector. India is fortunate enough to have an alert civic society and this has resulted in a force to maintain the quality of education.

India is a large exporter of technical manpower. A large number of alumni organizations like ‘Pan IIT’ network are functioning in India and abroad. This has enabled the country to get the expertise of Indian professionals working abroad.

Out of the eighty nine CFTIs, eight IITs, ten NITs, three IISERs, seven IIMs and eight other institutions totaling to 30 Institutions were created during the XI<sup>th</sup> FYP (2007-12), marking a growth rate of 34 per cent during the plan period. In addition to the unprecedented expansion in the numbers of CFTIs, the number of AICTE approved institutions in the country during the FYP has almost doubled from 4491 in 2006-07 to 8361 in 2011-12 and annual intake has increased from 907822 in 2007-08 to 2046611 in 2011-12 (FYP WG Report 2012) (Table 4.17).

**Table 4.17**  
**Growth of Intake in AICTE Approved Engineering Institutions**

Year	Total student intake for UG/PG	Increase of seats with respect to the base year 2007-08	Percentage of increase
2007-08	9,07,822		
2008-09	11,39,116	2,31,294	25
2009-10	14,08,807	5,00,985	55
2010-11	17,90,751	8,82,929	97
2011-12	20,46,611	11,38,789	125

*Source: Report of the Working Group on Technical Education for XII Plan 2011*

Finally, in a developing country like India, technical education has to support various ecological factors such as environmental pollution, bio-technology, agriculture etc. Scanning of remote environment is followed by scanning sector specific external environment.

#### **4.4.3.2 Scanning of Technical Education Environment in India**

India opened to foreign universities to set up campuses in India (Times 2013) through Foreign Educational Institution (Regulation of Entry and Operation) Bill 2010. This is expected to raise the quality and quantity of higher education to meet India's growing demand for skilled manpower. In the globalised economy, CFTIs are facing tough competition from the WCUs as movement of students is not restricted within the borders. CFTIs are also getting good amount of fees from international students and non-resident Indians. Starting of foreign universities will hit this major income stream. Thus new entrants are a real threat for the CFTIs.

Some private technical institutions like Birla Institute of Technology and Science (BITS), Vellore Institute of Technology (VIT), Dhirubhai Ambani Institute of Information and Communication Technology (DAIICT) etc. have set up their own brand equity in terms of quality education and excellent infrastructural facilities. These institutions are able to attract talented students having good rank in national level entrance examinations. More than this, Government of India has allowed private participation in starting IITs and recently approved the bill for private participation in the area of research, innovation and entrepreneurship even in CFTIs. It gives evidence of forthcoming increasing trend of rivalry among existing technical institutions in India.

Increasing recurring expenses in terms of wages and administrative expenses are the critical issues faced by CFTIs while government is trying to reduce the financial support (Kakodkar 2011). The final phase of external environment consists of scanning of institution-specific operating environment.

#### **4.4.3.3 Scanning of Operating Environment of CFTIs**

The institutions like IITs and IISc have established brand equity within the country and abroad. The NITs and Other institutions are also well sought after by the students. The employability of the graduates from the CFTIs is also very high. In the

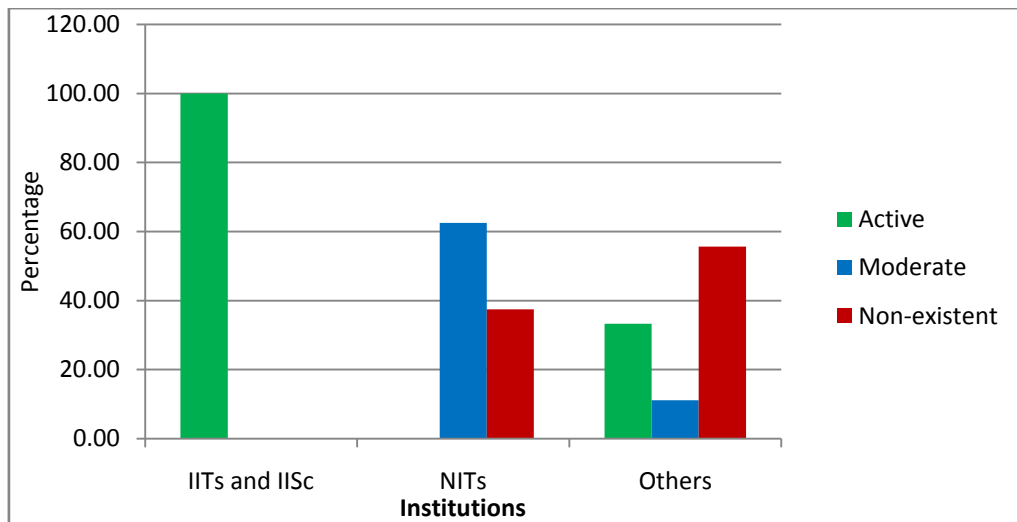
research front, the CFTIs contribute significantly to the country. Accordingly, the competitive position of CFTIs is high.

India is one of the largest technical manpower producers in the world. Compared to the population, it is not significant and there is a tremendous scope for improvement (Goel 2013)

CFTIs are providing technical manpower for the ever-growing needs of industrial sector. Simultaneously, these institutions provide support to the industry through industry institute linkage activities in various continuing education programmes for working professions to update technology. Institutions also provide consultancy and sponsored project and work as research and development hub. Compared to other developed nations, the industrial supports attained by the CFTIs are low.

CFTIs have to strive for providing high satisfaction to its stakeholders such as students, faculty, parents, society, alumni, industry employing the graduates etc. The stakeholder's satisfaction provided by CFTIs is analyzed towards the end of this chapter.

To sum up, the strategic planning process demands careful analysis of the external environment because the environment keeps changing and calls for new organizational strategies (Beal 2006). The aim is to assess the most significant environmental developments around which the institution must formulate its future goals, strategies, structures and systems. In order to measure the environmental scanning processes being carried out in CFTIs, the variables discussed above were considered. The analysis of responses indicates that external environmental scanning is fully active in IITs and IISc (Figure 4.9)



Source: Research Survey data

Fisher's Exact Value Test :0.001 Highly significant

**Figure 4.9**

#### **Assessing Existence of the External Environmental Scanning Process in CFTIs**

NITs have 62.50 per cent at moderate level, while 37.50% NITs do not have full fledged system of environmental scanning. In the case of Others, 33.30 per cent is active, 11.10% is moderate and 55.60 per cent do not have the system of environmental scanning. The reason for the disparity among the institutions is mainly on account of the fact that IITs and IISc were established long before and have an established standardized system, whereas NITs and Others are in the stage of settling down.

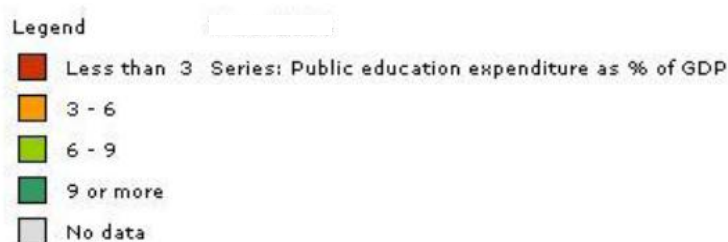
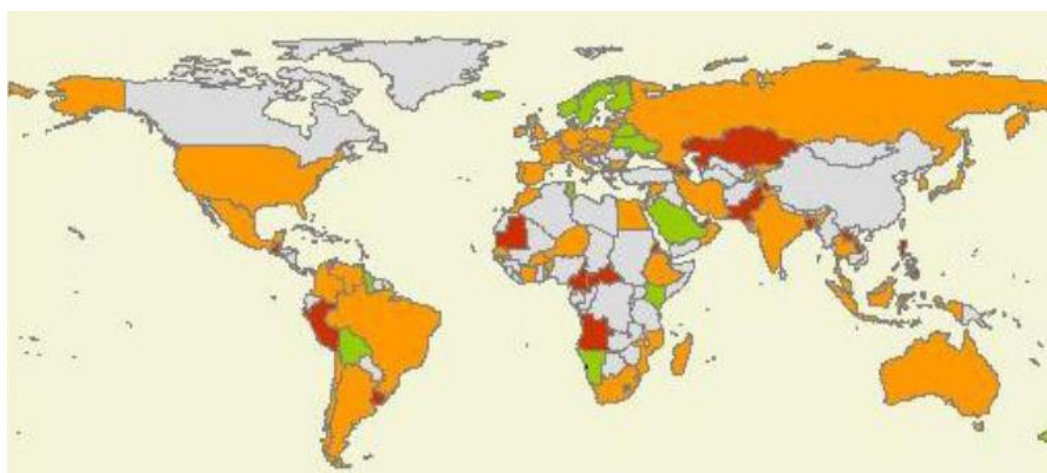
#### **4.4.4 Scanning of Global Environment**

A borderless economy means allowing free access to global players in all economic activities. In order to understand the strategic planning options available to an institution, the external scanning can also be extended to the global environment.

Some of the measurable indicators are discussed to assess the direction of the Indian education sector and tertiary education in particular.

The geographical map represents the expenditure incurred by various nations as percentage of their Gross Domestic Product (GDP) spent on public education (Figure 4.10). The expenditure spent on education is less than 3 percent of their GDP in

certain regions of Middle East, few African countries and a couple of South American countries. It is clearly evident from the map that European countries and a few countries in Middle East are spending 6 to 9 percent of their GDP in education, in comparison to a few countries and regions like India, Australia, North America, South America, Russia and most of the Asian countries spending 3 to 6 percent of the GDP.

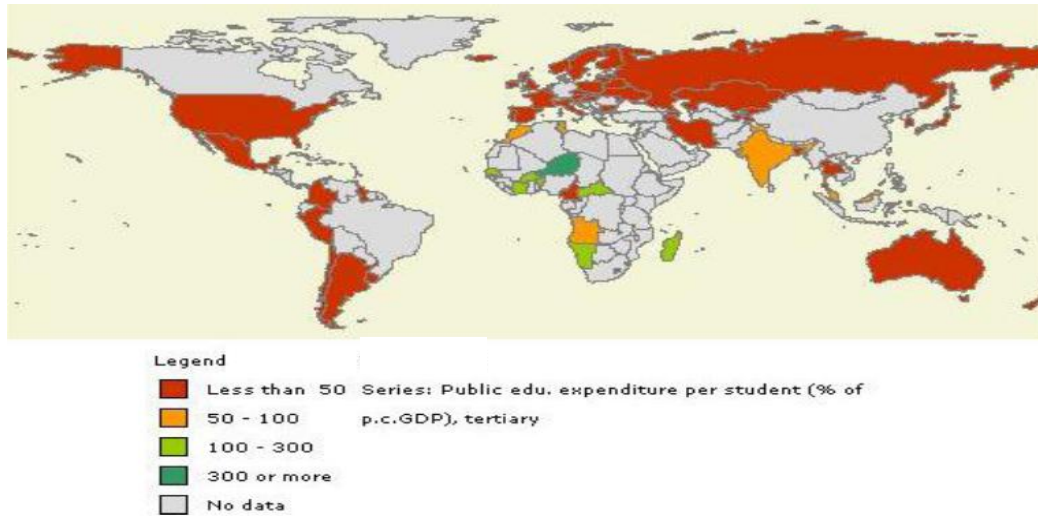


Source: <http://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?display=map>(Feb.14,2012)

**Figure 4.10**

**Public Education Expenditure as Percentage of GDP – A Global Analysis**

Another important factor to be considered to assess the direction of the nation in tertiary education is the expenditure incurred as percentage of the per capita GDP spent on public education expenditure per student (Figure 4.11). It is evident from the map that in comparison with India, which is incurring 50 to 100 per cent of per capita GDP, most of the other continents and regions like Australia, Europe, Russia, North America and few South American countries are spending less than 50 per cent of GDP on public education expenditure per student on tertiary education.

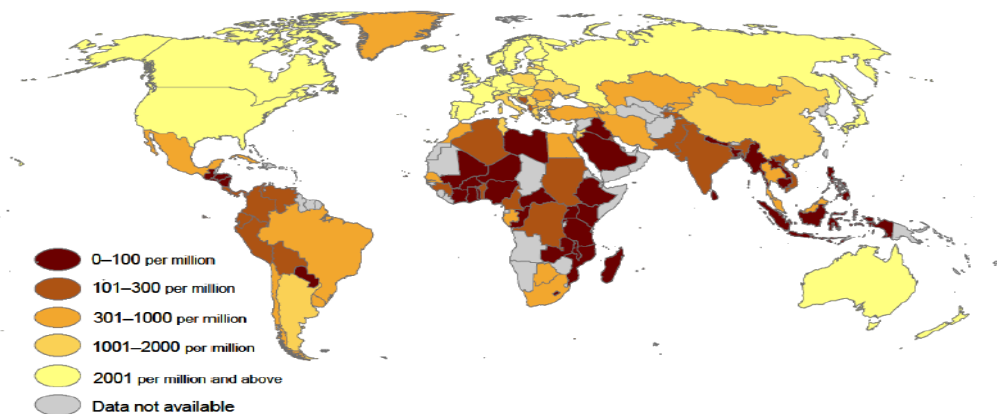


Source: <http://www.nationsencyclopedia.com/WorldStats/Edu-expenditure-public-student-tertiary.html> (Feb.14,2012)

**Figure 4.11**

**Public Education Expenditure per student (% of p.c.GDP) Tertiary Education-  
A Global perspective**

A geographical map showing the distribution of researchers per one million inhabitants is at Figure 4.12. The data expressed are in full-time equivalents, which is a measure of the actual volume of human resources devoted to research and development. The map clearly depicts that the number of researchers per million in India are quite low to that of 101 to 300, while regions like USA, Australia, Europe and most of the Asian countries are having 2001 or more.



Source: UIS, July, 2011

**Figure 4.12**

**Distribution of Researchers per Million Population Region-wise – A Global Perspective**

Most of the Indian CFTIs have internationalization as a goal in the vision and mission statement. This goal calls for a scanning of global environmental factors concerning tertiary education, technical education and research environment in particular. In a developing country like India, the major challenge before the government is the need to develop specialized human resources to address convergence and multi disciplinary sciences; gainful employment of graduates and post graduate students; specialized technical skill requirements due to increased automation and sophistication in instrumentation for research, manufacturing and industrial requirements of the country and abroad.

After completing the external environment analysis, the subsequent phase of strategic management process is scanning of internal environment of the Institution.

#### 4.4.5 Scanning of Internal Environment by CFTIs

Internal scan involves identification of strengths and weaknesses of the institution and those aspects that help or hinder the accomplishment of the organization's mission and fulfillment of its mandate. The analysis of the responses on existence of scanning internal environment in CFTIs is at Table 4.18.

**Table 4.18**  
**Assessing the Existence of Scanning the Internal Environment Process by CFTIs**  
*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	80.00	12.50	33.30	36.36
Moderate	20.00	87.50	66.70	63.64
Non-existent	0	0	0	0
Total	100	100	100	100

*Source: Research Survey Result*

The analysis reveals that 63.64 per cent of CFTIs have the presence of internal scanning process as a part of the strategic management system at a moderate level and 36.36 per cent at active level. Scanning the internal environment determines the capacity of the institute to take up the strategic intent. Without a good support from the internal system, the vision, mission and goals will become only a dream.

The periodic review of the internal strengths and weaknesses is an important factor in the changing environment and with every revision and re-defining of vision, mission and goals. In order to have an overview of the internal strengths and weaknesses of the CFTIs system, some key factors which are highly influential to the non-profit education sector have been taken up for discussion.

#### **4.4.5.1 Ability of CFTIs to Attract Talented Students from the Country**

Admissions to the CFTIs were mainly through Joint Entrance Examination (IIT JEE) and All India Engineering Entrance Examination (AIEEE). Since 2013 onwards these were modified as JEE Advanced and JEE Main respectively. The number of seats available under IIT JEE was 9509 in 2010 which showed a marginal increase to 9647 in the year 2012, whereas under AIEEE, total seats available for counseling was 25575 during 2010 which rose to 37443 in the year 2012 (Table 4.19).

**Table 4.19**  
**Distribution of Seats Available under**  
**Major National Level Engineering Entrance Examinations**  
**(JEE and AIEEE)**

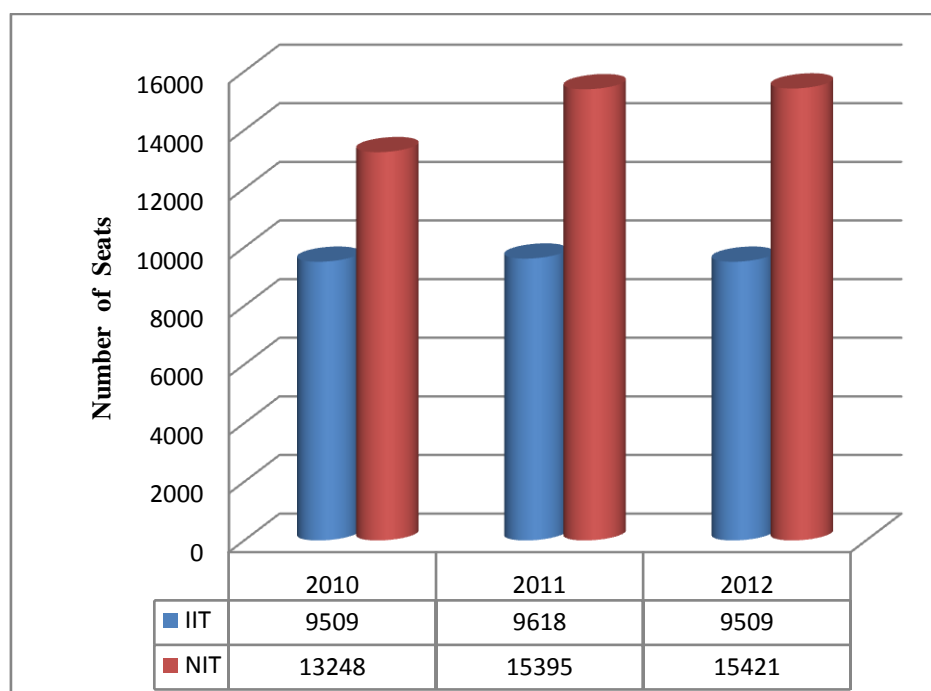
<b>Year</b>	<b>No. of seats available for admission</b>	
	<b>IITJEE</b>	<b>AIEEE</b>
2010	9509	25575
2011	9618	34191
2012	9647	37443

*Source: Data compiled from JEE and AIEEE web sites, last accessed on 30-08-2012*



The rise in seats available under AIEEE is mainly due to increase in number of new NITs established recently and other institutions whose admissions are being done based on the rank obtained in AIEEE. Another factor contributing to the drastic increase in the intake in CFTIs is mainly the introduction of reservation for OBC

IITs and NITs are major players in CFTIs and the seats available for UG programmes in both IITs and NITs during the period 2010 to 2012 shows a steady increase (Figure 4.13). Six new IITs and ten new NITs were started in the year 2008. Compared to the NITs, the effect of increase in intake stabilized more quickly in IITs. Whereas, due to the problem in acquisition of land, new NITs became functional only in the later part of XI<sup>th</sup> FYP



Source: Data compiled from MHRD web site [www.mhrd.nic.gov.in](http://www.mhrd.nic.gov.in) last accessed on 28/11/2012

**Figure 4.13**

**Distribution of Intake of UG Programmes  
in IITs and NITs (2010 to 2012)**

An analysis of candidates who appeared for the IIT JEE and AIEEE for the period 2010 to 2012 reveals that there is a continuous increase in the number of candidates who appeared for the IIT JEE (Table 4.20). At the same time there is marginal

decrease in the number of candidates for AIEEE during this period. This is mainly on account of the increase in the seats in IITs and its growing brand equity.

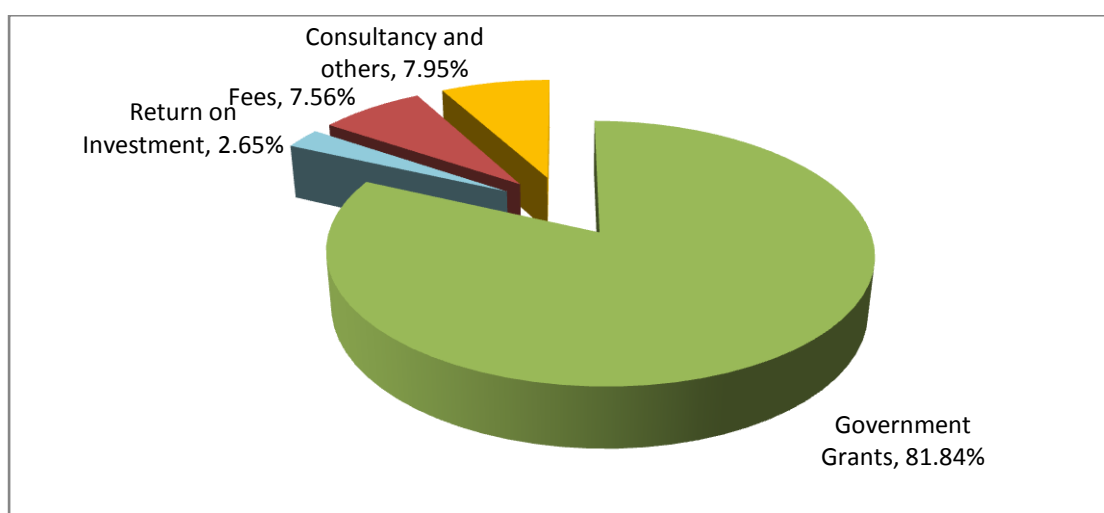
**Table 4.20**  
**Distribution of Number of Candidates Appeared for IIT JEE and AIEEE**

S No.	Year	Total No. of candidates appeared for	
		IIT JEE	AIEEE
01	2010	472,000	1065100
02	2011	486,000	1050000
03	2012	506,000	1061854

*Source: Research survey data*

#### 4.4.5.2 Analysis of Income and Expenditure of CFTIs

Basically CFTIs are fully funded by the Government of India. A scrutiny of the sources of income indicate that a major share to the tune of 81.84 per cent of income is coming directly as grants from government in the form of plan (non-recurring) and non-plan (recurring) funds. As regards internal revenue generation, around 7.95 per cent of funds are gained through consultancy and sponsored research; 7.56 per cent as fees and 2.65 per cent as return on investment (Figure 4.14)

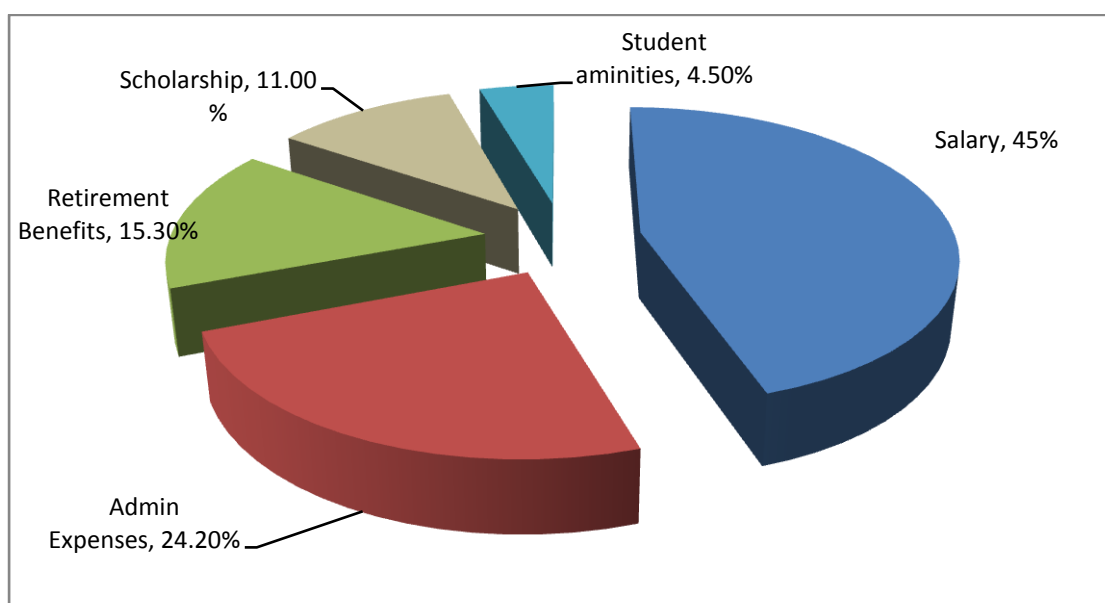


*Source : Research Survey data*

**Figure 4.14**  
**Distribution of Inflow of Funds to CFTIs in India in 2011**

While examining the outflow of funds, it has been observed that the major share of 45 per cent is by way of salary for faculty and non faculty positions; 24.20 per cent towards administrative expenses; 15.30 per cent on retirement benefits; 11 per cent on scholarships and 4.50 per cent by way of providing student amenities (Figure 4.15). Thus, the major share of expenditure is salary and administrative expenses. Expenditure on salary cannot be reduced to a significant level, as it is the prime factor for attracting faculty and professional staff.

*(Figures in percentage)*



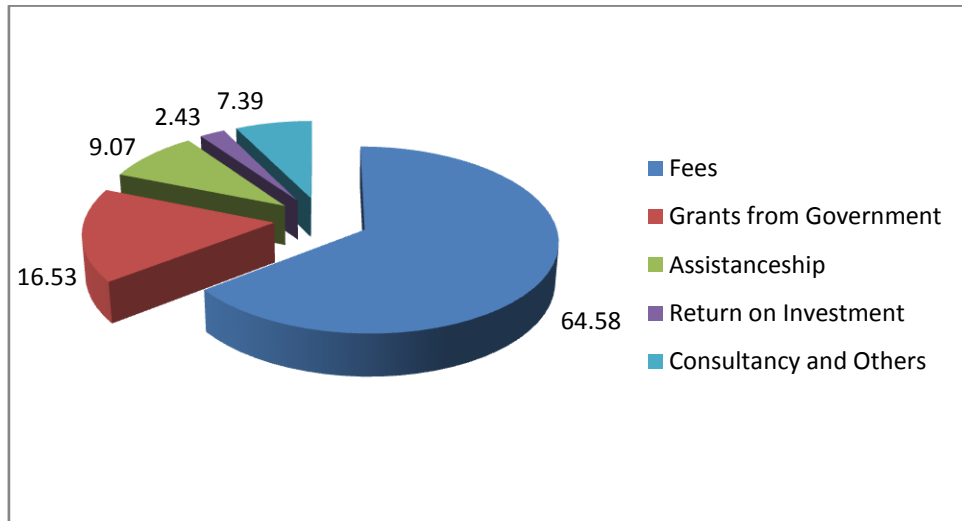
*Source: Research survey data*

**Figure 4.15**

**Distribution of Outflow of Funds from CFTIs in India in 2011**

The funding pattern suggested by Kakodkar (2011) for reducing the dependence on governmental support, primarily focuses on raising the fees. The model envisaged in the report calls for raising the fees to a reasonable level to match up with cost involved. Thus, as per this model, 64.58 per cent of income has to be accumulated by way of fees and only 16.53 per cent as governmental support (Figure 4.16). The report also calls for acquiring assistantship for various PG and research programmes of the Institute, which should form approximately 9.07 per cent of the income.

(Figures in percentage)



**Figure 4.16**

**Model Funding Pattern suggested by Kakodkar (2011)**

All the CFTIs are fully funded by the Government of India. The funds are allotted to the institutions under major heads such as Plan fund for non-recurring and non-plan fund for recurring expenses. The institutions have to submit the budget for every year well in advance. The recurring expenses are met from the non-plan fund, provided to the institutions by way of matching grants or carry forward of deficits. As such the recurring expenses are not a bottleneck for the CFTIs.

In the case of non-plan funds, the institutions have to make the demand for such funds well in advance along with the recurring funds. Subject to the availability of funds and based on the proposals submitted by the institutions, non-plan funds are allotted to the institutions. The allotments to the non-plan expenditure are based on long term planning to build up infrastructure and facilities. The government will provide funds only to such proposals which are approved by them. Accordingly, the allotment to these proposals is not guaranteed.

#### 4.4.5.3 Information and Communication Technology (ICT) Facilities in CFTIs

ICT is a real strength for the strategic management in the technology driven scenario. CFTIs are having good ICT network with substantially large number of nodes to support the needs of multiple number of users through internet and intranet connectivity (Table 4.21).

**Table 4.21**  
**ICT Network in CFTIs**

IITs and IISc	NITs	Others
Wifi Campus; 200 Mbps bandwidth 6000 nodes; Fibre Connectivity to all buildings; UTM system; Coreswitches and Edgeswitches; IP Phone facility; Video Conferencing facility; Centralized hardware monitoring system; Microsoft Campus Agreement; MIS	Wifi Campus; 150 Mbps bandwidth 3000 nodes; Fibre Connectivity to all buildings; UTM system; Coreswitches and Edgeswitches; IP Phone facility; Video Conferencing facility; Centralized hardware monitoring system; Microsoft Campus Agreement; MIS	Wifi Campus; 80 Mbps bandwidth 500 nodes

*Source : Research survey data*

With regard to Management Information System (MIS), it is in existence in almost all CFTIs except in new institutions. Thus, it is evident that CFTIs have good infrastructural support for strategic management processes.

#### 4.4.5.4 Analysis of Physical Infrastructure of CFTIs

All IITs and IISc have land of around 600 acres, a standard which is determined by the government while the NITs have around 300 acres of land. Even though the other group of institutions does not have the land to this tune, the state government where the institute is situated is making every efforts to acquire enough land for these

institutions. Accordingly, land is not a bottleneck for the CFTIs for the developmental plans.

IITs and IISc have excellent infrastructural facilities like academic buildings, non academic buildings, laboratories and hostels. NITs also have sufficient infrastructural facilities even though they are not as much as in the case of IITs and IISc. The reason behind this is mainly on account of the fact that these institutions were not fully funded by government of India till 2002. The institutions like IIITs, IISERs in the Other category are yet to build up the infrastructural facilities. But institutions like NITIE, ISM in the Other category have good infrastructural facilities. With the limited autonomy and cumbersome procedures involved in government expenditure, infrastructure building up in CFTIs is a time consuming process. The CFTIs have recently lodged a strategy to increase intake by fifty four per cent to accommodate OBC reservation. This has caused some constraints in physical facilities like hostel, class rooms and other facilities.

#### **4.4.5.5 Administration and Governance in CFTIs**

Administration and governance structure is a major factor for any planning process. Hence, in the internal scanning process this occupies an important position.

All CFTIs are governed by a BoG consisting of members as specified in the Act and Statutes. Chairman is nominated by the Government of India from the well known technologists in the country. Director of the Institute is appointed by the Board based on the recommendations from Government of India on a contract basis for tenure of five years. Administrative authorities of the institution are as provided in the Act and Statute. The powers and delegations are well defined in the Act and Statutes. All the institutions have to follow government of India rules for expenditures and are subject to the audit by the Comptroller and Auditor General (C&AG) of India. Thus, the organizational structure of every institute is well defined. The decision process of the Institute is top down management. The responses on administrative structure of the institute reveal that almost majority CFTIs have traditional structure (Table 4.22)

**Table 4.22**  
**Distribution of Pattern of Administrative Structure in CFTIs**  
*(Figures in percentage)*

Type	IISc and IITs	NITs	Others
Traditional	80	100	100
Contemporary	20	0	0
Hybrid	0	0	0

*Source: Research Survey Data*

CFTIs being non-profit organizations funded by government, the powers and delegations are concentrated only on few authorities covered in the Statute.

Most of the institutions are governed by an Act passed by the Parliament and functioning under a statute framed thereon. Majority of institutions in CFTIs are IITs and NITs. The Act provides IIT Council and NIT Council as the apex body to take major policy decisions of these institutions. The Union Minister of MHRD is the Chairman of both these Councils. There is no mandatory number of meetings stipulated for these councils. In order to ascertain the active participation of these councils in policy decisions the average number of meetings held and the percent of attendance in these meetings has been surveyed (Table 4.23)

**Table 4.23**  
**Distribution of Number of Meetings Held by the IIT and NIT Council and Participation by the Members**

Name of Council	Average Number of Meetings per year	Average Attendance in per cent
IIT Council	2	85
NIT Council	2	76

*Source: Research Survey data*

The data reveals that both the Councils are meeting on an average of twice in a year and the average attendance rate of members are more than 75 per cent. The

interviews with the educational experts also revealed that the minutes of the meetings of the councils are widely circulated among member institutions and also published through internet. The action taken on the decisions were ensured through reporting back in the successive meetings.

**(a) Administration**

The BoG is the apex governance body for all institutions under CFTIs. The general superintendence, direction and control of the affairs of the Institute are bestowed on the BoG. As per provisions contained in the Statute, the BoG has to normally meet four times in a year. The frequency of the meetings actually held has been assessed through the survey and the average number of meeting held has been compiled for the period of three years (Table 4.24)

**Table 4.24**  
**Distribution of Number of BoG Meetings Held**  
**During the Period 2008-09 to 2010-11**

Institutions	Average number of Meetings Held During the Year		
	2008-09	2009-10	2010-11
IITs and IISc	3	3	4
NITs	2	3	3
Others	2	2	2

*Note: Minimum Number of meetings suggested as per the Statute is four per year*

*Source: Research Survey Data*

The results indicate that the number BoG meetings held are less than the suggested minimum numbers, except in the case of IITs and IISc during the year 2010-11. The major reason expressed by some of the educational experts is pre-occupation of most of the nominated members and ex-officio members from MHRD.

Finance Committee (FC) of the Institute is entrusted with the duty of scrutinizing the financial budget and also to consider and make recommendations to the BoG, on all



matters involving finance. As per the statute the FC has to normally meet four times in a year. The number of FC meetings held by each institution has collected and the average number of meeting held by each group of institutions for three consecutive years has been compiled (Table 4.25)

**Table 4.25**  
**Number of FC Meetings Held**  
**During the Period 2008-09 to 2010-11**

<b>Institutions</b>	<b>Average number of Meetings Held During the Year</b>		
	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>
IITs and IISc	3	4	4
NITs	3	3	3
Others	2	2	3

*Note: Minimum Number of meetings suggested as per the Statute is four per year*

*Source: Research Survey Data*

IITs and IISc are able to hold FC meetings as suggested in the statute in 2009-10 and 2010 -11. In all other cases the average number of FC meetings held is less than the suggested minimum. Normally, FC meetings are held prior to the BoG meetings. Hence, pre-occupation of the members is the main reason for lower number of FC meetings.

Building and Works Committee (BWC) is a technical sub-committee of the BoG entrusted with the task of control and superintendence of the civil construction works of the Institute. The suggested number of meetings of BWC is also four in a year. The three years data reveals that IITs and IISc are holding BWC meetings as suggested in the statutes (Table 4.26). In the case of NITs the actual number meetings of BWC held are more than the suggested minimum. The main reason behind this is that the infrastructure building up in IITs and NITs are on higher rates. This is mainly because of the increased intake in these institutions for the last few years to accommodate new OBC reservation. The minutes of the meetings are on public domain. The action taken is ensured by way of reporting back to the BWC.

**Table 4.26**  
**Number of BWC Meetings Held**  
**During the Period 2008-09 to 2010-11**

<b>Institutions</b>	<b>Average number of Meetings Held During the Year</b>		
	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>
IITs and IISc	3	4	4
NITs	4	5	5
Others	3	3	3

*Note: Minimum Number of meetings suggested as per the Statute is four per year*  
*Source: Research Survey Data*

After analyzing the frequency of meeting, another major factor put under the scrutiny is the participation by the members in these meetings. Accordingly, the attendance of members in the meetings of the BoG, FC and BWC were compiled (Table 4.27 )

**Table 4.27**  
**Participation of Members in BoG, FC and BWC Meetings**

*(Figures in percentage)*

<b>Institutions</b>	<b>Attendance in Percentage (Year 2011)</b>		
	<b>BoG</b>	<b>FC</b>	<b>BWC</b>
IITs and IISc	80	85	75
NITs	66	70	83
Others	60	75	80

*Source: Research Survey Data*

The results indicate that there is a good attendance rate in IITs and IISc in BoG, FC and BWC meetings. Whereas, the attendance rate is low at 66 per cent for NITs and 60 per cent for Others in the BoG meetings of NITs and Other group of institutions. Same is the case of FC meetings of these institutions. The main reason for the lower attendance is inability of MHRD officials and other nominated members of regulatory

bodies to attend the meetings, as the number of institutions are large compared to IITs and IISc. In BWC the attendance rate is fairly high in NITs and Others group of institutions as majority of the nominated members are from the nearby locality.

The dissemination of the minutes of the BoG, FC and BWC have analyzed in order to verify how far it is made available to the major stakeholders (Table 4.28)

**Table 4.28**  
**Dissemination of Decisions/ Minutes of BoG, FC, BWC etc.**

*(Figures in percentage)*

Method of Circulation	Institutions		
	IITs and IISc	NITs	Others
Wide Internal and External circulation through both printed and electronics media (including Web)	40	65	20
Circulation within the Institution only	30	25	20
Communicated only to concerned Departments/ Sections	30	10	30
Distribution among senior administrators only	0	0	30
Not circulated and kept as confidential document	0	0	0

*Source: Research Survey Data*

The Right to Information (RTI) Act 2005 calls for full transparency in all matters of governance. As such, the decisions are to be made available in public domain. The analysis of responses on dissemination of minutes indicate that, it is freely made available internally and through web in 40 per cent IITs and IISc, 65 per cent in NITs and 20 per cent in Other group of institutions. There is only the internal circulation in 30 per cent IITs and IISc and 25 per cent NITs and 20 per cent Other institutions. The conventional practice of dissemination only among senior administrative officers still remains in 30 per cent of Other Institutions.

The implementation of the decisions of the meetings is ensured through reporting back, as it is explicitly mentioned in the Statute.

**(b) Funding**

Another major aspect is funding required for the functioning of the Institute. The funding for the functioning of the Institute is provided by the MHRD in the form of Plan and Non-Plan grants (Table 4.29)

**Table 4.29**  
**Employee Participation in the Preparation of Financial Estimates**

*(Figures in per cent)*

Type of Funds	Major Head	Employee participation in preparation of estimates
Recurring Expenses	Non-Plan (Matching Grants)	40
Non-Recurring (Capital) Expenses	Plan	85

*Source: Research Survey Data*

The annual budget for the Institution is prepared mainly by the Finance Department and the Departments are consulted for the estimates on Departmental Operating Costs (DOC) only. As such the responses of the institutes indicate that the participation is 40 per cent only. MHRD provides the whole recurring expenses by way of grant and deficit, if any, will be given in the next year. The surplus amount on non-plan expenditure has to be carried forward to the succeeding year. Capital expenses or non-recurring expenditures are known as Plan expenditure. The amount towards this is usually released based on the availability of funds with the MHRD and depending upon the proposals submitted by the Institutions. In order to draw the proposals there is wide participation from the departments, faculty and staff. Accordingly the responses state that there is 85 per cent participation in preparing plan proposals.

World Bank has taken interest in systemic transformation of India's technical education system and to make it globally competitive and joined hands with Government of India to launch a Technical Education Improvement Programme (TEQIP) as a long term programme of ten to twelve years and in two to three phases. The programme started in 2003 and the first phase completed in 2009. The second phase has started in the year 2010. The details of the coverage, objective and assistance are at Table 4.30.

**Table 4.30**

**Details of TEQIP Undertaken by Government of India  
in Association with World Bank**

<b>Description</b>	<b>TEQIP – Phase I</b>	<b>TEQIP – Phase II</b>
Period	March 2003 to March 2009	April 2010 to March 2014
Objectives	<ul style="list-style-type: none"> <li>• Promotion of Academic Excellence</li> <li>• Networking of Institutions for quality enhancement and resource sharing</li> <li>• Enhancing quality and reach of services to Community and Economy</li> <li>• System Management Capacity Improvement.</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening Institutions to produce high quality engineers for better employability,</li> <li>• Scaling-up postgraduate education and demand-driven Research &amp; Development and Innovation,</li> <li>• Establishing Centers of Excellence for focused applicable research,</li> <li>• Training of faculty for effective Teaching, and</li> <li>• Enhancing Institutional and System Management effectiveness.</li> </ul>
Total participating Institutions	127	189
No of CFTIs	18	25
Amount Allocation (Rs. In Million)	13393.730	24300.00
Actual Amount spent (Rs. In Million)	13196.935	Ongoing Programme

*Source: Research Survey Data*

The first phase of TEQIP has been successful in fully utilizing the amount allocated for the purpose. The second phase of TEQIP is under progress.

(c) **Human Resource Management**

The faculty and non-faculty positions in the Institute are based on the norms prescribed by the government.(Table 4.31)

**Table 4.31**  
**Distribution of Faculty and Non-Faculty Ratio**

<b>Student : Faculty Ratio</b>	<b>Faculty :Non-Faculty Ratio</b>
<b>IISc No such ratio</b>	<b>1:1.1</b>
<b>1:9 in IITs 1:12 Other Institutions</b>	

*Source: Research Survey Data*

Accordingly , the faculty positions can be created based on the student strength of the Institute. In respect of every sanctioned intake of twelve students, one faculty position can be created. Like-wise, non-faculty position can be created based on the sanctioned faculty strength at the ratio of 1:1.10. The appointments to faculty and non-faculty positions in the institute are made through all India open selection. All support services in the Institute such as security, sanitation and transport are outsourced.

The present faculty position of the major institutions under CFTIs has been assessed through the survey (Table 4.32)

**Table 4.32**  
**Distribution of Vacancy in Faculty Positions in Major CFTIs**

<b>Institutions</b>	<b>Sanctioned</b>	<b>In-position</b>	<b>Vacancy</b>	<b>Per cent of vacancy</b>
IISc	520	406	114	21.92
IITs	11,920	7,399	4,521	37.92
NITs	6,425	4,259	2,166	33.71
IIITs	240	159	81	33.75

*Source: Research Survey Data – Year 2011*

The results indicate that there is a faculty shortage of 21.92 per cent in IISc. In all other institutions the per cent of vacancy is more than 30 per cent. Lack of qualified candidates has been assessed as the major reason. The entry qualification for the faculty position is the doctorate degree. The number of Ph.D.s produced in engineering and technology is low compared to the growing demand. Another problem being faced by the CFTIs are faculty retention. The salary at entry level for a faculty is low compared to the salary, the engineers are drawing in the Industry.

The present level of non-faculty positions have also assessed (Table 4.33). In the IITs and IISc group of institution the per cent of vacancy is 18.35 and in NITs it is as high as 29.71 per cent. The major reason for the shortage of non-faculty positions in NITs are on account of pending restructuring to the new ratios and aligning to central government pay structure.

**Table 4.33**  
**Distribution of Non-Faculty Vacancy Positions CFTIs**

<b>Institutions</b>	<b>Vacancy</b>
IISc and IITs	18.35
NITs	29.71
Others	15.69

*Source: Research Survey data*

Staffing pattern of the institution is one of the important factors to be considered for the internal scanning. The analysis of the responses received shows that 50 per cent of CFTIs have optimal staffing pattern while 50 per cent are understaffed (Table 4.34)

**Table 4.34**  
**Distribution of Existing Staffing Pattern in CFTIs**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Overstaffed	0	0	0	0
Optimal	80.00	12.50	66.70	50.00
Understaffed	20.00	87.50	33.30	50.00
Total	100	100	100	100

*Source: Research Survey data*

The increase in intake which was introduced from the year 2008 has created shortage of faculty members in many institutions under CFTIs. There is shortage of non-faculty positions in the case of NITs, because of restriction for recruitment pending approval from the government of India.

On identifying the key factors on strength and weakness of CFTIs, the focus of the research has been to identify the techniques for internal analysis being used by the CFTIs

**(d) Participation of Stakeholders in Decision Making**

Participation of major stakeholders in the process of strategic management supports the commitment to the strategic plan. In the case of CFTIs, the involvement of BoG and the major stakeholders such as faculty, students and staff is one of the major factors to be considered in the internal scanning. The responses shows that around 50 per cent of CFTIs have participation of faculty, staff and students at active level (Table 4.35), 40.90 per cent at moderate level and only 9.10 at non-existent level.



**Table 4.35**  
**Participation of Faculty, Staff and Students in the Management of CFTIs**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	80.00	62.50	22.20	50.00
Moderate	20.00	37.50	55.60	40.90
Non-existent	0	0	22.20	9.10
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

*Source: Research Survey data*

As per the Act and Statute, two faculty members are nominated to the BoG. The supreme academic body of senate consists of all professors of the institute, few members nominated from institutions outside. There are student nominations in the department level academic committee. Hence, it is evident that there is enough participation of a cross section of stakeholders.

**(e) Openness and Transparency**

In order to have openness and to promote transparency in governance, Government of India has issued directives to set up certain statutory bodies/ forums in all governmental organizations. Similarly, in order to promote gender equity, the government organizations has to set up forum to prevent sexual harassment of women at workplace. As such, the CFTIs have to set up these statutory bodies/ forums to ensure the openness and transparency. The responses obtained from the Institutions indicate that these bodies/forums are active in all CFTIs (Table 4.36)

**Table 4.36**  
**Statutory Bodies to Enhance Transparency in Governance  
and Gender Equity**

Statutory Bodies /Forums	Active in Number of Institutions in percentage		
	IITs and IISc	NITs	Others
Public Grievance Redressal	100	100	90
Right to Information (RTI)	100	100	100
Equal Opportunity Center	100	100	100
Vigilance and Anti-corruption	100	100	100
Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal)	100	100	100

*Source: Research Survey data*

Thus, governance in CFTIs are tuned with the governmental guidelines, in which the openness and transparency to the stakeholders are given due prominence.

#### **4.4.5.6 Internal Scanning Techniques Used by CFTIs**

SWOT analysis is a traditional approach that has been in use for decades. In order to overcome some of the limitations, two more techniques are being used such as Value Chain Analysis (VCA) and Resource-based View (RBV). VCA attempts to understand how an organization creates customer value by examining the contributions of different activities within the organization to that value. RBV analyzes the firm's strategic advantages based on examining its distinct combinations of assets, skills, capabilities and intangibles as an organization. The analysis of the responses shows that 90 per cent of the CFTIs use the traditional method of SWOT analysis for internal scanning (Table 4.37)

**Table 4.37****Distribution of Responses on Internal Scanning Techniques Used by CFTIs***Figures in percentage*

<b>Internal Scanning Techniques</b>	<b>IITs and IISc</b>	<b>NITs</b>	<b>Others</b>	<b>Total</b>
SWOT	80	100	90	90
VCA	0	0	0	0
RBV	20	0	10	10

*Note: Responses only from Institutions where internal scanning is available*

*Source: Research Survey Data*

Only 10 per cent of institutions use RBV, where the institutions have specific strategic advantages.

#### **4. 4.6. Assessing Existence of the Strategic Management Process of Environmental Scanning (Internal and External) in CFTIs**

In order to assess the holistic view on the practice of environment scanning, both external and internal, an analysis of the total scores obtained on environmental scanning process on each group of institutions has been done (Table 4.38)

**Table 4.38**

#### **Assessment of Total Score on the Responses on Environmental Scanning (Internal and External) in CFTIs**

Category	Min.	Max.	Mean	Std. deviation	Median	KW Test	d.f.	P value
IITs and IISc	16.00	23.00	20.00	3.24	22.00	7.218	2	0.027 Sig
NITs	0.00	12.00	7.13	3.64	7.00			
Others	0.00	26.00	8.22	9.78	6.00			
Total	0.00	26.00	10.50	8.42	7.50			

*Maximum possible score = 30*

*Source: Research Survey Data*

The mean score for IITs and IISc is  $20.00 \pm 3.24$ , NITs  $7.13 \pm 3.64$  and Others  $8.22 \pm 9.78$ . The value of KW test is 7.218, d.f. 2 and the p value is less than 0.05. Accordingly the hypothesis tested is:

*H2 Among CFTIs, environmental scanning in the strategic management process is more evident in IITs and IISc than in NITs and Other group of Institutions.*

On completion of the analysis of external and internal environment, the next phase of strategic management process is setting up of long term objectives and evolving generic and grand strategies

#### **4.4.7 Practice of Evolving Long-term Objectives and Strategies in CFTIs**

Long term objectives can be defined as the results an institution seeks to achieve over a specified period of time typically over a period of three to five years. The practice of evolving such long term objectives in CFTIs has assessed through the variables included in the questionnaire. The results of the analysis indicate that in IITs and IISc and in NITs the practice of setting up of long term goals as a strategic management process is fully evident (Table 4.39)

**Table 4.39**

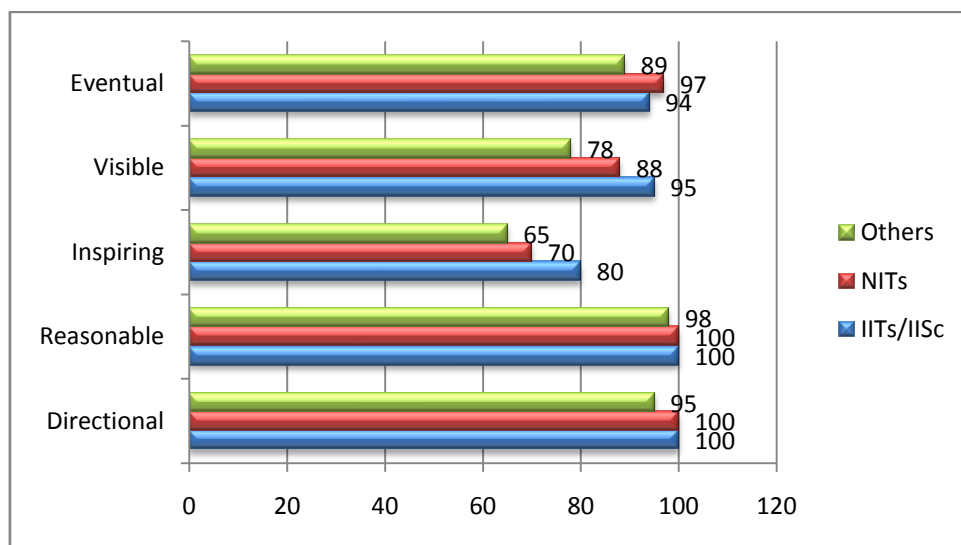
<b>Practice of Setting-up of Long Term Goals in CFTIs as a Strategic Management Process</b>				
		IITs and IISc	NITs	Others
Setting up of long term goals for a period of 3 to 5 years	Yes	100	100	66.70
	No	0	0	33.30

*Source: Research Survey Data*

The practice of setting up of long term goals for a period of 3 to 5 years is not found in 33.30 per cent of institutions under the Others category. The main reason for the absence of such practice is that, some of these are new institutions which are yet to establish their long term goals and some of the institutions are affiliated to the Universities where there is lack of freedom.

The basic qualities of long term goals are (a) Directional (moves towards the general objectives of the vision statement), (b) Reasonable (practical and obtainable not extreme), (c) Inspiring (provides management challenges and positive motivation), (d) Visible (the goal is easy to visualize) and (e) Eventual (will be fulfilled at a future date). It has also been verified whether CFTIs are giving sufficient care on these aspects while designing the long term goals (Figure 4.17)

(Figures in percentage)



Source: Research Survey Data

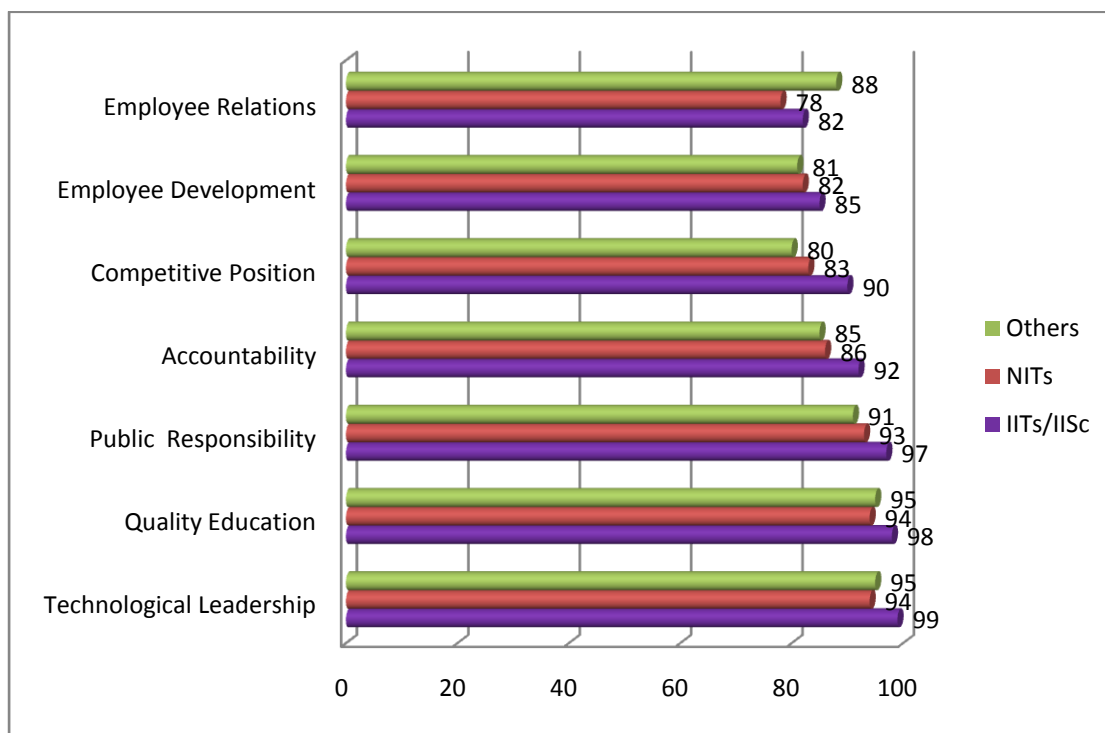
**Figure 4.17**

### **Distribution of Quality Dimensions of Long-term Objectives in CFTIs**

The data reveals that while devising the long-term goals in CFTIs, it is fully ensured that they are directional and reasonable. There is little deviation in rest of the quality dimensions particularly on account of the organizational set up of some of the institutions and lack of participation by all sections of the employees.

In order to achieve long term prosperity in the strategic management process, there are seven areas such as (a) Profitability (CFTIs being non-profit organizations this can be rephrased as Accountability); (b) Productivity (in the case of CFTIs it can be taken as Quality Education); (c) Competitive position (d) Employee Development (e) Employee Relations (f) Technological Leadership and (g) Public Responsibility. It

has also been verified whether the focus of long term planning of CFTIs is within these directions (Figure 4.18)



Source: Research Survey Data

**Figure 4.18**

### **Distribution of Focus Area of Long-term Objectives in CFTIs**

The results indicate that CFTIs cover all the seven areas while planning sustainable development. However, the major focal point of long term objectives of CFTIs is technological leadership followed by quality education and public responsibility.

The further process of activity in strategic management is identification of generic strategy.

#### **4.4.7.1 Identification of Generic Strategy of CFTIs**

The general philosophy of strategic management process is to concentrate the activities in line with the mission statement. This has to be translated into a holistic statement of institution's strategic orientation before it is further defined in terms of a specific long term strategy. In other words, a long-term or grand strategy must be based on a core idea about how an institution can excel and compete in the education

environment. The popular term used for this core idea is ‘generic strategy’ (John et al 2012). Based on the Michael Porter model, many strategists believe that any long term strategy has to be derived from a firm’s attempt to seek a competitive advantage based on any of the three generic strategies such as low cost leadership, differentiation and focus.

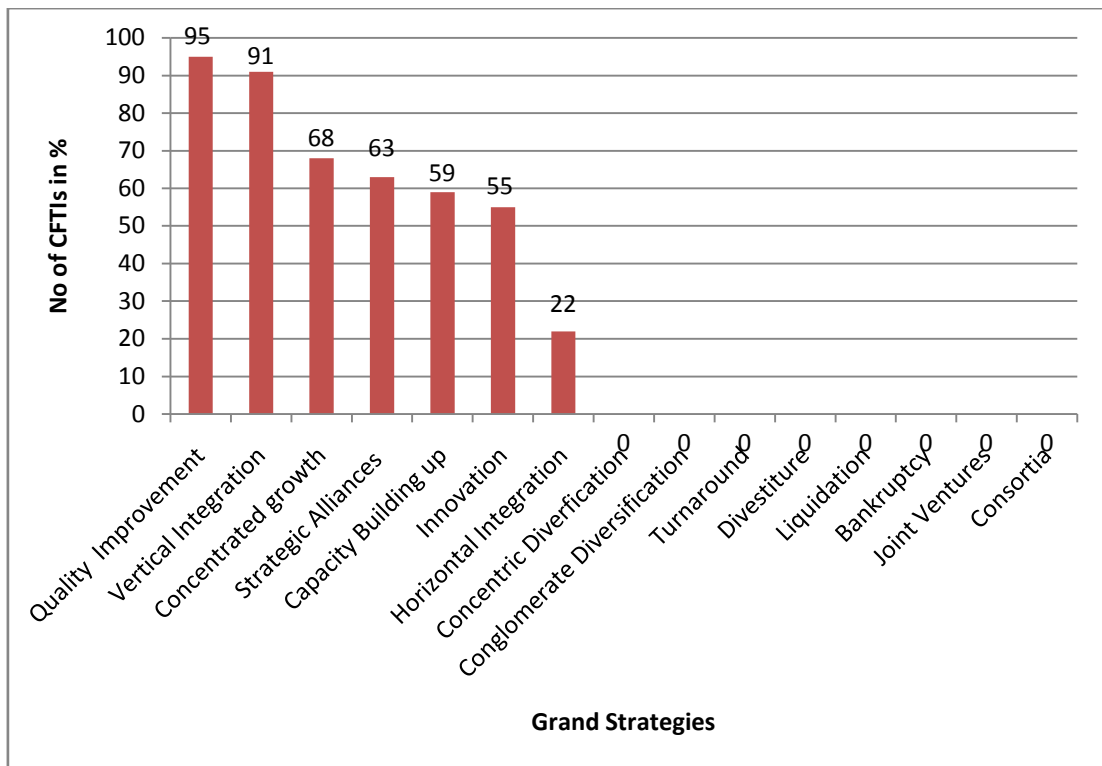
As can be identified from the discussions in section 4.4.2 the focus of mission of CFTIs is ‘differentiation’. Thus the generic strategy of CFTIs, is striving to create unique quality of technical education and quality research through differentiation.

After discussing the generic strategy of CFTIs, further discussion is focused on the various grand strategies available in the strategic management process.

#### **4.4.7.2 Identification of Grand Strategies by CFTIs**

A master long-term plan that provides basic direction for major actions directed towards achieving long-term objective is called grand strategy. Grand Strategies are the basis of coordinated and sustained efforts directed towards achieving long-term objectives. This will also indicate time period over which long-range objectives are to be achieved. Thus, the grand strategy is defined as a comprehensive general approach that guides the major actions. There are fifteen principal grand strategies for the business sector. Two of these, namely market development and product development are not at all relevant to the non-profit education sector. In this study, these have been re-phrased as capacity building-up and quality improvement. Accordingly, the grand strategies are concentrated growth, capacity building-up, quality improvement, innovation, horizontal integration, vertical integration, concentric diversification, conglomerate diversification, turnaround, divestiture, liquidation, bankruptcy, joint ventures, strategic alliances and consortia. The organizations usually combine several grand strategies to achieve the long-term objectives.

The data on various grand strategies adopted by CFTIs were collected and sorted on the basis of number of CFTIs resorted on the grand strategy (Figure 4.19)



**Figure 4.19**  
**Distribution of Grand Strategies Adopted by CFTIs**

The data reveals that 95 per cent of CFTIs have resorted to quality improvement as grand strategy. Specialized quality improvement programmes for the faculty members and frequent faculty development programmes are being offered in all CFTIs. Periodical revision of the curriculum is being done with inputs taken from various stakeholders. International conferences of emerging technology areas are being organized regularly. With all these focused measures, in general, CFTIs are able to achieve more quality to keep abreast with the changing technology environment.

Vertical integration has been adopted as a grand strategy by 91 per cent of CFTIs. Almost all NITs previously known as RECs were initially started only with the undergraduate programmes. Later, these institutions could start post-graduate programmes and doctoral programmes in all areas of engineering and technology. Many of the IITs have even post-doctoral fellowships in all specializations of engineering. Thus, CFTIs are able to achieve the vertical integration to a great extent.



Concentrated growth as a grand strategy has been adopted by 68 per cent of CFTIs. The core strength of many of the institutions under CFTIs is on the undergraduate programmes offered by them. Realizing this aspect in the initial phase, the concentration was on undergraduate programmes offered by the institutions. Once the undergraduate programmes were stabilized, the institutions focused on the concentrated growth of post-graduate programmes.

Strategic alliances as a grand strategy have been taken up by 63 per cent of CFTIs to meet the direction on internationalization given in the vision and mission statement. The IITs and IISc have signed Memorandum of Understandings (MoUs) with leading WCUs on collaborative research programmes. In order to have knowledge sharing, even the institutions like NITs are now focusing on MoUs with WCUs on the area of faculty and students' exchange programmes. CFTIs are also having strategic alliances with major players in the industry in the area of consultancy and sponsored research programmes.

Capacity building-up is another grand strategy resorted to by 59 per cent of CFTIs. Initially, the intake on each specialization of engineering was sixty and the total students in the campus were to the tune of 3000 to 4000. In WCUs, the student strength is around 10000 per institution. None of the CFTIs has attained this level. However, on constant efforts the CFTIs could raise the student intake level to a manageable level. Consequent to the introduction of reservation for OBCs in CFTIs, the government of India directed the IITs and NITs to build up intake for the undergraduate programmes to the tune of fifty four per cent more over a period of four years. Even though, the institutions could attain the targeted level, there are constraints such as faculty shortage and infrastructural support facilities. Accordingly, this cannot be stated as a successful grand strategy.

Innovation as a grand strategy seeks more customer (in the case of CFTIs, it is stakeholder) acceptance with improved services or products. Among CFTIs 55 per cent of institutions are focusing on this aspect to attain the mission direction of multi-disciplinary education. With this strategy the CFTIs are offering many industry

specific post-graduate programmes. Likewise, the CFTIs could also attain many post-graduate programmes in the multi-disciplinary area of bio-technology, bio-engineering, nanotechnology etc.

Horizontal integration was another strategy for CFTIs (22 per cent). Moving away from courses on technology some of the institutions under CFTIs could start programme in the field of pure Science, Arts, Bio-engineering and Law. Recently, IIT Kharagpur submitted a proposal for opening a medical college in collaboration with Indian railways, which has formally approved by the IIT Council. However, for offering programme in medicine the IIT Act has to be amended and the approval from the medical council is also required or IITs has to be given a statutory status so that they can also give medical degrees. As per the criteria under QS World Ranking, the institutions have to offer minimum five disciplines and must have medical education as a separate branch. This is one of the major drawback that the Indian Institutions to achieve good position in the world ranking.

The opinion of the faculty on integration shows diverse opinion on Vertical integration, Horizontal or on both (Table 4.40). The highest total percentage of 31.70 is of the opinion that the CFTIs should focus on both vertical and horizontal integration.

**Table 4.40**  
**Distribution of Faculty Opinion on the Grand Strategy on Integration**

*(Figures in percentage)*

	IITs and IISc	NITs	Others	Total
Vertical integration	27.60	28.60	29.10	28.30
Horizontal integration	30.30	22.40	32.70	28.90
Both vertical and horizontal integration	30.30	38.80	27.30	31.70
Integration will hamper the system	11.80	10.20	10.90	11.10
Total	100	100	100	100

*Source: Research survey data*

The strategic management model provides strategic choice decision making leads to the sequential selection of long-term objectives and grand strategies. In fact, strategic choice is the simultaneous selection of long-term objectives and grand strategies. The strategic planners while studying the opportunities, try to determine which are the most likely to result in achieving various long-range objectives. Simultaneously, they try to forecast whether an available grand strategy can take advantage of preferred opportunities so the tentative objectives can be met.

#### **4.4.8 Practice of Strategic Analysis and Choice in CFTIs**

The strategic planners of the institute have to evaluate and choose strategies that they think fit for their institution. In the business, the generic strategies are low cost leadership, differentiation and focus. In the case of CFTIs, the popular generic strategies can be differentiation, which makes the institution distinct from others in terms of quality and excellence. The subsequent level of importance can be assigned to the low cost leadership, which will help the CFTIs to become more self sustaining in the scenario of reducing governmental dependence. Rivalry is reduced when the institution is successful in differentiates itself. It is also a fact that brand loyalty is hard for any new entrants to overcome. The beneficiaries or customers are less sensitive to prices for effective differentiation. Hence the low cost leadership is only secondary in the case of CFTIs.

The existence of the practice of strategic analysis and choice as a strategic management process has measured through the variables. The analysis of responses reveals that the practice of strategic analysis and choice is evident in IITs and IISc to the tune of 80 per cent at active level and remaining 20 per cent at moderate level (Table 4.41)

**Table 4.41****Assessment of Existence of Strategic Analysis and Choice in CFTIs***(Figures in percentage)*

Classification	Type of Institution			Total
	IIT and IISc	NITs	Others	
Active	60.00	37.50	33.30	40.90
Moderate	40.00	62.50	22.20	40.90
Non-existent	0	0	44.40	18.20
Total	100	100	100	100

*Source: Research Survey Data*

In the case of NITs majority (62.50 per cent) are in active category and rest (37.50 per cent) moderate. In Other category institutions are 33.30 per cent in active, 22.20 per cent in moderate and finally 44.50 per cent as non-existent.

Thus, the presence of the practice of strategic analysis and choice varies within group of institutions. However, in total majority (54.55 per cent) of the institutions are having the practice of strategic analysis and choice in the strategic management process. An assessment of the total score of this section has been made to find out possible relationships (Table 4.42).

**Table 4.42****Summary Score on the Practice of Strategy Analysis and Choice in CFTIs**

Category	Min.	Max.	Mean	SD	Median	KW test value	d.f.	P value
IITs & IISc	2.00	8.00	5.600	2.191	6.000	6.889	2	0.032 Significant
NITs	2.00	9.00	4.875	1.458	5.000			
Others	1.00	9.00	4.333	2.398	4.000			
Total	0.00	9.00	3.727	2.472	3.5000			

*Maximum Possible Score = 9**Source: Research survey data*

The KW test value of the section is 6.889 and p value is 0.032 which is significant. The mean value is  $5.60 \pm 2.191$  in IITs and IISc, Others  $4.33 \pm 2.398$  and NITs  $1.875 \pm 1.458$ . As such the hypothesis tested is :

*H4 Among CFTIs, the practice of strategy analysis and choice is more evident in IITs and IISc than in other CFTIs.*

With this the formulation in strategic management process has concluded. The forthcoming section focuses on strategy implementation.

#### **4.5 STRATEGY IMPLEMENTATION IN CFTIs**

To ensure success, the strategy has to be translated into carefully implemented action. Accordingly, the strategy has to be translated into guidelines for the daily activities of the organization. It has to be reflected in key organization leaders, culture of the organization and the way the firm organizes its activities. The administrators or executives has to put into place 'steering' controls to adjust strategies, commitments and objectives in response to ever-changing future conditions. Precisely, there has to be serious commitments to survive, grow and prosper in a vastly competitive and rapidly changing global arena.

There are two major phases in the strategy implementation. One is creation of clear short-term objectives and action plans that are compatible with the selected set of long-term objectives and grand strategies. Secondly, implementation of the strategic choices by means of budgeted resource allocations, matching of tasks, people, structures, technologies and reward system. This includes specific functional tactics, empowerment of operating personnel through policies and guide decisions and implementation of reward system etc.

##### **4.5.1 Identifying the Practices of Evolving of Short Term Objectives in CFTIs**

Short term objectives help implementation of strategy in at least three ways. Firstly, short-term objectives operationalize long term objectives. Secondly, discussion about the agreement on short-term objectives helps raise issues and potential conflicts

within the organization. Finally, short-term objectives assist strategy implementation by identifying measurable outcomes of action plans or functional activities.

The practice of setting up short-term objectives has been identified through the variable in the questionnaire (Table 4.43)

**Table 4.43**  
**Assessing the Practice of Setting up of Short-term Objectives in CFTIs**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	60.00	37.50	11.10	31.80
Moderate	40.00	62.50	33.35	45.45
Non-existent	0	0	55.55	22.75
Total	100	100	100	100

*Source: Research Survey Result*

The practice of setting up of short term objectives in line with the grand strategy is at moderate level in majority of the CFTIs (45.45 per cent). In the active category, there are 31.80 per cent institutions.

In CFTIs, there is the practice of drawing budget estimates both for recurring (plan) and non recurring (non-plan) expenditure for the period of one year and the estimate for the forthcoming year as a blue print of future objectives. This has to be submitted to the MHRD, Government of India every year. While MHRD usually allots matching grants for the recurring expenses (non-plan), the allotment to the non-recurring (plan) expenditure is based on the proposals, discussion by the MHRD Officials with the institute officials and finally allotment subject to fund availability of the Ministry. The short term plans of the CFTIs includes recruitment plan for faculty and staff, curriculum revisions, building up infrastructural support, renovation of laboratories etc. to support the long term objectives.

It is also identified during the interviews that many institutions of CFTIs resort to adhoc planning to meet various exigencies.

The next task is to find out whether CFTIs assure qualities of short-term objectives to be more effective. The variables to assess the qualities in fixing the short-term objectives taken for this study are measurable and prioritized (Table 4.44)

**Table 4.44**  
**Assessing Qualities of Short-term Objectives of CFTIs**

		IITs and IISc	NITs	Others
In Setting up of short term objectives whether the qualities (measurable and prioritization) are ensured	Yes	100	80	22.20
	No	0	20	77.80

*Source: Research Survey Data*

The analysis reveals that these quality aspects of measurability of short term objectives were ensured as well as these objectives are prioritized based on the time consideration or on the impact on the strategy in hundred per cent IITs and IISc and 80 per cent NITs. In the Others group these aspects are not ensured (77.80), primarily because of the fact that planning is at the infancy stage in many of these institutions.

Thus, when the short-term objectives are finalized the initial task of strategy implementation is over. The second phase of strategy implementation is evolving functional tactics, empowerment of operating personnel through policies and guide decisions and implementation of reward system etc.

#### **4.5.2 Identifying the Practices of Evolving Functional Tactics to Implement Strategies**

The functional tactics translate thought (grand strategy) into action designed to accomplish specific short-term objectives. Every value chain activity in an organization executes functional tactics that support the organizational level strategy and help realizing the objectives.

Functional tactics are highly important in strategic management. This may seem, detailed and tedious compared to earlier phases of strategic planning, which is more or less creative in nature. Therefore, functional tactics is too often ignored, leaving the results of earlier stages of planning meaningless. Meaningful stages of earlier planning become utterly useless, in case proper functional tactics is not made and people are not empowered with policies and guide decisions.

The difference between short-term objective and functional tactics are in terms of specificity, time horizon and participant. The functional tactics are too specific for each functional area of the institution may be academic, administration, finance etc. The shorter time horizon of functional tactics is critical to the successful implementation of the strategy for two reasons. First, it focuses the attention of functional managers on what needs to be done now to make the strategy work. Second, it allows functional managers to adjust to changing current conditions. Lastly, the participant work on developing strategy is too little at top level, whereas, the section heads typically delegates the development of functional tactics to subordinates charged with running the operating areas of the institution. To verify how it works in CFTIs, the variables obtained through questionnaire has been analyzed (Table 4.45)

**Table 4.45**  
**Assessment of the Practices of Formulation of Functional Tactics in CFTIs**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IIT and IISc	NITs	Others	
Active	60.00	37.50	22..20	36.36
Moderate	40.00	62.50	22.20	40.90
Non-existent	0		55.60	22.74
Total	100	100	100	100

*Source: Research Survey Data*



The analysis of results indicates that in total 50 per cent of institutions are at active level. This is followed by a total of 27.30 per cent at moderate level. Such practice is non-existent in 22.70 per cent institutions. Here also, IITs and IISc are the fore-runners. This is because of the fact that IITs and IISc have established planning system, resources and sufficient funds to execute the plans.

The functional tactics in CFTIs are done at the department level. The faculty, staff and even students participate in designing the functional tactics. Some of the functional tactics taken by the institutions under CFTIs are outsourcing some areas, contract engagements, class room renovation, laboratory renovation, building up research base for specific branch of engineering, course planning etc.

Empowerment is the act of allowing an individual or team the right and flexibility to make decisions and initiate action. Training, self-managed work groups, eliminating whole levels of management in organizations, and aggressive use of automation are some of the ways and ramification of this fundamental change in the way organization function. At the heart of the effort is the need to ensure that decision making is consistent with mission, strategy and tactics and at the same time, allowing considerable latitude to operating personnel. Empowerment has limited application in a non-profit institution like CFTIs, where the autonomy is considerably limited. However, in CFTIs such terms of reference have been given to committees constituted for specific purposes. The committees make specific recommendations and final decision is taken by the competitive authorities.

Policies are directives designed to guide the thinking, decisions, and actions of managers and their subordinates in implementing a firm's strategy. Sometimes, policies (standard operating procedures) increase managerial effectiveness by standardizing many routine decisions which in turn speed up implementing functional tactics. Logically, policies are derived from functional tactics for stimulating strategy execution. CFTIs have devised policies on procurement, recruitment, academic matters and quality improvement measures.

Another factor which complements the functional tactics is reward system. The analysis of responses collected indicates that IITs and IISc and NITs do not have any system of offering rewards to the individuals/groups for the successful implementation of the strategies (Table 4.46)

**Table 4.46**  
**Existence of Reward System to Complement Strategy Implementation in CFTIs**

		IITs and IISc	NITs	Others
Does CFTIs offer rewards to the individuals/ group for the successful implementation of Strategies	Yes	0	0	11.10
	No	100	100	88.90

*Source: Research Survey Data*

In the Other category of institutions only 11.10 per cent offer such rewards. This is particularly because of the reason that in CFTIs compensation is paid as per government rules. The government rules do not provide any scope for making such rewards.

Thus, the implementation of strategy is the process through which a chosen strategy is put into action. It involves the design and management of systems to achieve the best integration of people, structure, processes and resources in achieving organizational objectives. Hence, institutions must consider analysis of its structures and system before implementation as well as the analysis of culture, power and conflict (Ellis and Dick 2000). In order to effectively implement strategy, the organization must integrate the activities of several different functions namely the best integration of people, structures, process and resources in reaching the goals and objectives. The survey relating to the success of strategy implementation indicates that it cannot be achieved in full in any one of the CFTIs (Table 4.47).

**Table 4.47**  
**Success of Strategy Implementation in CFTIs**

Success Rate in per cent	<i>Number of institutions in per cent</i>		
	IITs and IISc	NITs	Others
76 to 100	0	0	0
51 to 75	60	35	22
26 to 50	40	25	13
0 to 25	0	40	65
Total	100	100	100

*Source: Research Survey Data*

IITs and IISc group could achieve 51 to 75 per cent success in 60 per cent of their strategies and 26 to 50 per cent success in 40 per cent of institutions. In the case of NITs 51 to 75 per cent success for 35 per cent of institutions, 26 to 50 per cent success in 25 per cent of institutions and 0 to 25 per cent success in 40 per cent institutions. In Other group, the condition is still worse. The success rate of 51 to 75 per cent has only in 22 per cent institutions, 26 to 50 per cent success in 13 institutions and 0 to 25 per cent success in 65 per cent of the institutions. The low success rate in CFTIs can be attributed as there are impeders in strategy implementation. Hence, an analysis has been made to assess the impeders of strategy implementation.

#### **4.5.3 Assessment of Impeders in Strategy Implementation in CFTIs**

An analysis was made to find out the major impeders in strategy implementation in CFTIs, based on the responses received on the questionnaire in 5 point Likert scale with choices ranging from 1 for strongly disagree and 5 for strongly agree, which were administered to the faculty members, who actively participates in the top level management in CFTIs. The study of impeders were made in five major headings

namely Organizational issues, planning consequences, managerial issues, individual issues and environmental issues.

#### 4.5.3.1 Organizational Issues as Impeders in Strategy Implementation in CFTIs

The major organizational impeders in respect of CFTIs that directly affect the strategy implementation has been assessed through the mean value and standard deviation of the responses sorted on the basis of mean value to find out the most significant impeders of this group (Table 4.48).

**Table 4.48**

#### **Organizational Issues as Impeders in Strategy Implementation in CFTIs**

No*	Impeders	IITs & IISc		NITs		Others		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
O2	Lack of Autonomy	3.65	1.16	3.63	1.09	3.58	1.07	3.65	1.10
O1	Incompatible structure with the strategy	3.79	1.09	3.58	1.07	3.46	1.15	3.61	1.09
O11	Unsuitable compensation system	3.66	1.08	3.62	1.00	3.44	1.07	3.57	1.06
O12	Inadequate physical facilities	3.51	1.71	3.65	1.08	3.52	1.02	3.56	1.09
O4	Lack of adequate communication	3.71	1.09	3.49	1.01	3.36	1.00	3.52	1.04
O8	Competing activities among people	3.68	1.05	3.32	1.05	3.44	1.21	3.48	1.12
O6	Lack of adequate information system	3.67	1.06	3.39	1.10	3.13	1.23	3.46	1.11
O7	Compatible Organizational Culture	3.56	1.17	3.62	1.12	3.22	1.04	3.46	1.12
O10	Unsuitable evaluation and control system	3.60	1.04	3.36	1.12	3.38	1.07	3.45	1.08
O13	Lack of in-creative system	3.40	1.18	3.53	1.02	3.38	1.21	3.44	1.44
O3	Unsuitable resources allocation	3.33	1.05	3.49	1.00	3.33	1.06	3.38	1.02
O5	Lack of effective co-ordination	3.44	1.07	3.30	1.02	3.34	1.24	3.36	1.11
O9	Competing activities among Departments	3.56	1.07	3.23	1.09	3.11	1.10	3.30	1.10

*Note:\*= Item numbers correspond with those in Table 2.6*

*Source: Research survey data*

Accordingly, major organizational issues in respect of CFTIs are lack of autonomy; incompatible organizational structure and unsuitable compensation system are the three major obstacles. As far as IITs and IISc group is concerned, the major obstacle is organizational structure; in NITs inadequate physical facilities and in Other groups,

lack of autonomy is the major obstacle. The lowest means in total column represent the least affected obstacles. As far as CFTIs are concerned the least affected obstacles are the competition among department and lack of co-ordination.

#### 4.5.3.2 Planning Consequences as Impeders in Strategy Implementation in CFTIs

On analysis of responses on planning consequences, results indicates that lack of identification of major problems, unclear regulation and executive policies and lack of consensus among decision makers are the major impeders, having highest mean of 3.47, 3.44 and 3.43 consecutively (Table 4.49).

**Table 4.49**  
**Distribution of Planning Consequences**

No	Impeders	IITs & IISc		NITs		Others		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
P5	Lack of Identification of major problems	3.44	1.07	3.64	1.11	3.33	1.16	3.47	1.12
P8	Unclear regulation and executive policies	3.40	1.17	3.49	1.24	3.42	1.18	3.44	1.19
P4	Lack of consensus among decision makers	3.11	1.20	3.52	1.06	3.67	1.06	3.43	1.13
P6	Lack of effective role formulators	3.38	1.14	3.39	1.17	3.38	1.16	3.38	1.15
P1	Lack of exact strategic planning	3.22	1.04	3.68	1.27	3.13	1.28	3.34	1.22
P7	Unsuitable training system	3.33	1.12	3.30	1.17	3.29	1.14	3.31	1.14
P3	Time Limitation	3.33	1.06	3.02	1.21	5.45	1.16	3.27	1.15
P9	Lack of choice of real strategy	3.28	1.05	3.26	1.07	3.26	1.07	3.27	1.06
P2	Insufficient linking of the strategy to goals	3.00	1.16	3.26	1.19	3.52	1.28	3.26	1.23
P10	Lack of a national attitude to strategy	3.23	1.26	3.23	1.29	3.23	1.29	3.24	1.28

Note: Item numbers correspond with those in Table 2.6

Source: Research survey data

At the same time national attitude to strategy and insufficient linking of strategy to goals formed the least influenced impeders on this group. Group-wise analysis indicate that IITs and IISc have the major obstacle of lack of identification of major

problems, NITs have lack of exact strategic planning and lack of consensus among decision makes in respect of Others group.

#### 4.5.3.3 Managerial Issues as Impeders in Strategy Implementation in CFTIs

Successful strategy implementation depends greatly on good internal organization and competent personnel. Strategy formulation requires great deal of vision, analysis, and entrepreneurial judgment and the success of strategy implementation depends on the skills of working through others, organizing, motivating, culture-building, and creating stronger strategy and how the organization operates. The managers, who are the strategy implementers has to face the challenge in bringing the conduct of internal operations into good alignment with strategy and to unite the total organization behind accomplishment of strategy. Based on the responses from the CFTIs, the major impeders in the managerial issues has been sorted out on the total mean value (Table 4.50)

**Table 4.50**  
**Managerial Issues as Impeders in Strategy Implementation in CFTIs**

S No	Impeders	IITs & IISc		NITs		Others		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
M6	Unsuitable personnel management	3.53	1.05	3.52	1.05	3.56	1.06	3.54	1.05
M8	Lack of enough motivation among managers	3.31	1.15	3.31	1.12	3.30	1.14	3.31	1.13
M1	Unsuitable leadership	3.21	1.26	3.19	1.05	3.16	1.28	3.19	1.20
M2	Lack of adequate organizational support	3.16	1.10	3.18	1.12	3.13	1.10	3.16	1.11
M4	Fear of insecurity among managers	3.17	1.07	3.18	1.06	3.13	1.07	3.16	1.06
M5	Political factors in regard to power	3.17	1.28	3.14	1.29	3.15	1.25	3.15	1.27
M3	Lack of adequate manager commitment	3.10	1.05	3.14	1.05	3.11	1.06	3.12	1.05
M7	Uncontrollable factors	3.02	1.14	3.08	1.14	3.13	1.21	3.08	1.16

*Note: Item numbers correspond with those in Table 2.6*

*Source: Research survey data*

The results indicate that the major impeder as unsuitable personnel management with highest mean value of 3.54, which is highest among all groups. All groups are under unanimous on this opinion. This is followed by lack of enough motivation among

managers with mean value of 3.31 and unsuitable leadership with mean value of 3.19. This is also in confirmation with the results among other sub groups. Accordingly these aspects are taken for detailed deliberations.

#### 4.5.3.4 Individual Issues as Impeders in Strategy Implementation in CFTIs

Strategy implementation broadly contains three main parts: the technical system, the business process system, and the social system. The management teams do a good job in re-engineering business processes with their new strategy, the advantage of cutting-edge technology can get over the technical system very fast, but the synthesizing the social system with the strategy is a rocky one. Thus the major individual issues were tested with the responses received and based on the mean value these issues were sorted (Table 4.51).

**Table 4.51**  
**Individual Issues as Impeders in Strategy Implementation in CFTIs**

No	Impeders	IITs & IISc		NITs		Others		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
I3	Resistance to change among Departments	3.43	1.09	3.4	1.09	3.43	1.07	3.42	1.09
I2	Resistance to change among people	3.37	1.11	3.39	1.06	3.33	1.27	3.36	1.14
I5	Lack of understanding of the strategy	3.33	1.23	3.26	1.29	3.30	1.22	3.30	1.25
I6	Inadequate connection to the vision	3.33	1.19	3.28	1.23	3.29	1.20	3.30	1.21
I8	Lack of employee commitment	3.27	1.24	3.26	1.23	3.27	1.22	3.27	1.23
I1	Lack of enough capabilities of employees	3.29	1.16	3.25	1.19	3.25	1.17	3.26	1.16
I7	Lack of enough motivation of employees	3.26	1.15	3.23	1.25	3.21	1.12	3.24	1.17
I4	Fear of insecurity in the new assignments	3.12	1.17	3.13	1.14	3.10	1.16	3.12	1.16

*Note: Item numbers correspond with those in Table 2.6*

*Source: Research survey data*

Among the various issues, resistance to change has become the major issue in all groups of institutions, which is followed by resistance to change among people. Lack of understanding of the strategy has become the third obstacle in line.

#### 4.5.3.5 Environmental Issues as Impeders in Strategy Implementation in CFTIs

Modern organizations face significant shifts in the environment. Education sector has greater footing on various environmental factors as the output from these institutions has to be in tune with the needs of the economy and the political factors greatly influence in defining the directions of the no-profit institutions. The analysis of the responses on the drivers on environment and arranged in the order of mean reveals that all factors are having more or less equal weightage and with slightly higher degrees (Table 4.52). Thus, the major obstacle on environmental issues is unanticipated market change. The least affected one is lack of support from industries with mean value 3.32.

**Table 4.52**

**Environmental Issues as Impeders in Strategy Implementation in CFTIs**

No	Impeders	IITs & IISc		NITs		Others		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
E2	Unanticipated market change	3.60	1.22	3.52	1.21	3.50	1.13	3.54	1.19
E1	Uncontrollable external factors	3.43	1.13	3.46	1.26	3.40	1.04	3.43	1.14
E3	Lack of support from Industries	3.48	1.14	3.26	1.17	3.21	1.26	3.32	1.20

*Note: Item numbers correspond with those in Table 2.6*

*Source: Research survey data*

#### 4.5.3.6 Identification of Major Impeders in Strategy Implementation in CFTIs

In order to identify the major impeders the first two major impeders in different headings are put together for analysis (Table 4.53). In total ten major impeders from the five different headings are compiled.



**Table 4.53****Distribution of Major Impeders in Strategy Implementation in CFTIs**

No	Impeders	IITs&IISc		NITs		Others		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
O2	Lack of Autonomy	3.65	1.16	3.63	1.09	3.58	1.07	3.65	1.10
O1	Incompatible structure with the strategy	3.79	1.09	3.58	1.07	3.46	1.15	3.61	1.09
M6	Unsuitable personnel management	3.53	1.05	3.52	1.05	3.56	1.06	3.54	1.05
E2	Unanticipated market change	3.60	1.22	3.52	1.21	3.50	1.13	3.54	1.19
P5	Lack of Identification of major problems	3.44	1.07	3.64	1.11	3.33	1.16	3.47	1.12
P8	Unclear regulation and executive policies	3.40	1.17	3.49	1.24	3.42	1.18	3.44	1.19
E1	Uncontrollable external factors	3.43	1.13	3.46	1.26	3.40	1.04	3.43	1.14
I3	Resistance to change among Departments	3.43	1.09	3.4	1.09	3.43	1.07	3.42	1.09
I2	Resistance to change among people	3.37	1.11	3.39	1.06	3.33	1.27	3.36	1.14
M8	Lack of enough motivation among managers	3.31	1.15	3.31	1.12	3.30	1.14	3.31	1.13

*Note: Item numbers correspond with those in Table 2.6*

*In item number alphabet O=Organizational Issues, P=Planning issues, M= Managerial Issues, I=Individuals Issues and E=Environmental Issues*

*Source: Research survey data*

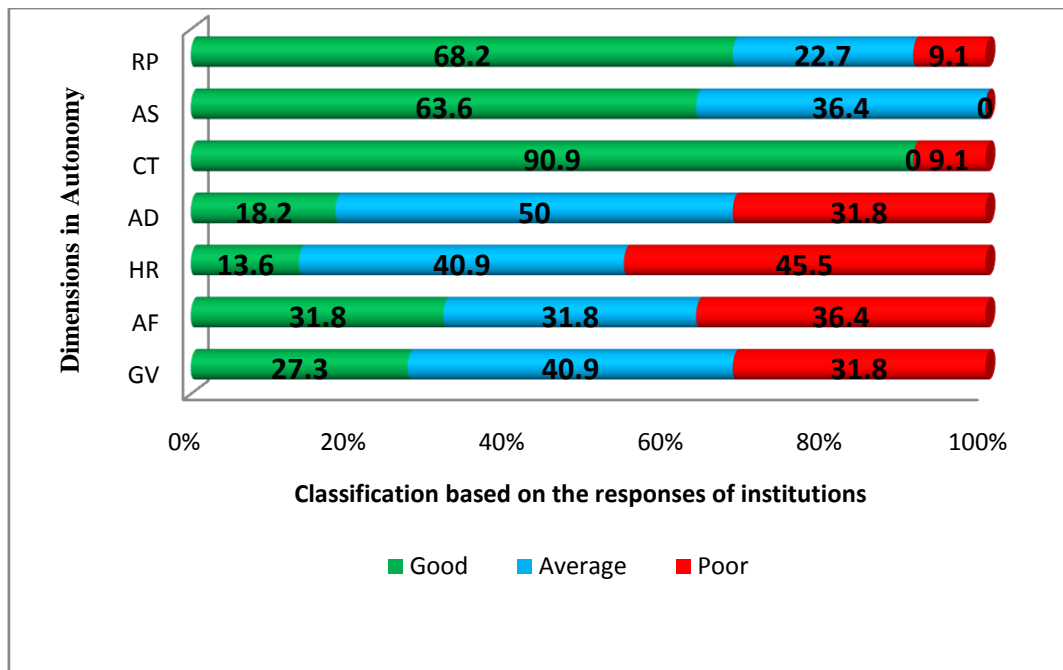
The analysis reveals that Lack of Autonomy (mean  $3.65 \pm 1.10$ ) in organizational issues form the most important impeder followed by incompatible structure with the strategy (mean =  $3.61 \pm 1.09$ ). These two impeders have taken up for detailed study for more clarity.

#### **4.5.3.7 Level of Autonomy Exercised by the CFTIs**

Autonomy in the right sense denotes freedom in administration and governance without any intervention from government or regulatory bodies. Institutes must take advantage of their new found autonomy. Something else which boosts the confidence

of Institute administration is, objectively, the exceptional financial assistance which has made available for them by the government. The universities and world of higher education changed extremely quickly and that if institutions don't plan for the future they could quickly find themselves irrelevant. India is genuinely a country on the move and, as such, has plenty of reasons to be optimistic. In the case of non-profit organization the intervention of various governmental agencies and regulatory bodies are a common phenomena in India. This will act as an impediment to make Institute's own management policies and strategies. As such, before analyzing the strategic management practices, an assessment of the level of autonomy enjoyed by the CFTIs is an essential factor.

Autonomy enjoyed by CFTIs was measured in seven major dimensions such as autonomy in governance, administration and finance, human resource management, admission, curriculum and teaching, academic standards and research and publication. The responses on all variables in each section given by the institution has analyzed using the statistical formula  $\text{mean} \pm 0.425 \times \text{SD}$ . Since the variable is standardized, mean is equal to zero and standard deviation is one always. (i) if it is  $> (\text{mean} + 0.425 \times \text{SD})$  categorized as "good", If score  $< (\text{mean} - 0.425 \times \text{SD})$  then one, which is categorized as "poor" and if it is between  $(\text{mean} - 0.425 \times \text{SD}, \text{mean} + 0.425 \times \text{SD})$  categorized as "average". The results of the analysis have been plotted in Figure 4.20. The results indicate that the highest level of autonomy enjoyed by the CFTIs are in curriculum and teaching (90.90 per cent) followed by autonomy on research and publication (68.20 per cent). In fixing the academic standards also the CFTIs enjoy considerable level of autonomy (63.90 per cent). As per the IIT Act, NIT Act and statutes thereon the institutions have considerable level of autonomy in all academic matters. The senate of the institute is the final authority on any academic matters. There is no intervention from any authorities in any way in the academic matters of the institute.



Note: RP = Autonomy in research publications, AS = Autonomy in fixing academic standards, CT=Autonomy in curriculum and teaching, AD=Autonomy in Admission, HR=Autonomy in human resource management, AF=Autonomy in administration and finance, GV=Autonomy in governance

Source: Research survey data

**Figure 4.20**

### **Distribution of Autonomy Enjoyed by CFTIs on Various Dimensions**

The restriction in autonomy in CFTIs are mainly on human resource management (45.50 per cent ), followed by administration and finance (36.40 per cent, governance (31.80 per cent) and admission (31.80 per cent). In human resource management the CFTIs have lesser autonomy because the institutions have to follow the reservations norms as prescribed by government of India, the salary and other compensation are fixed as per government of India rules and institutions do not have any flexibility. Even ratio of student versus faculty and faculty versus students are fixed by the government. The sanction of positions of faculty and staff are based on these norms. Thus, the autonomy for the CFTIs in human resource management has been curtailed to a great extent. Administration and finance of these institutions are strictly as per government of India regulations. Government financial rules are the basis for any financial expenditure. In the case of procurement and writing off obsolete items the government regulations has to be followed. In the governance also there are lot of intervention by the funding ministry and other regulatory agencies. In the case of

admission the government of India intervenes on reserving the seats for the socially backward classes of the society. In order to determine the level of autonomy among the group of institutions under CFTIs an analysis has been made based on the responses. Accordingly, the scores obtained in seven major sections as already explained were consolidated and analyzed (Table 4.54).

**Table 4.54**  
**Assessment of Autonomy Exercised by CFTIs**

Category	Min.	Max.	Mean	Std. deviation	Median	KW test value	d.f.	P value
IITs and IISc	95.00	124.00	105.40	8.82	103.00	10.396	2	0.006 Highly significant
NITs	90.00	105.00	96.00	5.07	94.50			
Others	78.00	94.00	89.75	7.85	93.50			
Total	78.00	124.00	99.14	9.48	97.50			

*Maximum Possible Score = 124*

*Source: Research survey data*

The KW Test value is 10.396, d.f. 2 and the p value is less than 0.05. The highest mean score is  $105.40 \pm 8.82$  for IITs and IISc, NITs  $96.00 \pm 5.07$  and Others  $89.75 \pm 7.85$ , as such the hypothesis tested is

*H1 IITs and IISc have more autonomy than NITs and other group of institutions in CFTIs*

#### **4.5.3.8 Analysis of Organizational Structure of CFTIs**

The organization chart of IISc, four IITs, NITs and one institution from Other group were analyzed. These organization charts are placed as Appendix I to VII.

Organizational structure refers to the formalized arrangement of interaction between and responsibility for the tasks, people and resources in an organization. It is most often seen as a chart, often a pyramidal chart, with positions or titles and roles in cascading fashion.

As we can see the organization structure of IITs and NITs are of functional organizational structure, where the tasks are entrusted in to different functional groups with formal procedures for coordinating and integrating the activities. Even among IITs the Planning function has not figured any prominence and has not assigned to a particular functional group except in the case of IIT Bombay. Thus, this structure is with a concentration of power in the apex functional group and with limited freedom when it moves down to the bottom line. This calls for decentralization of power which facilitates quick decision making process which is a pre-requisite of every competitive environment.

The twenty first century has seen an accelerating move away from traditional organizational structures toward hybrid adaptations that emphasize an external focus, flexible interaction, interdependency and a bottom-up approach. Accordingly, the CFTIs have to consider rebalancing the need for control, co-ordination, adjusting and re-engineering the structures to emphasize strategic activities, by downsizing and moving toward self-managing operational activities. In order to implement these, institutions has to get more autonomy.

#### **4.5.3.9 Analysis of Organizational Leadership and Culture of CFTIs**

Organizational leadership is the process and practice by key executives of guiding and shepherding people in an organization toward a vision over time and developing that organization's future leadership and organizational culture. Even though the responses do not indicate leadership and culture as a major indicator, the leadership and culture are important factor for every success of the strategy implementation. The chief leadership positions of CFTIs like that of Chairman of BoG, Director of the Institute are nominated by the MHRD, Government of India and the institution does not have any role in the appointment to these positions. The membership in the BoG is nominations from the Ministry and from Other regulatory agencies. Such nominations are ex-officio positions and the individuals occupying these positions change very often. There are nominations of two faculty members to the BoG. Even such nominations are only for a period of two years. Only the position of Registrar, who is responsible with the administration, is appointed by the Institute on contract

basis by selection. The senior advisory positions of Deans and the position of head of the departments are nominated from the faculty members without considering any specialized managerial expertise. Such nominations are for a specific period of two years. During such shorter periods of assignments any futuristic planning may be possible and secondly the continuity in planning process cannot be ensured. Similarly, specialized training on managerial aspects is another need to improve upon the situation

The aspect on imparting managerial training was raised on the questionnaire and the responses received reveals that the system is in existence among the IITs and IISc in a mild manner up to 50 per cent, whereas among NITs and Other Institutions (75 per cent and 60 per cent respectively) does have the system of such managerial training (Table 4.55).

**Table 4.55**  
**Practice of Imparting Managerial Training to Leaders of CFTIs**

*Figures in percentage*

		<b>IITs and IISc.</b>	<b>NITs</b>	<b>Others</b>
Kind of managerial training imparted	Continuous	25.00	12.50	20.00
	Frequent	25.00	0	0
	Occasional	0	12.50	20.00
	None	50.00	75.00	60.00

*Source: Research survey data*

In today's competitive environment requires a different set of management competencies than we traditionally associate with the role. The balance has clearly shifted from attributes traditionally thought of as masculine (strong decision making, leading the troops, driving strategy, waging competitive battle) to more feminine qualities (listening, relationship building and nurturing) (Williams et. al 2007).

Organizational culture refers to set of important assumptions and belief that members of an organization share in common. Every organization has its own culture. An

organizations culture is similar to an individual's personality. It is an intangible asset in providing meaning, direction and the basis for action. Managing the strategy-culture relationship requires different approaches, depending on the match between the demands of the new strategy and the compatibility of the culture with that strategy.

Thus, after deliberating on the strategy implementation and impeders affecting strategy implementation the next stage in the strategic management process is strategic control.

#### **4.6 STRATEGY CONTROLS IN CFTIs**

In this phase there are two aspects to be taken up. One is monitoring and control and secondly evaluation on the success or failure of the strategic management process and to give this as a feedback for future planning.

Strategies are forward looking plans, normally designed to accomplish over a period of time in future. These are often based on the assumptions about numerous events and factors that have not yet occurred. Thus, the strategic controls are intended to steer a company towards its long term strategic goals under uncertain, often changing circumstances. Four types of strategic controls exercised in the business world are premise controls, strategic surveillance, special alert controls and implementation controls. All these are to monitor strategy in its implementation. Operational control system requires systematic evaluation of performance and to report deviations, if any.

##### **4.6.1 Identifying the practice of Monitoring and Evaluation of Strategies in CFTIs**

In a non-profit organization, monitoring is the duty of the management to stay on the top of the stakeholder situations and deciding whether things are moving well internally and development monitored closely.

The concurrent quality audit by an internal body and unbiased assessment by an external body is a good practice for measuring the outcome. The responses received

from the institutions under CFTIs indicates that such mechanisms are not available in CFTIs (Table 4.56)

**Table 4.56**  
**Monitoring Quality Assessment by Internal/ External Body**  
*(Figures in percentage)*

Method of Quality Assessment		Institutions		
		IITs and IISc	NITs	Others
Existence system of quality assessment through internal/ external body	Yes	30	20	5
	No	70	80	95

*Source: Research survey data*

Similarly, in the competing environment the accreditation of institutions helps the institutions in determining the standards. The survey indicates that there is no mandatory requirement for CFTIs to undergo any national or international accreditation process (Table 4.57)

**Table 4.57**  
**Mandatory Accreditation by National / International Agencies**  
*(Figures in percentage)*

Method of Accreditation		Institutions		
		IITs and IISc	NITs	Others
Existence Mandatory requirement of accreditation by National/International agencies	Yes	0	0	0
	No	100	100	100

*Source: Research survey data*

National Board of Accreditation (NBA) is available as a national level accreditation process; it is optional for the institutions to undergo the process. India has not joined with Washington Accord. The absence of such accreditation causes student movement by way of collaboration on course delivery and credit transfer etc.



Monitoring and evaluation are geared towards learning from what you are doing and how you are doing it, by focusing on efficiency, effectiveness and impact. The variables measured are levels of controls on monitoring, measurement of impact, system of recording and assessing of accountability etc. In the compiled score of responses and categorization indicates that IITs and IISc have a monitoring and evaluation practice at active level (40 per cent) and remaining at moderate level (60 per cent) (Table 4.58). In other two cases majority responses indicates that such system is not in existence

**Table 4.58**

**Assessing the Practice of Monitoring and Evaluation of the Strategies in CFTIs**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IIT and IISc	NITs	Others	
Active	40.00	12.50	22.20	22.70
Moderate	60.00	25.00	22.20	31.80
Non-existent	0	62.50	55.60	45.50
Total	100	100	100	100

*Source: Research survey data*

Precisely, the system of monitoring and evaluation is present in CFTIs at active level only in 22.70 per cent institutions, in moderate level in 31.80 per cent institutions and non-existent in 45.50 per cent institutions.

In the final phase of strategic management the results evaluation and control has to be reported back to the designing level of strategic intent and also to the internal and external environment scanning, in the form of feedback.

#### 4.6.2 Identifying the Practice of Feedback as a Strategic Management Process in CFTIs

Finally, feedback system function as reporting the success or failures of the strategic plan to the environmental scanning and also to vision and mission is an important aspect through which the planning can be corrected in tune with the results on implementation. Existence of the feedback in CFTIs was measured through various variables and responses were compiled and categorized (Table 4.59).

**Table 4.59**  
**Existence of Feedback System**

*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	40.00	0	22.20	18.20
Moderate	60.00	37.50	22.20	36.30
Non-existent	0	62.50	55.60	45.50
Total	100	100	100	100

*Source: Research survey data*

The practice of providing feed back to strategic planning process is active only in 18.20 per cent CFTIs, moderate in 36.30 per cent institutions and it is non-existent in 45.50 per cent institutions.

On completing the discussion on components of various strategic management processes the next section reveals how far strategic management practices are evident in CFTIs.

#### 4.7 ASSESSMENT OF STRATEGIC MANAGEMENT PROCESSES IN CFTIs

The existence of the major components of strategic management in CFTIs have identified through various variables. Finally, the responses on all the variables were consolidated to trace out a holistic view of existence of strategic management process in CFTIs (Table 4.60). The results indicate that in IITs and IISc, the components strategic management practices are evident at 60 per cent of institutions at active level. Remaining 40 per cent of institutions at moderate level of 37.50 and is non-existent in 62.50 per cent institutions. In Others group, 33.30 per cent institutions are active level, 11.10 per cent institutions at moderate at level and 55.60 per cent are at non-existent level.

**Table 4.60**  
**Assessment Based on Cumulative Score on**  
**Strategic Management Practices in CFTIs**  
*(Figures in percentage)*

Classification	Type of Institution			Total
	IITs and IISc	NITs	Others	
Active	60	0	33.30	27.20
Moderate	40	37.50	11.10	27.30
Non-existent	0	62.50	55.60	45.50
Total	100	100	100	100

*Source: Research Survey Data*

Thus, the results reveal that the presence of the components of strategic management practices in the group of IITs and NITs. This may be primary due to the fact that these institutions are established years before. The results in the case of NITs are comparatively low because NITs come in their new dimensions very recently and yet to settle down in their new status. Others group could score well as many of these institutions have established at the beginning of twenty first century and compared to NITs, the size of these institutions are also low.

Assessment of the total score obtained on different variables was compiled along with the results of statistical tests (Table 4.61).

**Table 4.61**  
**Assessment of Strategic Management Practices in CFTIs**

Category	Min.	Max.	Mean	Std. deviation	Median	KW test value	d.f.	P value
IITs and IISc	191.00	222.00	207.400	11.415	206.000	8.038	2	0.018 Significant
NITs	104.00	252.00	162.444	46.185	148.000			
Others	126.00	170.00	150.125	15.923	151.000			
Total	104.00	252.00	168.182	37.768	159.000			

*Maximum Possible Score = 252*

*Source: Research survey data*

The KW test value is 8.038, d.f. 2 and p value 0.018 which is less than the value of  $p = 0.05$ . The mean value of IITs and IISc is  $207.400 \pm 11.415$  followed by Others  $162.444 \pm 46.185$  and NITs  $150.125 \pm 15.923$ . Thus the hypothesis tested is

*H5 In CFTIs, the components of strategic management practices are more evident in IITs and IISc than in NITs and Other group of Institutions.*

Having assessed the components of strategic management in CFTIs, the next phase of the study is relating to trace out impact of strategic management in CFTIs.

#### **4.8 IMPACT OF STRATEGIC MANAGEMENT IN CFTIs**

The non-profit organizations has struggled to fill gaps caused by cutbacks in public sector services at the same time as it has been hit hard by the economic downturn's double-whammy of decreased government funding and increased demand for services. Non-profit organizations are working in an era of heightened scrutiny, greater demands, fewer resources, and increased competition (Adams and Perlmutter 1995; Ryan 1999 and Burt and Tayler 2003). Conventional management approaches seem to operate from the assumption that non-profit organizations have no bottom line. Drucker (1990) suggested that because of a missing bottom line, non-profit organizations would be in greater need for management than for profit organizations,

where performance is often easier to measure and monitor (Drucker, 1990). A non-profit organization has several bottom lines because no price mechanisms are in place that can aggregate the interests of clients, staff, volunteers and other stakeholders that can match costs to profits, supply to demand, and goals to actual achievements (Helmut, 2000). Accordingly, CFTIs being non-profit institutions, impact of strategic management has been measured through satisfaction of various stakeholders including students, faculty, researchers, alumni, the parent body and finally the entities, both public and private, employing the graduates.

#### 4.8.1 Assessment of Student's Satisfaction in CFTIs

In order to assess the student's satisfaction levels in CFTIs a full cross section of student population has been taken (Table 4.62).

**Table 4.62**  
**Age Distribution of Student Respondents**

*(Figures in percentage)*

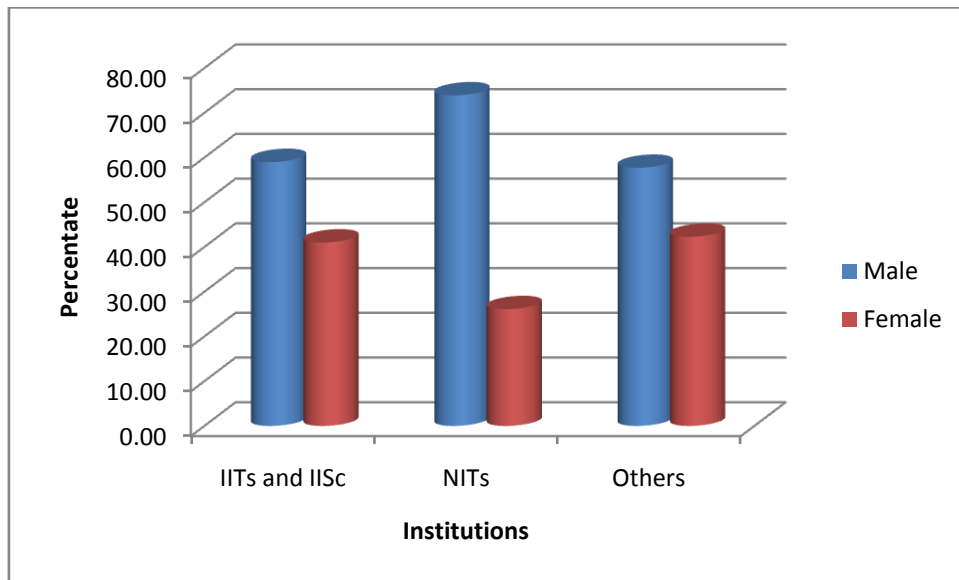
Age	Institution			Total
	IITs/IISc	NIT	Others	
18 to 21	75.20	70.70	69.40	71.80
22 to 25	18.90	27.90	26.60	24.50
26 to 35	0.90	0	0.90	0.60
36 to 50	5.00	1.40	3.20	3.20
Total	100.00	100.00	100.00	100.00

*Source: Research survey data*

The age distribution of the student respondent shows that the respondents are from all age levels starting from 18 to 50 years. The major category of student respondents is in age group of 18 to 21, who normally represent the undergraduate students and there is also a representation of the highest age category of 36 to 50 representing the research scholars.

The gender distribution of student respondents indicate that 53.50 per cent are male and 36.50 per cent are of female category (Figure 4.21).

Figures in percentage



Source: Research survey data  $\chi^2=15.511, d.f.=2, p=.000$  Highly Significant

**Figure 4.21**

**Gender Distribution of Student Respondents**

The course of study of the respondents reveals proper distribution of students from different programmes offered by CFTIs. (Table 4.63)

**Table 4.63**

**Distribution of Respondent’s Course of Study**

(Figures in percentage)

Course	Institutions			Total
	IITs & IISc	NITs	Others	
Undergraduate	66.70	79.60	59.30	68.50
Postgraduate	21.60	19.00	24.90	21.80
Ph.D.	11.70	1.40	15.80	9.60
Total	100	100	100	100

Source: Research survey data  $\chi^2=34.135, d.f.=4, p=0.000$  Highly Significant

The results indicate that a cross section of the students of different programmes has participated in the survey.

The student's satisfaction has assessed based on eight different major categories consisting of wide range of variables thereon, with seven point likert scale from one at low and seven at high.

#### 4.8.1.1 Student's Satisfaction on Course Organization

Satisfaction of the students on the course organization of the institutions has been assessed based on six variables (Table 4.64). The results of the analysis of responses are sorted based on mean value.

**Table 4.64**  
**Student's Satisfaction on Course Organization**

Course Organization	IITs & IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
The way your timetable is spread over the week	6.06	1.13	4.99	1.57	4.59	2.09	5.21	1.75
Prior Notification of changes to course arrangements	6.14	1.16	4.63	1.60	4.67	2.1	5.15	1.81
Range of topics covered in the syllabus	6.05	1.12	4.79	1.27	4.62	2.13	5.15	1.69
Clarity on course documentation	5.91	1.48	4.64	1.31	4.6	2.09	5.05	1.77
Relevance of topics in application level	5.99	1.35	4.46	1.44	4.62	2.18	5.02	1.83
Knowing what is expected of you as a student	5.85	1.34	4.55	1.27	4.54	2.12	4.98	1.74
Total	6.02	1.00	4.68	1.09	4.61	2.01	5.10	1.58

*Source: Research Survey Results*

The results indicate that the greatest satisfaction of the students is on the time tabling process of the institution followed by prior notification of the changes.

#### 4.8.1.2 Student's Satisfaction on Learning Process

Another factor considered for measuring the student satisfaction level is on learning. The variable sorted based on the highest mean score shows that the maximum level of

satisfaction is on the course which helped in augmenting the knowledge level with total mean value of 5.10 followed by opportunities to learn with others and increase in confidence level (Table 4.65).

**Table 4.65**  
**Student's Satisfaction on Learning Process**

Learning	IITs& IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
The course has helped in developing your knowledge	6.02	1.21	4.60	1.39	4.66	2.08	5.10	1.73
There is sufficient opportunities to learn with others	5.91	1.19	4.69	1.45	4.65	2.15	5.09	1.75
Your confidence has enhanced	5.99	1.20	4.58	1.45	4.64	2.17	5.07	1.78
The course prepares you for employment	5.87	1.24	4.46	1.56	4.64	2.05	4.99	1.76
Developed problem solving skills	5.65	1.26	4.43	1.41	4.66	1.97	4.91	1.66
Developed critical ability	5.32	1.32	4.41	1.37	4.99	1.81	4.90	1.56
Developed communication skills	5.02	1.47	4.64	1.47	4.99	1.71	4.88	1.56
Developed interpersonal skills	5.13	1.41	4.5	1.42	4.88	1.71	4.84	1.54
Developed practical skills	5.08	1.59	4.37	1.47	5.02	1.82	4.82	1.66
Total –Learning	5.55	0.94	4.52	1.18	4.79	1.72	4.96	1.39

*Source: Research survey data*

In IITs and IISc and in NITs the syllabus revision is being carried in regular intervals of four years. In all such periodic syllabus revisions all efforts are taken to incorporate latest development in the technology and even feedback from the industry as the stakeholder is invariably taken. Accordingly, the course content is highly helpful for the development of the knowledge level of the student. More than this, the course delivery is carried out in these institutions are on continuous evaluation method with sufficient facilities for practical learning. Above all the course structure also calls for industrial training and independent project work. Thus, it is very clear



that these institutions take all measure to develop the knowledge level of the students with maximum perfection.

The least score is on development of practical skills, wherein there is wide variation among groups. This factor is high in the case of Other category of institutions where as it is low in IITs and IISc and among NITs. This mainly because of the fact that the majority of institutions under Other category have limited student's intake and they have ample faculty student ratio. As the student intake in IITs and NITs has gone up drastically and the availability of qualified faculty has reduced, faculty student ratio in IITs as well as in NITs has decreased. More than this, the institutions like IISER and IIITs are offering courses which are highly practical oriented.

#### 4.8.1.3 Student's Satisfaction on Teaching

Satisfaction level of students in the process of teaching and learning was measured through various variables identified and the variables were ranked based on the total value of mean (Table 4.66)

**Table 4.66**  
**Student's Satisfaction on Teaching**

Learning	IITs&IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Sufficient level of challenge	5.76	1.23	4.52	1.43	4.77	2.03	5.02	1.68
Well executed time tabling of assignments	5.75	1.35	4.51	1.57	4.66	2.00	4.97	1.75
Promptness of feedback on assignments	5.77	1.44	4.30	1.67	4.69	2.04	4.92	1.84
Sufficient range of teaching/assessment modes	5.84	1.16	4.36	1.40	4.51	2.11	4.90	1.74
Reliability of teaching staff	6.01	1.24	4.25	1.54	4.42	2.29	4.89	1.92
Informal discussions with the staff	5.78	1.27	4.07	1.69	4.69	1.92	4.85	1.80
Availability of audio visual aids	5.51	1.34	4.18	1.73	4.81	1.85	4.83	1.74
Sufficient Student participation in teaching process	5.70	1.21	4.21	1.51	4.46	1.96	4.79	1.72
Receptive to student approach	5.56	1.27	4.18	1.50	4.59	1.96	4.78	1.70
Total	5.74	1.01	4.32	1.24	4.65	1.82	4.9	1.52

Source: Research survey data

The maximum score on the student satisfaction in area of teaching rest with a total mean value of 5.02 is on sufficient level of challenge in the course content. The course contents of the CFTIs are devised by the Senate of each institution with periodic revision to meet the emerging needs. The student evaluation process in CFTIs is based on the continuous evaluation process. As such, the students should be highly alert on all the contact hours as well as in the practical sessions. In the final evaluation, the grades normally awarded with 40 per cent weightage to all sessional examinations and remaining 60 per cent to terminal examinations. Other than this, the performance of students in NSS, Value education and environmental studies are taken as a mandatory requirement for the award of the degree. Hence, there is sufficient level of challenge posed on every student. The least satisfaction is on receptive to student approach where the institutions have to give more thrust. The reason behind is that the whole student life in CFTIs are so structured to meet the overall objective of the professional development of the students

#### **4.8.1.4 Student's Satisfaction on Library Facilities**

Library and education are co-existent with each other. In education, strength of library has a great influence. All CFTIs have good Library facilities in the campus. Among the satisfaction level on the library services availability of computers and library timing has equally become the top scoring variables (Mean 5.25) (Table 4.67) Most of the libraries in CFTIs function round the clock. In the digital library, availability of sufficient number of computers is also a major factor. The student community at CFTIs heavily depends on digital library facilities rather than the print version of books. Hence to total mean score on the availability of recent editions of text books are low.

**Table 4.67**  
**Student's Satisfaction on Library Facilities**

Library	IITs & IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Availability of computers	6.04	1.21	5.14	1.62	4.56	2.20	5.25	1.83
Library timings	5.85	1.29	5.05	1.54	4.86	1.93	5.25	1.66
Digital resources	5.77	1.28	5.11	1.58	4.66	2.04	5.18	1.72
Printing/Photocopying facility	5.64	1.17	5.00	1.70	4.76	1.84	5.14	1.64
Service of Library staff	5.58	1.28	4.92	1.61	4.79	1.79	5.10	1.61
Web based catalogue	5.55	1.21	4.92	1.63	4.74	1.78	5.07	1.59
Availability of Latest journals	5.66	1.28	4.86	1.58	4.50	2.14	5.01	1.77
Course books and essential texts	5.65	1.33	4.74	1.59	4.47	2.10	4.95	1.77
Availability of recent editions of text books	5.69	1.30	4.47	1.67	4.31	2.12	4.83	1.84
Total	5.71	0.99	4.91	1.28	4.63	1.83	5.09	1.48

*Source: Research survey results*

#### **4.8.1.5 Student's Satisfaction on Computing Facilities**

International universities consider computing facilities available in the campus as major strength. These computing facilities include unlimited internet access, private web space for each student etc. The International University of Cyprus have ratio of one student : one computer. Even though, the CFTIs could not achieve this ratio, there exist an excellent computing and internet facilities. The satisfaction level of student on the timing of the computer centers recorded the highest satisfaction level among the six different variables assessed (Table 4.68).

**Table 4.68**  
**Student's Satisfaction on Computing Facilities**

Computing facilities	IITs&IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Timings of Computer Centres	5.79	1.33	5.13	1.59	4.66	2.08	5.20	1.76
Availability of High speed computers	5.45	1.11	4.92	1.60	4.67	1.91	5.02	1.61
Maintenance of computers	5.31	1.25	4.88	1.60	4.77	1.82	4.99	1.59
Availability of specialist software	5.32	1.26	4.56	1.65	4.68	1.76	4.86	1.60
Availability of high speed internet	5.44	1.31	4.69	1.75	4.80	1.87	4.97	1.69
Availability of Support Staff/technicians	5.28	1.41	4.67	1.62	4.94	1.78	4.96	1.63
Total	5.43	1.01	4.81	1.41	4.76	1.69	6.00	1.43

*Source: Research survey data*

The least scored variable is availability of support staff/ technicians. It is the fact that there are many non-faculty positions lying vacant pending clearance from MHRD for recruitment.

#### **4.8.1.6 Student's Satisfaction on Laboratory and Workshop Facilities**

Provision for qualitative functional and up-to-date laboratory is one of the essential factors for enhancing the academic excellence. The workshop helps the design, development and construction of mechanical apparatus to complement teaching and research.

The laboratory/workshop timings have contributed highly to the satisfaction among the other variable with total mean score of 4.91 followed by availability of latest equipments with the total mean score of 4.82 (Table 4.69). The lowest scored variable is maintenance and upkeep. This is on account of non-faculty shortage in CFTIs.

**Table 4.69**  
**Student's Satisfaction on Laboratory and Workshop Facilities**

Laboratory/Workshop facilities	IITs & IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Laboratory, workshop timings	5.38	1.32	4.82	1.53	4.52	1.92	4.91	1.64
Availability of latest equipments	5.38	1.18	4.50	1.60	4.59	1.95	4.82	1.65
Meeting to the needs of course	5.44	1.36	4.48	1.57	4.61	1.99	4.84	1.71
Accessibility to equipments	5.65	1.42	4.46	1.58	4.65	2.09	4.92	1.80
Availability of consumables	5.41	1.29	4.46	1.51	4.64	1.97	4.84	1.66
Maintenance and upkeep	5.14	1.44	4.57	1.55	4.80	1.93	4.83	1.67
Total	5.40	1.15	4.55	1.33	4.63	1.81	4.86	1.50

*Source: Research survey data*

#### 4.8.1.7 Student's Satisfaction on Hostel Facilities

CFTIs are primarily residential institutions. The responses from students on hostel facilities are compiled on this aspect (Table 4.70).

**Table 4.70**  
**Student's Satisfaction on Hostel Facilities**

Hostel facilities	IITs & IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Upkeep and maintenance	4.80	1.54	4.10	1.99	4.77	1.84	4.56	1.82
Basic amenities	5.15	1.41	3.68	1.91	4.56	1.96	4.47	1.87
Sufficient number of rooms	5.29	1.46	3.05	2.02	4.38	1.89	4.24	2.02
Total	5.08	1.28	3.61	1.78	4.57	1.73	4.42	1.72

*Source: Research survey data*

The facilities provided for the stay of students in the campus makes the campus life memorable. Among the variables, upkeep and maintenance have overall highest

mean score of 4.56 and the lowest is lack of sufficient number of rooms. The upkeep and maintenance is outsourced in almost all CFTIs. As such, the desired results are achieved. That is the reason for the highest satisfaction for upkeep and maintenance of hostel.

The shortage of rooms in CFTIs is mainly on account of recent increase in intake. The augmentation of infrastructural facilities are planned to complete in the XII<sup>th</sup> FYP by the Government of India.

#### 4.8.1.8 Student's Satisfaction on Learning Environment

Various facilities for student activities are provided in the campus like sports, club activities, yoga, spiritual learning pave the way for a healthy environment which in turn will help the overall development of the students and the satisfaction thereof. Based on the responses student's satisfaction on learning environment has been compiled (Table 4.71)

**Table 4.71**  
**Student's Satisfaction on Learning Environment**

	IITs&IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Sports facilities	4.86	1.49	4.15	1.71	3.53	1.91	4.18	1.80
Club Activities	3.86	1.81	4.73	1.82	3.37	1.91	4.02	1.93
Sports training/coaching	4.50	1.63	3.91	1.70	3.40	1.72	3.94	1.74
Fitness centres	4.32	1.62	4.00	1.75	3.18	1.66	3.83	1.74
Environmental studies	3.29	1.49	4.13	1.89	3.26	1.61	3.66	1.78
Value Education	3.05	1.65	3.69	1.81	3.17	1.76	3.30	1.76
Spiritual development	3.37	1.61	3.11	1.85	3.11	1.69	3.20	1.72
Yoga Centers	2.47	1.51	2.89	1.84	3.02	1.70	2.79	1.70
Total	3.73	1.16	3.83	1.44	3.26	1.30	3.60	1.33

*Source Research survey data*

Within the various activities provided to the students the maximum satisfaction of the student community of CFTIs is on Sport facilities provided to the students in the campus.

The lowest scored variable is yoga centre. In the present learning environment, mental stress plays an important role. In order to reduce the mental stress the yoga is proved to be a futile exercise and the campuses began to acknowledge this experience.

#### 4.8.1.9 Overall Student Satisfaction

Overall student satisfactions on eight major concepts have calculated by taking the total mean value of all variables contained in each concept. In order to have a comparison among the major groups total of each group has been taken separately (Table 4.72)

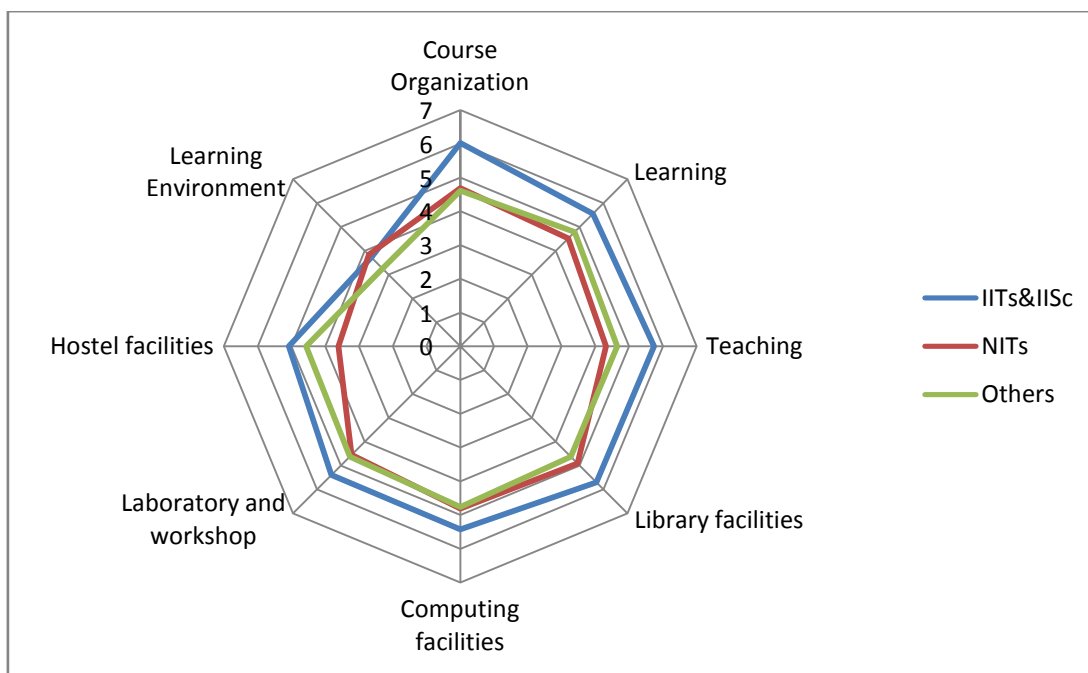
**Table 4.72**

**Distribution of Overall Student's Satisfaction**

Concepts	IITs&IISc Mean	NITs Mean	Others Mean	Total Mean
Course Organization	6.02	4.68	4.61	5.10
Learning	5.55	4.52	4.79	4.96
Teaching	5.74	4.32	4.65	4.90
Library facilities	5.71	4.91	4.63	5.09
Computing facilities	5.43	4.81	4.76	6.00
Laboratory and workshop	5.40	4.55	4.63	4.86
Hostel facilities	5.08	3.61	4.57	4.42
Learning Environment	3.73	3.83	3.26	3.60

*Source Research survey data*

In order to ascertain the comparative advantage of each type of institutions on major areas of student satisfaction, the data has been presented in a radar chart (Figure 4.22). On examination of this chart, it can be ascertained that IITs and IISc have comparatively higher advantage on all fronts except in the area of learning environment. On students activities all the three types of institutions meets at a nearer points. This is because of the fact that the environment provided to the students for overall development are at the same standard level in all CFTIs are in a similar fashion.



Source: Research Survey results

**Figure 4.22**

### Overall Student's Satisfaction Summary

In other areas the satisfaction level of NITs and Other group of students are more or less equal. It is also interesting to note that in all areas, the satisfaction level is more than total mean score of three. Hence, the services and facilities provided by the CFTIs have got good satisfaction level to the students.

In order to find out the possible relationship between various groups of Institutions in terms of overall student's satisfaction has been worked out (Table 4.73)

**Table 4.73**

### Assessment of Overall Student's Satisfaction

Institution	Mean	SD	Median	KW test value	d.f.	p value
IITs and IISc	4.67	0.68	4.80	87.210	2	0.000
NITs	4.02	0.89	3.93			
Others	3.93	1.13	4.40			
Total	4.21	0.98	4.47			

Source Research survey data



The p value is less than 0 .05, which shows that there is a positive relationship between the types of the institution and the overall satisfaction of the students. Among the groups IITs and IISc have higher students' satisfaction level (Mean 4.67±0.68) than NITs (Mean 4.02±0.89) and Other Institutions (Mean 3.93±1.13). Therefore, the hypothesis tested:

*H6 IITs and IISc provide higher levels of student satisfaction than in NITs and Other group of Institutions in CFTIs*

#### **4.8.1.10 Relationship of Overall Student's Satisfaction with Gender**

An analysis to find out the relationship of overall student's satisfaction with gender, has been done (Table. 4.74)

**Table 4.74**

#### **Assessment of Relationship Between Overall Student's Satisfaction with Gender**

Institution	Mean	Std. Deviation	Median	KW test value	d.f.	p value
Male	4.22	0.99	4.4667			
Female	4.19	0.95	4.4667	0.477	2	0.633
Total	4.21	0.98	4.4667			

*Source : Research survey data*

$p = >0.05$  Not significant

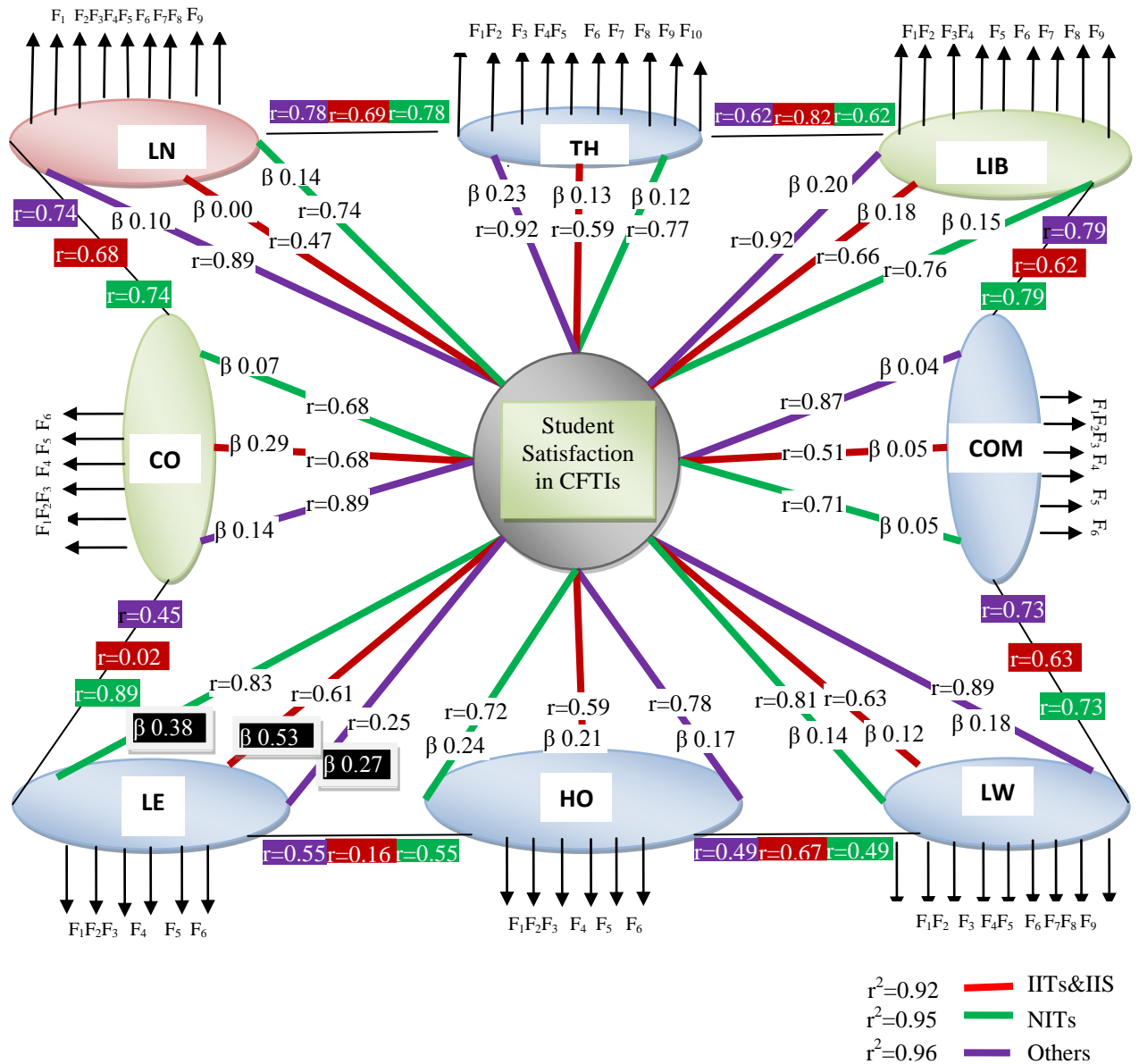
The results reveal that the p value is 0.633, which is above the acceptable value. Hence it proved that there is no relationship between the gender and overall student's satisfaction. As such the hypothesis tested is

*H16 There is no relationship between gender and overall student satisfaction in CFTIs*

Thus, it is clearly evident from the results that the CFTIs offer its services to the students irrespective of gender. Males and females are provided equal opportunities for the technical education which is one of the mandates of Indian higher education.

#### 4.8.1.11 Model on Institution Based Student's Satisfaction

Model for overall students' satisfaction in CFTIs and the relationship between factors used to assess the satisfaction in respect of each specific category of institutions has been drawn up (Figure 4.23)



Note: CO = Course Organisation, LN = Learning, TH = Teaching, LIB = Library, COM = Computing facilities, LW = Laboratory and workshop, HO = Hostel, LE = Learning Environment

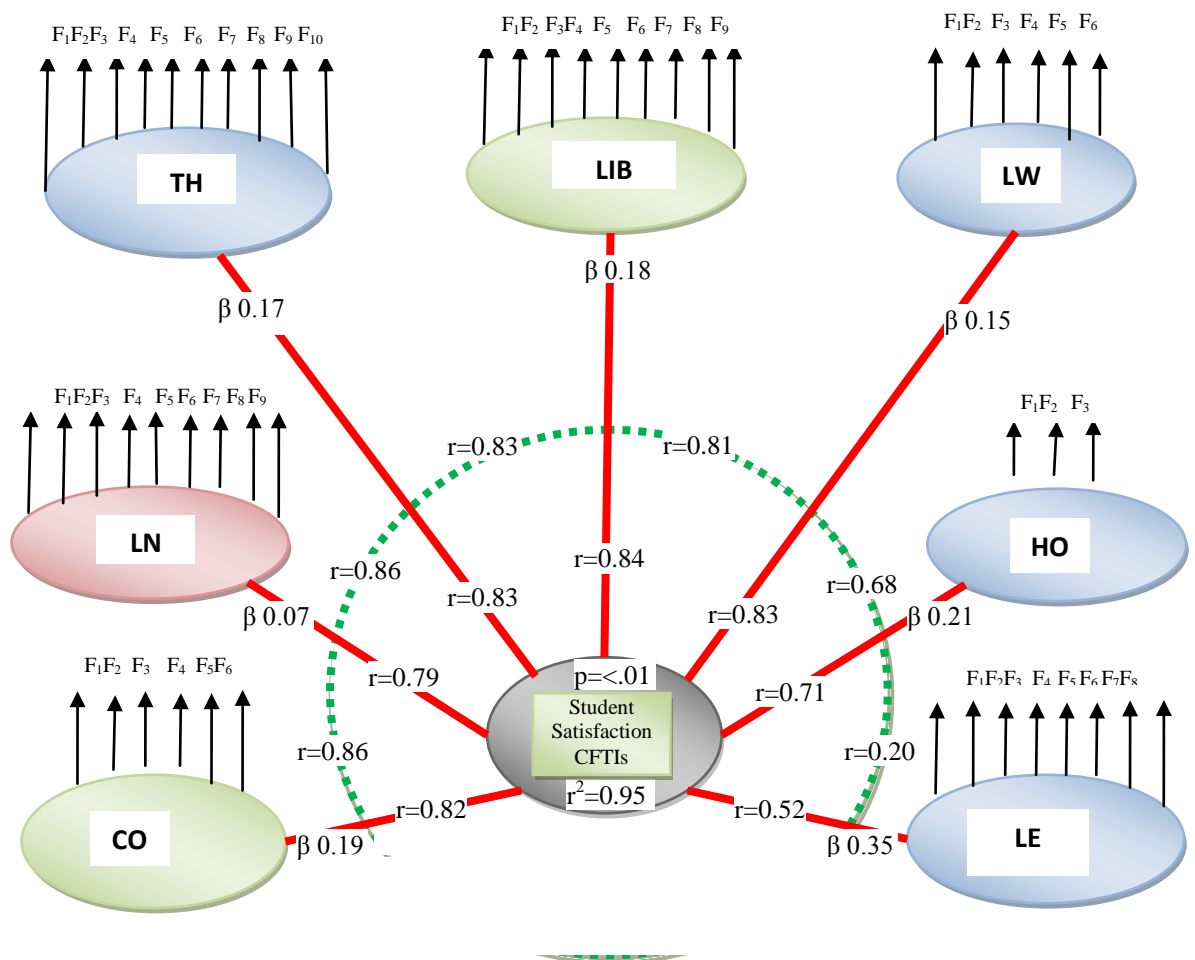
Source: Resurvey survey data

**Figure 4.23**  
**Model on Student's Satisfaction (Institution-wise)**

It can be observed that there exist relationships among all the eight factors used in measuring the students' satisfaction and the 'r' value for each category of institution has been highlighted in three different color coding. The relationships of each factor contributing to the overall student satisfaction are also given separately. Among the factors 'Learning Environment' have a major influence with respect to all categories of Institutions (IITs&IISc  $\beta=0.53$ ; NITs  $\beta=0.38$ ; Others  $\beta=0.27$ ). Accordingly, the hypothesis tested is:

*H7 Student satisfaction on learning environment at IITs and IISc is greater than in NITs and Other institutions under CFTIs.*

#### 4.8.1.12 Model on Overall Student Satisfaction



Note: CO = Course Organisation, LN = Learning, TH = Teaching, LIB = Library, LW = Laboratory and workshop, HO = Hostel, LE=Learning Environment

**Figure 4.24**

#### Model on Overall Student's Satisfaction in CFTIs

The overall students' satisfaction and the relation between the various factors on a holistic manner for all institutions under CFTIs have drawn up in another model (Figure 4.24). Here also, the overall students satisfaction is highly related to Learning Environment ( $\beta$  0.35) than Course Organization ( $\beta$  0.19), Learning Process ( $\beta$  0.07), teaching process ( $\beta$  0.17), Library facilities ( $\beta$  0.18), Laboratory and workshop facilities ( $\beta$  0.15), and Hostel facilities ( $\beta$  0.21). Thus, in both the models Learning Environment has strong relation with the overall student's satisfaction. Hypothesis tested is:

*H8 Student satisfaction on Library facilities and teaching learning processes are closely related in all groups of Institutions under CFTIs*

*H10 Learning Environment has strong relationship with overall student satisfaction in CFTIs*

#### **4.8.1.13 Factorization of Variables on Student's Satisfaction**

All the major factors under the student's satisfaction analyzed using factor analysis. Factor analysis was used to verify and to find out the extent to which each item contributed to the overall student's satisfaction. In order to verify the sampling KMO test was done which has given the result as 0.917 (Table 4.75). As the result is more than 0.5 and near to one, the sampling adequacy is very good. Bartlett's Test of Sphericity also shown the significance level as 0.000 and the hypothesis that the correlation matrix is an identity matrix is strongly rejected.

**Table 4.75**

**KMO and Bartlett's Test (Student's Satisfaction)**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.917
Bartlett's Test of Sphericity	
<i>Approx Chi-square</i>	<i>5126.895</i>
<i>Df</i>	<i>36</i>
<i>Significance</i>	<i>0.000</i>

*Source: Research Survey Result*

The total variance and the initial eigen values are at Table 4.76.

The factors with eigen value is less than one is not good and there are only two factor with eign value more than one.

**Table 4.76**

**Total Variance and Initial Eigen Values of Variables on Student's Satisfaction**

Component	Initial Eigen Values			Extraction sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	5.580	62.003	62.003	5.580	62.003	62.003	5.317	59.074	59.074
2	1.073	11.921	73.925	1.073	11.921	73.925	1.337	14.851	73.925
3	0.887	9.855	83.780						
4	0.491	5.456	89.236						
5	0.383	4.253	93.489						
6	0.186	2.072	95.561						
7	0.153	1.695	97.257						
8	0.135	1.504	98.761						
9	0.111	1.239	100.000						

*Source: Research survey data*

Principal component analysis and the rotational method varimax with Kaiser normalization were used to produce orthogonal factors which were unrelated or independent of one another. When the principal component analysis and varimax with Kaiser normalization were performed for eight major components covering all the intrinsic variables therein, it successfully yielded two factors which were orthogonal. However, factor loading for one item represented more than one factor and one item with the value less than 0.5. These items were deleted. Table 4.77 shows Rotated Component matrix.

**Table 4.77**

**Rotated Component Matrix on Student's Satisfaction**

Components	1	2
Course		
Organization	0.925	
Learning Process	0.906	
Teaching Process	0.932	
Library facilities	0.911	
Computing facilities	0.831	
Laboratory and workshop	0.872	
Hostel facilities	0.686	
Learning Environment		0.679
Institute campus		0.769

Note: Extraction Method : Principal Component Analysis, Rotation Method : Varimax with Kaiser Normalization, Rotation converged in 3 iterations

Source: Research survey data

The final list of variables and the new variable to represent each item is at (Table.4.78)

**Table 4.78**

**Final Variables on Student's Satisfaction**

	Components		
	1	2	
Course Organisation	0.925		
Learning	0.905		Enabling Process
Teaching	0.932		
Library	0.911		
Computing	0.831		
Laboratory and workshop	0.872		
Learning Environment		0.679	Creative environment
Institute Campus		0.769	

Source : Research survey data

After rotation of variable the new variable identified the percentage of variance for the new variables shows that Enabling Process has high value on percentage of variance (Table 4.79).

**Table 4.79**  
**Percentage of Variance on New Variables (Student's Satisfaction)**

Variable	Eigen values	% of variance
Enabling Process	5.580	62.001%
Creative environment	1.073	11.917%

*Source: Research survey data*

Accordingly it can be concluded that the Enabling Process have contributed more on overall student satisfaction.

This section examined the student's satisfaction on various factors in detail. The next important stakeholder is alumni and the satisfaction levels of alumni are deliberated in the next section.

#### **4.8.2 Assessment of Alumni Satisfaction**

This section deals with the satisfaction levels of the graduates completed the course from CFTIs. The gender-wise distribution of the respondents indicates that both male and female had more or less equally participated in the survey (Table 4.80)

**Table 4.80**  
**Gender Distribution of Alumni Respondents**

*(Figures in percentage)*

		Studied in			Total
		IITs and IISc	NIT	Others	
Gender	Male	41.40	53.80	30.00	47.30
	Female	58.60	46.20	70.00	52.70
Total		100.00	100.00	100.00	100.00

*Source: Research survey data*

The respondents participated in the survey also represent major educational programmes being offered by the CFTIs (Table 4.81)

**Table 4.81**  
**Distribution of Programme Studied by the Alumni Respondents**  
*(Figures in percentage)*

	Programme	Studied in			Total
		IITs&IISc	NIT	Others	
	B.Tech.	72.40	51.90	20.00	54.90
	M.Tech.	20.70	40.40	30.00	33.00
	Ph.D.	6.90	7.70	0	6.60
	Others	0	0	50.00	5.50
Total		100.00	100.00	100.00	100.00

Source: Research survey data

Fizher's Exact Test  $p = 0.000$  Highly significant

The place of residents of alumni respondents participated in the survey indicates that 63.70 per cent are staying in India and the balance of 36.30 per cent are staying abroad.(Table 4.82).

**Table 4.82**  
**Place of Residence of Alumni Respondents**

*(Figures in percentage)*

	Studied in			Total
	IITs/IISc	NIT	Others	
Within India	51.70	73.10	50.00	63.70
Outside India	48.30	26.90	50.00	36.30
Total		100.00	100.00	100.00

Source: Research Survey data

The perception of the alumni, as to whether the education imparted by the CFTIs were adequate, has been measured in a five point likert scale starting from one as low and five as high (Table 4.83).



**Table 4.83****Alumni Satisfaction on Programme Undergone in CFTIs***(Figures in percentage)*

		Adequacy of education					Total
		Very High	High	Medium	Low	Very low	
Programme	IITs and IISc	62.07	27.59	10.34	0	0	31.87
	NIT	67.31	30.77	1.92	0	0	57.14
	Others	70.00	30.00	0	0	0	10.99
Total		65.93	29.67	4.40	0	0	100.00

*Source: Research survey data**Fizher's Exact Test p = 0.000 Highly significant*

The results indicate that the majority of alumni (65.93 per cent) have very high satisfaction on the adequacy of education and 29.67 per cent have rated as high and remaining 4.40 per cent rated as medium. Thus, the education provided to the students found adequate, while they work in different organizations on various capacities.

The results of the analysis made on the responses of alumni, on employment potential of the course undergone by them indicates that 53.80 per cent as very high, 42.90 per cent as high and remaining 3.30 per cent as medium (Table 4.84)

**Table 4.84****Employment Potential of the Programme Undergone by Alumni***(Figures in percentage)*

		Employment potential					Total
		Very High	High	Medium	Low	Very low	
	IITs and IISc	75.90	17.20	6.90	0	0	100.00
	NITs	44.20	55.80	0	0	0	100.00
	Others	40.00	50.00	10.0	0	0	100.00
Total		53.80	42.90	3.30	0	0	100.00

*Source: Research survey data*

Between the different groups in ‘very high’ category; IITs and IISc have the highest score of 75.90 per cent, followed by NITs (44.20 per cent) and Other category (40 per cent).

An analysis of the responses of survey result has made to categorize the present assignments of alumni (Table 4.85)

**Table 4.85**  
**Distribution of Present Assignment of Alumni**

*(Figures in percentage)*

		Studied in			Total
		IITs and IISc	NIT	Others	
Present assignment	Employee	44.80	65.40	80.00	60.40
	Research Scholar	27.60	25.00	10.00	24.20
	Scientist	6.90	1.90	10.00	4.40
	Entrepreneur	17.20	3.80	0	7.70
	Unemployed	3.40	3.80	0	3.30
Total		100.00	100.00	100.00	100.00

Source: Research survey data

*Fizher’s Exact Test p = 0.000 Highly significant*

The results reveals that in total 60.40 per cent are employees, 24.20 per cent are research scholars, 4.40 per cent as Scientist, 7.70 as Entrepreneurs and 3.30 per cent as unemployed. Thus majority of the graduates from CFTIs are working as employees and a little can only be contributed as Scientists or Entrepreneurs of the nation.

#### **4.8.2.1 Factor Analysis on Evaluation of Skills Obtained by Alumni of CFTIs**

In order to evaluate skills acquired during the studies in CFTIs, twenty different skills and competencies were given in the questionnaire to rate in a five point likert scale from low to high. The responses obtained were considered for factor analysis and the results shows the sample adequacy at 0.902, which is on the very high side (Table 4.86). Bartlett’s Test of Sphericity also shown the significance level as 0.000 and the hypothesis that the correlation matrix is an identity matrix is strongly rejected. Thus,

the factor analysis has done to identify most influential group of skills and competencies.

**Table 4.86**  
**KMO and Bartlett's Test on Skills Obtained by Alumni**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.902
Bartlett's Test of Sphericity	
<i>Approx Chi-square</i>	1262.621
<i>Df</i>	276
<i>Significance</i>	0.000

*Source: Research survey data*

The total variance and the initial eigen values are at **Table 4.87**.

**Table 4.87**  
**Total Variance and Initial Eigen Values of Variables on Alumni Satisfaction**

Component	Initial Eigen Values			Extraction sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	10.837	45.156	45.156	10.837	45.156	45.156	4.094	17.058	17.058
2	1.371	5.711	50.867	1.371	5.711	50.867	3.983	16.594	33.652
3	1.200	5.001	55.868	1.200	5.001	55.868	2.904	12.099	45.752
4	1.147	4.781	60.649	1.147	4.781	60.649	2.438	10.159	55.911
5	1.067	4.446	65.096	1.067	4.446	65.096	2.204	9.185	65.096
6	0.911	3.795	68.891						
7	0.850	3.542	72.432						
8	0.746	3.107	75.539						
9	0.724	3.015	78.554						
10	0.626	2.606	81.160						
11	0.584	2.435	83.595						
12	0.543	2.263	85.859						
13	0.484	2.019	87.877						
14	0.460	1.916	89.793						
15	0.410	1.706	91.500						
16	0.315	1.314	92.813						
17	0.297	1.237	94.051						
18	0.276	1.149	95.200						
19	0.276	1.049	96.249						
20	0.247	1.031	97.280						
21	0.215	.896	98.177						
22	0.164	.685	98.661						
23	0.138	.575	99.436						
24	0.135	.564	100.00						

*Source Research survey results*

The factors with eigen value is less than one is not good and there are five factors with eigen value more than one.

Principal component analysis and the rotational method varimax with Kaiser normalization were used to produce orthogonal factors which were unrelated or independent of one another. When the principal component analysis and varimax with Kaiser normalization were performed for twenty four major components covering all the intrinsic variables therein, it successfully yielded five factors which were orthogonal. However, factor loading for one item represented more than one factor and one item with the value less than 0.5. These items were deleted. Table 4.88 shows Rotated Component matrix.

**Table 4.88**

**Rotated Component Matrix of Skills and Competencies**

	Component				
	1	2	3	4	5
Analyzing Capacity					0.767
Applying into Practice					0.629
Planning	0.685				
Basic G K	0.648				
Professional knowledge					0.475
Communication skills	0.653				
Research Skills			0.548		
Learning capacity	0.589				
Memory retrieval	0.640				
Critical Outlook	0.577				
Creativity		0.599			
Decision making		0.587			
Problem Solving		0.607			
Interpersonal skills		0.666			
Teamwork			0.777		
Leadership			0.629		
Diversity and multi-culturality				0.589	
Working in international environment				0.785	
Understanding people and cultures of other country				0.666	
Work independently		0.492			
Project design and management	0.476				
Entrepreneurial spirit		0.685			
Ethical commitment		0.551			
Quality Concern		0.550			

Note: Extraction Method : Principal Component Analysis Rotation Method : Verimax with Kaiser Normalization;Rotation converged in 13 iterations

Source: Research Survey Data

The components which have the score of less than 0.5 have considered for elimination and two variables have eliminated. The final variables were put under five different components and new variable names have been assigned (Table 4.89)

**Table 4.89**  
**Final Variables on Skills and Competencies Acquired by the Students of CFTIS**

	Components				
	1	2	3	4	5
Planning	0.685				
Basic G K	0.648				
Communication skills	0.653				
Learning capacity	0.589				
Memory retrieval	0.640				
Critical Outlook	0.577				
Creativity		0.599			
Decision making		0.587			
Problem solving		0.607			
Interpersonel skills		0.666			
Entrepreneurial spirit		0.685			
Ethical Commitment		0.551			
Quality Concern		0.550			
Research Skills			0.548		
Teamwork			0.777		
Leadership			0.629		
Diversity and multi-culturality				0.589	
Working in international environment				0.785	
Understanding people and cultures of other country				0.666	
Analyzing Capacity					0.767
Applying into practice					0.629

Source : Research Survey Result

Finally the five new variables were compiled and presented in the order sequence based on the percentage of variance (Table 4.90)

**Table 4.90**  
**Percentage of Variance on New Variables on Skills and Competencies**

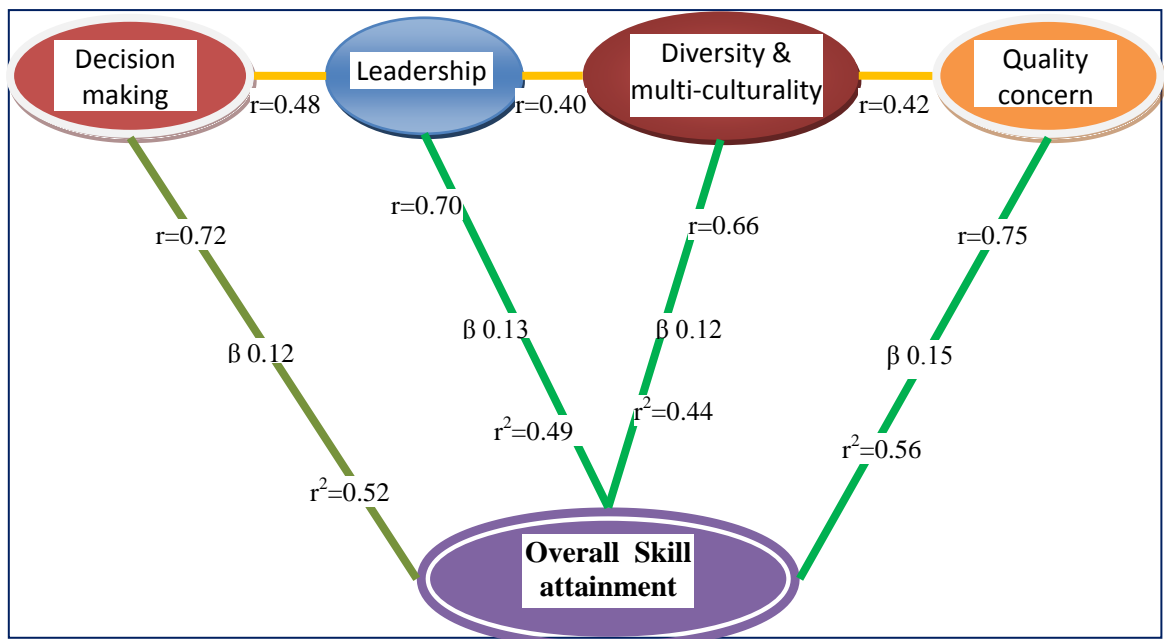
Variable	Eigen values	% of variance
Professional skills	7.758	17.058
Application skills	2.822	16.594
Talents compiled	2.145	12.099
International Calibre	1.703	10.159
Analytical skills	1.486	9.185

Source: Research Survey Data

Among the various skills listed, the professional skills acquired during the education have the highest position followed by application skills.

#### 4.8.2.2 Model on Skills and Competencies Obtained by the Alumni of CFTIs

The case of all components of skill and competencies acquired by the alumni during their education in CFTIs has been taken to draw up the influence and relationship between each other (Figure 4.25)



Source : Research survey data

$p = .000$  for all relations

**Figure 4.25**

#### Model on Skills and Competencies Acquired by Alumni of CFTIs

All the components have positive  $\beta$  value. Among the components, the quality concern has strong relationship between overall skill relationships ( $r^2=0.56$ ) with overall skill attainment. The p value of all components mentioned in the model is 0.000. Accordingly, the hypothesis tested is :

*H11 Quality Concern has a strong positive relationship with Overall skill attainment*

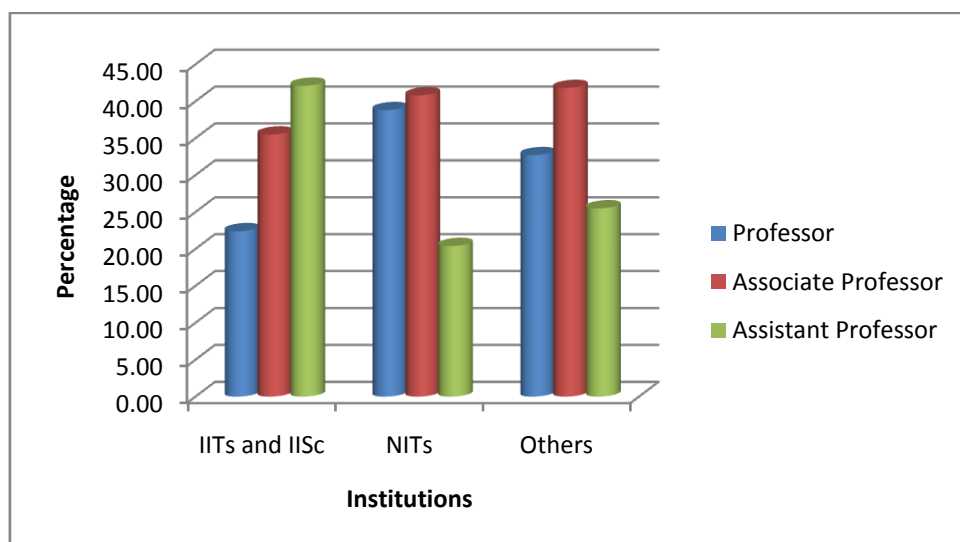
Similarly, the model reveals that there is a strong relationship between Overall skill attainment and decision making skill ( $r^2=0.52$ )

*H12 Decision making capacity has as a strong relation with overall skill attainment of CFTIs alumni*

After alumni the faculty forms another stakeholder of CFTIs and the satisfaction levels measured are discussed in the next section.

### 4.8.3 Assessment of Faculty Satisfaction

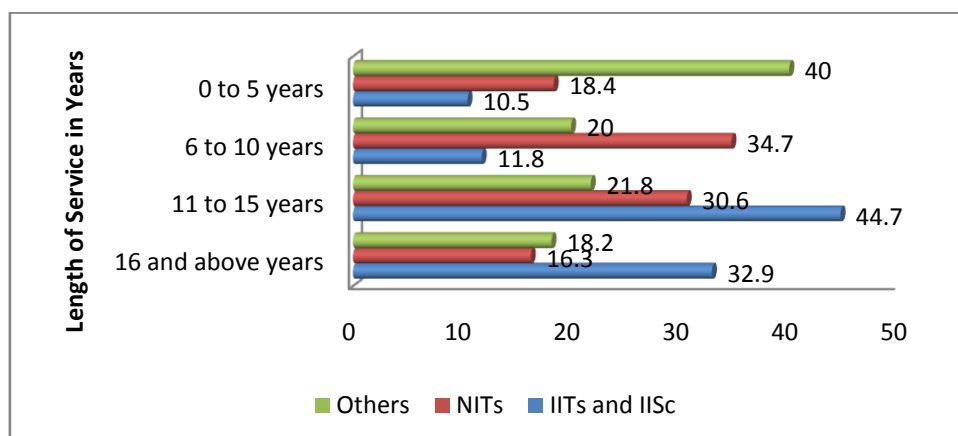
Faculty being one of the important stakeholders of CFTIs, the level of satisfaction has measured. All categories of faculty members from various institutions of CFTIs participated in the survey ( Figure 4.26)



Source: Research survey data

**Figure 4.26**  
**Distribution of Category of Faculty Respondents**

In the survey faculty members having different span of experience with CFTIs were participated (**Figure 4.27**) (Figures in percentage)



Source: Research survey data

**Figure 4.27**

**Distribution of Length of Service of Faculty Respondents**

Satisfactions of faculty members on various factors identified were assessed through one to ten ranking by the respondents. The responses were analyzed through Garret Mean score and ranked to have a holistic view (Table 4.91).

**Table 4.91**

**Ranking of Faculty Satisfaction on various Factors**

Factors	IITs& IISc		NITs		Others		Total	
	GM Score	Rank	GM Score	Rank	GM Score	Rank	GM Score	Rank
Research facilities	69.30	1	66.50	2	67.40	1	68.00	1
Job itself	66.60	2	66.10	3	66.90	2	66.50	2
Remuneration	61.60	3	67.90	1	62.10	3	63.50	3
Service conditions	53.70	4	55.00	4	57.30	4	55.10	4
Job security	49.20	5	48.00	5	51.00	5	49.40	5
FDP	48.50	7	47.60	6	45.00	7	47.20	6
Responsibility	49.00	6	42.10	7	47.20	6	46.60	7
Promotion avenues	36.40	9	41.80	8	40.90	8	39.20	8
Physical Environment	36.90	8	34.80	9	35.90	9	36.00	9
Relationships	32.80	10	33.30	10	31.20	10	32.40	10

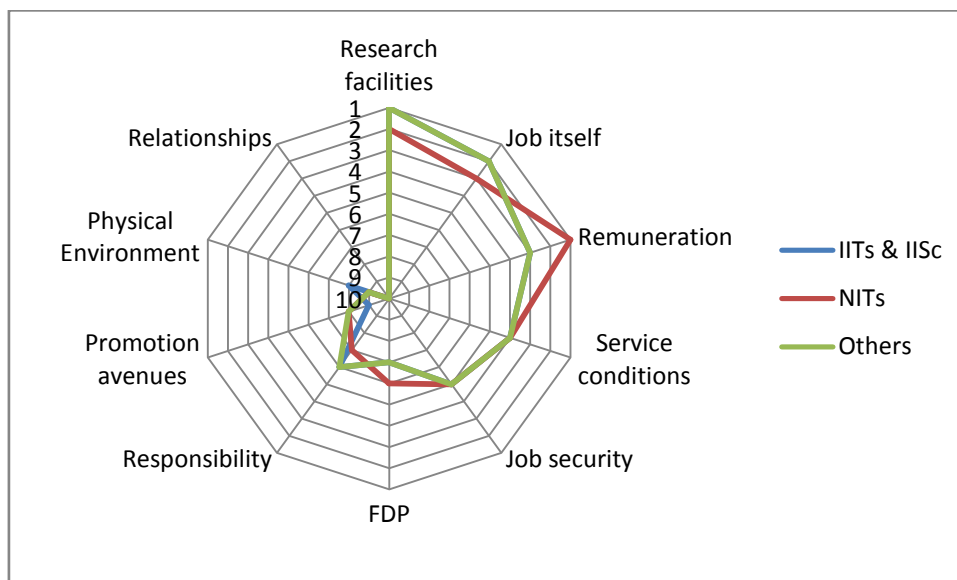
Source : Research Survey Results

GM Score = Garret Mean Score

Among the CFTIs the top rank goes to the Research facilities with a Garret Mean Score of 68.00. This is followed by Job satisfaction and remuneration respectively.



In order to have a comparison on faculty satisfaction among the various groups of Institutions under CFTIs, the ranks were plotted into a radar chart (Figure 4.28 )



Source: Research survey data Rank based on Garret Mean score

**Figure 4.28**

**Distribution of Levels of Faculty Satisfaction on Various Factors**

The results indicate that the satisfaction on various factor are linear and have only minor deviations among various group of institutions.

**4.8.4 Assessment of Satisfaction of Researchers**

Satisfaction level of research scholars working in various CFTIs has measured in five point likert scale on ten different variable and the responses were sorted on the basis of the total mean score (Table 4.92)

The result shows that the researchers are fully satisfied by the facilities and services rendered by CFTIs as the mean score is above three in all cases. Among the institutions IITs and IISc have the greatest satisfaction level ( Mean 3.41), followed by Other group of institutions (Mean 3.27) and finally NITs (Mean 3.04). Among

the variables, research sharpened the analytical skill of scholars has the highest score (Mean 3.75).

**Table 4.92**  
**Satisfaction of Researchers of CFTIs**

	IITs&IISc		NITs		Others		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Learnt to develop ideas and present them	3.64	0.61	3.91	1.28	3.60	0.61	3.72	0.89
Research sharpened the analytical skill	3.62	0.57	3.93	1.25	3.69	0.70	3.75	0.89
Research developed my problem solving skills	3.80	0.79	3.00	1.17	3.81	0.68	3.54	0.90
Access to computing facilities and services	3.80	0.73	2.81	1.40	3.77	0.84	3.46	1.03
Good guidance on topic selection and its refinement	3.84	0.98	2.81	1.18	3.74	0.85	3.46	1.01
Access to a suitable working space	3.98	0.69	2.93	1.10	2.91	0.75	3.27	0.90
Financial support for research activities	2.84	0.90	2.64	1.61	3.00	0.89	2.83	1.18
The research ambience in the Institute is excellent	2.96	1.26	2.78	1.13	2.78	0.99	2.84	1.12
Seminar/ Workshops were able to conduct	2.88	1.11	2.82	1.32	2.68	0.94	2.79	1.12
Necessary equipments were provided	2.76	0.80	2.76	1.57	2.74	0.85	2.75	1.12
Total	3.41		3.04		3.27		3.24	

*Source: Research survey data*

#### **4.8.5 Satisfaction of Industry Employing the Graduates of CFTIs**

In order to measure the satisfaction of industry employing graduates of CFTIs, different skills and competencies are given on five point likert scale of one as low and five as high. The results on the analysis of overall score obtained are at Table 4.93

**Table 4.93****Assessment of Skills and Competencies of CFTI Graduates**

Category	Mean	SD	Median	KW test value	d.f.	P value
IITs and IISc	4.50	0.21	4.50	17.573	2	0.000 Highly significant
NITs	3.71	0.39	3.75			
Others	3.80	0.20	3.79			
Total	3.98	0.44	3.91			

Source: Research survey data

The KW test value is 17.573, d.f. 2 and the p value is 0.000. The mean score for IITs and IISc is 4.50, followed by Others with 3.80 and NITs at 3.17. As such the hypothesis tested is:

*H13 Skills and competencies attained by the graduates of IITs and IISc are higher than graduates from other CFTIs*

Similarly, the work performance of CFTI graduates were measured through various variables and the results based on the total score are at Table 4.94

**Table 4.94****Assessment of Work Performance of Graduates of CFTIs**

Category	Mean	Std. deviation	Median	KW test value	d.f.	P value
IITs and IISc	4.35	0.26	4.33	11.341	2	0.003 Highly significant
NITs	3.56	0.49	3.41			
Others	4.01	0.41	4.00			
Total	3.96	0.50	4.00			

Source: Research survey data

The total mean value for IITs and IISc is 4.35 which is higher than Other group of Institutions with total mean value of 4.01 and finally total mean value of 3.56 for NITs. KW test value is 11.341 and p value is < 0.05. Accordingly hypothesis tested is

*H14 The work performance of IITs and IISc graduates are higher than graduates from other CFTIs*

Finally, the overall satisfaction obtained from the graduates of CFTIs employed in the industry was assessed ( Table 4.95)

**Table 4.95**  
**Assessment of Overall Satisfaction of Industry Employing Graduates of CFTIs**

Category	Mean	Std. deviation	Median	KW test value	d.f.	P value
IITs and IISc	3.91	0.32	4.03	13.818	2	0.001 Highly significant
NITs	3.14	0.35	3.09			
Others	3.30	0.35	3.28			
Total	3.43	0.46	3.38			

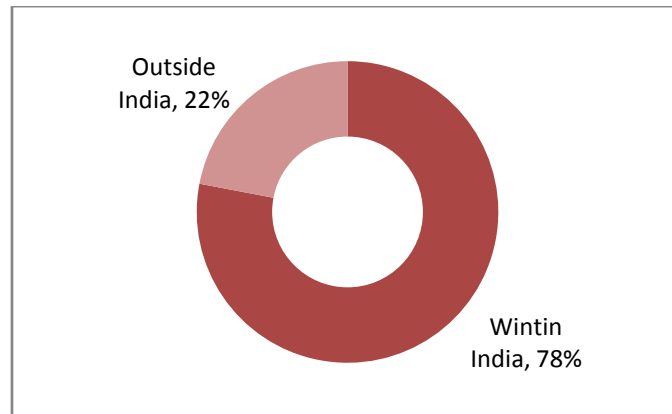
*Source: Research survey data*

IITs and IISc graduates stood first again with a total mean value of 3.91, followed by Others (3.30) and NITs with (3.14). The p value is 0.001, as such Hypothesis tested is

*H15 IITs and IISc graduates are able to provide more satisfaction to the industry employing them, compared to graduates from other institutions under CFTIs*

#### **4.9 Satisfaction of Parents and Members of the Society**

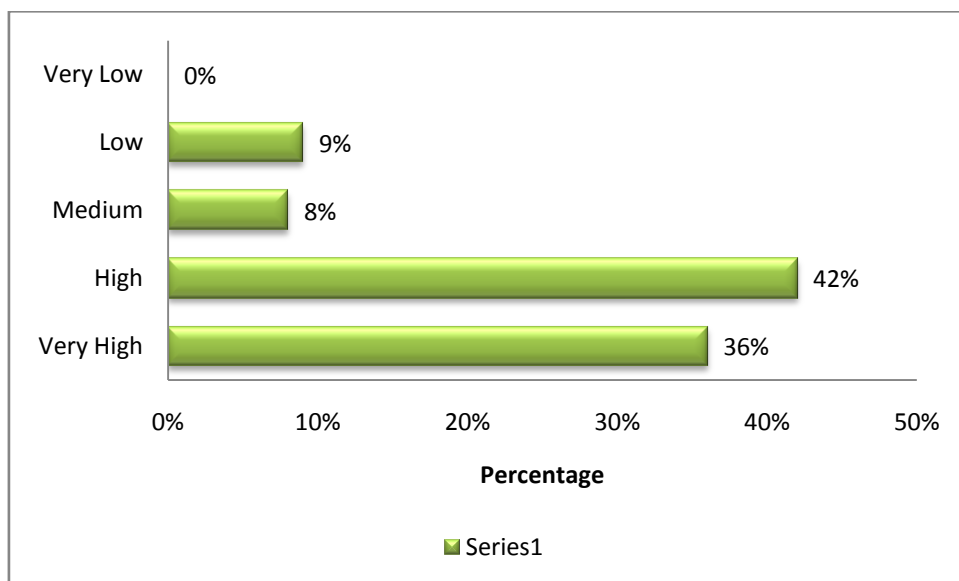
The satisfaction of parents and members of the society were measured through a survey. The survey was well responded by people presently residing in India and abroad (Figure 4.29).



**Figure 4.29**  
**Place of Residence of**  
**Respondents from Parents and Members of Society**

Out of the total respondents 78 per cent were from India and the remaining 22 per cent were from abroad.

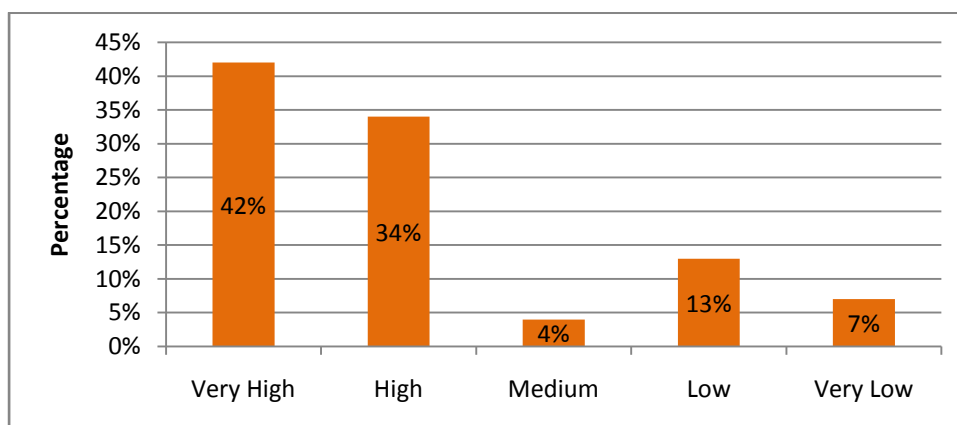
The satisfaction of the respondents on the quality of courses offered by CFTIs was measured on five point likert scale of one as very low and five as very high. The results on the analysis reveals that 46 per cent rated as very high, 42 per cent as high and none of the respondent rated as very low (Figure 4.30).



**Figure 4.30**  
**Perception of Parents and Society on the Quality of Courses offered by CFTIs**

This is mainly on account of the fact that the graduates of the CFTIs have gained quality education from the institutions, which helped them to secure attractive employment or research career. This is also evidenced by the over whelming responses in the entrance examinations of CFTIs as given Table 4.19 and 4.20.

The opinion of parents and members of society on social responsiveness of CFTIs were also measured using the five point likert scale. The analysis reveals that 42 per cent rated the social responsiveness of CFTIs are very high and 34 per cent as high (Figure 4.31).



**Figure 4.31**

**Opinion of Parents and Members of Society on the Social Responsiveness of CFTIs**

Only seven per cent of respondents rated the social responsiveness of CFTIs as very low. The social responsiveness are rated as high mainly because the large number of social outreach programmes resorted by CFTIs.

**4.10 Performance Outcomes of CFTIs**

The performance outcomes of CFTIs were also measured with some of the identified parameters. Initially analysis was made to find out the placement pattern of CFTIs graduates based on the startup salary (Table 4.96) . Almost all CFTIs have its own placement departments and major industrial players and governmental/semi-governmental organizations visit the campus for placement.

**Table 4.96**

**Distribution of Start-up Salary (per annum) of CFTI Graduates**

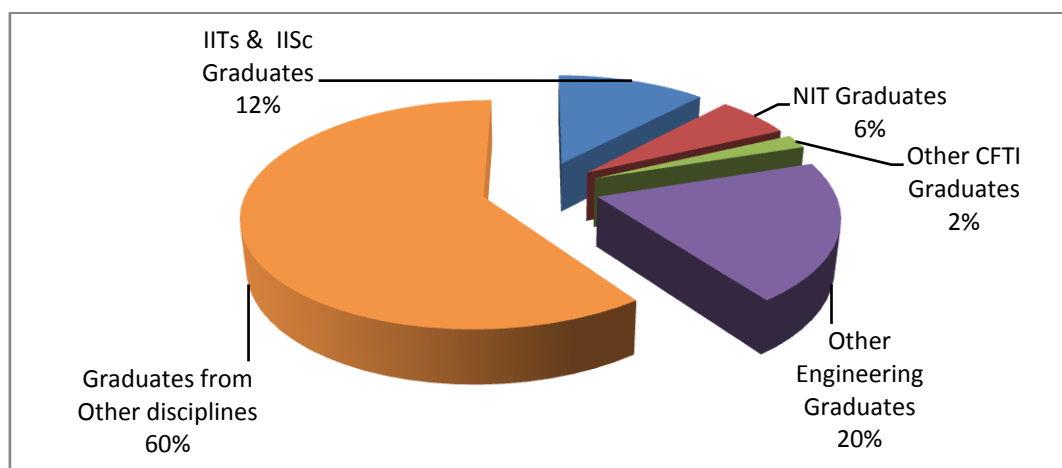
*(Rs. In million)*

<b>Institution</b>	<b>Highest</b>	<b>Lowest</b>	<b>Average</b>
IITs and IISc	8.16	0.60	1.20
NITs	7.00	0.40	0.60
Others	0.60	0.20	0.25

*Source : Research survey data*

The average start up salary is very high in IITs and IISc, compared to the other two groups. The main reason for the variation is that the companies focus on these institutions. In the QS 2012 World Ranking, while the MIT had a score of 100 on employer reputation, the highest score obtained by IIT Bombay was 82.70

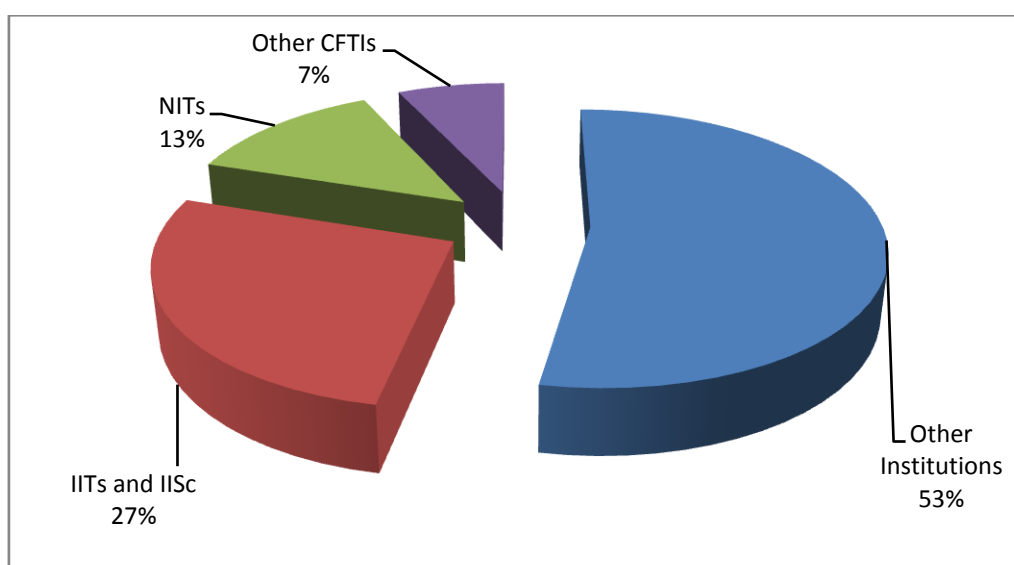
Another parameter evaluated was the performance of CFTI graduates in the national level competitive examinations. In the successful candidates of Indian Civil Service Examinations constitute forty per cent were engineering graduates and rest sixty per cent are from graduates from other disciplines. Among the engineering graduates who come out successful, twelve per cent are from IITs and IISc, 6 per cent are from NITs and two per cent are from other CFTIs (Figure 4.32). In short the CFTIs every year contribute average 20 per cent graduates to the Indian Civil Service.



*Source: Research survey data*

**Figure 4.32**  
**Distribution of the Share of CFTI Graduates in the Indian Civil Service Examinations**

Another national level competitive examination participated by the engineering graduates is Graduate Aptitude Test in Engineering (GATE), which is the admission test for post graduate programme in engineering and science. Out of the total graduates appearing for the GATE examination, statistics shows that in the successful candidates twenty seven per cent contribution are from IITs and IISc, thirteen per cent from NITs, seven per cent from other CFTIs and remaining fifty three per cent from other institutions. Thus, eighty nine institutions of CFTIs contribute forty seven per cent of successful candidates in GATE examination (Figure 4.33).



Data : 2012 statistics of GATE office

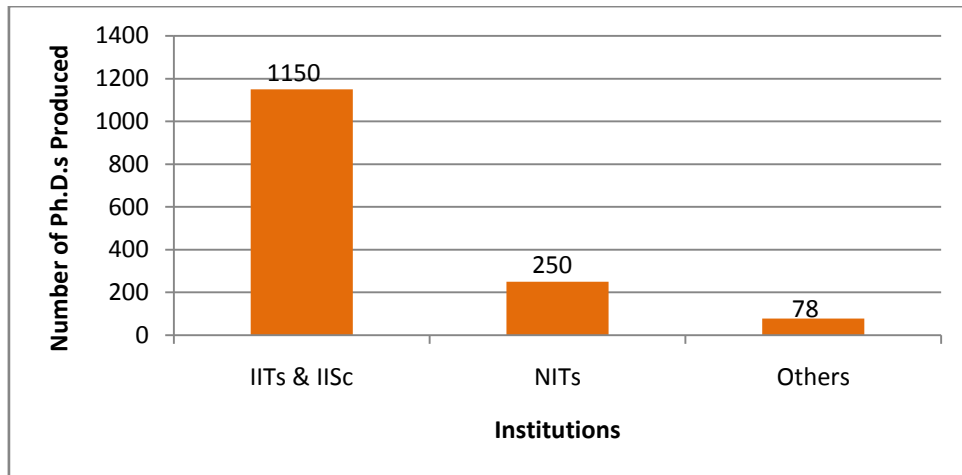
Source Research survey data

**Figure 4.33**

**Distribution of Share of CFTI Graduates in GATE**

The Ph.D. awarded by the institution is one of the yardsticks to measure performance and research strength of the institution. On an average the IITs and IISc produces 1150 Ph.D.s in a year, whereas, the NITs produces 250 Ph.D.s in a year and Other CFTIs produce 78 Ph.D.s (Figure 4.34).





Source Research survey data

**Figure 4.34**

**Distribution of Average Number of Ph.D.s Produced per Annum**

The performance of NITs and Other CFTIs are comparatively less in producing Ph.Ds. as these institutions are at its infancy stage and are in the process of strong research base.

**4.11 SUMMARY**

This chapter started with analysis and interpretation of strategic management practices in CFTIs. The analysis was made in three major phases of strategic management, namely formulation, implementation and control. This has been followed by the analysis of satisfaction of various stakeholders such as students, alumni, faculty, research, parents and the industry employing graduates from CFTIs. Finally, the various performance outcome of CFTIs were discussed.

**CHAPTER 5**  
**FINDINGS AND CONCLUSIONS**

## **CHAPTER 5**

### **FINDINGS AND CONCLUSIONS**

#### **5.1 INTRODUCTION**

This chapter summarizes the findings on the basis of analysis of secondary data, responses on the survey and review of literatures. The chapter begins with the summary of the research, wherein the purpose of study, research methodology and the major findings based on the study are discussed. Based on the findings, a strategic model has been evolved for CFTIs. Later, conclusions were drawn up based on the findings. Some recommendations are also put forward, in the later part. Chapter concludes with limitations of the study and directions for future study.

#### **5.2 SUMMARY OF THE RESEARCH**

##### **5.2.1 Purpose of the Study**

Education is a regulated sector and is subject to governmental regulations, historical influences and geographical constraints. This do not necessarily apply to other sectors of the economy. Accordingly, gaining success on education sector is not so conducive as it would be in commerce and industry. Given the specific nature of the education sector, the application of strategic management concepts poses challenges at conceptual and practical levels.

CFTIs in India are now faced with the pressures of reducing dependence on government funding, sustainable growth and development, upholding the quality and brand equity and attaining accountable management. In order to keep abreast with the challenges, the CFTIs have to focus on the strategic management to augment the dynamic capabilities. Being non-profit educational institutions, every initiative of CFTIs have to be supported by governmental initiatives at the national level.

### **5.2.2 Methodology**

Mixed approach was used for this study. The components of strategic management as applicable to education and the CSFs were identified through exploration. In order to trace-out the practices of strategic management in CFTIs, identifying impeters and also to figure out the reflections in performance, a survey was conducted. The responses of the survey were analyzed using meaningful descriptive and inferential statistics. Thus, through various research methods, the study was successful in identifying the deficiencies in the strategic management of CFTIs and able to propose a strategic model for CFTIs.

### **5.2.3 Major Findings**

The strategic management have three broad phases, such as strategy formulation, implementation and control. The findings of the study in these three major phases are elaborated in the same sequence.

#### **(i) Findings on Strategy Formulation in CFTIs**

Initially, the practice of setting up of strategic intent are evident in IITs and IISc ( $\mu=5.40$ ), NITs ( $\mu=4.33$ ) and Other institutions ( $\mu=3.13$ ). However, least efforts have been made on periodic revision of vision or mission based on the feedback from the last phase strategy control and evaluation, as 86.36 per cent of CFTIs never revised the vision statement and 95.45 per cent CFTIs never revised the mission statement. The practice of setting up of strategic intent in CFTIs has been tested with a hypothesis (H3) and it is found that it is more active in IITs and IISc( $\mu=5.40$ ), than in NITs ( $\mu=4.33$ ) other institutions ( $\mu=3.13$ ) under CFTIs.

The content analysis of vision and mission statement identified seven major areas, where CFTIs are focusing. These are R&D (62%), social concern (60%), educational excellence (55%), internationalization (48%), industry institute linkage (22%), multidisciplinary education (19%) and creating learning environment (15%). On comparison with the national vision, it is found that the vision and mission of CFTIs

carries the spirit of national vision. A detailed analysis has been made on the major areas focus on the vision and mission statement to identify the directions of CFTIs in line strategic intent set by them. The results revealed that the CFTIs are moving in the directions set by them in the strategic intent.

The external environmental scanning of CFTIs involves scanning at three levels, namely scanning of remote environment, education environment and operating environment. In the remote environment scanning, it is evident that government of India give full financial support even in the financial outlay of XI<sup>th</sup> FYP (32%) on technical education. There is ever increasing support from Government on technical education since post-independence as 40 per cent of budget on education have been spent only on technical education in 2011-12. Analysis of demographic data also indicate the increase in working age population (39%) and this has resulted demographic dividend for India. Hence, in a developing country like India, there is niche for the technical graduates. At the global level, expenditure made by India on education is fairly high, as percent of GDP ( 3 to 6 %) and per cent of per capita GDP for tertiary education (50-100%). The researchers per million population is low in India compared to other developing countries (101 to 300 per million). The second level of scanning of technical education indicates that the new entrants emerging from Foreign Educational Institution (Regulation of Entry and Operation) Bill 2010 is a real challenge for CFTIs. In the operating environment, CFTIs have established their own brand equity in the technical education, as the quality of the courses offered are rated as very high (32%) by the parents and society. Precisely, the external environment scanning of CFTIs reveals a great potential for growth in future through sustained efforts. The results on identifying the practice of external environment scanning in CFTIs indicate that it is fully active in IITs and IISc (100%), it is at moderate level in NITs (62.50%) and in Other group, it is non-existent in majority (55.60%) institutions.

Internal environment scanning is the next stage in strategic management process. The system is active in IITs and IISc (80%) and is at moderate level in NITs (87.50%) and Other institutions (66.70%). On the analysis of various internal factors, it is

brought to light that the CFTIs are able to attract talented students from the country. With the growing demands, the intake of CFTIs have increased considerably in the last three years. The major portion of the expenditure is on salary (45%) and income from fees is very less (7.56%). As such, governmental dependence for funding is more. The infrastructure and ICT framework in CFTIs are good to support strategic management. The organizational structure of CFTIs are traditional with concentration of power on few authorities. The participation of stakeholders in decision making is active at IITs and IISc (80%) and NITs (62.50%). It is at moderate level (55.60%) in Other group of institutions.

Governance plays a vital role in strategy formulation. As such the governance system of CFTIs has been put on scrutiny. The findings reveals that IIT Council and NIT Council are the bodies taking decision on all major policy matters and new initiations. These Councils are meeting at periodic intervals (two per year). The decisions taken on the minutes are widely published through web and action taken on the decisions are reported back. The governance, direction and superintendence of CFTIs are bestowed on the BoG. As per the statutes the BoG has to normally meet four times in an year. The analysis reveals that the BoG meetings are held less than the suggested minimum. The minutes of the BoG are published internally. The practice of publishing the minutes in web for wide circulation among stakeholders is highly evident in NITs rather than IITs and Other group of Institutions. The action taken on the minutes is ensured through reporting back. The meetings of the Finance Committee are held less than the required minimum suggested in the statute. The faculty and staff ratio of all institutions are as per the norms prescribed by the government. The ratio of faculty strength is one faculty for every nine students in IITs and for every twelve students in other institutions. There is no such ratio in IISc. The ratio for staff is 1.1 for every faculty member. The selection of both faculty and non faculty positions are made on all India recruitment. In the faculty side, there is a severe shortage and about one third strength is vacant in all CFTIs. In the case of staff, there is severe shortage particularly in NITs (29.71%), which is primarily because of conversion of RECs to NITs and subsequent instructions issued by the government to restructure the staff positions. In staffing pattern, it is optimum at IITs

and IISc (80%) and Others group (66.70%), whereas, it is understaffed in NITs (87.50%).

The internal scanning techniques used by 90 per cent CFTIs are SWOT analysis. The techniques such as VCA and RBV are not used by the majority of institutions. The internal scanning is followed by setting up long term objectives. Hypothesis (H2) tested that the environmental scanning (internal and external) is more evident in IITs and IISc ( $\mu=20$ ), than in NITs ( $\mu=7.13$ ) and Other ( $\mu=6.00$ ) institutions.

The practice of setting up long term objective is prevalent in CFTIs at fairly high rates in all groups of institutions (IITs and IISc =100%, NITs = 100% and Others=66.70%). The institutions are able to keep the qualities of long term objectives such as eventual, visible, inspiring, reasonable and directional (>65%). As the focal point of long term objectives CFTIs keeps employee relations, employee development, competitive position, accountability, public responsibility, quality education and technological leadership (>80%). The generic strategies adopted by organizations normally focus on cost leadership, differentiation and focus. CFTIs are non-profit organizations, majority of which are institutions of national importance. As such, rather than cost leadership and focus, the prime strategy for CFTIs are differentiation established through quality technical education and research facilities. Some of the grand strategies adopted by the CFTIs are Quality improvement (95%), vertical integration (91%), concentrated growth (68%), strategic alliances (63%), capacity building up (59%), innovation (55%) and horizontal integration (22%).

The final phase of strategy formulation in strategic management process is strategy analysis and strategic choice. Strategic choice has to be made based on the results various factors gained through internal and external scanning. The identification of existence of practice of strategic analysis and choice in CFTIs (H4), reveals that the practice is active in IITs and IISc ( $\mu=5.60$ ) than in NITs ( $\mu=4.88$ ) and Other ( $\mu=4.33$ ) institutions.

The second phase of strategic management process is Strategy Implementation.

## **(ii) Findings on Strategy Implementation in CFTIs**

Strategy implementation has two major phases. One is creation of clear short term objectives and action plans compatible with grand strategies. Secondly, implementation of the strategic choices by resource allocation with matching tasks, people, structures, technologies and reward system. The practice of setting up of short up of short term objectives and action plan is evident in majority of IITs and IISc (60%) at active level. In NITs majority (62.50%) is at moderate level. In the case of Other institutions the majority (55.55%) is at non-existent level. It is also assessed that the qualities of measurability and prioritization has been done in short-term objectives and action plans in both IITs and IISc and NITs, where the practice is evident. The second phase of evolving functional tactics, which put the strategy into operation is present in IITs and IISc (60%) at active level and in NITs (62.50%) at moderate level, whereas in Others group in majority (55.60%) of institutions it is non-existent. While evolving functional tactics there exist participation from faculty, staff and students. Empowerment has found a limited application in CFTIs due to lack of sufficient autonomy. However, specialized committees are constituted for recommendations and final decision is taken by the competitive authorities. CFTIs also have a system of devising policies for their major activities. The system of reward as motivation is not present in CFTIs, as these institutions are governed by government financial rules, and this does not provide any scope for such awards. An analysis has been made on the responses to assess the success rate in strategy implementation. The results indicate that the success rate is below seventy five per cent in all CFTIs. In the case of IITs and IISc, majority of the institutions rated the success range between 51 to 75 per cent. But in the case of two other groups of institutions the range is between 0 to 25 percent for majority institutions. This throws light to the fact that there are impeters in implementation of strategies in CFTIs.

The impeters were analyzed in five major heads; among these the most important is autonomy ( $\mu=3.65$ ) and incompatible structure ( $\mu=3.61$ ) of organizational issues, identified as the prominent impeters for CFTIs. Detailed analysis of autonomy enjoyed by the CFTIs in different areas reveals that CFTIs have autonomy in major areas of academic matters such as research, fixing academic standards and curriculum



and teaching. The restriction in autonomy is mainly in the areas of human resource management (45.50%), administration and finance (36.40%) and in institute governance (31.80%). The analysis (H1) also revealed that IITs and IISc have more autonomy ( $\mu=105.40$ ) compared to NITs ( $\mu=96.00$ ) and other ( $\mu=89.75\%$ ) of institutions.

The organizational structures of CFTIs have also been put under detailed scrutiny. The organizational structures of CFTIs are traditional in nature. The study shows that the organization structure is having concentration of power in the apex functional group with limited freedom to the bottom line. Whereas, in WCUs most of them are having divisional organizational structure with relatively autonomous units or divisions, integrated in a central office with its own functional specialists.

Leadership and culture are the other important factors for strategy implementation. The apex functional groups such as Chairman of BoG is nominated by the Government and the post of the Director of the institute is appointed by the government and approval by the BoG. Similarly, all other advisory positions of Deans and functional heads, such as head of the departments are nominations only for a fixed, short period. CFTIs do not have the system to impart specialized managerial training to these functionaries.

By this the fourth objective of finding out the impeding factors on strategy implementation in CFTIs has been met.

The last phase of strategic management is strategic control.

### **(iii) Findings on Strategy Control in CFTIs**

The Strategy control have been analysed in two major sections. Firstly, monitoring and control and secondly evaluation of the success or failure of strategy and giving feedback for the future planning. The results of the analysis on existence of such strategic monitoring and evaluation, is that it is only present at moderate level in IITs and IISc (60%) and non-existent in majority NITs (62.50%) and other (55.60%) institutions. The final phase is the feedback to report the results of monitoring and evaluation. The practice of feedback is also present only at a moderate level in IITs

and IISc (60%) and non-existent in NITs (62.50) and other (55.60%) institutions under CFTIs. In quality assessment and assurance there is no inbuilt mechanism in the CFTIs. The Act or the Statutes of institutions under CFTIs does not call for mandatory accreditation by National Board of Accreditation or through any agencies abroad.

**(iv) Findings on Components of Strategic Management in CFTIs**

The initial objective of the research was to find out the components of strategic management as applicable to education. An explorative study was made on various literatures to find out whether the components of strategic management used in business sector and the education are identical or not. The inputs were also received from various educational experts during the process of interviews. Components of Strategic Management as applicable to education sector have been finally identified through exploration. The identified components are Strategic intent (Vision & Mission), Internal Scanning, External Scanning, Goals and objectives, Strategies, Implementation, Evaluation and Control and Feedback. Among these components most of the studies are concentrated on strategic intent, which are followed identification of strategies and evaluation and control. Thus, the first research objective of identification of components of strategic management has fulfilled.

**(v) CSFs for Planning Strategic Management**

The CSFs for planning strategic management was another objective for the study. In order to have a reliable input on CSFs, various research work done in India and abroad were studied in detail. Based on the findings of these research studies, various CSFs were identified. Among the different CSFs majority of the authors support planning as most important, this is followed by quality, students and faculty. The strategic management calls for the need to see changes coming up. A good planning system helps to analyze external environment for anomalies and opportunities, so that strategies can be adopted to suit the strength and weakness of the internal environment. Quality is a major aspect that institutions has to uphold for sustainable development, in which the quality of inputs namely students and faculty are important factors. By this, the third objective of identifying the CSFs has been fulfilled.

**(vi) Findings on strategic management processes in CFTIs**

The results of the final analysis indicate that the components of strategic management practices are more evident in IITs and IISc ( $\mu=207.40$ ) than in NITs ( $\mu=162.44$ ) and Other ( $\mu=150.13$ ) institutions (H5). By this, the second part of the first objective, that is to assess the application of components of strategic management and simultaneously the second objective of awareness and practice of strategic management in CFTIs have been fulfilled.

**(vii) Finding on the Impact of Strategic Management on the Overall Performance.**

As CFTIs are non-profit educational institutions, primarily impact was measured through stakeholder satisfaction consisting of students, faculty, researchers, alumni, parent, and the industry employing the graduates

**a) Student's satisfaction**

The student's satisfaction was measured with seven major constructs, namely, course organization, learning process, teaching process, library facilities, laboratory and workshop facilities, hostel facilities and learning environment. Major variables influencing each constructs were identified with the help of highest mean score. The result of the analysis reveals that IITs and IISc gain more student satisfaction ( $\mu=4.67$ ) than NITs ( $\mu=4.02$ ) and other ( $\mu=3.93$ ) institutions (H6). Accordingly, it is confirmed that in IITs and IISc, where strategic management is evident, have a positive impact in student satisfaction.

A comparison of each constructs with the overall satisfaction as a latent variable has been done to find out comparative advantage in gaining the student's satisfaction, with the help of a model. The analysis also reveals the relationship between the constructs on student's satisfaction. In all cases there is a positive  $\beta$  value, as such it is found that all constructs are positively related to overall student's satisfaction. Among these constructs, learning environment has a major influence with respect to all categories of institution. It is also found that student's satisfaction on learning environment at IITs and IISc is greater than in NITs and Other institutions under CFTIs (IITs & IISc  $\beta=0.53$ , NITs  $\beta=0.38$ , Others  $\beta=0.27$ ) (H7). The model on overall

student's satisfaction in all CFTIs put together gave the indication that there is a close relationship between library facilities and teaching learning processes ( $r=0.83$ ) (H8). It is also confirmed in this model also that learning environment has strong relationship ( $\beta=0.35$ ) with overall student's satisfaction in CFTIs (H10). The analysis also gave interesting results that gender have no influence on the overall student satisfaction ( $p=0.633$ )(H16). This substantiates the fact that CFTIs are providing equitable treatment to all students, irrespective of gender. The factor analysis of all constructs has helped to evolve two new variables such as enabling process (62.001%) and creative environment (11.917%) to measure student's satisfaction.

#### **b) Alumni Satisfaction**

The satisfaction level of programme undergone by the alumni has been rated as very high (65.93%). Majority (53.80%) also rated the employability of the programme undergone as very high. Amongst the alumni, majority (60.40%) is employed and only few (24.20%) have become research scholars. In total CFTIs holds good satisfaction level of their alumni.

The various skills acquired by the alumni during the education has been put into factor analysis and five major variables such as professional skills (17.058%), application skills (16.594%), talents compiled (12.099%), international caliber (10.159%) and analytical skills (9.185%) are identified.

A model on skills attained by the alumni has been evolved for establishing the relationship with overall skill attainment. The results indicate that quality concern is positively related ( $r^2=0.56$ ) to overall skill attainment (H11). Similarly, decision making capacity is closely related ( $r^2=0.56$ ) to overall skill attainment (H12).

#### **c) Faculty Satisfaction**

The variables used to measure faculty satisfaction indicate that the faculty satisfaction is linear in respect of all CFTIs. There are some upward marginal deviations on the variables such as job and research facilities in the case of IITs and IISc.

On the question regarding choice on strategies relating to integration in CFTIs, majority of faculty supported both vertical and horizontal integration (31.70%).

**d) Satisfaction of Researchers**

The satisfaction of researchers of CFTIs was measured on ten different variables. The results of the analysis of researchers indicate that IITs and IISc provide more satisfaction ( $\mu=3.41$ ) than NITs ( $\mu=3.04$ ) and Other ( $\mu=3.27$ ) institutions.. This substantiates the fact that strategic management has a positive effect on researchers in providing them the best support.

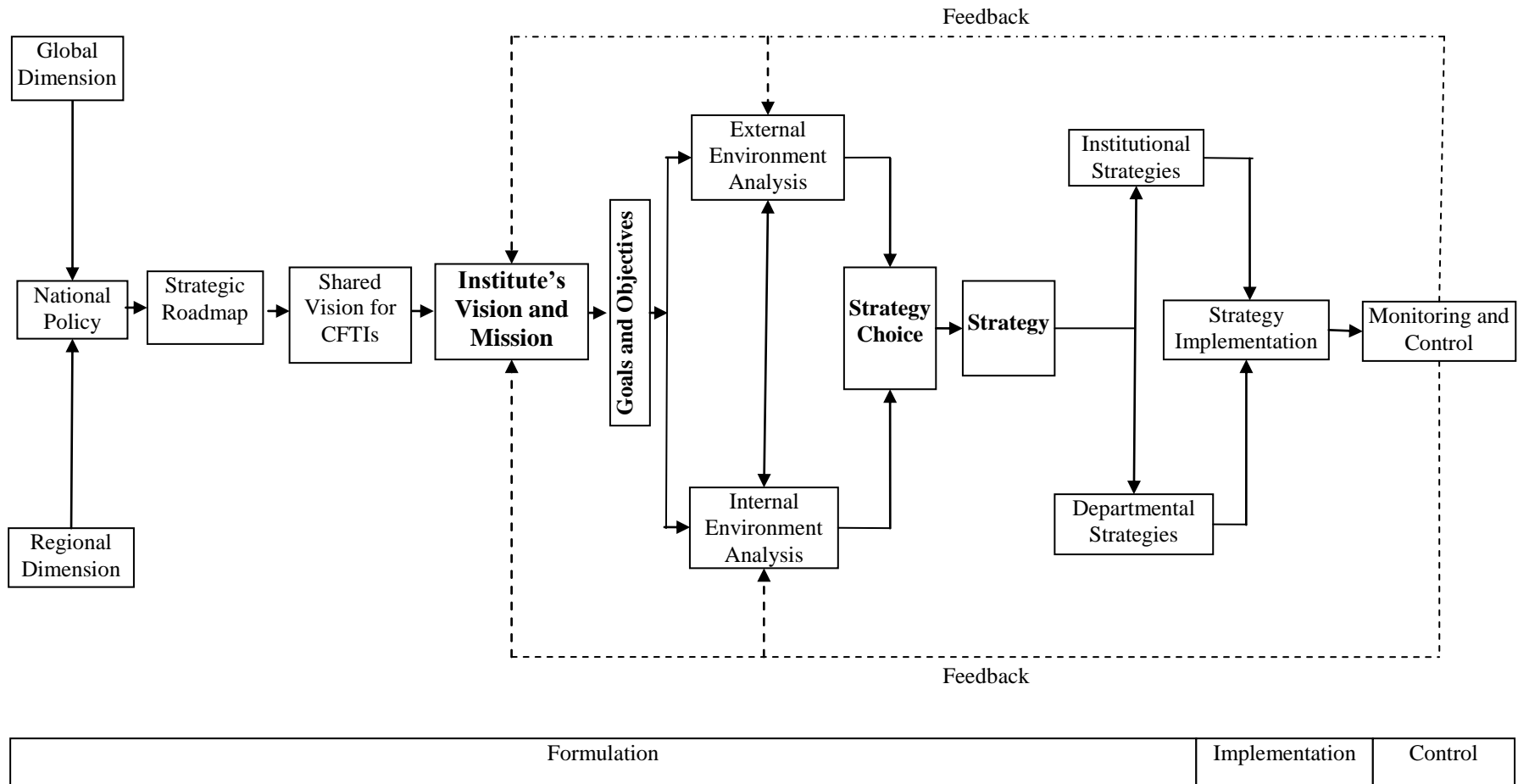
**e) Satisfaction of Industry Employing CFTI Graduates**

The analysis of data compared the performance of graduates from different categories of institutions under CFTIs. The results show that the skills and competencies acquired by graduates of IITs and IISc are higher ( $\mu=4.50$ ) than NITs ( $\mu=3.71$ ) and Other ( $\mu=3.80$ ) institutions (H13). Similarly the assessment of work performance graduates also indicate that IITs and IISc gives higher satisfaction to employers ( $\mu=4.35$ ), than NITs ( $\mu=3.56$ ) and Other ( $\mu=4.01$ ) institutions (H14). In the case of overall satisfaction of industry employing graduates of CFTIs also indicate that IITs and IISc more satisfaction ( $\mu=3.91$ ) than NITs ( $\mu=3.14$ ) and Other ( $\mu=3.30$ ) institutions (H15). This also support the effect of strategic management on the quality of deliverables. The quality concepts are also revealed with the help of academic outputs, start-up salary, share in civil service examinations and GATE examinations.

By this the fifth objective of identifying the impact of strategic management in CFTIs is met.

**5.3 STRATEGIC MANAGEMENT MODEL FOR CFTIs**

Keeping in mind the theoretical structure and the feedback obtained during the study a Strategic Management model has been evolved for effective implementation of strategic management in CFTIs (Figure 5.1).



**Figure 5.1**  
**Strategic Management Model for CFTIs**

National policy on technical education is normally derived from global dimension and a regional dimension. National policy has to give birth to the strategic roadmap for technical education in the country. The shared vision for CFTIs can be evolved from the strategic roadmap for technical education. The shared vision will help to emerge concerted efforts among member institutions and a sense of feeling to work together for a common goal. This will enable sharing of resources and expertise among each other, rather than working in water tight compartments.

Institute's vision and mission has to emerge from the shared vision of CFTIs. This will give rise to goals and objectives. This has to be followed by environmental scanning, including both internal and external environment. The subsequent phase is choice and selection of strategy. This will pave way to Institutional strategies and departmental strategies at functional level. Next phase is strategy implementation followed by monitoring and control. The last phase is feedback to vision and mission as well as to internal and external environment scanning. Thus, the model also has the proper grounding on theoretical framework of strategic management.

## **5.4 CONCLUSIONS**

Based on the review of relevant literatures, interviews with educational experts, survey of CFTIs and various stakeholders, hypothesis testing and interpretation of findings, the conclusions have been drawn in relation to the research objectives.

### **5.4.1. Identifying the components of strategic management applicable to education sector**

Through research literatures the components of strategic management in education as applicable to education sector has been identified. All the components of strategic management are squarely applicable to non-profit education sector also. The identified components are strategic intent (vision and mission), external scanning, internal scanning, goals and objectives, strategies, implementation, evaluation and control and feedback. Among these the most important one, as assessed from the literatures, are strategic intent followed by strategies and evaluation and control.

#### **5.4.2 CSFs for Planning Strategic Management**

The CSFs for planning strategic management identified through exploration are (a) planning, (b) quality (c) students and (d) faculty. As far as educational institutions are concerned these are the four major pillars for building up the future. Planning is the mental process, thoughts about action necessary to create a preferred future position. Planning is the corner stone for the strategic management process. In CFTIs, hardly some institutions have dedicated departments assigned with the planning function. Hence, planning has to be given more importance. The differentiation of CFTIs with other institutions is mainly on account of quality of deliverables. Thus, quality building up is a task ahead for every CFTIs. Strength of the CFTIs is talented students and quality faculty. Competition in education sector is a new threat on quality students. Lack of qualified faculty is also a major problem. As such, focus has to be given on attracting talented students and good faculty.

#### **5.4.3 Awareness and Practice of Strategic Management in CFTIs**

The components of strategic management process are not fully present in CFTIs. IITs and IISc have the components present at fairly high rates. There are some missing components in strategic management process, more in the area of implementation, evaluation and control. This has to be rectified and a full- fledged strategic management process has to be followed in all CFTIs.

Evolving strategic intent exist in almost all CFTIs. External scanning at macro level, gives an indication that there are ample opportunities for CFTIs for growth. India, being a developing country and the demographic dividend created ever flourishing niche for the graduates of CFTIs. The governmental support for CFTIs continues to be on the increasing trend. Hence, the institutions have to take the advantage of the situation to build up for the future. There is growing competition from national and international sectors, which pose future challenges for the CFTIs. Internal environment of CFTIs have advantage of talented students, infrastructure and resources. Internal revenue generation of CFTIs is very low and the dependence on



government is very high in CFTIs. There is severe shortage of faculty, which requires serious attention as it may have adverse effect on the quality of deliverables. There is too much concentration of power in CFTIs. Decentralization of power is a prerequisite for effective strategic management. The decision making bodies such as BoG, FC, and BWC has to be more involved in the activities of the institutions. Frequent meetings will ensure a sense of participation and at the same time monitoring and evaluation will be more efficient. The CFTIs are making every effort to uphold transparency in administration. This has to be kept high in the future agenda. Employee participation on governance is low. More participation will be an impetus for effective strategic planning. The teacher student ratio is very low compared to WCUs. This has to be improved for more quality education and to augment the research output. The faculty staff ratio is also low, which hit hard on the administration. In order to have effective administration this has to be kept fairly high.

Precisely, the institutions have to be more vigilant on scanning the internal and external environment, which will help in strategic analysis and choice. The failures on strategy implementation are at fairly high rate. The practice of strategic control is weak in CFTIs. There is no inbuilt mechanism for concurrent quality assessment. Accreditation is not mandatory for the CFTIs.

The presence of components at various stages of strategic management tested with the help of various hypotheses revealed that the components of strategic management are more evident in IITs and IISc.

#### **5.4.4 Impeders on Strategy implementation in CFTIs**

The Organizational issues such as autonomy and incompatible structure has been identified as the major impeders. The hypothesis tested indicates that IITs and IISc have more autonomy compared to other CFTIs. This in fact helped them to effectively implement strategic management process. In NITs and Other institutions under CFTIs, there is lack of autonomy in governance, administration and finance and

in human resource management. More autonomy has to be provided to these areas in these institutions to support overall development of CFTIs. The unlimited autonomy can be coupled with academic audit and accountability. The organizational structure of CFTIs does not support effective strategy implementation, as concentration of power is a deterrent factor evolving functional tactics and policies.

#### **5.4.5 Impact of Strategic Management on Overall Performance**

In order to ascertain the impact, satisfaction of various stakeholders such as student, faculty, parents, alumni, researchers, industry employing graduates of CFTIs have been measured. In all cases CFTIs provide stakeholder satisfaction at higher levels. Among the institutions IITs and IISc give more satisfaction to stakeholders, which has been tested with the help of various hypothesis.

It is identified that the learning environment plays a vital role in attracting student's satisfaction. Hence, the future grand strategy can be focused on to building up world class infrastructure and support facilities for the overall development of the students. Similarly, it has been identified that quality concern has strong relation with overall skill attainment of the students in CFTIs. The work performance as well as skill and competencies of IITs and IISc graduates are proved to be higher than any other institution under CFTIs.

Finally, it is highly important to mention the findings on the gender equity provided by the CFTIs.

### **5.5 RECOMMENDATIONS**

Based on this study following major suggestions are put forward:

1. Build up visionary leadership, shared values and strategic alliances with WCUs.
2. All institutions under CFTIs to work more closely under a common goal, by sharing the strengths, focusing overall development of CFTIs.

3. Evolve a strategic road map for technical education in the country, which will be advantageous to crystallize strategic directions of every institution.
4. Boost up planning function to foresee changes coming up and act before anyone else does. This also will help searching the environment for anomalies and opportunities.
5. Adherence to strategic management processes through effective planning, implementation, evaluation and feedback.
6. Re-engineering the organizational structure to decentralize power to suit the strategic management processes.
7. Effective use of information technology as a tool for strategic planning, implementation and control. The expertise of IITs can be used for formulating such tools.
8. More autonomy in governance, administration, finance and human resource management, has to be bestowed on CFTIs.
9. The internal revenue generation in CFTIs has to be augmented through R&D, consultancy, continuing education programmes and support from industry.
10. Devise strategic plans to keep the courses, curriculum and learning processes up-to-date with latest scientific and technological advances.
11. Strategic plans to encourage research on emerging areas of science and technology
12. Attract more international students through quality innovative programmes.

13. Infrastructure building up and augmentation of facilities has to be given major importance.

## **5.6 LIMITATIONS**

Following are perceived as the limitations of the study:

- (a) The study involves CFTIs spread throughout the country. Due to time and financial constraints, the study has been limited only to representative samples selected from each region of the country. Similarly, there may be differences in resources among different NITs, formerly known as RECs which were a joint enterprise of State and Central Government, right from their inception in 1960, due to the different pattern of support given by different State Governments,. NITs became centrally funded only in the year 2004.
- (b) The process of interview and data collection lasted for nearly one year and some significant changes could have happened in the data collected in the intervening period.
- (c) Strategic management practices are assessed through the questionnaire, majority of which are self administered to the respondents who are the executives of the institute. It is assumed that the information provided by them are true and dependable.

## **5.7 DIRECTIONS FOR FUTURE STUDY**

Technical education being the pulse for every developing country, large volume of studies has been done in the rest of the world. The volume of work done on this area, compared to other countries, is very less. Further studies on strategic management practices of CFTIs can be done concentrating on each institution in particular, so that the practices and the outcomes thereon can be well analyzed. This will help in evolving specific strategies for the Institution. Research can also be carried out on each major phase of strategic management process such as formulation, implementation and control. Detailed studies can also be focused on the impellers on strategy implementation in CFTIs, so that the strategies evolved can be made successful.



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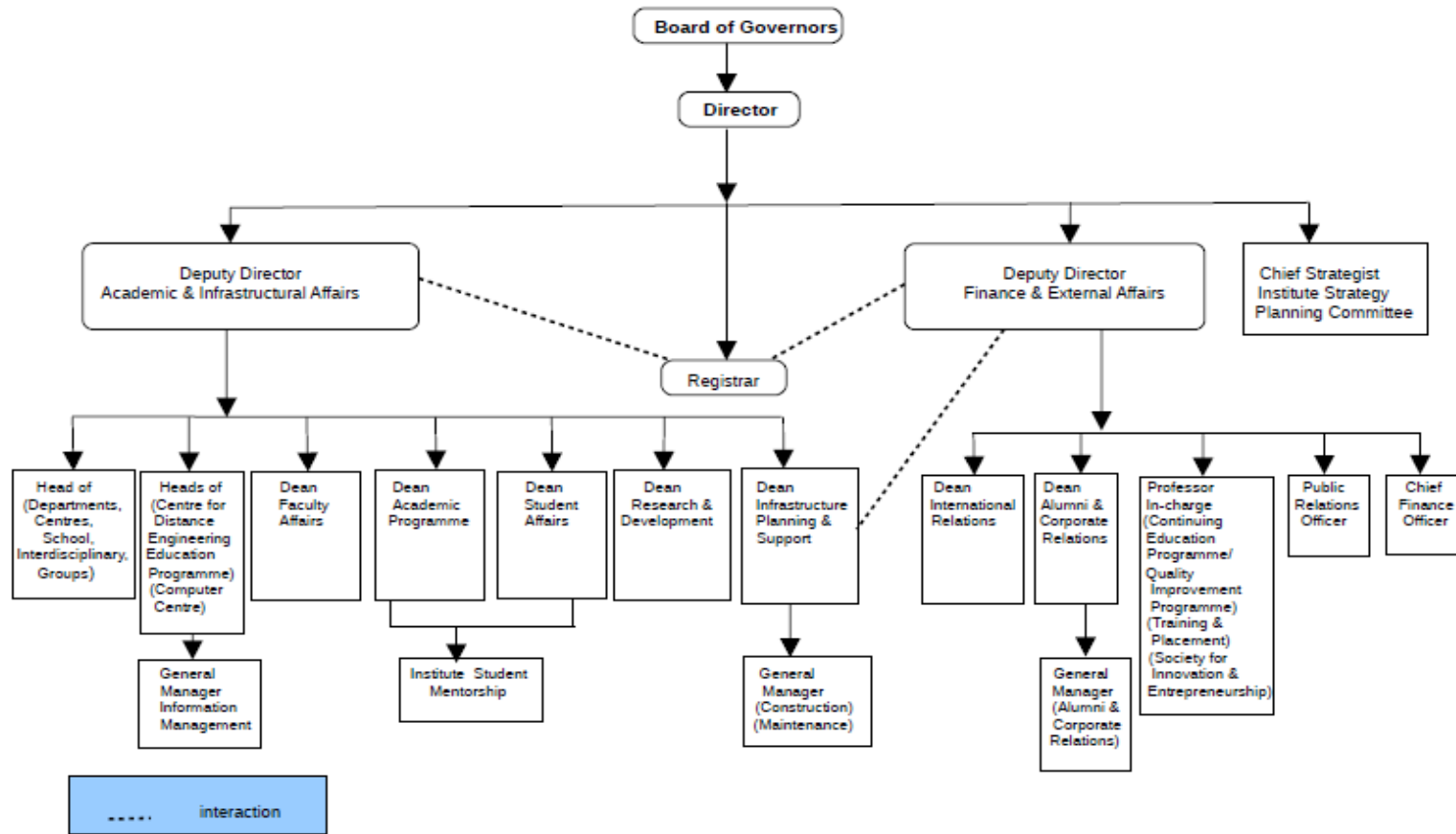
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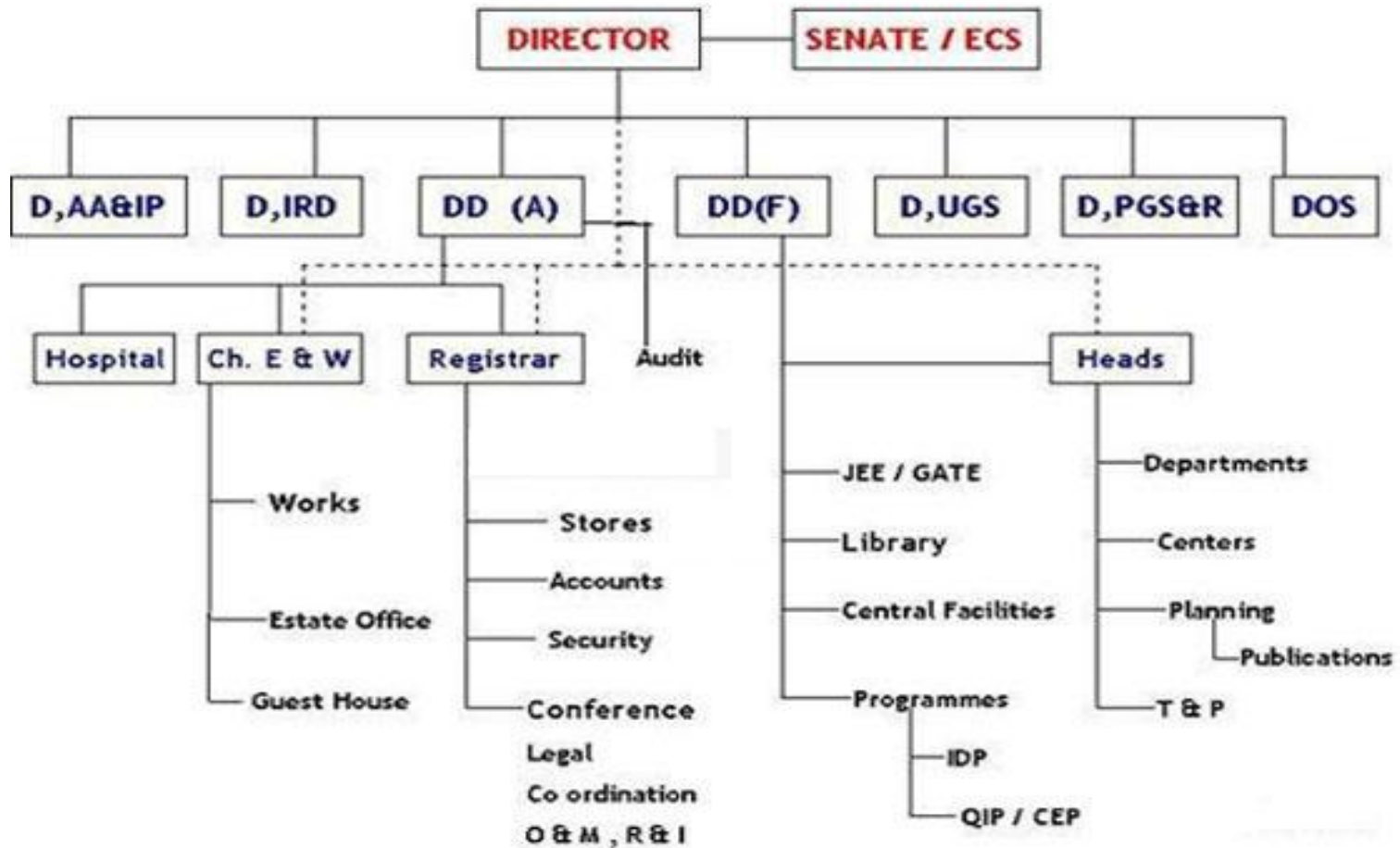
## Organization Structure of IIT Bombay



Appendix I

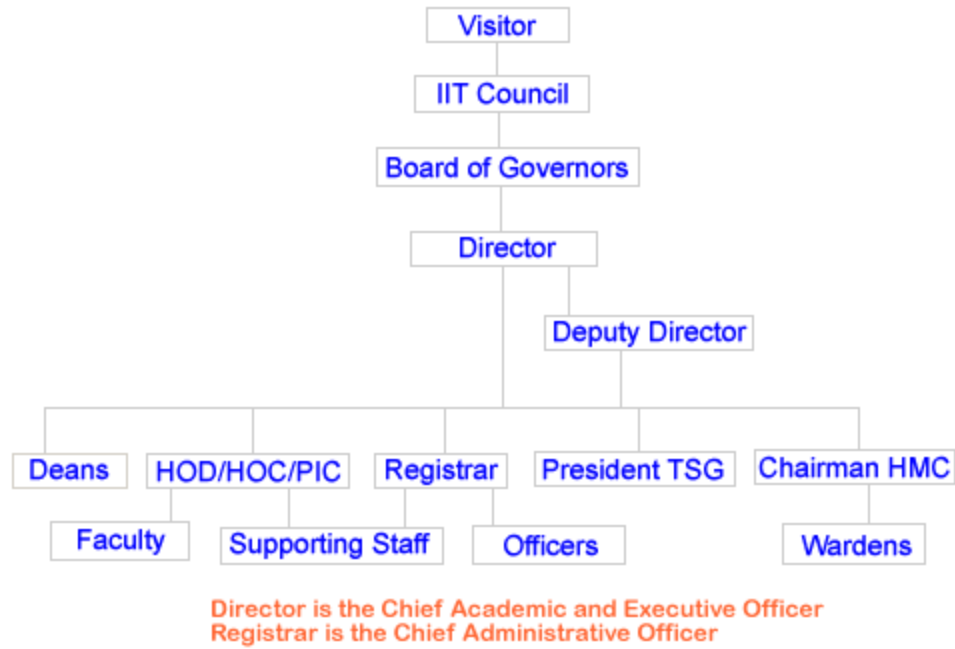
Source: Research Survey Data

## Organization Structure of IIT Delhi



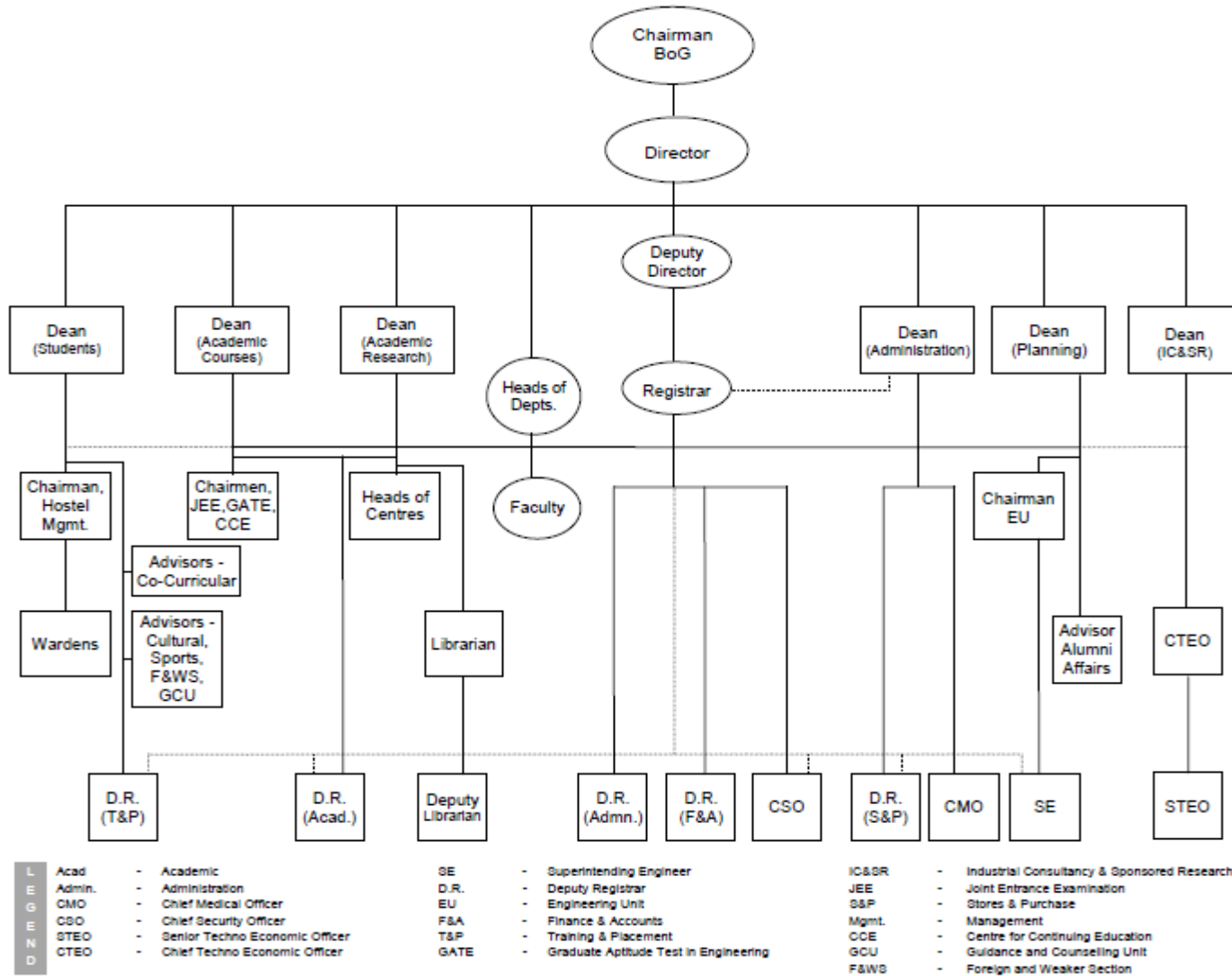
Source: Research Survey Data

## Organization Structure of IIT Kharagpur



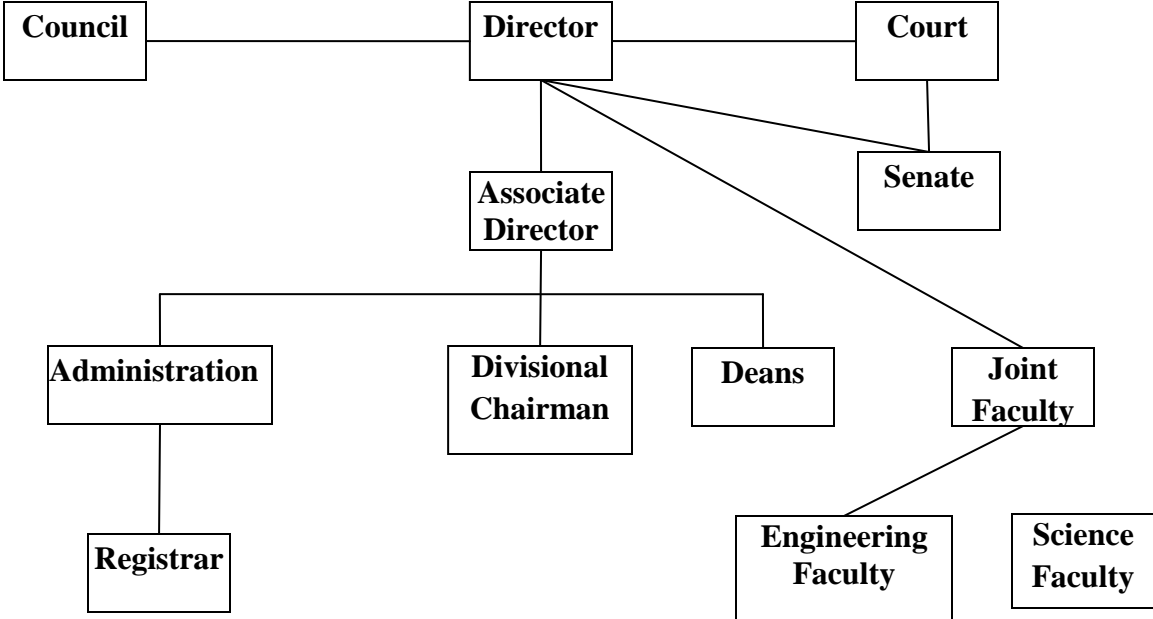
Source: Research Survey Data

## Organization Structure of IIT Madras



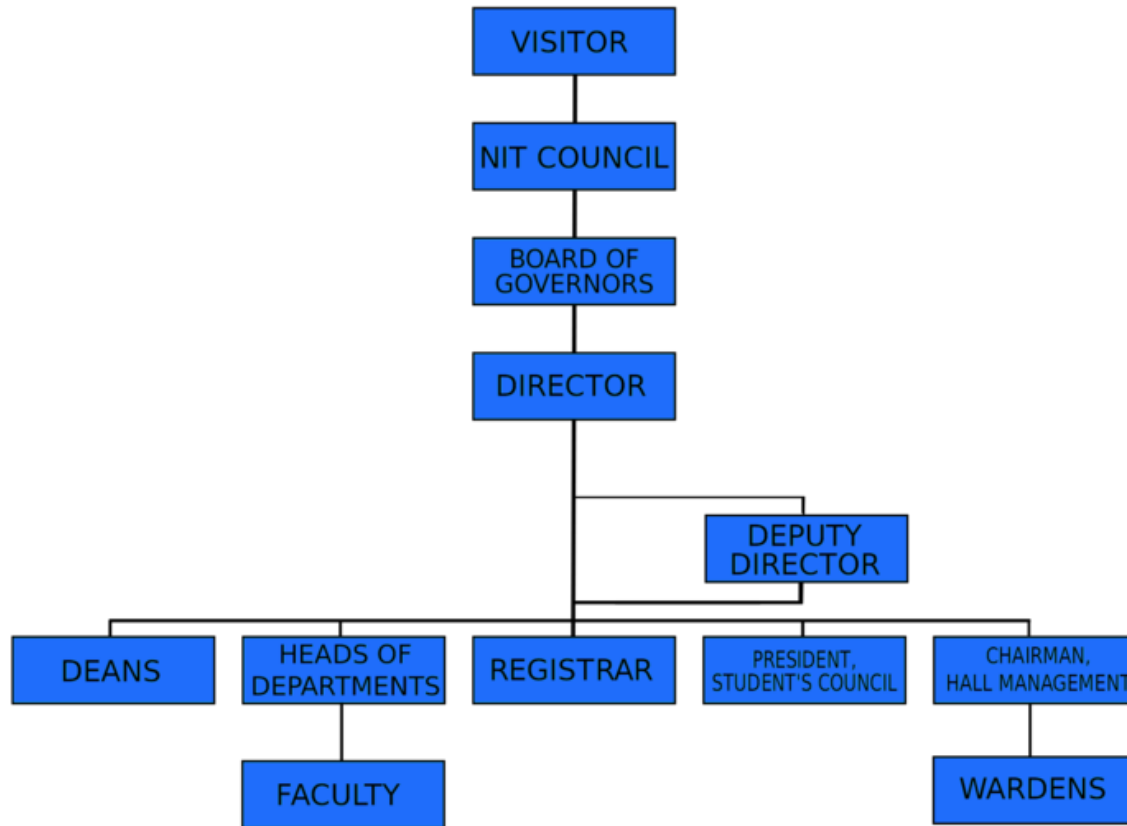
Source: Research Survey Data

**Organization Structure of IISc**



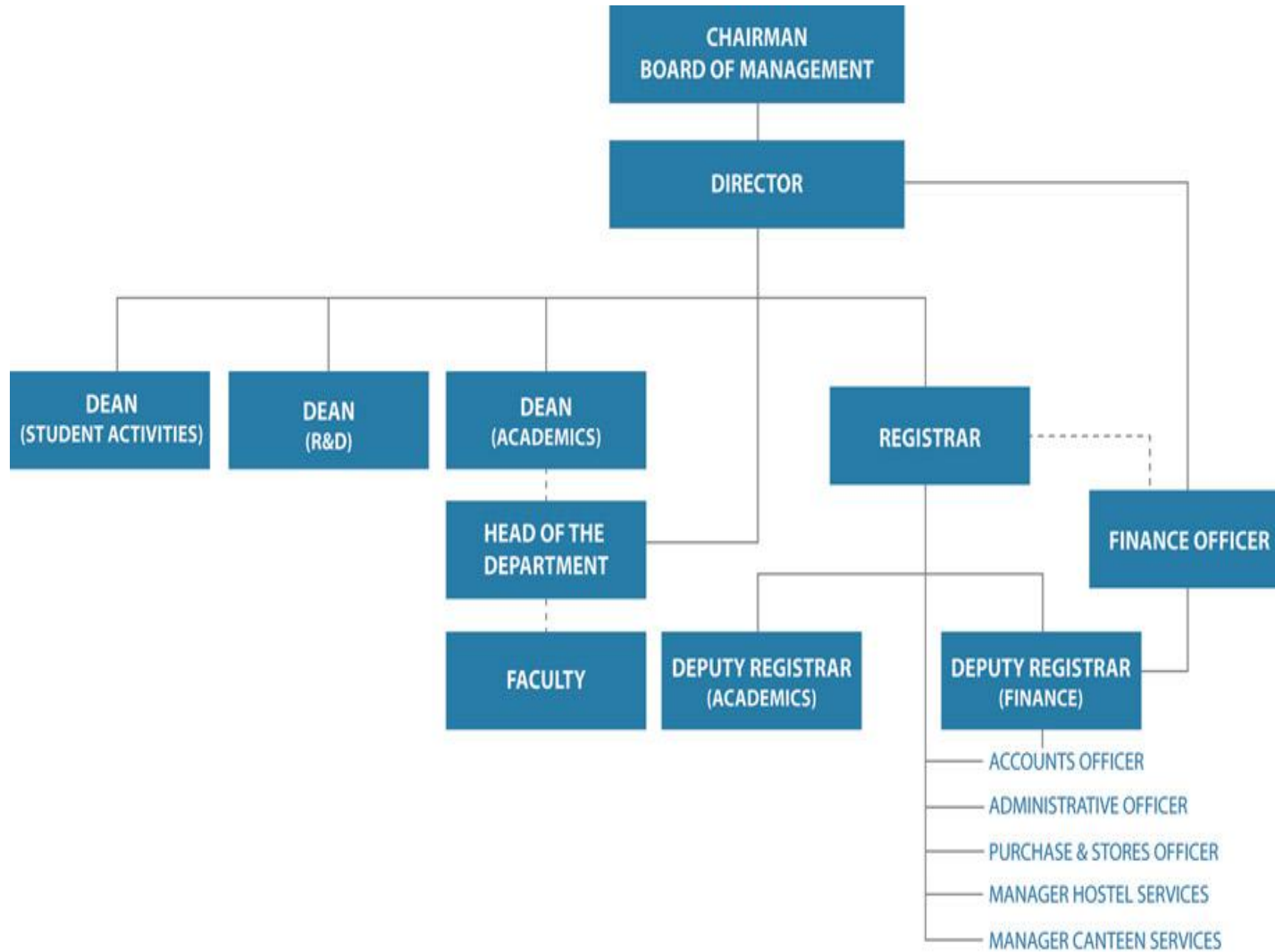
*Source: Research Survey Data*

## Organization Structure of NITs



*Source: Research Survey Data*

## Organization Structure of IIST



*Source: Research Survey Data*





## STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHICAL INSTITUTIONS (CFTIS) IN INDIA

### QUESTIONNAIRE TO ASSESS THE LEVEL OF AUTONOMY EXRCISED BY THE CFTIS

Respondents are Registrar/Deans in CFTIs

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic “Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India”. In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,

Raghunadhan T  
 Research Scholar, Department of HSM,  
 National Institute of Technology Karnataka  
 Surathkal, Mangalore 575 025  
 Email: raghu@nitc.ac.in

This questionnaire is consisting of following eight major Sections:

- Section 1: General Information
- Section 2: Autonomy in Institutional Governance
- Section 3: Autonomy in Administration & Finance
- Section 4: Autonomy in HumanResource Management
- Section 5: Autonomy in Course Admissions
- Section 6: Autonomy in Curriculum and Teaching
- Section 7: Autonomy in deciding Academic Standards
- Section 8: Autonomy in Research and Publications

### Section 1 : General Information

Please tick (‘✓’) in the appropriate box

1. Type of the Institute : 

IIT/IISc	NIT	Others
----------	-----	--------

2. Year of establishment :

3. State where the Institute is located :

## Section 2 : Autonomy in Institutional Governance

Please tick (‘✓’) in the appropriate box

4. Please state whether Central Government exercise any control over the functioning of Board of Governors of the Institute?

Yes  No

5. If yes, how often the Government exercise such control?

Always  Often  From time to time  Only Rarely  Never

6. Whether Central Government has any legal control on the appointment of the Chairman of the Board of Governors?

Yes  No

7. Does Government have control on the appointment and/or termination of the Director of the Institute

Yes  No

8. If yes, the frequency of exercising this power?

Always  Often  From time to time  Only Rarely  Never

9. Does Government have any control in the academic Boards of the Institute?

Yes  No

10. Whether Government exercise any control on student’s discipline/association?

Yes  No

11. Does State Government respect the autonomy granted to the Institution?

Yes  No

## Section 3: Autonomy in Administration and Finance

12. Does Government have any control on the total number of students to be admitted in the Institute?

Yes  No

13. If yes, frequency of exercising such control?

Always  Often  From time to time  Rarely  Never

14. Whether the Government make any stipulation on the maximum or minimum number of students to be admitted in a specialization

Yes                       No

15. If yes, how often such control is exercised?

Always      Often   Frotime to time   Rarely   Never                                           

16. Whether Government’s prior permission is required for closure or amalgamation of the Institute?

Yes                       No

17. Do any of the following regulatory agencies play any role in implementation of autonomy?

UGC                       AICTE                       COA    Others: Specify\_\_\_\_\_

18. In the present working environment, please state whether the Central Government intervene in the functioning with any type of control on following matters:

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| Titles and awards                      | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Length of courses                      | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Duration of the academic year          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Institute rules and regulations        | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Institution Budget                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Financial Audit                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Investment of money in making ventures | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Major Capital expenditures             | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Levy of tuition fees                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Financial aid to students              | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

### **Section 4: Autonomy in Human Resource Management**

19. Does Government of India exercise control over the appointment of the Director of the Institute?

Yes                       No

20. Please state whether the Government has power to intervene in matters relating to disciplinary actions against the Director?

Yes                       No

21. Can Government of India extend and/or terminate the contractual appointment of the Director?  
 Yes  No
22. Whether the Institute has power to determine its own Student Faculty Ratio and Faculty Non-teaching Staff Ratio?  
 Yes  No
23. Does the Institute have provision for **flexible staff structure**?  
 [ *Flexible staff structure here means the cadre strength of various levels can be determined by the Institute and there is no strict sanctioned strength for each cadres* ]  
 Yes  No
24. Whether Government of India intervenes in any of the following matters?  
 Appointment of faculty positions  
 Appointment of non-faculty positions  
 Appointment of faculty and non-faculty positions  
 In none of the above matters
25. Please mention whether the Institute can determine its own wage structure and service rules to the members of teaching as well as non teaching staff?  
 Yes  No
26. Does Government exercise any types of control on matters relating to disciplinary actions on members of faculty and non faculty positions?  
 Yes  No
27. Does Government intervene in the following matters?  
 Only in determining the promotion policy of faculty  
 Only in determining the promotion policy of non-faculty  
 In determining the promotion policy for faculty and non-faculty positions  
 Government does not intervene in the promotion policy of the institute
28. Is there any minimum number of publications for faculty fixed by an external body like AICTE/UGC etc. for the career prospectus?  
 Yes  No
29. Is the retirement age of the faculty/nonfaculty members are fixed by the Institute  
 Yes  No

### Section 5: Autonomy in Course Admissions

30. Whether the institute is empowered to start new courses which are not covered under the standard nomenclature?

[Standard Nomenclature of degrees in technical education includes: B.E./B.Tech./M.Sc./M.Tech./Ph.D. etc.]

Yes  No

31. Please state the method of selection of students for admission to various courses:

Common Entrance Examination

Institute's own Entrance Examination

Merit in the Qualifying examination

Entrance examination conducted by Group of Similar institutions

32. Whether Central Government will intervene in to the matters relating to the admission with any kind of instructions/directives on reservation of seats

Yes  No

### Section 6: Autonomy in Curriculum and Teaching

33. In your opinion please state whether Government intervene in the following matters relating to Curriculum and Teaching activities of the Institute:

Duration of the Programme	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Curriculum Development	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Course Syllabi	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Method of teaching	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Methods of examination	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Medium of instruction	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Introduction of new teaching avenues	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Termination of any teaching fields	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Selection of text books	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Hours of teaching	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Administrative load on faculty members	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### Section 7: Autonomy in Academic Standards

34. Can the Institute fix own Entry standards for Undergraduate, Postgraduate and Doctoral programmes?

Yes  No

35. Whether the Institute can fix own criteria for assessing student's academic performance e.g. awarding of letter grades, Marks etc.

Yes  No

36. Please mention as to whether the Institute can devise its own standards for the award of degree?

Yes  No

37. Whether Accreditation of the courses run by the Institute is made compulsory by the Government?

Yes  No

### Section 8 : Autonomy in Research and Publications

38. Whether Government has any restriction on starting of new Postgraduate/ Doctoral programmes?

Yes  No

39. Is there any directives issued by the Government on the research priorities?

Yes  No

40. Is the Scholars of the Institute are free to select the research topics of their own interest?

Yes  No

41. In your opinion please state whether there is any restrictions placed by Government or Institute on research publications

Yes  No

42. Whether the Institute has given freedom to the academic staff on public statements (Public Statement means, remarks, opinion on the current issues of public interest)

Yes  No

43. What do you feel on the adequacy of present level of autonomy given to the Centrally Funded Technical Institutions (CFTIs)?

# STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS (CFTIs) IN INDIA

## QUESTIONNAIRE TO ASSESS THE STRATEGIC MANAGEMENT PRACTICES IN CFTIs

Intended Respondents are Director/ Dy. Director/ Registrar

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic "Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India". In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,

Raghunadhan T  
 Research Scholar, Department of HSM  
 National Institute of Technology Karnataka  
 Surathkal, Mangalore 575 025  
 Email : raghu@nitc.ac.in

This questionnaire is consists of following nine major Sections:

- |            |   |
|------------|---|
| Section 1: | General Information                       |
| Section 2: | Scanning of Internal and External Factors |
| Section 3: | Strategic Management Processes            |
| Section 4: | Administration and Governance             |
| Section 5: | Strategic Intent                          |
| Section 6: | Performance Indicators                    |
| Section 7: | Action Plan                               |
| Section 8: | Implementation Methods                    |
| Section 9: | Monitoring and Evaluation                 |

### Section 1 : General Information

Please tick ('✓') in the appropriate box

1. Type of the Institute :
 

IIT/IISc	NIT	Others
----------	-----	--------
2. Year of establishment :
3. State where the Institute is located:
4. Number of UG Programmes :
5. Number of PG Programmes :



6. Number of Departments :

7. Whether the Ph.D. programme is offered in the above Departments:  Yes  No

## Section 2 : Scanning of Internal and External Factors

Please tick (✓) in the appropriate box

8. Please state whether the Institution has an up-to-date Organization Chart?

Yes  No

9. In your opinion, does the Institute is having a standardized decision making process?

Yes  No

10. What do you feel about the present administrative structure of the Institute?

Traditional

Contemporary

Hybrid

11. How is the staffing pattern in the Institute?

Understaffed

Overstaffed

Optimal

Uneven

12. Whether faculty members are involved or allowed to be involved in the decision making process of the Institute?

Yes  No

13. Is there any student participation in the decision making process of the Institute?

Yes  No

14. Whether administrative staff/ technical staff of the Institute are allowed to take part in the decision making process?

Yes  No

15. Please state the nature of appointment of Director of the Institute?

On Regular basis  On Contract basis

16. Please mention whether the institution follow the following practice?

Scanning of remote environment  Yes  No

Scanning of educational environment  Yes  No

Scanning of operating environment  Yes  No

17. Please state how the appointment of Deans of the Institute is made?

- Considering Seniority/Credentials of Professors
- Professors having Qualification in Management
- Professors who completed tenure as Head of the Department
- Without any specific criteria

18. Please state what kind of managerial training is imparted to the Director of the Institute and his Management team?

- Continuous Management training
- Frequent Management training
- Occasional Management training
- NoManagement training

19. Please mention the Pattern of funding to the Institute

- Budget funding
- Block grants
- Matching grants
- Proportional funding

20. Please state whether there is any direction/restriction from the funding agency (Central Government) in making provisions for various schemes in the Plan and Non-Plan funds?

- Yes                       No

21. Whether the Institute is offering any schemes for up-gradation of skills/qualification to the members of faculty?

- Yes                       No

22. Does the Institute offers any schemes for skill/qualification up-gradation of non-faculty members?

- Yes                       No

23. How does the Instituteundertake any community development activities for the Society?

- Frequently
- Periodically
- Often
- Never

24. Does the Institute periodically gather and analyze data about quality, efficiency and accountability which affect the deliverables?

Yes  No

25. Does there is any provision for encouraging innovative practices and its implementation?

Yes  No

26. Does the Institute have a Central Planning Committee under the Board of Governors, which takes care of the planning activities?

Yes  No

27. Please mention whether there is Planning function in the institute, which is managed strategically?

Yes  No

**If so, please answer the following questions in this section (up to Question No.49) or leave the same blank**

28. In your opinion, how the Institute consider strategic planning?

- Top priority activity
- Regular activity
- Least priority activity
- No significance

29. Does the Institution follow a defined set of procedures in strategic planning process?

Yes  No

30. How much resources the Institute provide in terms of finance, staff, incentive or support etc. specifically for strategic planning

100 %  75%  50%  25%  0%

31. Do all stakeholders of the Institute are included in the planning process?

Very much  Much  Not sure  Slightly  Not

32. Does any external environment analysis is made to identify key threats and opportunities to the Institute?

Yes  No

33. Does the analysis include detailed analysis of education scenario or other geographic and/or demographic and/or psychographic segments?

Yes  No

34. Do you feel that Institutional performance and operational characteristics of the Institute are compared with those of other similar institutions within the country and abroad?

Yes  No

35. Please state whether the Institute use to analyze the technological trends and technical manpower needs of the country?
- Always       Frequently       Not sure       Some-time       Never
36. Does the Institute assess the total educational scenario as a whole in terms of new avenues, technologies, research needs, competition, quality, employability of Graduates etc.?
- Yes       No
37. Does the Institute assess institutional factors such as cost and availability of capital, government regulations and the economy?
- Yes       No
38. Please state whether the Institute does have knowledge of and access to sources of information about the avenues, and other external factors?
- Yes       No
39. How frequently the Institute analyze own goals and objectives?
- Once in every five years  
 Once in every three years  
 Every year  
 Every six months  
 Never
40. Does there is any mechanism to identify key strengths and weaknesses of the Institute?
- Yes       No
41. If so, whether this analysis includes quality, accountability and social responsiveness?
- Yes       No
42. Please state the internal scanning techniques used by CFTIs?
- Strength, Weakness, Opportunities and Threat (SWOT) Analysis  
 Value Chain Analysis (VCA)  
 Resource Based View (RBV)
43. Please state whether there is any provision for publicizing or advertising the results of this analysis?
- Yes       No
44. Whether this analysis includes development of control strategy and its effects on stakeholder behavior?
- Yes       No

45. Please mention the main focus of such analysis:

- Improvement of Quality in teaching
- Improvement of Quality in stakeholder satisfaction
- Improvement in both Quality in teaching and stakeholder satisfaction
- Improvement in overall performance

46. Does the Institute assess the activities relating to human resource development and management development programs?

- Yes                       No

47. Does the Institute Management Information System provide relatively easy access to all internal data required for the external and internal analysis?

- Yes                       No

48. After completing the external and internal analyses, does the institution review the mission and goals in light of the apparent threats/opportunities and strengths/weaknesses?

- Yes                       No

49. Based upon such a review, does the strategic diagnosis culminate in identifying key strategic issues, e.g. improving accountability, quality, fund utilization, positioning change etc. ?

- Yes                       No

### **Section 3: Strategic Management Processes**

50. Please mention which planning approach is being followed by the Institute?

- Top Down
- Bottom Up
- Adhoc Planning
- Anyother

51. Does the Institute set goals for 1 to 3 years i.e. Short term Objectives?

- Yes                       No

52. Please state, while setting up short term objectives, whether the qualities(measurable and prioritization are ensured)

- Yes                       No

53. Does the institute set goals for 3 to 5 years i.e. Long term Objectives?

- Yes                       No

54. Please state the qualities of long term objectives assured by the Institute?

- Directional (moves towards the general objectives of the vision statement)
- Reasonable (Practical and obtainable not extreme)
- Inspiring (Provides management challenges and positive motivation)
- Visible (the goal is easy to visualize)
- Eventual (will be fulfilled at a future date)
- 

55. Please state the focus area of long term goals assured by the Institute?

- Technological Leadership
- Public Responsibility
- Quality Education
- Competitive Position
- Accountability
- Employee Development
- Employee Relations

56. If so, do you feel that the Planning is based on Short/Long term goals

- Yes                       No

57. Does Government provide sufficient funds for execution of such plans?

- Yes                       No

58. Please mark the grand strategies adopted by the Institution from the following list?

- |   |   |
|---|---|
| <input type="checkbox"/> Innovation                 | <input type="checkbox"/> Conglomerate Diversification |
| <input type="checkbox"/> Horizontal Integration     | <input type="checkbox"/> Turnaround                   |
| <input type="checkbox"/> Concentric Diversification | <input type="checkbox"/> Consortia                    |
| <input type="checkbox"/> Quality Improvement        | <input type="checkbox"/> Joint Venture                |
| <input type="checkbox"/> Vertical Integration       | <input type="checkbox"/> Bankruptcy                   |
| <input type="checkbox"/> Concentrated Growth        | <input type="checkbox"/> Liquidation                  |
| <input type="checkbox"/> Strategic Alliance         | <input type="checkbox"/> Divestiture                  |
| <input type="checkbox"/> Capacity Building up       |   |

59. How the deficiency of funds, if any, for execution of plans managed

- Carry forward deficits
- Borrowing
- Postponement
- Project Abandonment

60. Please state whether the Institute uses the strategic (situational) diagnosis to formulate strategic plan options?

- Yes                       No

61. Whether the process considers Institutional performance options, e.g. cost reduction, accountability, improvements, social responsiveness, stakeholder satisfaction etc.?

- Yes                       No

62. Please state whether the institute follow the practice of strategic analysis and choice

Yes      No

63. Does the institute have the practice of formulation of functional tactics ?

Yes      No

64. Does the process consider Institutional and management options, e.g. restructuring, competitive environment?

Yes      No

65. Does the Institute consider quality/service enhancement options while working upon the planning process?

Yes      No

66. Do you feel that the planning process based on criteria by which various strategic plans can be compared and selected?

Yes      No

67. How does the Institute decide its strategic plan(s)?

- Based on feasibility
- Based on return on investment
- Based on social needs and stake holder satisfaction
- All the above
- None of the above

**Section 4: Administration and Governance**

68. In case of IITs/NITs, please mention the number of meetings held per year and approximate attendance of members (in percentage) in these meetings?

Number of Meetings

Average attendance

69. Please mention the number of meetings of the following statutory bodies held during the last three years

Statutory Bodies	2008-09	2009-10	2010-11
BoG			
BWC			
FC			

BoG = Board of Governors , BWC = Buildings and Works Committee, FC= Finance Committee

70. Please mention the percentage of attendance in the meetings of the following statutory bodies held during the year 2011

Statutory Bodies	2010-11
BoG	
BWC	
FC	

BoG = Board of Governors , BWC = Buildings and Works Committee, FC= Finance Committee

71. Classify the Circulation of minutes of the BoG, BWC and FC from the following options?

- Wide internal and External circulation through both printed and electronics media (including web)
- Circulation within the Institution only
- Communicated only to concerned Departments/Sections
- Distribution among Senior administrators only
- Not circulated and kept as confidential document

72. Rate the employee participation in preparation of the estimates of the followings?

Plan

Non Plan

73. Please state which of the following statutory bodies are functioning in the Institute

- Public Grievance Redressal
- Right to Information Cell
- Equal Opportunities Center
- Vigilance and Anti-corruption
- Sexual Harassment of Women at workplace(Prevention, Prohibition and Redressal

**Section 5: Strategic Intent**  
(Vision, Mission Goals and Objectives)

74. Has your Institution articulated a Vision Statement?

- Yes      No

75. If so, periodicity of revision of vision statement?

- Every year
- Between 2 – 4 years
- Between 5 to 10 years
- More than 10 years back
- Never updated



76. Is the vision relevant to the institutions activities and mandate?

- Yes       No

77. Has your Institution developed a Mission Statement?

- Yes       No

78. If so, periodicity of revision of Mission Statement?

- Every year  
 Between 2 – 4 years  
 Between 5 to 10 years  
 More than 10 years back  
 Never updated

79. To what extent the Vision Statement of the Institute conforms to the National Agenda on Higher Education?

*[National Agenda focus on Fair Access and affordable participation]*

- Fully       Partly       Notsure       Not in conformity

80. Do you feel that your current mission statement is compatible with the activities being carried out by the?

- Yes       No

81. How is the Vision and Mission statement disseminated to the Stakeholders?

- Through Wall posters  
 Through Handouts  
 Through Websites  
 Through regular Communicated  
 Not disseminated

82. Are all management and higher-level staff aware of mission and do they understand the same?

- Yes       No

83. How do you rate participation by the Faculty and staff members in developing the Mission statement?

- Always       Frequently       Sometimes       Rarely       Never

84. How do you rate participation by the Board of Governors/ Govt. Policy in developing the mission Statement

- Always       Frequently       Sometimes       Rarely       Never

85. Do you involve stakeholders while articulating the Vision& Mission?

- Always       Frequently       Sometimes       Rarely       Never

86. Has your Institution defined a set of value statements?

- Yes       No

87. Please mention periodicity of revision of value statement?

- Every year  
 Between 2 to 4 years  
 Between 5 to 10 years  
 More than 10 years back  
 Never updated

88. Does the Institution have long term(3-5years) and short term (1 year) goals?

- Have Both long term and short term goals  
 Only Long term goals  
 Only short term goals  
 Do not have both long term and short term goals

89. Does the Institute have goals set at every operation level (viz. Department level, faculty/staff level, student level etc.)?

- Yes       No

90. Are the goals quantified into measurable targets (e.g. volume, social needs, growth rate, cost control)?

- Yes       No

91. In your opinion, do the goals appear to be realistic yet challenging, based upon experience and/or research?

- Yes       No

### **Section 6: Performance Indicators**

92. Please mention whether the institute has mechanism to measure actual performance in relation to expected performance?

- Yes       No

93. Whether there is any provision for absorption of scholars as faculty of the Institute on completion of postgraduate/research programme?

Yes No

94. Please mention the average employability of the graduates immediately on completion of the course?

- Between 25 to 49 percentage
- Between 50 to 74 percentage
- Between 75 to 90 percentage
- 91 percentage and above

### Section 7: Action Plan

95. Does the Institute have short term and Long term Action Plans?

Yes No

96. How the Non-plan expenditure is estimated in the Budgeting?

- Based on short term goals
- Ad-hoc budgeting
- On trend analysis
- Proportional increase

97. How is Plan proposals of the Institute evolved?

- Ad-hoc Planning
- Based on the Instructions from Government
- Based on Long term Goals and objectives
- Without any specific long term planning

98. Please state whether Central Government allocates funds for all Plan and Non Plan proposals as budgeted?

Yes No

99. If not, is there is any provision for performance budgeting and final action plans?

Yes No

100. In order to accomplish Vision, Mission, Goals and objectives, please state whether the Institute have any of the following major Action Plans?

- |                                |                              |                             |
|--------------------------------|------------------------------|-----------------------------|
| New Courses                    | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Scholarly activity for faculty | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Faculty Development Programmes | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Staff Development Programmes   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| I C T                          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Advanced Research Programmes   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Interdisciplinary programmes   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Collaborative Research         | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Assessment of courses          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Community development          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

### Section 8: Implementation Methods

101. Does the Institution make strategic decisions (implementation action plans) based upon the strategic plan?

- Yes       No

102. How does the Institution assign lead responsibility for action plan implementation?

- To one Dean
- On the Planning section
- On everyone
- None

103. Are sufficient resources allocated for implementation?

- Yes       No

104. Does the Institute set clearly defined and measurable performance standards for each plan element?

- Yes       No

105. How do you rate success rate of strategies implemented

- Between 76 to 100
- Between 51 to 75
- Between 26 to 50
- Between 0 to 25

106. Does periodic feedback are conducted to assess student satisfaction?

- Yes       No

107. Does the Institute have any Management Information System?  
Yes      No
108. If so, in your opinion the improvement in the productivity after the implementation of MIS in the area of Academic, Administration and Finance is?  
 Between 100 to 90%  
 Between 89 to 70 %  
 Between 69 to 50 %  
 Below 50%
109. Does the Institute have any provision for documenting Good Practices?  
Yes      No

### Section 9: Monitoring and Evaluation

110. Does the institution have the system of monitoring and evaluation of the strategies?  
Yes      No
111. Do you feel the level of Controls exercised on monitoring the implementation of Strategic Planning are  
 Very High      High       Medium       Low      Nil
112. Is there any mechanism being used to evaluate impact of Strategic Planning?  
 Yes       No
113. Whether shortfalls on planning and execution being reported back to planning forum for rectification?  
Yes      No
114. In your opinion, is there any provision for revision in planning based on the feedback received?  
Yes       No
115. Does the Institution have developed a system for monitoring and recording of performance standards?  
 Yes       No
116. Is there is any system of quality assessment through internal/external bodies?  
Yes      No
117. Is there is any system of mandatory requirement of accreditation by a national/international agency?  
Yes      No

118. Are individuals responsible for strategic planning and implementation rewarded for successful performance
- Yes  No
119. Does Board of Governors of the Institute encourage employees for effective strategic planning?
- Yes  No
120. Are there Monitoring Evaluation Committees at the following Levels:
- At Institute Level  
 At Department Level  
 At faculty/staff level  
 At student level
121. Does the Institute have any system assessing accountability?
- Yes  No
122. If so, please how do you rate the accountability standard of the Institute?
- Very High  High  Medium  Low  Nil
123. In your opinion, do you feel whether monitoring and evaluation have any role in strategic planning implementation?
124. What are the incentives offered by the Institute for promoting new ideas?
125. Which Institution/University(National level and International level viz. MIT, Stanford University, University of California etc.) is considered as the quality bench mark or role model by your Institute and reason thereon?

## STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS (CFTIs) IN INDIA SURVEY QUESTIONNAIRE FOR FACULTY MEMBERS

Intended respondents are Faculty Members of CFTIs

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic "Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India". In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,  
Raghunadhan T  
Research Scholar, Department of HSM  
National Institute of Technology Karnataka  
Surathkal, Mangalore 575 025  
Email : raghu@nitk.ac.in

This questionnaire is consists of following six major Sections:

Section 1 : General Information

Section 2: Working environment

Section 3: Performance appraisals

Section 4: Course Design

Section 5: Research

Section 6: Impediments in strategy implementation

### Section 1 : General Information

Please tick (✓) in the appropriate box

1. Position held :  Assistant Professor       Associate Professor       Professor
2. Length of Service with the Institute:     0-5 years     5-10 years     10-15 years     15+ years

### Section 2 : Working Environment

3. What did you most enjoy about working for the Institute? (Please rank 1 to 10)  
(Rank 1 to the most and Rank 10 to the least)

The job itself	<input type="checkbox"/>
Salary	<input type="checkbox"/>
Research facilities	<input type="checkbox"/>
Conditions of service	<input type="checkbox"/>
Faculty development/training	<input type="checkbox"/>
Responsibility in the job	<input type="checkbox"/>
Job Security	<input type="checkbox"/>
Promotion opportunities	<input type="checkbox"/>
Physical environment	<input type="checkbox"/>
Relationship with colleagues	<input type="checkbox"/>

4. Your percentage of time allocation for each of the following activities during semester?  
(Out of 100%)

Teaching	<input type="text"/>
Tutorials	<input type="text"/>
Preparation	<input type="text"/>
Research	<input type="text"/>
Evaluation of Assignments/Seminars	<input type="text"/>
Administration	<input type="text"/>

### Section 3 : Performance Appraisals

Please tick (✓) in the appropriate box

5. Was there any teaching effectiveness appraisal for the last one year:

Yes  No

6. Did you feel it as a useful exercise  Yes  No

7. Was your performance discussed  Yes  No

8. Was any corrective action made  Yes  No

### Section 4 : Course Design

9. What is the frequency of curriculum revision:

2 years  4 years  6 years  6+years

10. Main objective behind curriculum revision

- To meet technological change
- To meet the international standards
- To meet the Industry/research needs
- All of the above
- None of the above

11. Does the curriculum and Syllabus revision seek inputs from Industry?:  Yes  No



12. Do you feel diversification of courses will improve the strength of the Institute

- Yes      No

13. Which statement do you feel more appropriate in the present scenario of technical education?

[Vertical integration here refers to combining its upstream avenues (Research) and its downstream providers (Undergraduate/Higher Secondary). Similarly Horizontal Integration refers to consolidation of many specialisations viz. offering diversified courses such as Engineering, Medical etc.

- Vertical integration is more appropriate
- Horizontal integration is more appropriate
- Both Vertical and Horizontal integration will yield good results
- Any sort of integration will hamper the quality of the institution

**Section 5: Research**

14. Some statement on the necessity of developing Research activities in the Institute is given below. Please tick (‘✓’) in the appropriate box to indicate the extent to which you agree or disagree with a statement.

Statement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Research is carried out as it is a prestige to the Institute					
Research should be focused on problems in the international scenario					
Research should be more focused on the imminent needs of the society					
Applied research have more value in a developing economy					
Industry as a major stake holder should be given more focus					
There should be a common platform for research activities					

### Section 6 :Impediments in Strategy Implementation

15. Some impediments identified in implementation of strategy are given below. Please tick (✓) in the appropriate box to indicate your opinion, as to the extent to which you agree or disagree with respect to your Institution.

Impediments	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
<b>Planning Consequences</b>					
Lack of exact strategic planning					
Insufficient linking of the strategy to goals.					
Time limitation					
Lack of consensus among decision makers					
Lack of identification of major problems					
Lack of effective role formulators					
Unsuitable training system					
Unclear regulation and executive policies					
Lack of choice of real strategy					
Lack of a national attitude to strategy					
<b>Organizational Issues</b>					
Incompatible structure with the strategy					
Lack of Autonomy					
Unsuitable resources allocation					
Lack of adequate communication					
Lack of effective co-ordination					
Lack of adequate information system					
Incompatible organizational culture					
Competing activities among people					
Competing activities among units					
Unsuitable evaluation and control systems					
Unsuitable compensation system					
Inadequate physical facilities					
Lack of in-creative system					

Impediments	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
<b>Managerial Issues</b>					
Unsuitable leadership					
Lack of adequate organizational support					
Lack of adequate manager commitment					
Fear of insecurity among managers					
Political factors in regard to power					
Unsuitable personnel management					
Uncontrollable factors					
Lack of enough motivation among the managers					
<b>Individual issues</b>					
Lack of enough capabilities of employees					
Resistance to change among people					
Resistance to change among units					
Fear of insecurity in the new territory					
Lack of understanding of the strategy					
Inadequate connection to the vision					
Lack of enough motivation of employees					
Lack of employee commitment					
<b>Environmental</b>					
Uncontrollable external factors					
Unanticipated market change					
Lack of support from Industries					

16. Is seamless education a workable solution in the present technical education scenario?  
 [The concept of seamless engineering education is to evolve engineers who are skilled in solving more number of multifaceted problems. This can be achieved by a broad based engineering education at undergraduate level.]

17. Does institute support innovation and creation of new ideas?

# STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHICAL INSTITUTIONS (CFTIS) IN INDIA

## QUESTIONNAIRE TO ASSESS THE LEVEL OF STUDENT SATISFACTION IN CFTIS

Respondents are Students of CFTIs

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic "Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India". In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,

Raghunadhan T  
Research Scholar, Department of HSM,  
National Institute of Technology Karnataka  
Surathkal, Mangalore 575 025  
Email : raghu@nitc.ac.in

This questionnaire is consisting of following eight major Sections:

- |                         |                                   |
|-------------------------|-----------------------------------|
| 1. General Information  | 7. Laboratory/Workshop facilities |
| 2. Course Organization  | 8. Hostel facilities              |
| 3. Learning             | 9. Student Activities             |
| 4. Teaching             | 10. Institute Campus              |
| 5. Library              | 11. Quality dimensions            |
| 6. Computing facilities |                                   |

### Section 1: General Information

Please tick (✓) in the appropriate box

About you:

1. Gender

Male

Female

2. Age :

18-21

22-25

26-35

36-50

Above 50

3. Institution in which you are studying:

IIT/IISc

NIT

Others

4. What course you are studying now?
5. Year in which you are studying :

### Section 2: Course Organization

6. Following are some Statements on Course Organization. Please tick (✓) on the appropriate numbers to indicate your level of satisfaction on Courses offered to you by the Institute.

Statements	Satisfaction						
	Least						High
Clarity on course documentation	1	2	3	4	5	6	7
Knowing what is expected of you as a student	1	2	3	4	5	6	7
Prior Notification of changes to course arrangements (e.g. room changes, module content etc.	1	2	3	4	5	6	7
The way your timetable is spread over the week	1	2	3	4	5	6	7
Range of topics covered in your syllabus	1	2	3	4	5	6	7
Relevance of topics in application level	1	2	3	4	5	6	7

### Section 3: Learning

7. Some statements on the Learning process in the Institute are given below. Please tick (✓) on the appropriate numbers to indicate your level of satisfaction.

Statements	Satisfaction						
	Least						High
The course has helped in developing your knowledge	1	2	3	4	5	6	7
Your confidence has enhanced	1	2	3	4	5	6	7
There is sufficient opportunities to learn with others	1	2	3	4	5	6	7
The course prepares you for employment	1	2	3	4	5	6	7
Developed problem solving skills	1	2	3	4	5	6	7

Statements	Least							High
	1	2	3	4	5	6	7	
Developed interpersonal skills	1	2	3	4	5	6	7	
Developed practical skills	1	2	3	4	5	6	7	
Developed critical ability	1	2	3	4	5	6	7	
Developed communication skills	1	2	3	4	5	6	7	

### Section 4: Teaching

8. Statements on teaching process being carried in the Institute are tabulated below. Please tick (✓) on the appropriate numbers to indicate your satisfaction.

Statements	Satisfaction						
	Least						High
	1	2	3	4	5	6	7
Reliability of teaching staff	1	2	3	4	5	6	7
Sufficient range of teaching/assessment modes	1	2	3	4	5	6	7
Sufficient Student participation in teaching process	1	2	3	4	5	6	7
Receptive to student approach	1	2	3	4	5	6	7
Sufficient level of challenge	1	2	3	4	5	6	7
Availability of practical equipments in the Laboratory	1	2	3	4	5	6	7
Availability of audio visual aids	1	2	3	4	5	6	7
Informal discussions with the staff	1	2	3	4	5	6	7
Well executed time tabling of assignments	1	2	3	4	5	6	7
Promptness of feedback on assignments	1	2	3	4	5	6	7

### Section 5: Library

9. Some statements on Library facilities offered by the Institute is given below. Please tick (‘✓’) on the appropriate numbers to indicate your satisfaction on meeting these facilities to the student’s needs.

Statements	Satisfaction						
	Least						High
Availability of recent editions of text books	1	2	3	4	5	6	7
Availability of Latest journals	1	2	3	4	5	6	7
Course books and essential texts	1	2	3	4	5	6	7
Digital resources	1	2	3	4	5	6	7
Availability of computers	1	2	3	4	5	6	7
Printing/Photocopying facility	1	2	3	4	5	6	7
Web based catalogue	1	2	3	4	5	6	7
Service of Library staff	1	2	3	4	5	6	7
Library timings	1	2	3	4	5	6	7

### Section 6: Computing facilities

10. Statements relating to Computing facilities made available by the Institute to the students are given below. Please tick (‘✓’) in the appropriate numbers to indicate how these facilities have satisfied your requirements.

Statements	Satisfaction						
	Least						High
Timings of Computer Centres	1	2	3	4	5	6	7
Availability of High speed computers	1	2	3	4	5	6	7

Statements	Least							High
	1	2	3	4	5	6	7	
Maintenance of computers	1	2	3	4	5	6	7	
Availability of specialist software	1	2	3	4	5	6	7	
Availability of high speed internet	1	2	3	4	5	6	7	
Availability of Support Staff/technicians	1	2	3	4	5	6	7	

### Section 7: Laboratory/Workshop facilities

11. Here are some statements relating to practical aids offered to the students at various Laboratory/Workshops. Please tick (‘✓’) in the appropriate numbers to indicate to your level of satisfaction in preparing the courses undergone by you.

Statements	Satisfaction						
	Least						High
Laboratory timings	1	2	3	4	5	6	7
Availability of latest equipments	1	2	3	4	5	6	7
Meeting to the needs of course	1	2	3	4	5	6	7
Accessibility to equipments	1	2	3	4	5	6	7
Availability of consumables	1	2	3	4	5	6	7
Maintenance and upkeep	1	2	3	4	5	6	7



### Section 8: Hostel facilities

12. Statements on the Hostel facilities available in the institute are given below. Please tick (✓) in the appropriate numbers to indicate your satisfaction.

Statements	Satisfaction						
	Least						High
Sufficient number of rooms	1	2	3	4	5	6	7
Basic amenities	1	2	3	4	5	6	7
Upkeep and maintenance	1	2	3	4	5	6	7

### Section 9: Learning Environment

13. Statements on the extra-curricular facilities provided by the Institute to the students are given below. Please tick (✓) in the appropriate numbers to indicate your satisfaction level.

Statements	Satisfaction						
	Least						High
Sports ground	1	2	3	4	5	6	7
Sports training/coaching	1	2	3	4	5	6	7
Fitness centres	1	2	3	4	5	6	7
Spiritual development	1	2	3	4	5	6	7
Yoga Centres	1	2	3	4	5	6	7
Value Education	1	2	3	4	5	6	7
Environmental studies	1	2	3	4	5	6	7
Club Activities	1	2	3	4	5	6	7

## Section 10: Creative Environment

14. General Appearance

Excellent    Very good    Good    Average    Bad

15. Security measures:

Excellent    Very good    Good    Average    Bad

16. Basic Infrastructural facilities like Road, Electricity, and Water etc.

Excellent    Very good    Good    Average    Bad

## Section 11: Quality Dimensions

17. Please rank the following ten services quality dimensions .Please rank 1 to 9 (Rank 1 highest and Rank 10 Lowest)

Access to overall services

Responsiveness to the needs

Communication style and information provision

Humaneness in dealings

Security and care

Enabling/Empowerment of your development

Competence in overall service delivery

Equity of overall service delivery

Up-to-date range of physical facilities

8. In your opinion what are the strengths and weakness of the Institution

Strengths

Weakness



## STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS (CFTIs) IN INDIA SURVEY ON RESEARCH EXPERIENCE

Intended respondents are Research Scholars of CFTIs

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic “ Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India”. In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,  
Raghunadhan T  
Research Scholar, Department of HSM,  
National Institute of Technology Karnataka  
Surathkal, Mangalore 575 025  
Email : raghu@nitk.ac.in

Please give your valuable feedback on the Quality, Efficiency, Performance and Social responsiveness of Centrally Funded Technical Institutions in India viz. IITs, NITs., IISc. IIST etc. Please note that this data will be only used for academic survey purpose and the name details of the person(s) taking part in the survey will not be disclosed to any one:

1. Gender :  Male  Female

2. Area of Research

3. Some statements on the research facilities available, services offered by the Institute and how it might have benefited to you are given below. Please tick mark (‘✓’) in the appropriate box to indicate the extent to which you agree or disagree with a statement.

Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Sufficient Supervision was available					
Supervisor makes real effort to understand my difficulties					
Supervisor provided additional information relevant to the topic of interest					

**Q E**

Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Good guidance on topic selection and its refinement					
Good guidance on the literature survey was provided					
Supervisor provided helpful feedback on the progress					
The Department provided opportunities for social contacts					
Seminar/ Workshops were able to conduct					
The research ambience in the Institute is excellent					
Research developed my problem solving skills					
I learned to develop ideas and present them					
My research sharpened my analytical skill					
I had access to a suitable working space					
Good access to the technical support was provided to me					
Necessary equipments were provided to me					
Access to computing facilities and services was good					
There is appropriate financial support for research activities					

4. How you can stimulate research, which have high level application in the nearby social circle?



**STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS (CFTIs) IN INDIA**  
**SURVEY QUESTIONNAIRE ON STAKEHOLDER SATISFACTION**  
**(PARENTS & SOCIETY)**

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic “ Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India”. In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,  
Raghunadhan T  
Research Scholar, Department of HSM,  
National Institute of Technology Karnataka  
Surathkal, Mangalore 575 025 Email: raghu@nitc.ac.in

Intended respondents are any citizen and/or Parents of students who are studying/ studied in IITs, IISc., NITs and Other CFTIs.

Please tick (‘✓’) in the appropriate box

- 1. Gender :  Male  Female
- 2. Place of Residence  Outside India  Within India  Urban  Rural
- 3. Age  30-40 Years  40-50 years  50-60 years  60 +
- 4. Category  Parent  Well wisher  Social worker  Citizen



Please tick (‘✓’) in the appropriate box to indicate the extent to which you rate the different quality and performance dimensions of CFTIs in India

Dimensions	Very Low	Low	Medium	High	Very High
	1	2	3	4	5
Standards on Administration and Planning					
Autonomy enjoyed by CFTIs					
Quality of the Courses offered by CFTIs					
Competency of CFTIs to face the new challenges					
Social Responsiveness of CFTIs					
Facilities offered in the CFTIs					
Level of transparency in Administration					

# STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS (CFTIs) IN INDIA

## SURVEY QUESTIONNAIRE FOR ALUMINI OF CFTIs

Web Survey : Intended respondents are Alumini of CFTIs

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic “ Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India”. In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,  
Raghunadhan T  
Research Scholar, Department of HSM  
National Institute of Technology Karnataka  
Surathkal, Mangalore 575 025  
Email: raghu@nitc.ac.in

Please give valuable feedback on your Alma Mater, which is used for a research work to find out the present level of functioning and to suggest improvement. Please note that this data will be only used for academic survey purpose and the name details of the person(s) taking part in the survey will not be disclosed to any one:

Please tick mark(‘✓’) in the appropriate box

### Section 1: General Information

1. Gender :  Male  Female
2. Place of Residence :  Within India  Abroad
3. Age  30-40 Years  40-50 years  50-60 years  60 +
4. Studied in :  IIT  IISc.  NIT  Others
5. Name of the Institute



6. Programme
7. Specialisation
8. Passed out in the year

## Section 2: Career information

9. Nature of present assignment :

- Employee
- Research Scholar
- Scientist
- Entrepreneur
- Unemployed

10. Service Career after completion of education:

- Fully served within India
- Served Partially in India and Partially abroad
- Served fully abroad
- Research in India
- Research at abroad

11. Present engagement:

- Working in a position related to your degree
- Working in a position not related to your degree
- Further study
- Looking for your first job
- Unemployed, but have previously been employed
- Neither employed nor looking for employment

12. Do you feel that the education you have received from the Institute has been adequate?

- Very much
- Much
- Some
- Little
- Very little

13. How do you rate the employment potential of your degree?

- Very Good
- Good
- Fair
- Poor
- Very Poor

14. Comparing with the International Students having the same degree, how do you rate the knowledge acquired from your Institution

- Very Good
- Good
- Fair
- Poor
- Very Poor

### Section 3: Skills Evaluation

15. From the skills/competencies listed below, evaluate yourself as to how the skill/competencies acquired during your studies are applicable in your profession

*Matching level*

*Scale : 1=None; 2=weak; 3 = Medium 4=considerable; 5 = strong*

Skills/Competencies	Professional application				
	Low				High
Analysing Capacity	1	2	3	4	5
Applying knowledge in to practice	1	2	3	4	5

Skills/Competencies	Low <span style="float: right;">High</span>				
Planning skills	1	2	3	4	5
Basic General knowledge in the field of study	1	2	3	4	5
Knowledge of profession in practice	1	2	3	4	5
Communication skills	1	2	3	4	5
Research skills	1	2	3	4	5
Learning capacity	1	2	3	4	5
Knowledge/Memory retrieval	1	2	3	4	5
Critical outlook	1	2	3	4	5
Generating new ideas (creativity)	1	2	3	4	5
Decision making	1	2	3	4	5
Problem solving	1	2	3	4	5
Inter personal skill	1	2	3	4	5
Team work	1	2	3	4	5
Leadership	1	2	3	4	5
Appreciation of diversity and multiculturality	1	2	3	4	5
Ability to work in an international environment	1	2	3	4	5
Understanding the people and cultures of other countries	1	2	3	4	5
Ability to work independently	1	2	3	4	5
Project design and Management	1	2	3	4	5
Initiative and entrepreneurial spirit	1	2	3	4	5

Skills/Competencies	Low <span style="float: right;">High</span>				
Ethical commitment	1	2	3	4	5
Concern for quality	1	2	3	4	5

16. Please rank the five most important competencies in your opinion:  
(Please start from most important (1), subsequent (2) so on)

- 1. Item No.
- 2. Item No.
- 3. Item No.
- 4. Item No.
- 5. Item No.

# STRATEGIC MANAGEMENT PRACTICES IN CENTRALLY FUNDED TECHNICAL INSTITUTIONS (CFTIs) IN INDIA

## SURVEY QUESTIONNAIRE FOR INDUSTRY EMPLOYING GRADUATES FROM CFTIs

Questionnaire through E-mail : Intended respondents are Industry employing CFTI Graduates

Dear Sir/Madam,

I am pursuing my Doctoral research programme at National Institute of Technology Karnataka (NITK) Surathkal, on the topic "Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India". In connection with this research work, I am conducting a survey. I would be grateful if you could spare some time to enable me to fill up this questionnaire which helps in my research. I request you to answer all the questions completely. The collected data will be kept strictly confidential and used only for academic purpose.

With respectful regards,  
Raghunadhan T  
Research Scholar, Department of HSM,  
National Institute of Technology Karnataka  
Surathkal, Mangalore 575 025  
Email: raghu@nitc.ac.in

Please give your valuable feedback on the graduates selected from CFTIs, which is used for a research work to find out the present level of functioning and to suggest improvement. Please note that this data will be only used for academic survey purpose and the name details of the person(s) taking part in the survey will not be disclosed to any one:

### Section 1: General

Please tick mark ('✓') in the appropriate box

1. Type of Organisation

 Core Engg.

 Software

 Service

2. Campus Recruitment from

 IITs

 IISc

 NITs

 All CFTIs

 All Institutions

3. Schedule of recruitment

 Every year

 Alternate years

 Occasional

4. Recruiting Branch/ Specialisation

:

 All branches

 Specific Branch

5. If recruitment is for specific branch please mention the Branch:

6. Campus recruitment started from the year :

7. Average number of recruitments :

<50	50-100	100-150	150-200	>200
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### Section 2: Skills and Competencies CFTI Graduates

8. Some skills and competencies of are listed below. Please tick mark(‘✓’) in the appropriate number to indicate the level at which these are observed in CFTIs Graduates employed in your Organization.

*Scale : 1= Nil ; 2=weak; 3 = Medium 4=considerable; 5 = strong*

Skills/Competencies					
	Low				High
Academic Learning	1	2	3	4	5
Computer Skills	1	2	3	4	5
Written Skills	1	2	3	4	5
Personal Presentation	1	2	3	4	5
Leadership	1	2	3	4	5
Comprehension	1	2	3	4	5
Critical thinking	1	2	3	4	5
Enthusiasm	1	2	3	4	5
Logical thinking	1	2	3	4	5
Project Management	1	2	3	4	5
Time Management	1	2	3	4	5
Initiative	1	2	3	4	5

<b>Skills/ Competencies</b>	<b>Low</b>					<b>High</b>
Problem solving	1	2	3	4	5	
Flexibility	1	2	3	4	5	
Inter personal skill	1	2	3	4	5	
Inter personal skills	1	2	3	4	5	
Communication skills	1	2	3	4	5	
Independent work	1	2	3	4	5	
Learning attitude	1	2	3	4	5	
Motivation	1	2	3	4	5	
Team work	1	2	3	4	5	
Project design and Management	1	2	3	4	5	
Initiative and entrepreneurial spirit	1	2	3	4	5	
Ethical commitment	1	2	3	4	5	
Concern for quality	1	2	3	4	5	

### **Section 3: Work Performance**

9. Some performance indicators are listed below. Please tick mark (‘✓’) on the appropriate numbers to determine level at which these are observed in CFTIs Graduates employed in your Organization.

<b>Indicators</b>	<b>Low</b>					<b>High</b>
Ability to adapt to new technologies	1	2	3	4	5	
Ability to sustain intellectual curiosity	1	2	3	4	5	

Indicators	Low					High				
	1	2	3	4	5	1	2	3	4	5
Ability to deliver ideas/solutions to the colleagues	1	2	3	4	5	1	2	3	4	5
Ability to demonstrate professional behavior	1	2	3	4	5	1	2	3	4	5
Ability to take responsibility for one's own learning and development	1	2	3	4	5	1	2	3	4	5
Ability to think creatively to generate solutions	1	2	3	4	5	1	2	3	4	5
Ability to synthesize and evaluation information gathered	1	2	3	4	5	1	2	3	4	5
Ability to apply knowledge, principles and concepts in work place	1	2	3	4	5	1	2	3	4	5
Ability to apply logical and rational process to analyze the problems	1	2	3	4	5	1	2	3	4	5
Ability to understand and apply a range of learning strategies	1	2	3	4	5	1	2	3	4	5
Ability to think globally and consider issues from variety of perspective	1	2	3	4	5	1	2	3	4	5
Ability to apply international standards and practices within a discipline or professional area	1	2	3	4	5	1	2	3	4	5

### Section 4: Career Growth and Retention

Please tick mark(‘✓’) in the appropriate box

10. Average number of years served :

<2 years	2-5 years	5-10 years	10-20 years	➤ 20 years
----------	-----------	------------	-------------	------------

11. Career growth

Slow	Average	Satisfactory	Good	Outstanding
------	---------	--------------	------	-------------

12. In your opinion what more you expect from CFTI graduates?

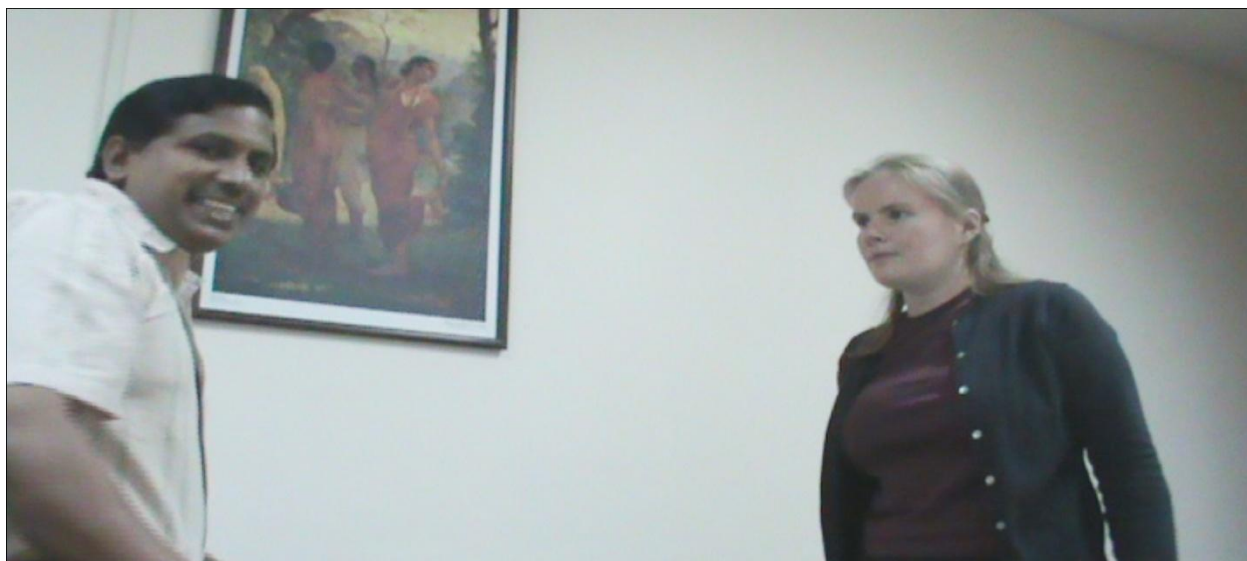


**Q-H**

**INTERVIEWS WITH EDUCATIONAL EXPERTS**



**Researcher with Prof. Jim Guthrie, Leeds University, UK**



**Researcher with Prof. Amy Walker, University of Texas at Dallas, US**



**Researcher with Prof. Bernede Jean Christian, Universite de Nantes, France**



**Researcher with Prof. Mrinal Thakur, Auburn University, US**



**Researcher with Prof.Linda CuttinGuenadez, Institut des Materiaux Jean Rouxel, France**



**Researcher with Professor Johannes Orphal, KIT Germany and Prof.Albert A Ruth,  
National University of Ireland**



**RESUME OF THE RESEARCH SCHOLAR**

Name : **RAGHUNADHAN T.**  
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Civil Station (PO), Kozhikode, Kerala, PIN 673020  
Phone: +919446784704  
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Fax: +91 49522867250

Date of Birth : May 3, 1960

Educational Qualifications:

**B.A.** Economics from University of Calicut  
**M.Com.** from University of Pune  
**LLB** from University of Calicut  
**M.A.** Sociology from University of Calicut  
**LLM** (Master of Laws) from M G University

Professional Experience:

Present: Working as Deputy Registrar in National Institute of Technology, Calicut, Kerala since 1991.

Previous Positions held:

1986 to 1991 With TATA Motors Limited, Pune (in the Department of Human Resources Department)

Research Interest

Higher Education



## List of Publications based on Ph. D. Research Work

Sl No	Title of the paper	Authors (in the same order as in the paper. Underline the Research Scholar's name	Name of the Journal/Conference/ Symposium, Vol., No., Pages	Month & Year of Publication	Category*
1	Strategic Management in Centrally Funded Technical Institutions (CFTIs) in India: A conceptual Model for effective implementation	Raghunadhan, T. and Sequeira, A. H	International Journal of Management Research and Business Strategy, ISSN 2319-345 X, Vol 2, No.1, pp 15-32	January 2013	1
2	Strategic 360 Degree Performance Appraisal Model as a Synergy for Strategic Education Planning in Premier CFTIs in India	Raghunadhan, Tand Sequeira A H	American International Journal of Research in Humanities, Arts and Social Sciences, ISSN(Print)2328-3734 ISSN (Online 2328-3696 (CD-ROM)2328-3688 Vol.3 No.1 pp 17-22	September 2013	1
3	Strategy: A Pedagogy for Efficient, Accountable and Socially Responsive Higher Education	Raghunadhan T	Global Business and Management Research – An international Journal, Vol. 1, No.1 Universal Publishers - Boca Raton, Florida, USA, ISSN 1947-5667 (Online)	April 2009	1
4	Impeders in Emerging Outcome Based Strategies in Higher Education Sector in India	Raghunadhan, Tand Sequeira A H	IUP 7 <sup>th</sup> International Conference on Outcome Based Competitive Strategies: Issues and Challenges”	November 2013	3

- \* Category :
- |  |  |
|--|--|
| 1. Journal paper, full paper reviewed  | 2. Journal paper, Abstract reviewed              |
| 3. Conference/Symposium Paper, full paper reviewed                                   | 4. Conference/Symposium paper, abstract reviewed |
| 5. Others (including papers in Workshops, NITK Research Bulletins, Short notes etc.) |  |
- (If the paper has been accepted for publication but yet to be published, the supporting documents must be attached)

Contd...2

## List of Publications based on Ph. D. Research Work

= 2 =

Sl No	Title of the paper	Authors (in the same order as in the paper. Underline the Research Scholar's name)	Name of the Journal/Conference/Symposium, Vol., No., Pages	Month & Year of Publication	Category*
5	Strategy: A Pedagogy for Efficient, Accountable and Socially Responsive Higher Education	Raghunadhan, T.	International Online Conference on Business and Management (IOCBM 2009)	May, 2009	3
6	Strategic 360 degree performance Appraisal Model for premier HTIs in India	Raghunadhan, T and Sequeira A H	“Managing Technical Education for Leveraging Innovation and Entrepreneurship” organized by Indian Society for Technical Education, New Delhi	December, 2009	3
7	Strategic Management Practices in Centrally Funded Technical Institutions (CFTIs) in India	Raghunadhan, T and Sequeira A H	National Research Conference organized by All India Management Association on	January, 2011	3

- \* Category :
- |  |  |
|--|--|
| 1. Journal paper, full paper reviewed  | 2. Journal paper, Abstract reviewed              |
| 3. Conference/Symposium Paper, full paper reviewed                                   | 4. Conference/Symposium paper, abstract reviewed |
| 5. Others (including papers in Workshops, NITK Research Bulletins, Short notes etc.) |  |
- (If the paper has been accepted for publication but yet to be published, the supporting documents must be attached)