

## **Project Completion Report**

# **A STUDY ON RESEARCH AND CONSULTANCY ACTIVITIES OF NIT SYSTEM OF INDIA**

### **Study Sponsored By**

NATIONAL SCIENCE AND TECHNOLOGY MANAGEMENT INFORMATION SYSTEM (NSTMIS)  
DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST), GoI  
F.No.DST/NSTMIS/05/143/2011-12

### **Study Implemented By**

**Dr. Ritanjali Majhi**  
Assistant Professor  
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National Institute of Technology, Warangal

&

**Prof. Ganapati Panda**  
Professor and Former Dy. Director  
School of Electrical Sciences  
Indian Institute of Technology, Bhubaneswar

**June 2016**



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Principal Investigator  
Assistant Professor  
NIT Warangal



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## **Preface**

The National Institute of Technology (NIT) is the second tier technical institution of Government of India and is next to the IIT system. After conversion of Regional Engineering Colleges to NITs during 2002-2003 the central government has paid more attention for the growth of M.Tech and PhD programs in these NITs. Till date more than 10 years have passed and substantial funding has been provided to these NITs. Thus, there was a need to have an in-depth study on research and consultancy activities of these NITs. Keeping this objective in view the National Science and Technology Management Information System (NSTMIS) division of the Department of Science and Technology (DST) has funded a research project in the year 2012 jointly to NIT Warangal and IIT Bhubaneswar.

A sincere effort has been made by both the investigators to collect relevant data from all the stakeholders through different sets of questionnaires and format. Critical analyses have been made by using the collected data and interesting observations have been made in the areas of research and consultancy. It is expected that the findings of the study will be of immense help both to the respective institutions and the Ministry of Human Resource Development, Government of India. All the 28 NITs (which were functioning at the time of starting of the project) have been clustered into four groups based on their R&D performance. It is expected that, based on the analysis, if appropriate corrective measures are made then the less performing NITs will improve their R&D performance.

We would like to thanks Dr. Parveen Arora, Advisor & Head, and Mrs. Namita Gupta, Director/Scientist F of NSTMIS division of DST for their constant guidance and encouragement throughout the period of the project. Further, we appreciate the support and co-operation of Directors of NIT Warangal and IIT Bhubaneswar which helped in successful completion of

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## EXECUTIVE SUMMARY

In 2002, believing in and acknowledging the potential as proven by the success of their alumni and their contributions in the field of technical education, seventeen Regional Engineering Colleges (RECs) were upgraded to National Institute of Technology (NITs) and were given the status of institutes of national importance and deemed university by the Government of India (GoI). Later on in 2004 to 2006 three more colleges were also issued NIT status, thus increasing their number to twenty. Subsequently based on the request of state governments and feasibility, ten new NITs were either converted from existing institutes or freshly created in 2010 and one more NIT in 2015 were setup. Hence till date the country has a total of 31 NITs. Today, with more than 10 years having passed and significant funding been provided by the GoI to these institutes, there has till date not been a systematic study assessing the contributions made by the NITs, especially in terms of research and consultancy activities. Hence there is a need to have an extensive study and assessment on the research and consultancy activities of these institutes.

In view of this need, the objectives of the present investigation are as follows:

- To make an analysis and assessment of academic performance of the faculty and students of NITs of India.
- To group existing NITs based on similar academic, research and consultancy performance.
- To identify core competence of each NIT for the benefit of academic community and industries.

The methodology employed for achieving the above laid objectives is as follows:

- Designing and preparation of questionnaire, in terms of both its content and format
- Collection of relevant data from different NITs as per the questionnaire
- Computation of the mean score of the NITs under each head/category
- Analysis and comparison of performance of each NIT under each head/category
- Cluster analysis using performance parameters and interpretation of various results

### Conclusion on the situation and proposed suggestions:

Based on academic, research and consultancy performance of the existing NITs, they are grouped into four clusters. The NITs belonging to first two groups, which comprise of 4 NITs in the first group and 7 in the second and hence a total of 11 in the two groups, are performing reasonably well on all academic fronts. However, the NITs in the remaining two clusters need substantial improvement in strengthening their laboratory infrastructure as well as increasing the number of quality faculty members so that the R&D output increases further. Particularly, the

last group consists of new NITs which as of now lack in all the above parameters of infrastructure and the quality and number of senior faculty. One also needs to take into consideration the fact that even some of the older NITs have poor R&D performance which needs to be strengthened by identifying and thereafter removing the issues surfacing from the above report.

In addition, core competence of each NIT has been evaluated. It is observed that NIT Rourkela has the maximum, i.e. 6, core competence areas whereas many NITs are having only one. All the ten new NITs do not have proven core competence in any area which is understandable since they are new and yet to develop sophisticated laboratories, research facilities and produce quality publications.

The MHRD, GoI should therefore consider the suggestions, recommendations made in the conclusion chapter and adopt them as a policy so that all the NITs are able to justify themselves as “Institutes of National Importance”. The number and quality of faculty members in many NITs is a matter of concern. It is also suggested that the available laboratories, resources and expensive or state-of-the-art software at different NITs should be made available to other NITs and Government institutes for use by their faculty and students, thereby promoting collaborative research. In the present scenario, such resource sharing is not happening properly which is leading to underutilization of R&D equipment. The interaction with industries needs substantial improvement for the betterment of both the industries and NITs. Greater emphasis should be given in the course curriculum of NITs to encourage entrepreneurship and launching of startups. This is again one aspect where the NITs have fared poorly. We are hopeful that if these issues are addressed in form of new policies and guidelines, the academic standing of the NIT system will substantially enhance.

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### List of Abbreviations

ABBREVIATION	MEANING
ACPP	AVERAGE CAMPUS PLACEMENT PERCENTAGE
APPS	AVERAGE PASS PERCENTAGE OF STUDENTS
B.TECH	BACHELOR OF TECHNOLOGY
BIOTECH	BIOTECHNOLOGY ENGINEERING
CE	CHEMICAL ENGINEERING
CoE	CENTRE OF EXCELLENCE
CSE	COMPUTER SCIENCE ENGINEERING
DST	DEPARTMENT OF SCIENCE AND TECHNOLOGY
ECE	ELECTRONICS AND COMMUNICATION ENGINEERING
EE	ELECTRICAL ENGINEERING
EEE	ELECTRICAL AND ELECTRONICS ENGINEERING
EI	ELECTRONICS AND INSTRUMENTATION ENGINEERING
ETE	ELECTRONICS AND TELECOMMUNICATION ENGINEERING
FSR	FACULTY STUDENT RATIO
HPRC	HIGH POWERED REVIEW COMMITTEE
ICE	INSTRUMENTATION AND CONTROL ENGINEERING
IIT	INDIAN INSTITUTE OF TECHNOLOGY
INI	INSTITUTE OF NATIONAL IMPORTANCE
IT	INFORMATION AND TECHNOLOGY ENGINEERING
LPAC	LOCAL PROJECT ADVISORY COMMITTEE
M.Sc	MASTER OF SCIENCE

M.TECH	MASTER OF TECHNOLOGY
MANIT	NATIONAL INSTITUTE OF TECHNOLOGY BHOPAL
MBA	MASTER OF BUSINESS ADMINISTRATION
MCA	MASTER OF COMPUTER APPLICATION
ME	MECHANICAL ENGINEERING
MHRD	MINISTRY OF HUMAN RESOURCE DEVELOPMENT
MME	MATERIAL AND METALLURGICAL ENGINEERING
MNIT	NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR
MNNIT	NATIONAL INSTITUTE OF TECHNOLOGY ALLAHABAD
NIT	NATIONAL INSTITUTE OF TECHNOLOGY
NITA	NATIONAL INSTITUTE OF TECHNOLOGY AGARTALA
NITAP	NATIONAL INSTITUTE OF TECHNOLOGY ARUNACHAL PRADESH
NITC	NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
NITD	NATIONAL INSTITUTE OF TECHNOLOGY DELHI
NITDGP	NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR
NITG	NATIONAL INSTITUTE OF TECHNOLOGY GOA
NITH	NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR
NITJ	NATIONAL INSTITUTE OF TECHNOLOGY JALANDHAR
NITJSR	NATIONAL INSTITUTE OF TECHNOLOGY JAMSHEDPUR
NITK	NATIONAL INSTITUTE OF TECHNOLOGY SURATHKAL
NITKKR	NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA
NITM	NATIONAL INSTITUTE OF TECHNOLOGY MEGHALAYA
NITMN	NATIONAL INSTITUTE OF TECHNOLOGY MANIPUR

NITMZ	NATIONAL INSTITUTE OF TECHNOLOGY MIZORAM
NITN	NATIONAL INSTITUTE OF TECHNOLOGY NAGALAND
NITP	NATIONAL INSTITUTE OF TECHNOLOGY PATNA
NITPY	NATIONAL INSTITUTE OF TECHNOLOGY PUDUCHERRY
NITRKL	NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA
NITRR	NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
NITS	NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR
NITSKM	NATIONAL INSTITUTE OF TECHNOLOGY SIKKIM
NITSRI	NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
NITT	NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
NITUK	NATIONAL INSTITUTE OF TECHNOLOGY UTTARAKHAND
NITW	NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL
NSTMIS	NATIONAL SCIENCE AND TECHNOLOGY MANAGEMENT INFORMATION SYSTEM
PG	POST GRADUATION
PhD	DOCTOR OF PHILOSOPHY
REC	REGIONAL ENGINEERING COLLEGE
R&C	RESEARCH AND CONSULTANCY
R&D	RESEARCH AND DEVELOPMENT
SVNIT	NATIONAL INSTITUTE OF TECHNOLOGY SURAT
UG	UNDER GRADUATION
UT	UNION TERRITORY
VNIT	NATIONAL INSTITUTE OF TECHNOLOGY NAGPUR

## CHAPTER -1

### Introduction

#### 1.1 History of Regional Engineering Colleges

During the second five-year plan (1956–60) in India, a number of industrial projects were contemplated. The success of technology-based industry led to high demand for technical and scientific education. To ensure enough supply of trained personnel to meet the demand for these projects, a decision was taken to start the Regional Engineering Colleges (RECs), at the rate of one per each major state, which can churn out graduates with good engineering merit. Thus, seventeen RECs were established from 1959 onwards in each of the major states. Each of these colleges was a joint and cooperative enterprise of the central government and the concerned state government. The RECs were jointly managed by the Central Government and the concerned State Government. Non-recurring expenditures and expenditures for post-graduate courses during the REC period were borne by the Central Government, while recurring expenditure on undergraduate courses was shared equally by Central and State Governments. Table 1.1 lists the place and the year of starting of seventeen RECs.

**Table 1.1: List of Seventeen RECs and the corresponding year of starting**

S.No.	Name of RECs	Year of Establishment
1	Regional Engineering College, Warangal	1959
2	Regional Engineering College, Karnataka	1960
3	Maulana Azad College Of Technology, Bhopal	1960

4	Regional Institute Of Technology, Jamshedpur	1960
5	Visvesvaraya Regional College Of Engineering, Nagpur	1960
6	Regional Engineering College, Durgapur	1960
7	Regional Engineering College, Srinagar	1960
8	Sardar Vallabhbhai Regional College Of Engineering & Technology, Surat	1961
9	Regional Engineering College, Rourkela	1961
10	Regional Engineering College, Calicut	1961
11	Motilal Nehru Regional Engineering College, Allahabad	1961
12	Malaviya Regional Engineering College, Jaipur	1963
13	Regional Engineering College, Kurukshetra	1963
14	Regional Engineering College, Tiruchirappalli	1964
15	Regional Engineering College, Silchar	1967
16	Regional Engineering College, Hamirpur	1986
17	Regional Engineering College, Jalandhar	1987



## 1.2 Conversion of RECs to National Institute of Technology (NITs)

Due to the enormous costs and infrastructure involved in creating globally respected Indian Institutes of Technology (IIT), in 2002 the then MHRD Minister Dr. Murli Manohar Joshi decided to upgrade RECs to "National Institutes of Technology" (NITs) instead of creating new IITs. The Central Government decided to provide full funding to these NITs. Table 1.2 presents the name of seventeen NITs and the corresponding year of starting.

**Table 1.2: Name of NITs and the corresponding year of starting**

S.No.	Name of REC	Year of conversion to NIT	Name of NIT
1	Regional Engineering College, Warangal	2002	National Institute Of Technology, Warangal
2	Regional Engineering College, Karnataka	2002	National Institute Of Technology, Surathkal
3	Maulana Azad College Of Technology, Bhopal	2002	Maulana Azad National Institute Of Technology, Bhopal
4	Regional Institute Of Technology, Jamshedpur	2002	National Institute Of Technology, Jamshedpur
5	Visvesvaraya Regional College Of Engineering, Nagpur	2002	Visvesvaraya National Institute Of Technology, Nagpur
6	Regional Engineering College, Rourkela	2002	National Institute of Technology, Rourkela
7	Regional Engineering College, Calicut	2002	National Institute Of Technology, Calicut
8	Motilal Nehru Regional Engineering College, Allahabad	2002	Motilal Nehru National Institute Of Technology, Allahabad
9	Malaviya Regional Engineering College, Jaipur	2002	Malaviya National Institute Of Technology, Jaipur

10	Regional Engineering College, Kurukshetra	2002	National Institute Of Technology, Kurukshetra
11	Regional Engineering College, Silchar	2002	National Institute Of Technology, Silchar
12	Regional Engineering College, Hamirpur	2002	National Institute Of Technology, Hamirpur
13	Regional Engineering College, Jalandhar	2002	National Institute Of Technology, Jalandhar
14	Regional Engineering College, Durgapur	2003	National Institute Of Technology, Durgapur
15	Regional Engineering College, Srinagar	2003	National Institute Of Technology, Srinagar
16	SardarVallabhbhai Regional College Of Engineering & Technology, Surat	2003	SardarVallabhbhai National Institute Of Technology, Surat
17	Regional Engineering College, Tiruchirappalli	2003	National Institute Of Technology, Tiruchirappalli

The upgrade was designed along the lines of the prestigious Indian Institutes of Technology (IITs) after it was concluded that RECs had potential as proven by the success of their alumni and their contributions in the field of technical education. Subsequently, funding and autonomy for NITs increased, and they award degrees which have raised their graduates' perceived value. These changes implemented recommendations of the "High Powered Review Committee" (HPRC). The HPRC, chaired by Dr. R.A. Mashelkar, submitted its report entitled "Strategic Road Map for Academic Excellence of Future RECs" in 1998.

**Table 1.3: List of Under- Graduate Engineering programs offered at the time of RECs and in NITs as on 2013**

S.No.	NIT	Engineering programs offered at the time of REC	Engineering programs offered in NIT as on 2013
1	NITW (Warangal)	Civil, EE, ME, ECE, MME, CE, CSE	Civil, EE, ME, ECE, MME, CE, CSE, <b>Biotech*</b>
2	NITK (Surathkal)	CE, Civil, ECE, ME, Mining, EEE, IT, CSE, MME	CE, Civil, ECE, ME, Mining, EEE, IT, CSE, MME
3	MNNIT (Allahabad)	ME, ECE, EE, IT, CSE, Civil, Production & IndustrialEngg.	ME, ECE, EE, IT, CSE, Civil, Production & IndustrialEngg., <b>Chemical*, Biotech*</b>
4	SVNIT (Surat)	Civil, CE, CSE, EE, ECE, ME	Civil, CE, CSE, EE, ECE, ME
5	NITRKL (Rourkela)	Ceramic, CE, Civil, CSE, EE, ECE, ME, MME, Mining, EI	<b>Biotech*</b> , Ceramic, CE, Civil, CSE, EE, ECE, ME, MME, Mining, EI, <b>Food Processing*</b>
6	NITDGP (Durgapur)	CE, Civil, CSE, EE, ECE, ME, IT	<b>Biotech*</b> , CE, Civil, CSE, EE, ECE, ME, <b>MME*</b> , IT
7	MNIT (Jaipur)	ECE, EE, CSE, MME, ME, Civil, CE	ECE, EE, CSE, MME, ME, Civil, CE
8	NITH (Hamirpur)	ECE, CSE, ME, EE, Civil	ECE, CSE, ME, EE, Civil
9	NITP (Patna)	Civil, CSE, EE, ECE, IT, ME	Civil, CSE, EE, ECE, IT, ME
10	NITSRI (Srinagar)	CE, Civil, EE, ECE, ME, MME	CE, Civil, EE, ECE, <b>CSE*</b> , <b>IT*</b> , ME, MME
11	NITC (Calicut)	Civil, CSE, EEE, ECE, ME, CE	<b>Production*</b> , EEE, CSE, ME, ECE, Civil, CE, <b>Biotech*</b> , <b>Engineering Physics*</b>
12	NITT (Trichy)	Civil, CSE, EEE, ECE, ICE, ME, MME, Production, CE	Civil, CSE, EEE, ECE, ICE, ME, MME, Production, CE

13	NITRR (Raipur)	Bio-Medical, Biotech, CE, Civil, CSE, ETE, EE, IT, ME, Metallurgy, Mining	Bio-Medical, Biotech, CE, Civil, CSE, ETE, EE, IT, ME, Metallurgy, Mining
14	VNIT (Nagpur)	CE, Civil, CSE, ECE, EEE, ME, MME, Mining	CE, Civil, CSE, ECE, EEE, ME, MME, Mining
15	NITJ (Jalandhar)	CE, Civil, CSE, ECE, ME, Textile, ICE, Industrial and Production Engg.	<b>Biotech*</b> , CE, Civil, CSE, ECE, ME, Textile, ICE, Industrial and Production, <b>EE*</b> , <b>IT*</b> , <b>Mining*</b>
16	NITJSR (Jamshedpur)	MME, ME, Production, ECE, EEE, CSE, Civil	MME, ME, Production, ECE, EEE, CSE, Civil
17	NITS (Silchar)	Civil, ME, EE, ECE, CSE	Civil, ME, EE, ECE, CSE, <b>EI*</b>
18	MANIT (Bhopal)	Civil, ME, EE, ECE, CSE, CE	Civil, ME, EE, ECE, CSE, <b>MME*</b> , CE
19	NITKKR (Kurukshetra)	ECE, CSE, ME, EE, Civil	ECE, CSE, ME, EE, Civil, <b>IT*</b> , <b>Industrial Engineering &amp; Management*</b>
20	NITA (Agartala)	Civil, CS, EE, EC, ME, Production	<b>CE*</b> , Civil, CS, EE, EC, <b>EI*</b> , ME, Production, <b>Bio-Engineering*</b>

**\*New programs added**

As on 2013, NIT Jalandar has added four new Under-graduate courses in (i) Bio-Technology, (ii) Electrical Engineering, (iii) Information Technology, and (iv) Mining Engineering disciplines which is the highest compared to its REC period. The next one is NIT Calicut which had added three new Under-graduate programs in (i) Bio-Technology, (ii) Production Engineering, and (iii) Engineering Physics disciplines. It is observed that the new B.Tech programs added in few NITs during 2002-03 to 2012-13 are mostly in the discipline of

Bio-tech, Metallurgy and Mining disciplines. The NITK, SVNIT, MNIT, NITH, NITT, VNIT, NITJSR did not add any new B.Tech program after being converted to NIT from REC.

After 2002-03, the MHRD issued NIT status to three more Government Engineering colleges, located at Patna (Bihar Engineering College — a 110 year old college), Raipur (Government Engineering College), and Agartala (Tripura Engineering College) as detailed in Table 1.4. Further out of three government colleges which were converted to NIT during 2004-06 only NITA has added three new B.Tech programs by 2013.

**Table 1.4: List of three NITs started during 2004-06**

S.No.	Engineering College	Year of Establishment	Year of conversion to NIT	Name of NIT
1	Bihar Engineering College	1886	2004	National Institute Of Technology, Patna
2	Government College of Mining and Metallurgy, Raipur	1956	2005	National Institute Of Technology, Raipur
3	Tripura Engineering College	1965	2006	National Institute Of Technology, Agartala

NITs offer degree courses at Bachelors, Masters, and Doctorate levels in various branches of Engineering and Technology. It is given autonomous status since 2002-03 which enables them to start their own curriculum and full time PhD program.

With the technology based industry's continuing growth, the government decided to upgrade these twenty National Institutes of Technology to full-fledged Technical Universities.

Parliament passed enabling legislation, the National Institutes of Technology Act in 2007 and took effect on 15 August of that year. The target was to fulfill the need for quality manpower in the field of Engineering, Science, and Technology and to provide consistent Governance, fee structure, and rules across the NITs. The law designates each NIT an **Institute of National Importance (INI)**.

### 1.3 Establishment of new NITs

Subsequently based on the request of state governments and feasibility, ten new NITs were either converted from existing institutes or can be freshly created. Ten NITs in 2010 and one more NIT in 2015 were setup as listed in Table 1.5. In the present study these 11 NITs have been termed as new NITs. Hence till date the country has a total of 31 NITs which are presented in Table 1.6 along with the corresponding year of starting.

**Table 1.5: List of 11 new NITs added in and after year 2010**

S.No.	Name of NIT	Year of Establishment
1	National Institute of Technology, Ravangla	2010
2	National Institute of Technology, Aizawl	2010
3	National Institute of Technology, Dimapur	2010
4	National Institute of Technology, Delhi	2010
5	National Institute of Technology, Lamphel	2010
6	National Institute of Technology, Farmagudi	2010

7	National Institute of Technology, Yupia	2010
8	National Institute of Technology, Shillog	2010
9	National Institute of Technology, Karaikal	2010
10	National Institute of Technology, Pauri	2010
11	National Institute of Technology, Andhra Pradesh	2015

#### 1.4 Classification of NITs as old or new

In the present investigation the NITs which have completed at least 5 years of teaching and research have been termed as old NITs. In total 20 NITs are coming under this category. The NITs which started in 2010 and later are termed as new NITs where teaching and research has been carried out for less than 5 years. Accordingly to this explanation Sr. No. 1 to 20 of Table 1.6 are called old NITs and Sr. No. 21 to 31 of the same table (Also listed in Table 1.5) are called new NITs.

**Table 1.6: List of all the NITs in India as on 2015**

S.No.	NIT	Year of Starting
1	National Institute Of Technology, Warangal (Telangana)	2002
2	National Institute Of Technology, Surathkal (Karnataka)	2002
3	Maulana Azad National Institute Of Technology, Bhopal (Madhya Pradesh)	2002

4	National Institute Of Technology, Jamshedpur (Jharkhand)	2002
5	Visvesvaraya National Institute Of Technology, Nagpur (Maharashtra)	2002
6	National Institute of Technology, Rourkela (Odisha)	2002
7	National Institute Of Technology, Calicut (Kerala)	2002
8	Motilal Nehru National Institute Of Technology, Allahabad (Uttar Pradesh)	2002
9	Malaviya National Institute Of Technology, Jaipur (Rajasthan)	2002
10	<b>National Institute Of Technology, Kurukshetra (Haryana)</b>	2002
11	National Institute Of Technology, Silchar (Assam)	2002
12	National Institute Of Technology, Hamirpur (Himachal Pradesh)	2002
13	National Institute Of Technology, Jalandhar (Punjab)	2002
14	National Institute Of Technology, Durgapur (West Bengal)	2003
15	National Institute Of Technology, Srinagar (Jammu & Kashmir)	2003
16	Sardar Vallabhbhai National Institute Of Technology, Surat (Gujarat)	2003
17	National Institute Of Technology, Tiruchirappalli (Tamil Nadu)	2003
18	National Institute Of Technology, Patna (Bihar)	2004
19	National Institute Of Technology, Raipur (Chhattisgarh)	2005



20	<b>National Institute Of Technology, Agartala (Tripura)</b>	2006
21	National Institute of Technology, Ravangla (Sikkim)	2010
22	National Institute of Technology, Aizawl (Mizoram)	2010
23	National Institute of Technology, Dimapur (Nagaland)	2010
24	National Institute of Technology, Delhi (Delhi)	2010
25	National Institute of Technology, Lamphel (Manipur)	2010
26	National Institute of Technology, Farmagudi (Goa)	2010
27	National Institute of Technology, Yupia (Arunachal Pradesh)	2010
28	National Institute of Technology, Shillog (Meghalaya)	2010
29	National Institute of Technology, Karaikal (Puducherry)	2010
30	National Institute of Technology, Pauri (Uttarakhand)	2010
31	<b>National Institute of Technology, Andhra Pradesh (Andhra Pradesh)</b>	2015

### 1.5 List of Union Territories without NIT

Presently every state and two of the Union territories (UTs) of India have an NIT each but till date five UTs as listed in Table 1.7 do not have NIT and are listed below.

**Table 1.7: List of UTs not having an NIT**

S.No.	Union Territory	Capital
1	Lakshadweep	Kavaratti
2	Daman & Diu	Daman
3	Dagar& Nagar Haveli	Silvassa
4	Chandigarh	Chandigarh
5	Andaman & Nicobar Islands	Port Blair

### 1.6 NITs not included in the current investigation

The 2 NITs (NIT Agartala and NIT Kurukshetra) which did not respond to our questionnaire are listed in Table 1.8. The same table mentions the name of NIT Andhra Pradesh under new NIT category. This NIT has not been included in our study as it started in 2015 and no relevant data is presently available as well as it does not come under the period of the project.

**Table 1.8: List of NITs not included in current investigation**

S.No.	Name of NIT	NIT (Old/New)	Reasons
1	National Institute of Technology, Agartala	Old	Data could not be obtained
2	National Institute of Technology, Kurukshetra	Old	Data could not be obtained
3	National Institute of Technology, Andhra Pradesh	New	Classes just started in 2015 hence no relevant data is available

### **1.7 Research & Consultancy activities started at NITs**

Prior to 2002-03, all the RECs were not having Deemed University status. In academic departments numbers of faculty members having PhD degree were less. Hence the research and consultancy activities were very much limited. In general, about 30-35% faculty across all RECs was having PhD degree. After NIT conversion more emphasis was given on research and many faculty members were given study leave under quality improvement program (QIP) scheme. Many faculty members carried out research work under their own NIT and received their PhD degree. By 2010, more than 65-70% faculty members of all NITs had their PhD degree. Hence during 2002-2010 the number of faculty members having PhD degree increased by about 35% across all NITs.

### **1.8 Relevance of the present investigation**

The Ministry of Human Resource Development, Government of India aims to further enhance the quality of technical manpower in these 31 institutions particularly at Post Graduate and PhD levels. Accordingly, the Central Government has substantially increased the financial support to NITs and is in the process of strengthening and expanding the R&D infrastructures and to produce quality man power in science and engineering both at Postgraduate and PhD levels. In the meantime about ten years have passed from the date of creation of NITs and substantial financial inputs have been provided to these institutes for their growth and development. Hence it is felt that an in depth study on R&D activities of these leading institutions is required by collecting and analyzing the relevant data. The current project work that we have undertaken from the DST, GOI is a sincere attempt in this direction.

In this project an in-depth and consolidated study has been carried out using the data collected from 28 NITs out of 31 existing NITs of India. The data collected pertains to 18 Old NITs and 10 New NITs. From these NITs, the relevant data as per the format supplied to them was collected along with the responses from the faculty members (30 per NIT) and senior students (50 per NIT) of the respective institution. As per the objective of the project an in-depth study on the collected data was made and the findings obtained from the study are documented in this report. The details of the abbreviations used in this report are documented and given in List of Abbreviations.

The report contains information related to the total number of engineering programs offered by each NIT, the present student strength, the permanent faculty members, and the faculty-student ratio. The total number of ongoing and completed projects and the funds received during last five years are also included. Data relating to the consultancy work is also

analyzed. The number of publications and patent records by the students and faculty members of different NITs are also listed and a comparative study has been made. The report also includes the total number of academic events (seminars, workshops, conferences) organized and number of foreign visits made by the faculty members and students. The information related to the distribution of working hours in form of teaching, research and consultancy, and administrative work has been collected from different NITs and the corresponding data has also been analyzed.

The project also mentions few limitations which were observed during investigation. After the analysis of the results few recommendations have been suggested which are included in the project. Finally the overall conclusion of the investigation has been outlined in the concluding part of this report.

## **CHAPTER -2**

### **Objectives**

- To make an analysis and assessment of academic performance of the faculty and students of NITs of India.
- To group existing NITs based on similar academic, research and consultancy performance.
- To identify core competence of each NIT for the benefit of academic community and industries.

## **Methodology**

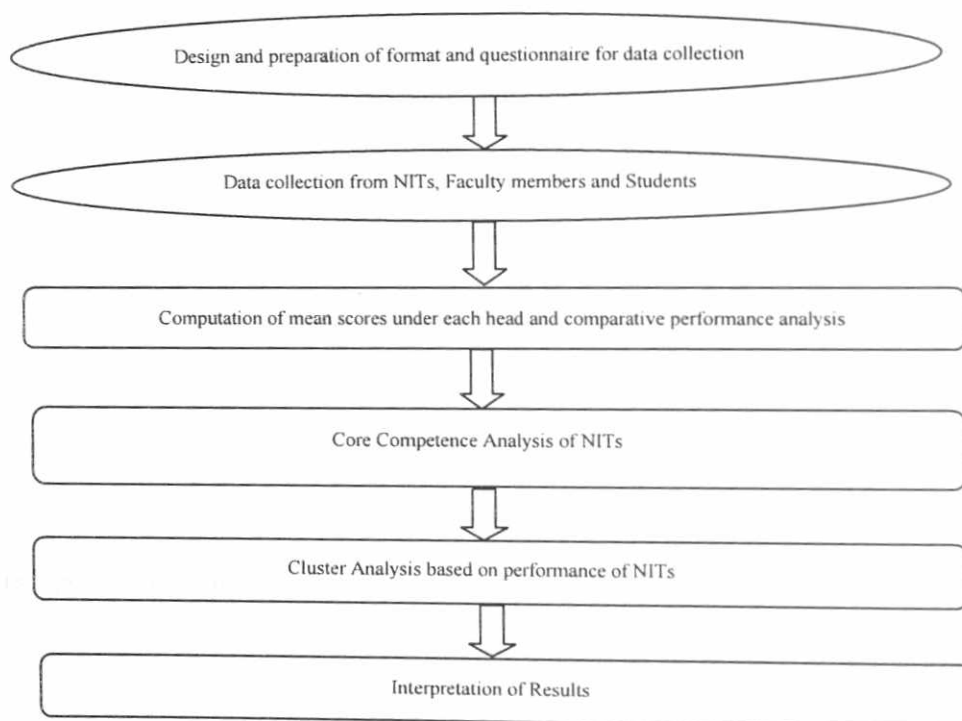
The present project has been undertaken to carry out a thorough study on research and consultancy activities of NIT system of India by collecting and analyzing the relevant academic data from various stakeholders of 28 NITs (the then present) using two sets of well-designed questionnaires for faculty members and students. In addition, a format was sent to each head of the NIT to supply their institute academic information. The various data such as number of research and consultancy projects, number of quality publications and patents, number of conferences and workshop conducted, number of foreign academic visits, summer internship of students, number of interdisciplinary projects carried out, number of PhD produced, transfer of technical know-how to industries and the centre of excellence have been considered in grouping various NITs into clusters. The feedbacks of existing senior UG and PG students, research scholars and faculty members have been collected from each NIT and the result has been analyzed. The percentage of time devoted by faculty in different NITs for carrying out R&D activities has also been taken into consideration. The data related to student – faculty ratio, awards and recognition received by students and faculty members, number and quality in campus placements have also been collected and studied.

Cluster analysis has been made to group the NITs into four clusters. Out of the four clusters it is observed that the NITs belonging to first two clusters are performing reasonably well. However, the remaining two clusters need substantial improvement in strengthening laboratory infrastructure as well as in increasing number of qualified faculty members so that required R&D output can be obtained.

There are many limitations faced during the period of investigation which are listed in the report. The stakeholders have also provided some suggestions to improve the research activities in their own institutions.

In essence, the investigators have tried hard to obtain relevant academic data through the project staff and tried to compile and analyze them to obtain meaningful information which is expected to be very useful to the authorities of both MHRD and NITs in enhancing the R&D activities of such NITs.

The steps involved in the research study are shown in the Figure and details involved are dealt in this section.



**Fig.2.1: Methodology involved in the research study**



## **1. Design of Format for Academic Data Collection from NITs**

A well thought format (**Annexure - 4**) was designed to collect data pertaining to academic programs, research and consultancy activities. The format contains four major parts:

- Part – 1: Academic Programs
- Part – 2: Academic Information related to faculty
- Part – 3: Research related information of students
- Part – 4: Research facilities

This format was sent to the Directors of all NITs (30) which were functioning at the time of starting of the project (October, 2012). The objective was to collect information pertaining to ongoing academic programs, research activities, consultancy and project works. All the Directors were requested to furnish the required information of their institutions.

## **2. Preparation of questionnaire to collect research and consultancy data from faculty and students**

One questionnaire (**Annexure – 5**) containing two parts was designed for collection of academic data from faculty members of NITs. Part -1 seeks for information related to personal details of faculty whereas Part -2 seeks for information through 18 questions related to research and consultancy activities. In this study the target group was 30 faculty members from each NIT randomly chosen from all cadres. Similarly one questionnaire (**Annexure – 6**) containing two parts was designed for collection of academic data from UG, PG, and PhD students of NITs. Part -1 seeks for information related to the concerned student whereas the second part seeks information related to

R&D activities carried out by students of concerned department. A total of 50 samples were collected from each NIT.

### **3. Data collection from NITs**

The academic data of 28 NITs for five years from 2008-09 to 2012-13 were collected by personal visits of investigators and research staff. These data were compiled and further analysis was carried out. Even then the information from NITKKR and NITA could not be obtained. Hence in the analysis the data of these two institutions have not been included.

### **4. Analysis of Data**

Mean Analysis, trend analysis, and comparative analysis are carried out on data collected from faculty members and students to assess performance based ranking of NITs on a five point scale. The core competence has been evaluated based on five important factors these are existing CoE, availability of specialized PG programs are offered, availability of specialized laboratories, availability of specialized faculty in the area, and good quality research publications. Core competences of NITs have been listed in Table 9.1.

### **5. Cluster Analysis**

The purpose of this analysis is to group the similarly performing NITs into one cluster. To achieve this objective 22 academic and research related variables are defined and the corresponding data of each NIT under each variable are arranged in a tabular form. Then agglomerative hierarchical clustering technique is applied and a complete dendrogram using SPSS statistical package as shown in Fig. 8.1 is obtained. The number of cases of various links having similar consistency factor are considered to be under one cluster. Accordingly the number of clusters is observed to be four. Subsequently the K-means

clustering algorithm is employed to group the various NITs into 4 known clusters. The result of the simulation study is shown in Fig. 8.2 and Table 8.2 of the revised report. The results obtained from this analysis are studied and the recommendations have been suggested.

### **Limitations of the Investigation**

Most of the new NITs setup after 2010 which have started just within last five years do not have sufficient relevant data with regard to research activities for the purpose of analysis. This is because adequate research infrastructure is yet to be created in those institutions and less numbers of faculty members are presently available. However this scenario will change after five years.

In spite of our personal visits and consistent efforts, from two NITs (Kurukshetra and Agartala) the required data was not possible to collect and hence these institutions are not included in the present study.

It is further experienced that most of the institutions do not have the required academic data available at a single source. The various academic data are dynamic and hence needs to be maintained and updated by each centrally funded institution like the NITs. This is not the current practice in many institutions. Hence it was really tedious task on our part to collect the relevant data from various sources of an institution.

Apart from collecting data from various offices of the NITs, additional information was collected through well designed questionnaire from the students and faculty members of each institution. The sample size was 50 students and 30 faculty members of at least having 5 years of teaching experience. These sizes were fixed because data were to be obtained from 28 NITs. These sizes could have been increased to achieve little better conclusions.

Another limitation is that the information collected from faculty and students of a NIT might have been little biased because it is their own NIT.

1.10 Regarding the publication record in reference journals of an institution would be less if papers published in paid and inferior online journals are taken into account. It is learnt that the names of standard journals in each branch of Engineering/Science in all NITs have not been finalized and made available to faculty members and students.

### **CHAPTER – 3**

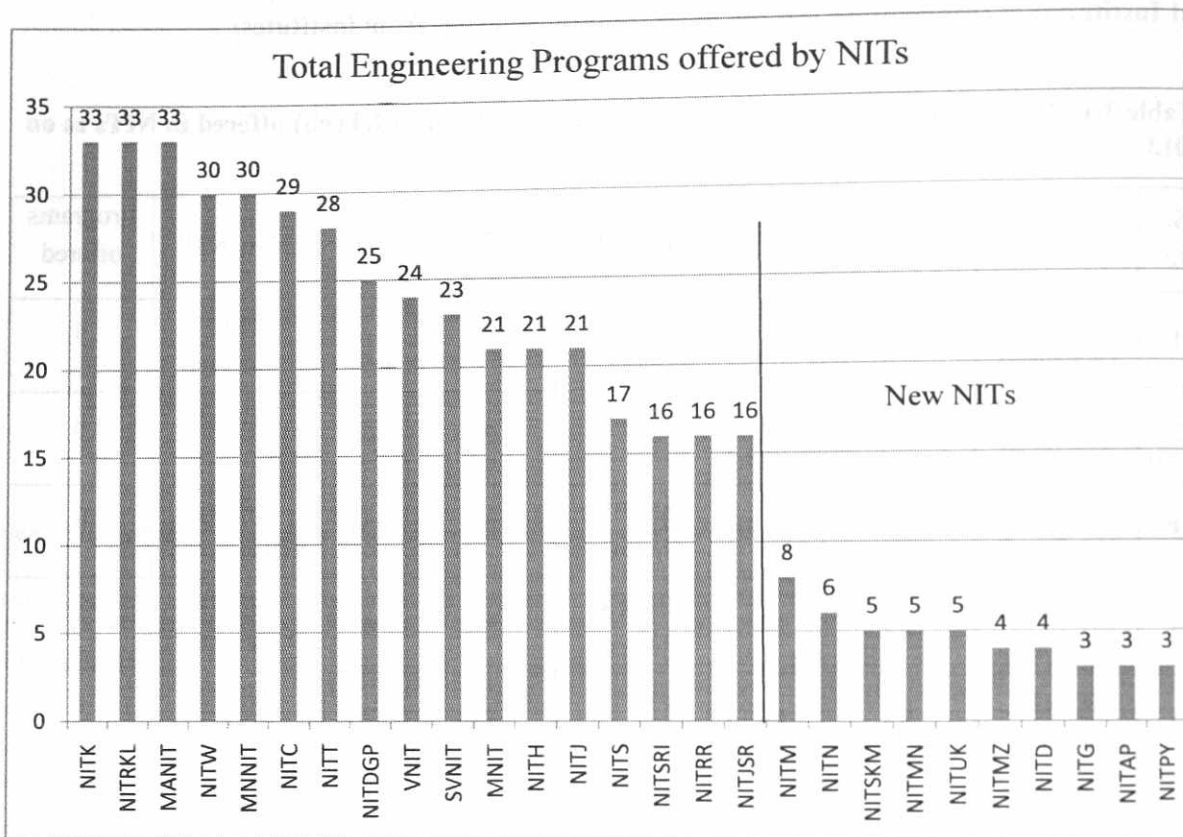
#### **Analysis of Information Related to Institutes (NITs)**

This chapter analyses the data pertaining to all academic programs in terms of average year wise pass percentage, number of PhDs produced and number of continuing research scholars, faculty-student ratio, student placement and number of seminar, conferences organized. These parameters have been used for cluster analysis. Hence these parameters are very important for assessing the performance of each NIT.

**3.1 Institutional Information (on the basis of data collected from institutes)**

**Table 3.1: Total number of Engineering programs (B.Tech +M.Tech) offered in NITs as on 2013**

S. No.	Old NIT	Programs offered	S. No.	Old NIT	Programs offered	S. No.	New NIT	Programs offered
1	NITW (Warangal)	30	11	NITSRI (Srinagar)	16	19	NITMZ (Mizoram)	4
2	NITK (Surathkal)	33	12	NITC (Calicut)	29	20	NITM (Meghalaya)	8
3	MNNIT (Allahabad)	30	13	NITT (Trichy)	28	21	NITPY (Puducherry)	3
4	SVNIT (Surat)	23	14	NITRR (Raipur)	16	22	NITUK (Uttarakhand)	5
5	NITRKL (Rourkela)	33	15	VNIT (Nagpur)	24	23	NITN (Nagaland)	6
6	NITDGP (Durgapur)	25	16	NITJ (Jalandhar)	19	24	NITD (Delhi)	4
7	MNIT (Jaipur)	21	17	NITJSR (Jamshedpur)	16	25	NITMN (Manipur)	5
8	NITH (Hamirpur)	21	18	NITP (Patna)	18	26	NITG (Goa)	3
9	MANIT (Bhopal)	33				27	NITAP (Arunachal Pradesh)	3
10	NITS (Silchar)	17				28	NITSKM (Sikkim)	5



**Fig. 3.1: Total number of Engineering programs (B.Tech +M.Tech) offered in NITs as on 2013**

**Table 3.2: Number of B.Tech programs offered at the time of RECs and by NITs as on 2013**

For Old NITs

NIT	NIT W	NIT K	MN NIT	SV NIT	NIT RKL	NIT DGP	MNI T	NIT H	MA NIT	NIT P
Programs offered at the time of REC	7	9	7	6	10	7	7	5	6	6
Programs offered by NIT as on 2013	8	9	9	6	12	9	7	5	7	6
New programs added	1	0	2	0	2	2	0	0	1	0



For Old NITs

NIT	NIT SRI	NIT C	NIT T	NIT RR	VNI T	NIT J	NIT JSR	NIT S
Programs offered at the time of REC	6	6	9	11	8	8	7	5
Programs offered by NIT as on 2013	8	9	9	11	8	12	7	6
New programs added	2	3	0	0	0	4	0	1

For New NITs

NIT	NITS KM	NIT MZ	NIT N	NIT D	NIT MN	NIT G	NIT AP	NIT M	NIT PY	NIT UK
Programs offered at the time of REC	Not Applicable									
Programs offered by NIT as on 2013	5	4	3	3	5	3	3	5	3	5
New programs added	Not Applicable									

Bio-tech program has been added by NITW, MNNIT, NITRKL, NITDGP, NITC, and NITJ, where as Metallurgy and material program has been added by NITDGP, and MANIT. Moreover MNNIT has introduced Chemical engineering, NITRKL added Food processing, NITSRI added Computers and Information technology, NITC added Production and Engineering physics, NITJ added Electrical, Information technology and Mining, NITS added Electronics and Instrumentation.

**Table 3.3: Number of M.Tech programs offered at the time of RECs and by NITs and as on 2013**

For Old NITs

NIT	NIT W	NIT K	MN NIT	SV NIT	NIT RKL	NIT DGP	MNI T	NIT H	MA NIT	NIT P
Programs offered at the time of REC	16	17	12	-	5	4	11	-	14	10
Programs offered by NIT as on 2013	22	24	21	17	21	16	14	16	26	12
New programs added	6	7	9	17	16	12	3	16	12	2

For Old NITs

NIT	NIT SRI	NIT C	NIT T	NIT RR	VNI T	NIT J	NIT JSR	NIT S
Programs offered at the time of REC	4	12	18	5	11	-	5	9
Programs offered by NIT as on 2013	8	20	19	5	16	9	9	11
New programs added	4	8	1	0	5	9	4	2

For New NITs

NIT	NITS KM	NIT MZ	NIT N	NIT D	NIT MN	NIT G	NIT AP	NIT M	NIT PY	NIT UK
Programs offered at the time of REC	Not Applicable									
Programs offered by NIT as on 2013	-	-	3	1	-	-	-	3	-	-
New programs added	Not Applicable									

NITW has added 6 new M.Tech programs in Additive manufacturing, Computer aided manufacturing, VLSI system design, Advanced systems, Computer science & Information security and Remote sensing & Geographic information system disciplines. NITK has added 7 new M.Tech programs in Nanotechnology, Mechatronics, Computational mathematics, VLSI design, Industrial biotechnology, Marine structures and Information security disciplines. MNNIT has added 9 new M.Tech courses in Biomedical, Biotechnology, Chemical, Information security, Microelectronics & VLSI design, Control & Instrumentation, GIS & Remote sensing, Computer aided design & Manufacturing and Product design & Development disciplines. SVNIT, NITH, and NITJ have added 17, 16 and 9 M.Tech programs respectively only after converting to NIT i.e. after 2002-03, prior to 2002-03 these three NITs do not have M.Tech programs. NITRKL has introduced 16 new M.Tech programs in Biomedical, Biotechnology, Steel technology, VLSI design & embedded systems, Control & Instrumentation, Software engg., Information security, Analytic and decision science, Industrial ceramic, Safety engg., Geotechnical engg., Signal and Image processing, Cryogenics & Vacuum technology, Plastic, composite and timber engg., Machine design and Communication & Networks disciplines. NITDGP has added 12 new M.Tech programs in Biotechnology, Software engg., Advanced material science & technology, Metallurgy & Material technology, Information technology, Entrepreneurship & Innovation, Microelectronic & VLSI, Environmental science & technology, High performance computing, Corrosion science & technology, Geotechnical engg. and Operation research discipline. MNIT has added 3 new M.Tech programs in Information security, Embedded systems and Earthquake engg. MANIT has added 12 new M.Tech programs in Geo-informatics & its applications, Geotechnical engg., Nanotechnology, Computational & System biology, Bio-informatics, Renewable energy, Green technology, VLSI design and embedded system, Advanced computing, Biotechnology, Stress and vibration analysis and Information security discipline. NITP has added 2 new M.Tech program in Nanotechnology and Microelectronics and VLSI design discipline. NITSRI has added 4 new M.Tech programs in Microelectronic, Geotechnical, Industrial tribology and maintenance management and Communication & Information technology discipline. NITC has added 8 new M.Tech programs in Nanotechnology, Environmental geotechnology, Traffic and transportation planning, Information security, Microelectronic & VLSI design, Signal processing, Energy engg. & management and Industrial engg. & management. NITT has added VLSI system as new M.Tech program. VNIT has added 5 new M.Tech program in Structural dynamics and earthquake engg., VLSI design, Environmental engineering, Chemical engg. and Integrated power systems disciplines. NITJSR has added 4 new M.Tech programs in Embedded systems, Information systems, Computer integrated design and manufacturing and Foundry technology disciplines. NITS has added 2 new M.Tech programs in Microelectronic and VLSI design and Control and industrial automation disciplines.

## Observations

**Table 3.4: Maximum and minimum number of new B.Tech programs introduced from inception of NITs to 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITJ (4), NITC (3), NITDGP (2), NITRKL (2), MNNIT (2), NITSRI (2)	NITW (1), NITS (1), MANIT (1)
New NITs	NITM (5), NITUK (5), NITSKM (5), NITMN (5)	NITN (3), NITD (3), NITG (3), NITAP (3), NITPY (3)

**Table 3.5: Maximum and minimum number of new M.Tech programs introduced from inception of NITs to 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	SVNIT (17), NITRKL (16), NITH (16)	MNIT (3), NITS (2), NITP (2) NITT(1)
New NITs	NITM (3), NITN (3)	NITD (1)

**Table 3.6: Maximum and minimum total number of new Engineering programs introduced from inception of NITs to 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRKL (18), SVNIT (17), NITH (16)	MNIT (3), NITS(3), NITP (2), NITT(1)
New NITs	NITM (8), NITN (6), NITSKM (5), NITMN (5), NITUK (5)	NITG (3), NITAP (3), NITPY (3)

**Table 3.7: Maximum and minimum total number of Engineering programs running in NITs as on 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITK (33), NITRKL (33), MANIT (33)	NITSRI (16), NITRR (16), NITJSR (16)
New NITs	NITM (8), NITN (6), NITSKM (5), NITMN (5), NITUK (5)	NITG (3), NITAP (3), NITPY (3)

**3.2 Average pass percentage of NIT students for different programs during 2008-09 to 2012-13**

Average pass percentage of NIT students signifies the institution effective and efficient teaching practice. Here we have time series data of five years from 2008-09 to 2012-13, So for calculation purpose we took the pass percentage of every year and then take the average of that which leads to the new factor Average pass percentage of students (APPS) as follows:

$$\begin{aligned}
 & \text{Average pass percentage of students} \\
 & = (\text{Pass percentage of students}(2008 - 09) \\
 & + \dots + \text{Pass percentage of students}(2012 - 13)) \div 5 \quad (1)
 \end{aligned}$$

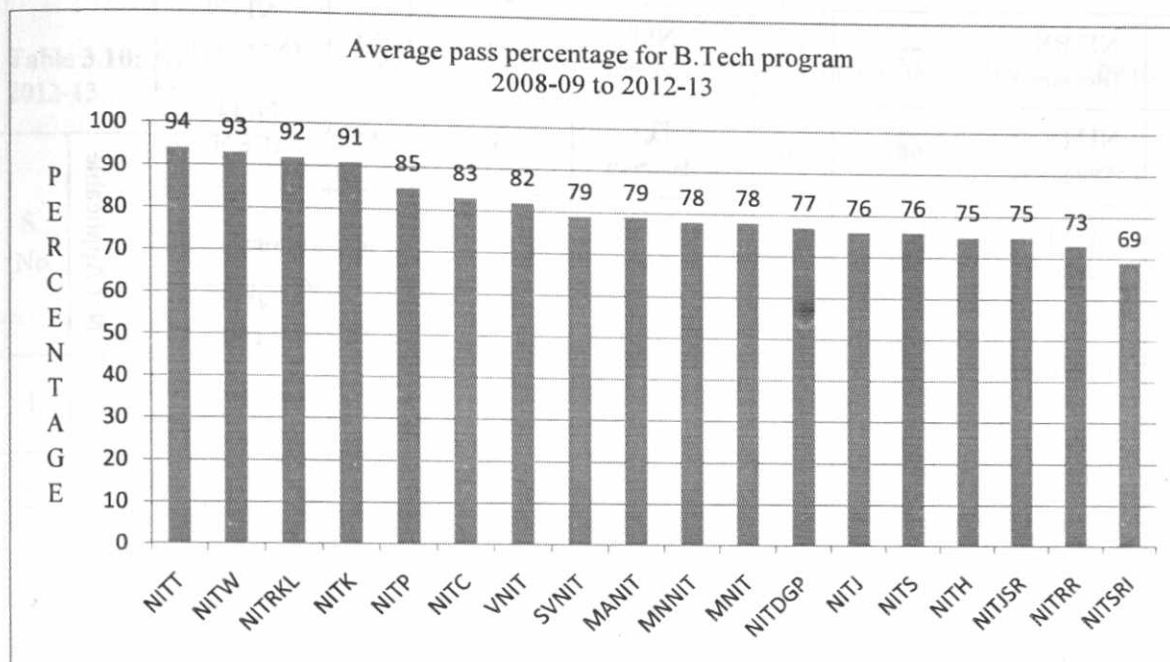
We divide it by five since we have the data of five years i.e. 2008-09, 2009-10, 2010-11, 2011-12, and 2012-13.

Where Pass percentage for particular year is calculated by dividing number of candidates passed out by number of candidates appeared. In mathematical form it can be written as

$$\text{Pass percentage} = (\text{No. of students passed} \div \text{No. of students appeared}) \times 100 \quad (2)$$

**Table 3.8: Average pass percentage of NIT students for B.Tech program during 2008-09 to 2012-13**

S. No.	Old NIT	Average pass percentage of students	S. No.	Old NIT	Average pass percentage of students	S. No.	New NIT	Average pass percentage of students
1	NITW (Warangal)	93	11	NITSRI (Srinagar)	69	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	91	12	NITC (Calicut)	83	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	78	13	NITT (Trichy)	94	21	NITPY (Puducherry)	
4	SVNIT (Surat)	79	14	NITRR (Raipur)	73	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	92	15	VNIT (Nagpur)	82	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	77	16	NITJ (Jalandhar)	76	24	NITD (Delhi)	
7	MNIT (Jaipur)	78	17	NITJSR (Jamshedpur)	75	25	NITMN (Manipur)	
8	NITH (Hamirpur)	75	18	NITP (Patna)	85	26	NITG (Goa)	
9	MANIT (Bhopal)	79				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	76				28	NITSKM (Sikkim)	

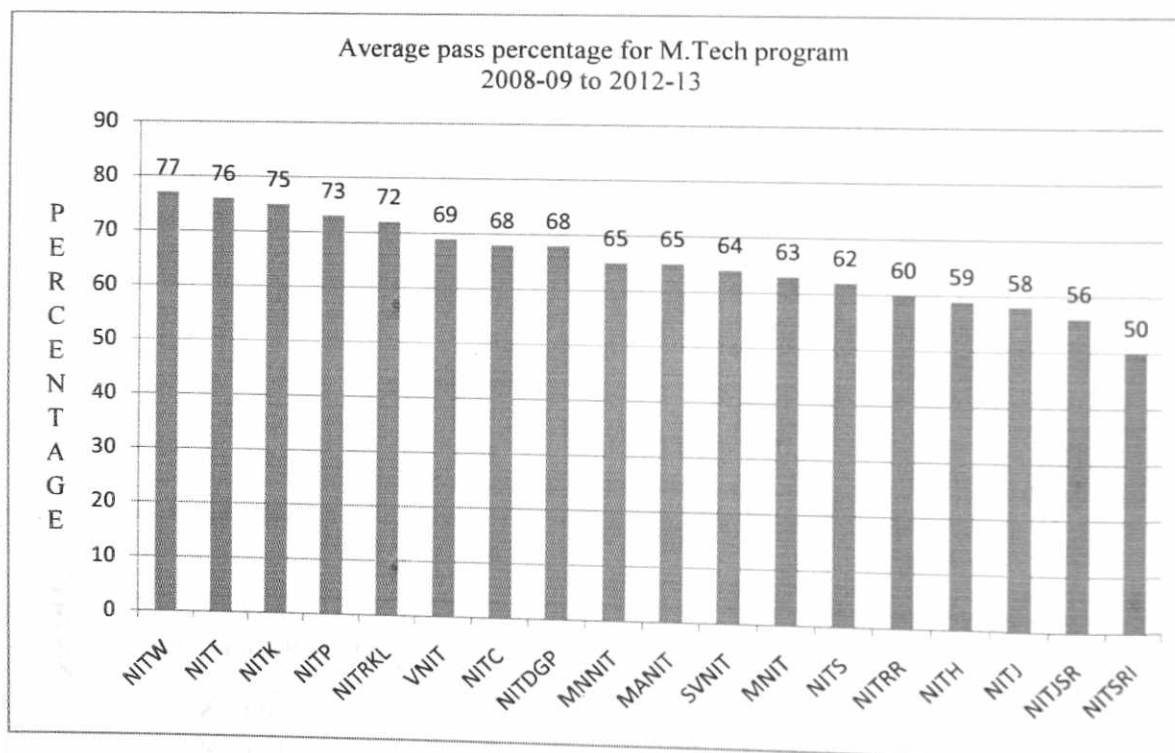


**Fig.3.2: Average pass percentage of NIT students for B.Tech program during 2008-09 to 2012-13**

**Table 3.9: Average pass percentage of NIT students for M.Tech program during 2008-09 to 2012-13**

S. No	Old NIT	Average pass percentage of students	S. No	Old NIT	Average pass percentage of students	S. No	New NIT	Average pass percentage of students
1	NITW (Warangal)	77	11	NITSRI (Srinagar)	50	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	75	12	NITC (Calicut)	68	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	65	13	NITT (Trichy)	76	21	NITPY (Puducherry)	
4	SVNIT (Surat)	64	14	NITRR (Raipur)	60	22	NITUK (Uttarakhand)	

5	NITRKL (Rourkela)	72	15	VNIT (Nagpur)	69	23	NITN (Nagaland)	Not Applicable
6	NITDGP (Durgapur)	68	16	NITJ (Jalandhar)	58	24	NITD (Delhi)	
7	MNIT (Jaipur)	63	17	NITJSR (Jamshedpur)	56	25	NITMN (Manipur)	
8	NITH (Hamirpur)	59	18	NITP (Patna)	73	26	NITG (Goa)	
9	MANIT (Bhopal)	65				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	62				28	NITSKM (Sikkim)	

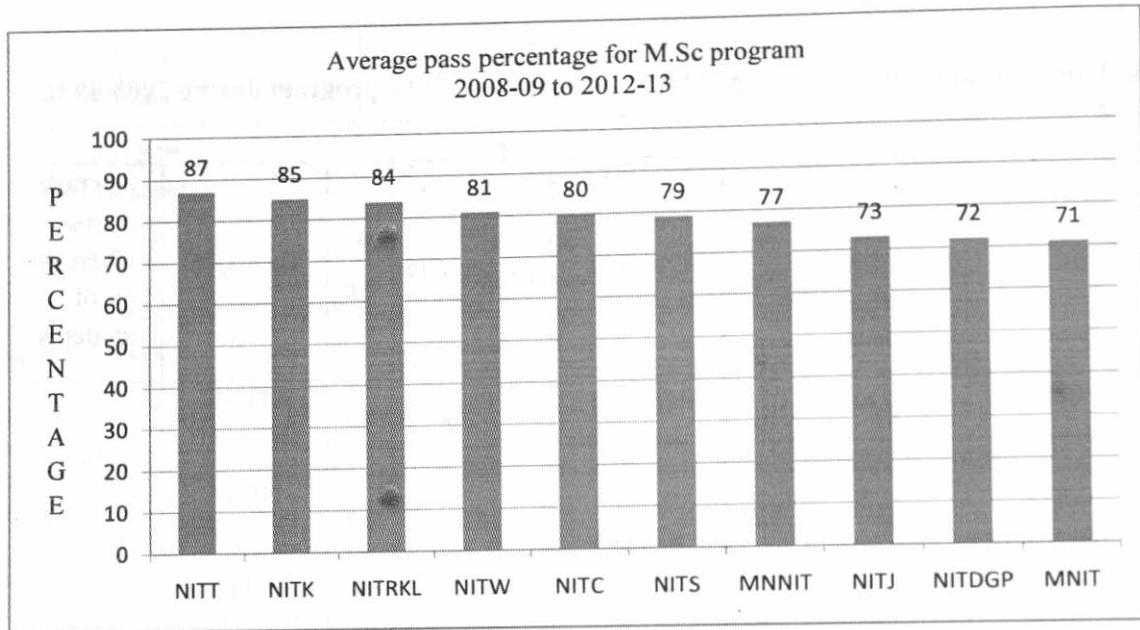


**Fig. 3.3: Average pass percentage of NIT students for M.Tech program during 2008-09 to 2012-13**



**Table 3.10: Average pass percentage of NIT students for M.Sc program during 2008-09 to 2012-13**

S. No	Old NIT	Average pass percentage of students	S. No	Old NIT	Average pass percentage of students	S. No	New NIT	Average pass percentage of students
1	NITW (Warangal)	81	11	NITSRI (Srinagar)	-	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	85	12	NITC (Calicut)	80	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	77	13	NITT (Trichy)	87	21	NITPY (Puducherry)	
4	SVNIT (Surat)	-	14	NITRR (Raipur)	-	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	84	15	VNIT (Nagpur)	-	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	72	16	NITJ (Jalandhar)	73	24	NITD (Delhi)	
7	MNIT (Jaipur)	71	17	NITJSR (Jamshedpur)	-	25	NITMN (Manipur)	
8	NITH (Hamirpur)	-	18	NITP (Patna)	-	26	NITG (Goa)	
9	MANIT (Bhopal)	-				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	79				28	NITSKM (Sikkim)	

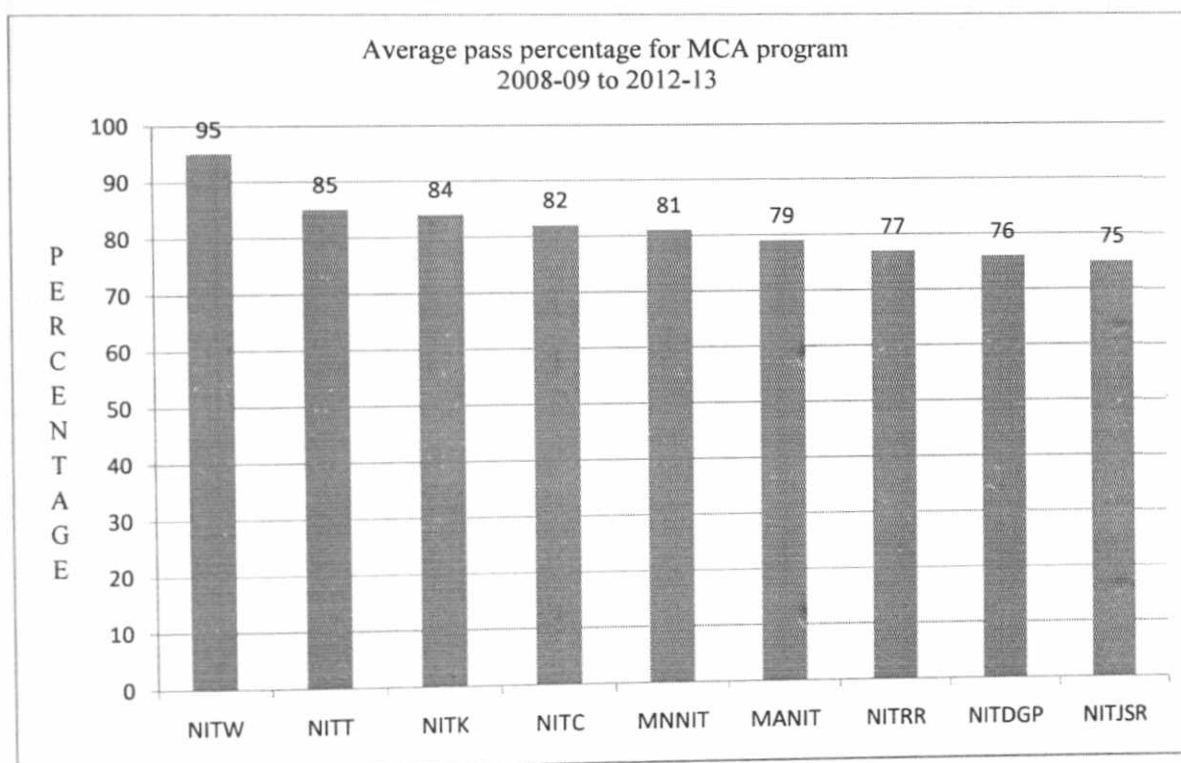


**Fig. 3.4: Average pass percentage of NIT students for M.Sc program during 2008-09 to 2012-13**

**Table 3.11: Average pass percentage of NIT students for MCA program during 2008-09 to 2012-13**

S. No	Old NIT	Average pass percentage of students	S. No	Old NIT	Average pass percentage of students	S. No	New NIT	Average pass percentage of students
1	NITW (Warangal)	95	11	NITSRI (Srinagar)	-	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	84	12	NITC (Calicut)	82	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	81	13	NITT (Trichy)	85	21	NITPY (Puducherry)	
4	SVNIT (Surat)	-	14	NITRR (Raipur)	77	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	-	15	VNIT (Nagpur)	-	23	NITN (Nagaland)	

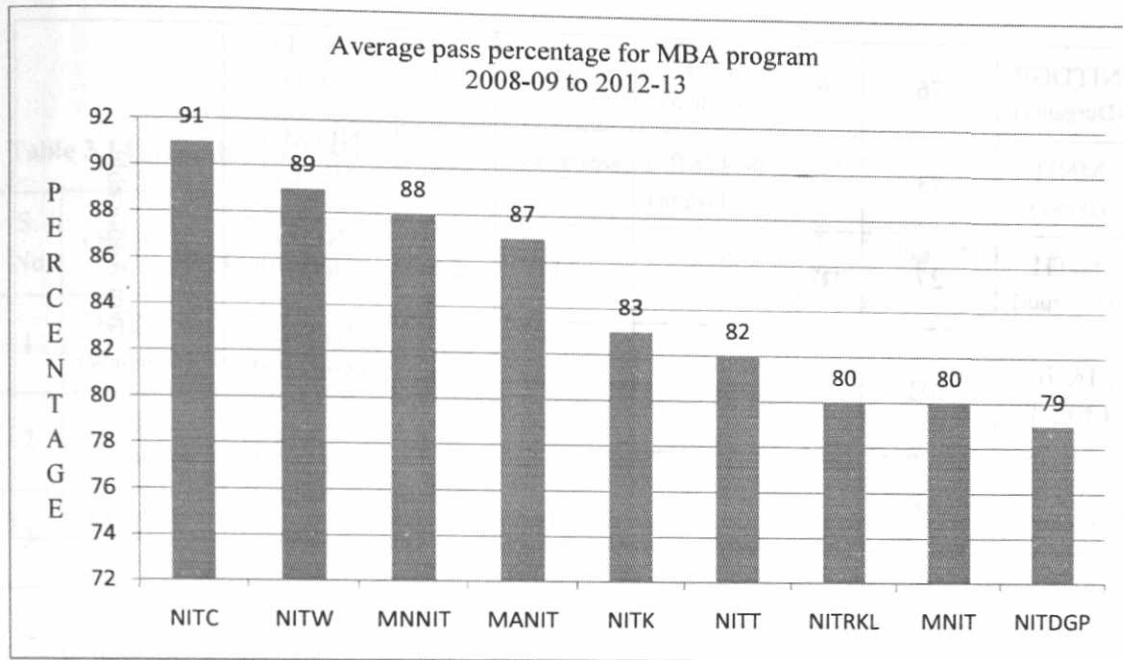
6	NITDGP (Durgapur)	76	16	NITJ (Jalandhar)	-	24	NITD (Delhi)	Not Applicable
7	MNIT (Jaipur)	-	17	NITJSR (Jamshedpur)	75	25	NITMN (Manipur)	
8	NITH (Hamirpur)	-	18	NITP (Patna)	-	26	NITG (Goa)	
9	MANIT (Bhopal)	79				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	-				28	NITSKM (Sikkim)	



**Fig. 3.5: Average pass percentage of NIT students for MCA program during 2008-09 to 2012-13**

**Table 3.12: Average pass percentage of NIT students for MBA program during 2008-09 to 2012-13**

S. No	Old NIT	Average pass percentage of students	S. No	Old NIT	Average pass percentage of students	S. No	New NIT	Average pass percentage of students
1	NITW (Warangal)	89	11	NITSRI (Srinagar)	-	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	83	12	NITC (Calicut)	91	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	88	13	NITT (Trichy)	82	21	NITPY (Puducherry)	
4	SVNIT (Surat)	-	14	NITRR (Raipur)	-	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	80	15	VNIT (Nagpur)	-	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	79	16	NITJ (Jalandhar)	-	24	NITD (Delhi)	
7	MNIT (Jaipur)	80	17	NITJSR (Jamshedpur)	-	25	NITMN (Manipur)	
8	NITH (Hamirpur)	-	18	NITP (Patna)	-	26	NITG (Goa)	
9	MANIT (Bhopal)	87				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	-				28	NITSKM (Sikkim)	

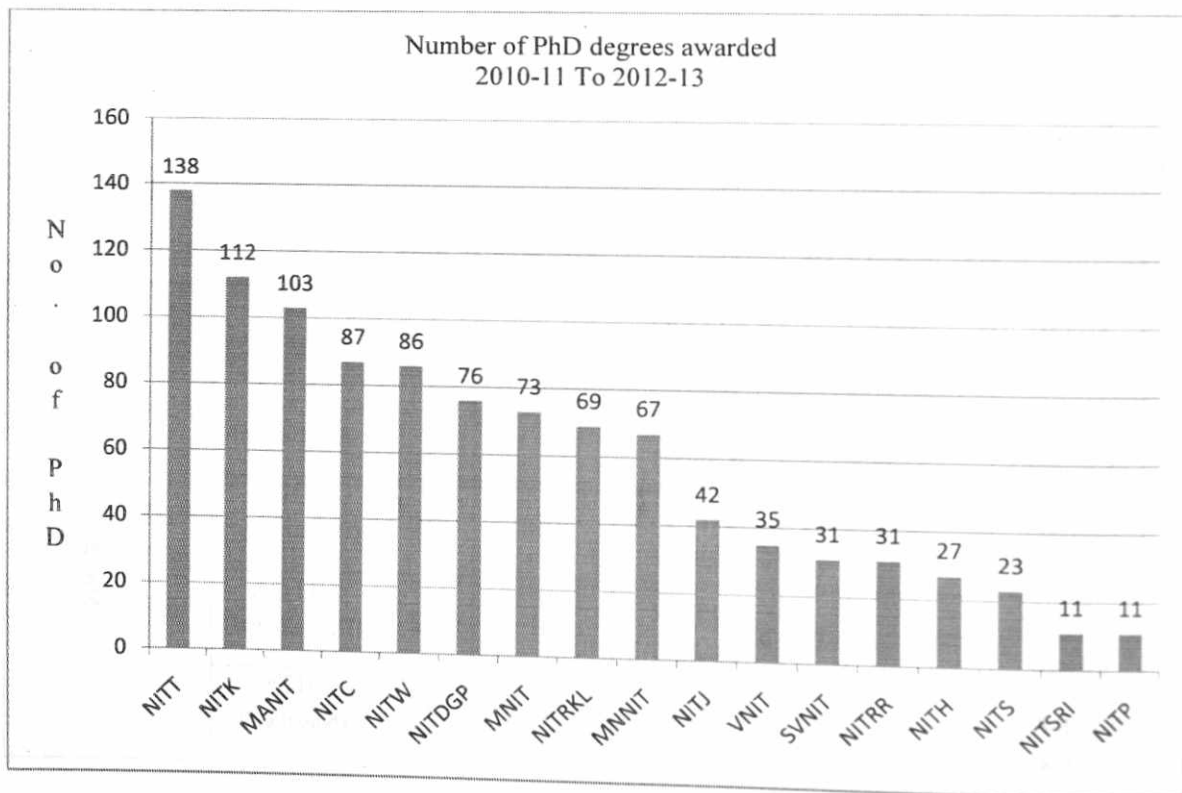


**Fig. 3.6: Average passpercentage of NIT students for MBA program during 2008-09 to 2012-13**

**Table 3.13: Number of PhD degrees awarded by NITs during 2010-11 to 2012-13**

S. No	Old NIT	PhD Awarded	S. No	Old NIT	PhD Awarded	S. No	New NIT	PhD Awarded
1	NITW (Warangal)	86	11	NITSRI (Srinagar)	11	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	112	12	NITC (Calicut)	87	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	67	13	NITT (Trichy)	138	21	NITPY (Puducherry)	
4	SVNIT (Surat)	31	14	NITRR (Raipur)	31	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	69	15	VNIT (Nagpur)	35	23	NITN (Nagaland)	

6	NITDGP (Durgapur)	76	16	NITJ (Jalandhar)	42	24	NITD (Delhi)	Not Applicable
7	MNIT (Jaipur)	73	17	NITJSR (Jamshedpur)	-	25	NITMN (Manipur)	
8	NITH (Hamirpur)	27	18	NITP (Patna)	11	26	NITG (Goa)	
9	MANIT (Bhopal)	103				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	23				28	NITSKM (Sikkim)	



**Fig. 3.7: Number of PhD degrees awarded by NITs from 2010-11 to 2012-13**

**Table 3.14: Number of PhD students continuing in NITs as on 2013**

S. No	Old NIT	PhD Continuing	S. No	Old NIT	PhD Continuing	S. No	New NIT	PhD Continuing
1	NITW (Warangal)	243	11	NITSRI (Srinagar)	61	19	NITMZ (Mizoram)	-
2	NITK (Surathkal)	398	12	NITC (Calicut)	382	20	NITM (Meghalaya)	-
3	MNNIT (Allahabad)	278	13	NITT (Trichy)	429	21	NITPY (Puducherry)	-
4	SVNIT (Surat)	156	14	NITRR (Raipur)	155	22	NITUK (Uttarakhand)	-
5	NITRKL (Rourkela)	283	15	VNIT (Nagpur)	327	23	NITN (Nagaland)	6
6	NITDGP (Durgaur)	407	16	NITJ (Jalandhar)	150	24	NITD (Delhi)	-
7	MNIT (Jaipur)	297	17	NITJSR (Jamshedpur)	22	25	NITMN (Manipur)	-
8	NITH (Hamirpur)	137	18	NITP (Patna)	39	26	NITG (Goa)	-
9	MANIT (Bhopal)	263				27	NITAP (Arunachal Pradesh)	2
10	NITS (Silchar)	154				28	NITSKM (Sikkim)	-

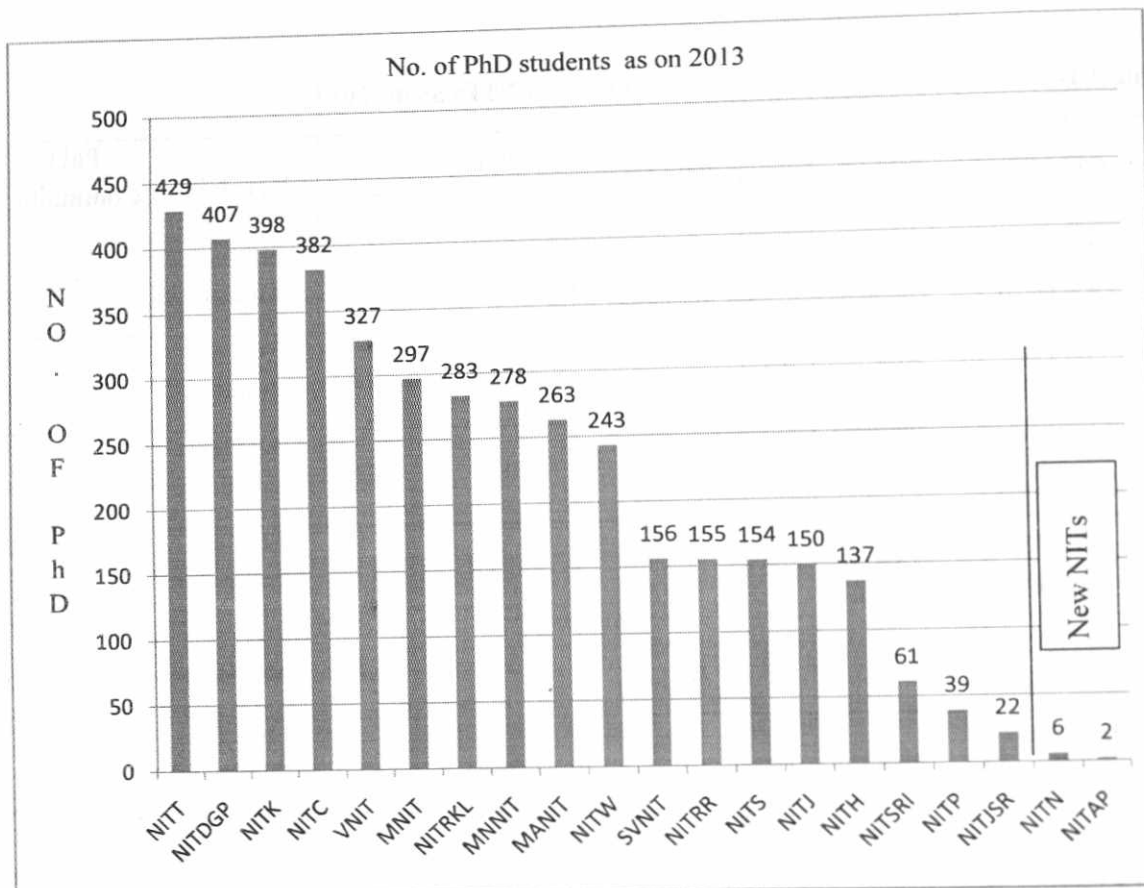


Fig. 3.8: Number of PhD students continuing in NITs as on 2013

### Observations

Table 3.15: Highest and lowest average pass percentage for B.Tech program during 2008-09 to 2012-13

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (94%), NITW (93%), NITRKL (92%)	NITJSR (75%), NITRR (73%), NITSRI (69%)
New NITs	Not Applicable	



**Table 3.16: Highest and lowest average pass percentage for M.Tech program during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITW (77%), NITT (76%), NITK (75%)	NITJ (58%), NITJSR (56%), NITSRI (50%)
New NITs	Not Applicable	

**Table 3.17: Highest and lowest average pass percentage for M.Sc program during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (87%), NITK (85%), NITRKL (84%)	NITJ (73%), NITDGP (72%), MNIT (71%)
New NITs	Not Applicable	

**Table 3.18: Highest and lowest average pass percentage of MCA program during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITW (95%), NITT (85%), NITK (84%)	NITRR (77%), NITDGP (76%), NITJSR (75%)
New NITs	Not Applicable	

**Table 3.19: Highest and lowest average pass percentage of MBA program during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITC (91%), NITW (89%), MNNIT (88%)	NITT (82%), NITRKL (80%), MNIT (80%), NITDGP (79%)
New NITs	Not Applicable	

**Table 3.20: Highest and lowest numbers of PhD degrees awarded by NITs during 2010-11 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (138), NITK (112), MANIT (103)	NITH (27), NITS (23), NITSRI (11), NITP (11)
New NITs	Not Applicable	

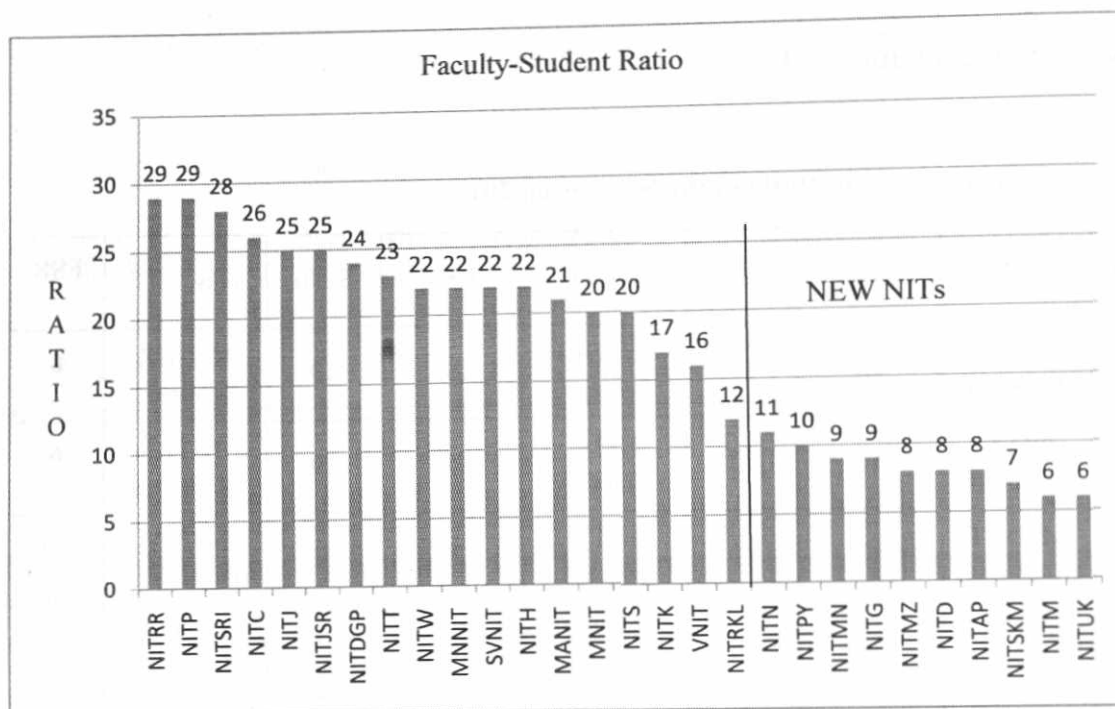
**Table 3.21: Maximum and minimum number of PhD students continuing in NITs as on 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (429), NITDGP (407), NITK (398)	NITSRI (61), NITP (39), NITJSR (22)
New NITs	NITN (6)	NITAP (2)

### 3.3 Faculty-Student Ratio (FSR)

**Table 3.22: Faculty-Student Ratio of the NITs as on 2013**

S.No	Old NIT	FSR	S.No	Old NIT	FSR	S.No	New NIT	FSR
1	NITW (Warangal)	22	11	NITSRI (Srinagar)	28	19	NITMZ (Mizoram)	8
2	NITK (Surathkal)	17	12	NITC (Calicut)	26	20	NITM (Meghalaya)	6
3	MNNIT (Allahabad)	22	13	NITT (Trichy)	23	21	NITPY (Puducherry)	10
4	SVNIT (Surat)	22	14	NITRR (Raipur)	29	22	NITUK (Uttarakhand)	6
5	NITRKL (Rourkela)	12	15	VNIT (Nagpur)	16	23	NITN (Nagaland)	11
6	NITDGP (Durgapur)	24	16	NITJ (Jalandhar)	27	24	NITD (Delhi)	8
7	MNIT (Jaipur)	20	17	NITJSR (Jamshedpur)	25	25	NITMN (Manipur)	9
8	NITH (Hamirpur)	22	18	NITP (Patna)	29	26	NITG (Goa)	9
9	MANIT (Bhopal)	21				27	NITAP (Arunachal Pradesh)	8
10	NITS (Silchar)	20				28	NITSKM (Sikkim)	7



**Fig. 3.9: Faculty-Student Ratio of NITs as on 2013**

**Note:** FSR is calculated by diving total number of students in the campus excluding PhD scholars by total number of permanent faculty.

**Observations**

**Table 3.23: High and Low Faculty-Student Ratio (FSR) in NITs as on 2013**

NIT	Highest Three (3) Values	Lowest Three (3) Values
Old NITs	NITRR (29), NITP (29), NITSRI(28), NITC (26)	NITK (17), VNIT (16), NITRKL (12)
New NITs	NITN (11), NITPY (10), NITMN (9)	NITSKM (7), NITM (6), NITUK (6)

### 3.4 Academic Events Organized by NITs

**Table 3.24: Number of academic events organized in NITs during 2008-09 to 2012-13**

S. No	Old NIT	Events Organized	S. No	Old NIT	Events Organized	S.No	New NIT	Events Organized
1	NITW (Warangal)	75	11	NITSRI (Srinagar)	23	19	NITMZ (Mizoram)	0
2	NITK (Surathkal)	67	12	NITC (Calicut)	49	20	NITM (Meghalaya)	4
3	MNNIT (Allahabad)	38	13	NITT (Trichy)	83	21	NITPY (Puducherry)	7
4	SVNIT (Surat)	39	14	NITRR (Raipur)	31	22	NITUK (Uttarakhand)	7
5	NITRKL (Rourkela)	74	15	VNIT (Nagpur)	30	23	NITN (Nagaland)	4
6	NITDGP (Durgapur)	41	16	NITJ (Jalandhar)	26	24	NITD (Delhi)	0
7	MNIT (Jaipur)	19	17	NITJSR (Jamshedpur)	17	25	NITMN (Manipur)	0
8	NITH (Hamirpur)	20	18	NITP (Patna)	15	26	NITG (Goa)	2
9	MANIT (Bhopal)	44				27	NITAP (Arunachal Pradesh)	8
10	NITS (Silchar)	22				28	NITSKM (Sikkim)	0

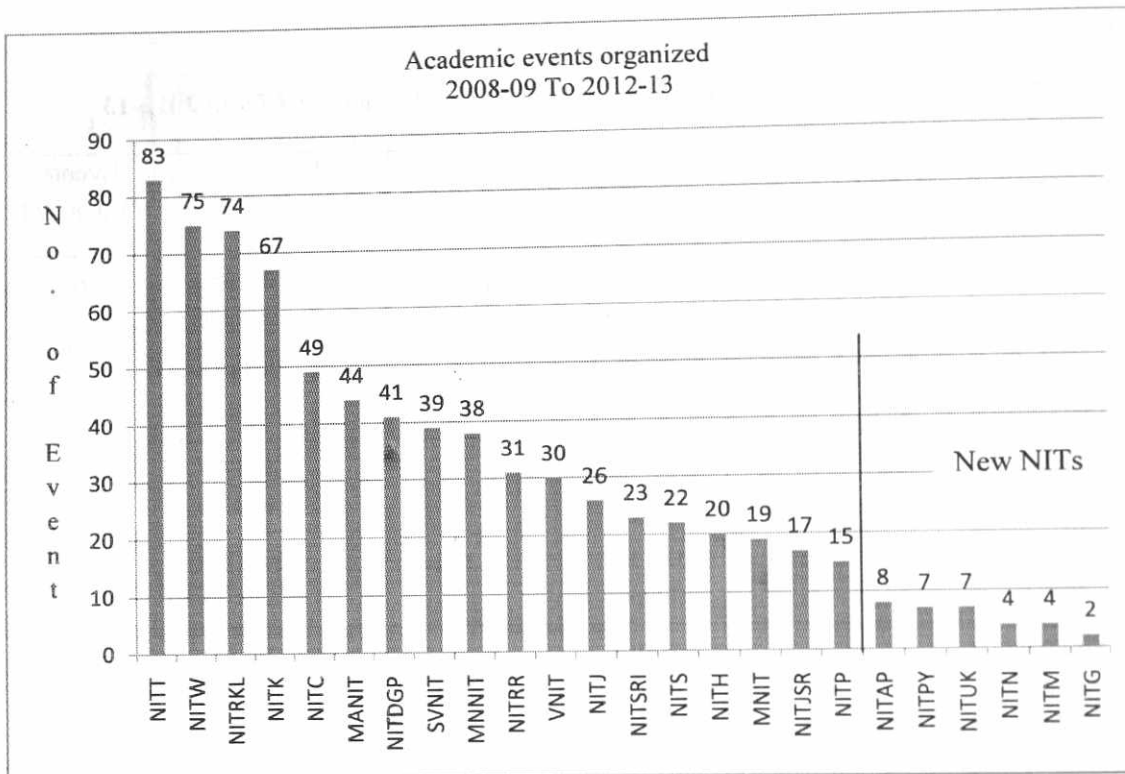


Fig. 3.10: Number of academic events organized in NITs during 2008-09 to 2012-13

Observations

Table 3.25: Maximum and minimum number of academic events organized by NITs during 2008-09 to 2012-13

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (83), NITW (75), NITRKL (74)	NITH (20), MNIT (19), NITJSR (17)
New NITs	NITAP (8), NITPY (7), NITUK (7)	NITM (4), NITN (4), NITG (2)

### 3.5 Campus Placements during 2008-09 to 2012-13:

The percentage of campus placement and the average pay package are two among other important factors contributing to the quality of students produced and the quality of education imparted by an institution. This is because good companies in India gather information about the quality of graduates produced from old students of various NITs and the feedback received on their performance from other important industries. Hence their students' potentiality and performance information of an NIT propagated to other similar industries. Hence a competitive environment is created among the top class industries to attract the right graduates to join their firms. Hence the annual pay packages as well as the number of graduates are good indicators of the quality of students produced by an NIT. The rating of various national institute of importance in technical education is in the order of (i) Indian Institute of Technology (IIT), (ii) National Institute of Technology (NIT), and (iii) Central Universities. The choice of students by industries and other Government of India research organizations are in the order of (i) Older IITs (ii) Older NITs (iii) Newer IITs (iv) Newer NITs and Central Universities. In addition, the average annual salary of students of older NITs is better than that of other government and private engineering colleges of the country. However, the average annual salary package of newer NITs is lesser than that of many famous government engineering colleges of the country.

Hence we calculated Average Campus Placement Percentage (ACPP) as follows for the NITs.

$$\begin{aligned}
 & \textit{Average Campus placement percentage} \\
 & = (\textit{Campus Placement percentage (2008 – 09)} \\
 & + \dots + \textit{Campus Placemet percentage (2012 – 13)}) \\
 & \div 5 \qquad \qquad \qquad (3)
 \end{aligned}$$

We divide it by five since we have the data of five years i.e. 2008-09, 2009-10, 2010-11, 2011-12, and 2012-13.

Where Campus Placement Percentage for particular year is calculated by dividing number of candidates got placed by number of candidates eligible for placements. In mathematical form it can be written as

$$\textit{Campus placement percentage} = (\textit{No. of students placed} \div \textit{No. of students eligible}) \times 100 \quad (4)$$

Also average salary offered during 2008-09 to 2012-13 can be calculated by adding up all the five values pertaining to the respective average salary package of the year and dividing it by 5. In mathematical form we can write it as follows:

$$\begin{aligned}
 & \textit{Avergae Salary offered (during 2008 – 09 to 2012 – 13)} \\
 & = ((\textit{Average salary offered (2008 – 09)} \\
 & + \dots + (\textit{Average salary offered (2012 – 13)})) \div 5 \qquad (5)
 \end{aligned}$$



**Table 3.26: Average campus placement percentage of NITs during 2008-09 to 2012-13**

S. No	Old NIT	Average placement percentage	S. No	Old NIT	Average placement percentage	S. No	New NIT	Average placement percentage
1	NITW (Warangal)	82	11	NITSRI (Srinagar)	50	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	88	12	NITC (Calicut)	81	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	79	13	NITT (Trichy)	94	21	NITPY (Puducherry)	
4	SVNIT (Surat)	74	14	NITRR (Raipur)	77	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	92	15	VNIT (Nagpur)	87	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	79	16	NITJ (Jalandhar)	79	24	NITD (Delhi)	
7	MNIT (Jaipur)	73	17	NITJSR (Jamshedpur)	78	25	NITMN (Manipur)	
8	NITH (Hamirpur)	81	18	NITP (Patna)	81	26	NITG (Goa)	
9	MANIT (Bhopal)	83				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	84				28	NITSKM (Sikkim)	

**Table 3.27: Highest annual salary offered in NITs during 2008-09 to 2012-13**

S. No	Old NIT	Highest annual salary (in Lac.)	S. No	Old NIT	Highest annual salary (in Lac.)	S. No	New NIT	Highest annual salary (in Lac.)
1	NITW (Warangal)	65	11	NITSRI (Srinagar)	8	19	NITMZ (Mizoram)	Not Applicable
2	NITK (Surathkal)	52	12	NITC (Calicut)	18	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	20	13	NITT (Trichy)	60	21	NITPY (Puducherry)	
4	SVNIT (Surat)	9	14	NITRR (Raipur)	11	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	14	15	VNIT (Nagpur)	16	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	11.25	16	NITJ (Jalandhar)	10.2	24	NITD (Delhi)	
7	MNIT (Jaipur)	16	17	NITJSR (Jamshedpur)	18	25	NITMN (Manipur)	
8	NITH (Hamirpur)	11.18	18	NITP (Patna)	18	26	NITG (Goa)	
9	MANIT (Bhopal)	100				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	18				28	NITSKM (Sikkim)	

**Table 3.28: Average annual salary offered in NITs during 2008-09 to 2012-13**

S. No	Old NIT	Average annual salary (in Lac.)	S. No	Old NIT	Average annual salary (in Lac.)	S. No	New NIT	Average annual salary (in Lac.)
1	NITW (Warangal)	5.85	11	NITSRI (Srinagar)	3.91	19	NITMZ (Mizoram)	NOT APPLICABLE
2	NITK (Surathkal)	5.34	12	NITC (Calicut)	4.44	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	4.67	13	NITT (Trichy)	5.13	21	NITPY (Puducherry)	
4	SVNIT (Surat)	3.95	14	NITRR (Raipur)	3.21	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	5.71	15	VNIT (Nagpur)	4.54	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	4.35	16	NITJ (Jalandhar)	3.9	24	NITD (Delhi)	
7	MNIT (Jaipur)	3.24	17	NITJSR (Jamshedpur)	3.71	25	NITMN (Manipur)	
8	NITH (Hamirpur)	4.12	18	NITP (Patna)	4.02	26	NITG (Goa)	
9	MANIT (Bhopal)	4.55				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	4.11				28	NITSKM (Sikkim)	

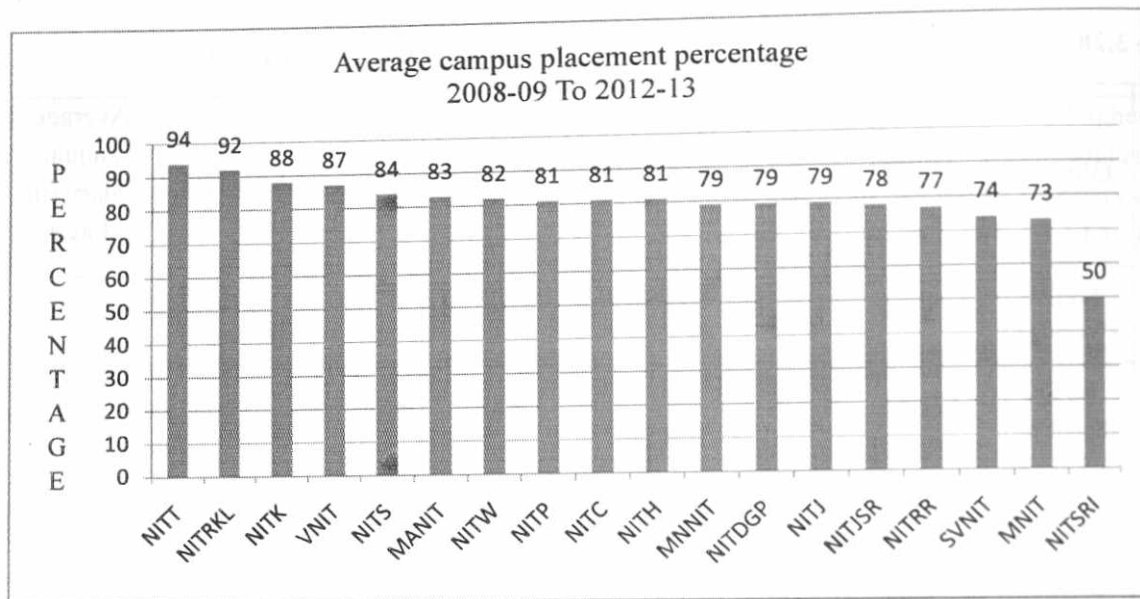


Fig. 3.11: Average campus placement percentage of NITs during 2008-09 to 2012-13

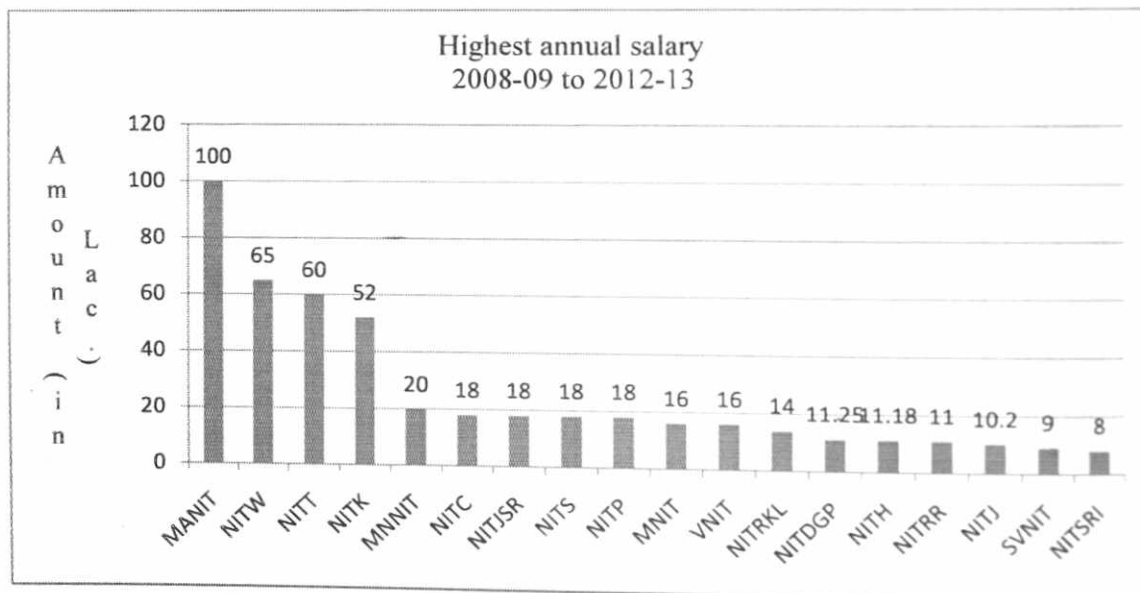
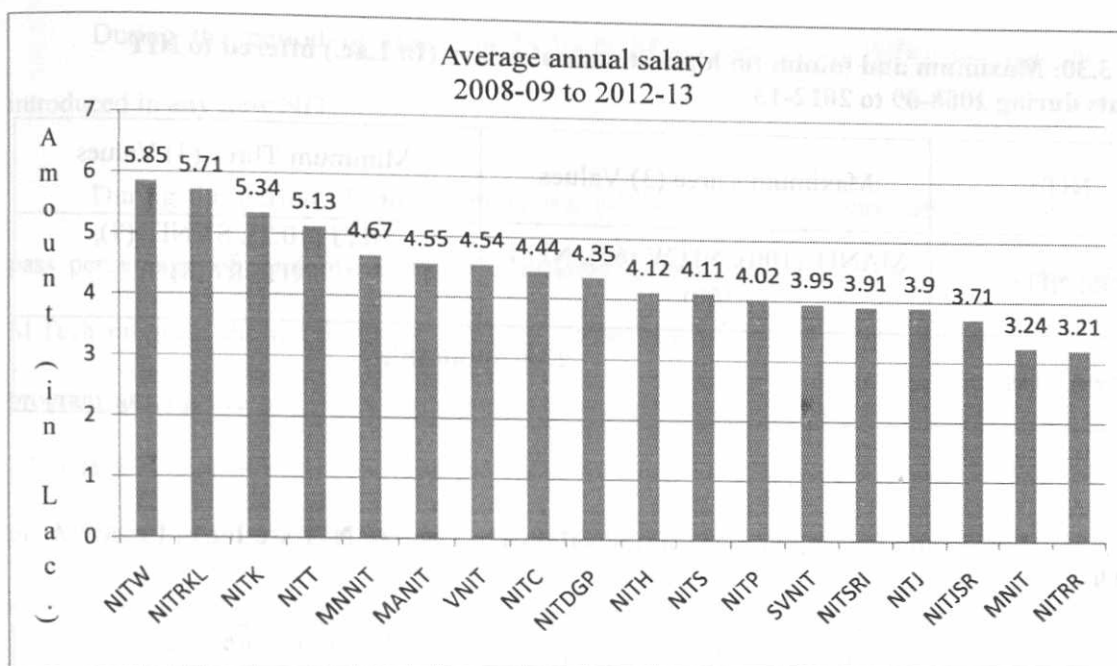


Fig. 3.12: Highest annual salary offered in NITs during 2008-09 to 2012-13



**Fig. 3.13: Average annual salary offered in NITs during 2008-09 to 2012-13**

**Observations**

**Table 3.29: Highest and lowest average placement percentage of NIT students during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (94%), NITRKL (92%), NITK (88%)	SVNIT (74%), MNNIT (73%), NITSRI (50%)
New NITs	Not Applicable	

**Table 3.30: Maximum and minimum highest annual salary (In Lac.) offered to NIT students during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	MANIT (100), NITW (65), NITT (60)	NITJ (10.2), SVNIT (9), NITSRI (8)
New NITs	Not Applicable	

**Table 3.31: Highest and lowest average annual salary (In Lac.) to NIT students during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITW (5.85), NITRKL (5.71), NITK (5.34)	NITJSR (3.71), MNIT (3.24), NITRR (3.21)
New NITs	Not Applicable	

### 3.6 Observation and conclusion

It is observed from the analysis that during the period of study among the old NITs, NITK, NITRKL, and MANIT are having maximum (33) number of ongoing engineering programs. The same among new NITs is 8 for NITM. Similarly among old NITs, NITSRI, NITRR, and NITJSR are running minimum (16) number of engineering programs and the same is 3 for NITG, NITAP, and NITPY among the new NITs.

From the time of conversion of RECs in NITs to year 2013, NITRKL has introduced 18 new engineering programs which is maximum whereas NITT has introduced 1 program which is the minimum. The same for new NITs are 8 for NITM and 3 for NITG, NITAP, and NITPY.

During the period of study no M.Tech, M.Sc, MCA, and MBA program has been introduced in any new NIT.

During the period of study among the old NITs, the maximum and minimum average pass percentage of students in B.Tech program is 94% for NITT and 69% for NITSRI. In M.Tech program the maximum is 77% for NITW and minimum is 50% for NITSRI. In M.Sc program among the old NITs the maximum and minimum average pass percentage is 87% at NITT and 71% at MNIT. The same for MCA program is 95% for NITW and 75% for NITJSR. For MBA program it is 91% for NITC and 79% for NITDGP.

During the period of study NITT has produced 138 PhD students which is the highest. It is 11 for NITP and NITSRI which is the lowest. The maximum and minimum of students continuing PhD programs in old NITs are 429 in NITT and 22 in NITJSR. The same among new NITs are 6 in NITN and 2 in NITAP respectively.

It is observed that NITRKL has minimum FSR (Faculty-Student ratio) value as 12 in old NITs and maximum value of FSR is 29 at NITRR and NITP. For all the other old NITs this ratio lies in the range of 16 to 28. Similarly for new NITs, FSR value is minimum (6) at NITUK, NITM and maximum (11) at NITN and for other new NITs it lies from 7 to 10.

During the period of study NITT has organized 89 numbers of academic events like Seminars, Workshops, and Conferences etc. whereas for NITJSR this is 17 which is the lowest in case of old NITs. However, in new NITs, NITAP has organized 8 academic events and whereas NITG has conducted only 2 academic events.

It is observed that NITT has the maximum average campus placement percentage (ACPP) as 94% whereas NITSRI has the minimum ACPP of 50% during the period of study and

for other old NITs this value lies in the range of 84% to 74%. Also, it is observed that highest annual salary is offered to one student of MANIT whereas NITSRI students got the minimum among the old NITs during the period of study. Moreover, it is observed NITW students got the maximum average annual salary whereas students of NITRR receive the minimum. During the period of study not a single batch of students has graduated from the new NITs.



## **Chapter – 4**

### **Analysis of Information related to Faculty members**

In this chapter analysis of the information collected on faculty members of different NITs has been carried out and the results obtained are tabulated. The interpretation of the results in terms of faculty strength, male – female ratio of faculty members, percentage of faculty having PhD degree, awards and recognitions by faculty members, number of foreign academic visits made by them as well as faculty contributing to social development has been made in the Table 4.9 and the findings have been presented in the conclusion of this chapter.

#### 4.1 Faculty details of NITs

**Table 4.1: Faculty strength in NITs as on 2013**

Old NITs

NIT	NIT W	NIT K	MN NIT	SV NIT	NIT RKL	NIT DGP	MNI T	MA NIT	NIT SRI	NIT C
Male Faculty	188	197	168	121	207	146	135	139	66	137
Female Faculty	17	32	30	26	28	24	32	57	16	45
Total Faculty	205	229	198	147	235	170	167	196	82	182
Faculty with PhD Degree	171	204	158	101	209	133	121	156	36	123

Old NITs

NIT	NIT T	NIT P	NIT H	NIT RR	VNI T	NIT J	NIT JSR	NIT S
Male Faculty	174	81	90	75	156	84	95	95
Female Faculty	52	13	15	18	29	24	6	19
Total Faculty	226	94	105	93	185	108	101	114
Faculty with PhD Degree	179	54	78	53	124	76	71	61

New NITs

NIT	NIT UK	NITS KM	NIT MZ	NIT N	NIT D	NIT MN	NIT G	NIT AP	NIT M	NIT PY
Male Faculty	43	31	18	26	20	22	28	27	46	17
Female Faculty	6	2	9	7	14	7	4	4	6	10
Total Faculty	49	33	27	33	34	29	32	31	52	27
Faculty with PhD Degree	18	20	7	10	14	14	28	9	27	14

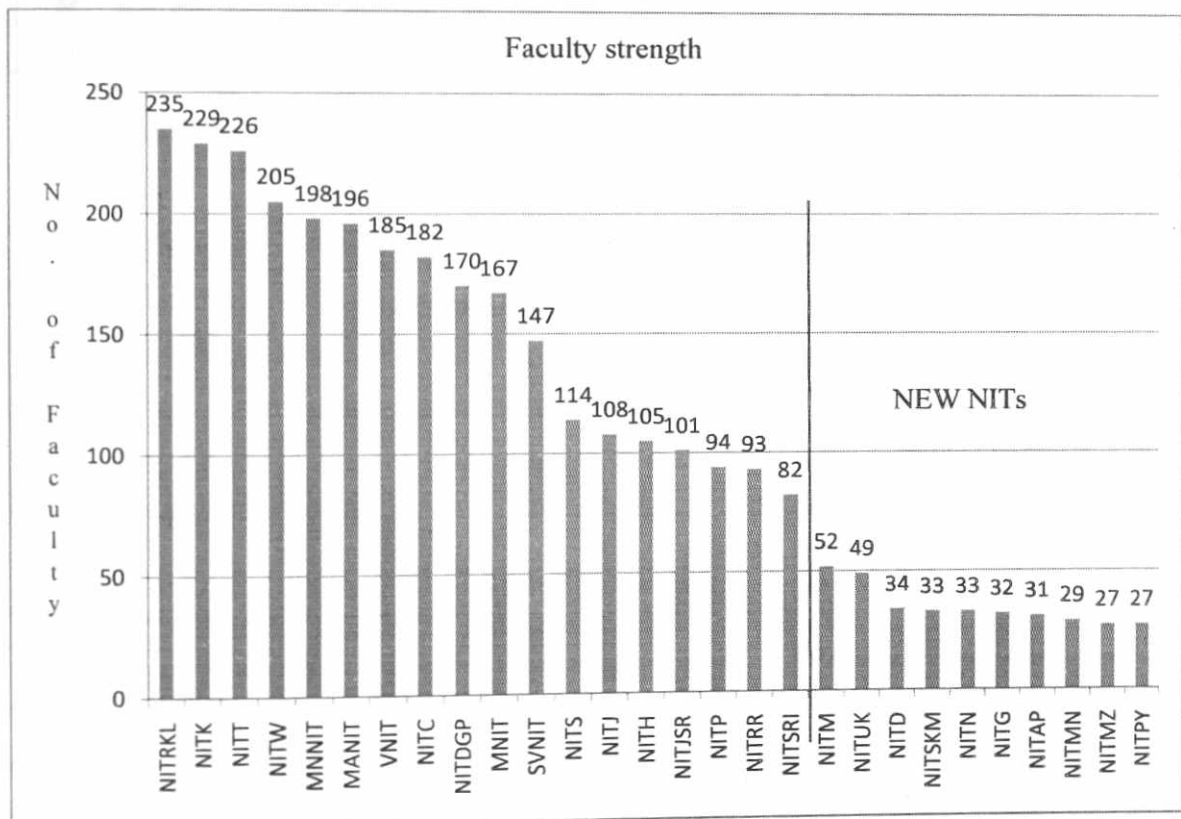


Fig. 4.1: Faculty strength in NITs as on 2013

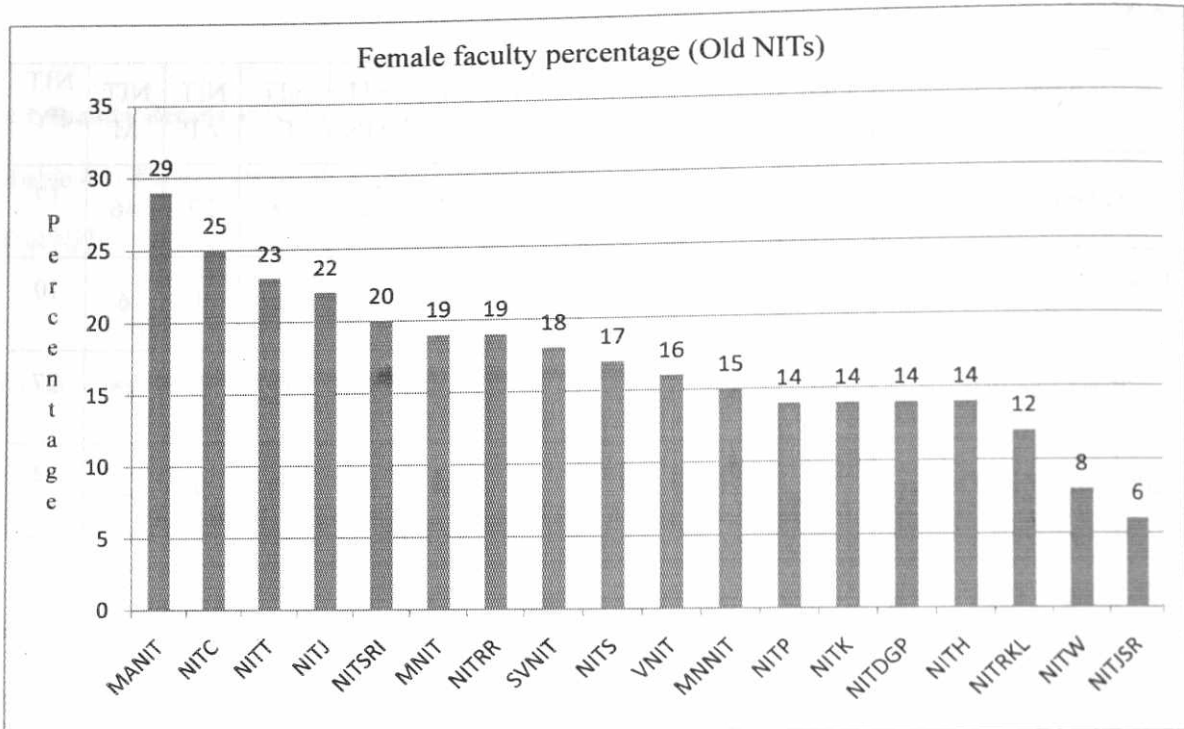


Fig. 4.2: Female faculty percentage in old NITs as on 2013

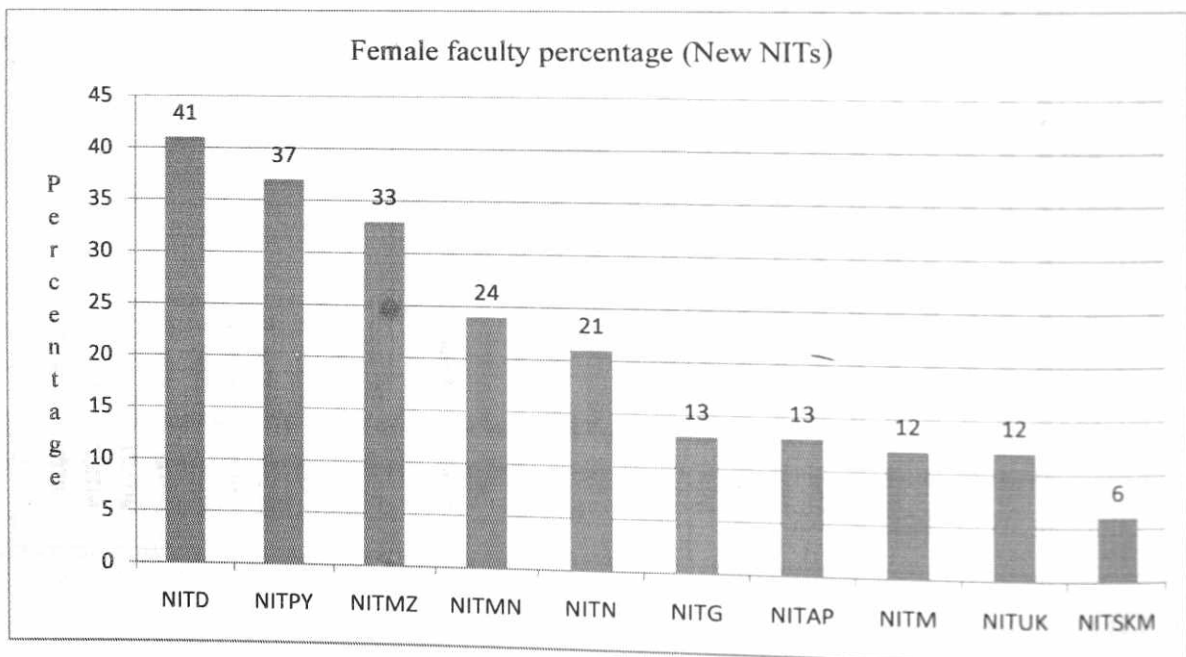


Fig. 4.3: Female faculty percentage in new NITs as on 2013

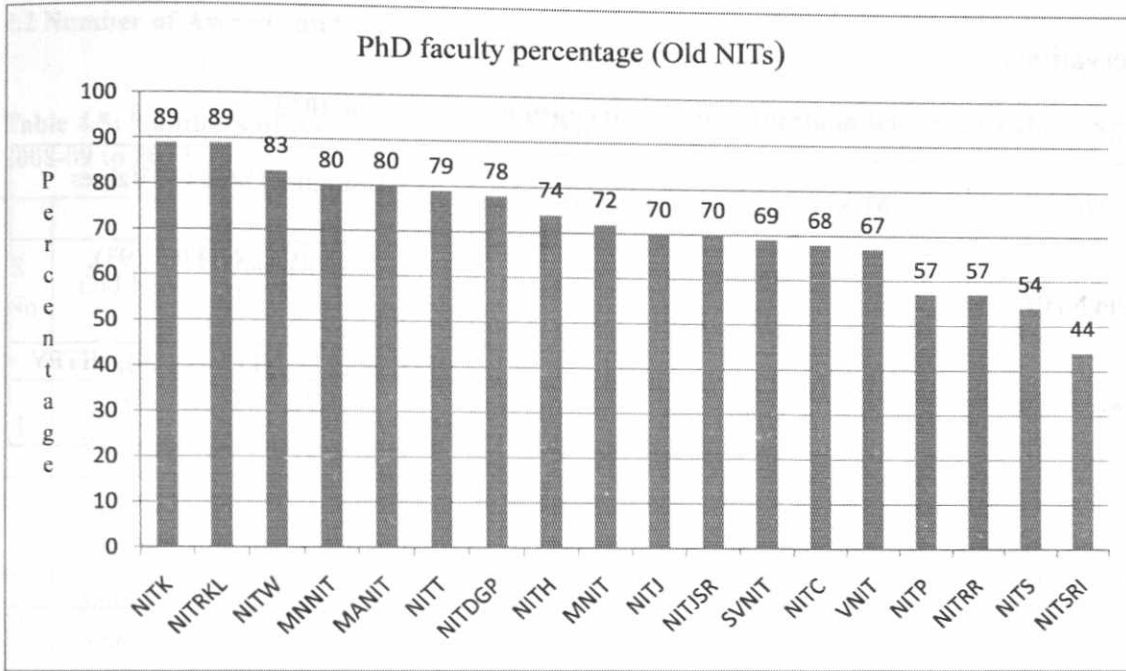


Fig. 4.4: Faculty percentage having PhD degree in old NITs as on 2013

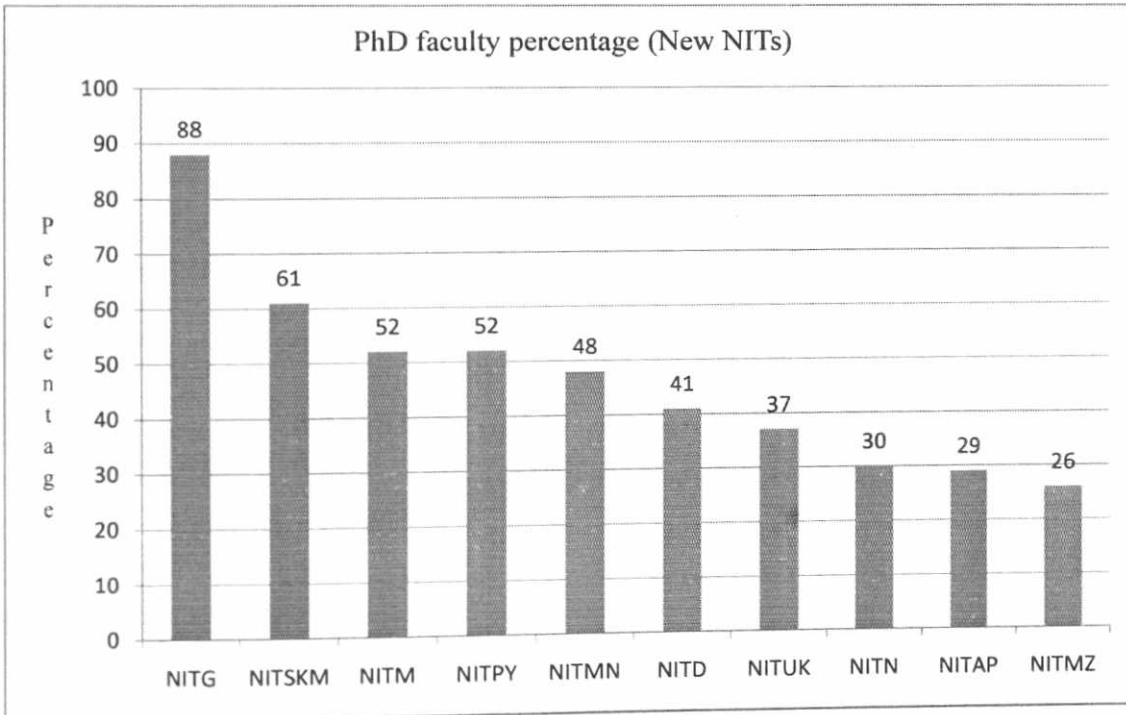


Fig. 4.5: Faculty percentage having PhD degree in new NITs as on 2013

Observations

**Table 4.2: Maximum and minimum faculty strength in NITs as on 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRKL (235), NITK (229), NITT (226)	NITP (94), NITRR (93), NITSRI (82)
New NITs	NITM (52), NITUK (49), NITD (34)	NITAP (31), NITMN (29), NITPY (27), NITMZ (27)

**Table 4.3: Maximum and minimum female faculty percentage in NITs as on 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	MANIT (29%), NITC (25%), NITT (23%)	NITRKL (12%), NITW (8%), NITJSR (6%)
New NITs	NITD (41%), NITPY (37%), NITMZ (33%)	NITAP (13%), NITM (12%), NITUK (12%), NITSKM (6%)

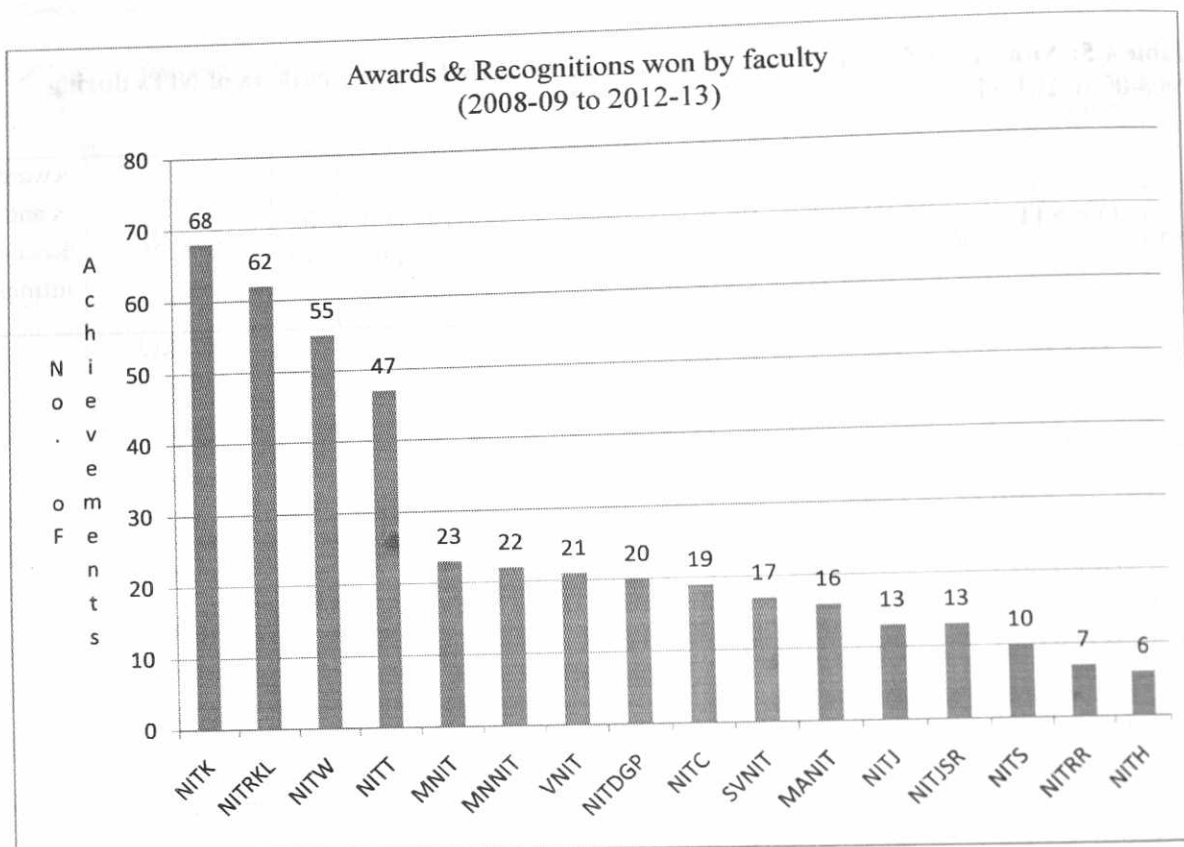
**Table 4.4: Maximum and minimum faculty percentage with PhD degree in NITs as on 2013**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITK (89%), NITRKL (89%), NITW (83%), MNNIT (80%), MANIT (80%)	NITP (57%), NITRR (57%), NITS (54%), NITSRI (44%)
New NITs	NITG (88%), NITSKM (61%), NITM (52%)	NITN (30%), NITAP (29%), NITMZ (26%)

#### 4.2 Number of Awards and Recognitions

**Table 4.5: Numbers of Awards and Recognitions won by faculty members of NITs during 2008-09 to 2012-13**

S. No	Old NIT	Awards and Recognitions	S. No	Old NIT	Awards and Recognitions	S. No	New NIT	Awards and Recognitions
1	NITW (Warangal)	55	11	NITSRI (Srinagar)	-	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	68	12	NITC (Calicut)	19	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	22	13	NITT (Trichy)	47	21	NITPY (Puducherry)	
4	SVNIT (Surat)	17	14	NITRR (Raipur)	7	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	62	15	VNIT (Nagpur)	21	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	20	16	NITJ (Jalandhar)	13	24	NITD (Delhi)	
7	MNIT (Jaipur)	23	17	NITJSR (Jamshedpur)	13	25	NITMN (Manipur)	
8	NITH (Hamirpur)	6	18	NITP (Patna)	-	26	NITG (Goa)	
9	MANIT (Bhopal)	16				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	10				28	NITSKM (Sikkim)	



**Fig. 4.6: Numbers of Awards and Recognitions won by faculty members of NITs during 2008-09 to 2012-13**

**Observations**

**Table 4.6: Maximum & minimum number of Awards & Recognitions won by faculty members of NITs during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITK (68), NITRKL (62), NITW (55)	NITS (10), NITRR (7), NITH (6)
New NITs	NIL	



### 4.3 Number of Foreign visits by faculty members of NITs

**Table 4.7: Foreign visits by faculty members of NITs during 2008-09 to 2012-13**

S. No	Old NIT	Foreign visits	S. No	Old NIT	Foreign visits	S. No	New NIT	Foreign visits
1	NITW (Warangal)	87	11	NITSRI (Srinagar)	22	19	NITMZ (Mizoram)	0
2	NITK (Surathkal)	103	12	NITC (Calicut)	47	20	NITM (Meghalaya)	5
3	MNNIT (Allahabad)	54	13	NITT (Trichy)	116	21	NITPY (Puducherry)	0
4	SVNIT (Surat)	17	14	NITRR (Raipur)	48	22	NITUK (Uttarakhand)	0
5	NITRKL (Rourkela)	96	15	VNIT (Nagpur)	62	23	NITN (Nagaland)	0
6	NITDGP (Durgapur)	23	16	NITJ (Jalandhar)	34	24	NITD (Delhi)	0
7	MNIT (Jaipur)	11	17	NITJSR (Jamshedpur)	27	25	NITMN (Manipur)	0
8	NITH (Hamirpur)	86	18	NITP (Patna)	31	26	NITG (Goa)	0
9	MANIT (Bhopal)	61				27	NITAP (Arunachal Pradesh)	7
10	NITS (Silchar)	37				28	NITSKM (Sikkim)	0

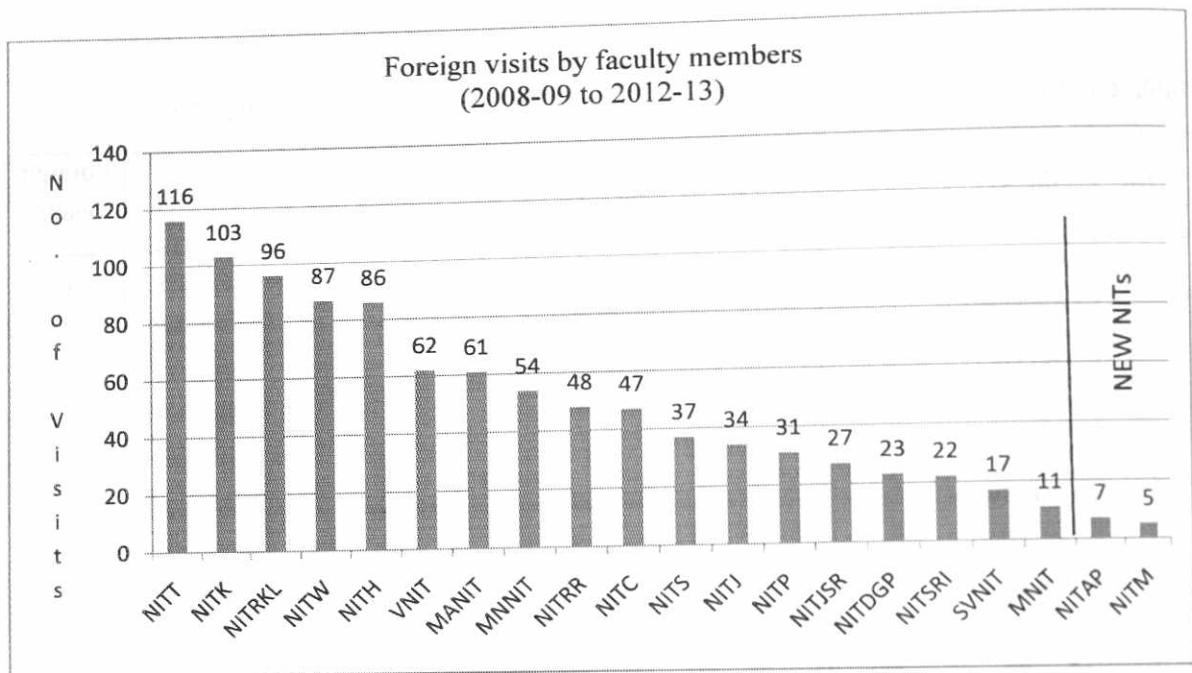


Fig. 4.7: Foreign visits by faculty members of NITs during 2008-09 to 2012-13

### Observations

Table 4.8: Maximum & minimum number of foreign visits by faculty members of NITs

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (116), NITK (103), NITRKL (96)	NITSRI (22), SVNIT (17), MNIT (11)
New NITs	NITAP (7)	NITM (5)

#### 4.4 Contribution to society by faculty members of NITs

Each NIT has rendered some technical contribution for betterment of society. However, specific information has not been supplied by the NITs. However, it is learnt that many students of different NITs are involved in teaching to illiterate children, men and women in towns and villages. In addition, NIT students are involved in training on computer awareness to rural students. Faculty of many NITs has developed innovative products and instruments for providing efficiency in agriculture, small scale industries, pollution control, weather forecasting, mining, metallurgical and manufacturing industries. However, these data did not share by any NIT. This is one of the important weaknesses of the present study.

**Table 4.9: Contribution of faculty members to the society**

S. No	NIT	CONTRIBUTION
1	NITW (Warangal)	<ul style="list-style-type: none"> <li>a. Short term training courses for faculty members of different institutions</li> <li>b. Open for all workshops, special lectures have been conducted on regular intervals on latest technological trends</li> <li>c. Students visit orphanage and counsel, motivate and provide moral courage to orphans</li> <li>d. Students literate poor people and on holidays and evening hours in both rural and town areas.</li> </ul>
2	NITK (Surathkal)	<ul style="list-style-type: none"> <li>a. Short courses, Training program on Internet usage and cyber crime</li> <li>b. Faculty conducts awareness programs on effect of pollution, drug, smoking and alcohol etc. to youth of urban areas.</li> </ul>
3	MNNIT (Allahabad)	<ul style="list-style-type: none"> <li>a. Community development cell activities</li> <li>b. Ganga pollution awareness program</li> <li>c. Awareness and cleaning at sangam during Mahakumbh</li> <li>d. Summer training program on VLSI.</li> <li>e. Conducts FDP/STC's from time to time</li> <li>f. Organized various awareness campaigns, workshop for upliftment of common people in Allahabad.</li> </ul>
4	SVNIT (Surat)	<ul style="list-style-type: none"> <li>a. Various construction projects for welfare of society</li> </ul>
5	NITRKL (Rourkela)	<ul style="list-style-type: none"> <li>a. Water resource management</li> <li>b. Social welfare projects given by GOI</li> </ul>
6	NITDGP (Durgapur)	<ul style="list-style-type: none"> <li>a. Rural development program</li> <li>b. Short training programs</li> </ul>

7	MANIT (Bhopal)	a. Organizing various competitions on Projects, Quiz etc
8	NITSRI (Srinagar)	a. Basic amenities development programs b. Cleaning of Dal Lake c. Open for all summer training programs
9	NITC (Calicut)	a. Various construction projects for welfare of society
10	NITT (Trichy)	a. Awareness programs b. Training courses c. Various clubs
11	NITP (Patna)	a. National Service Scheme including blood donation camps b. Workshop on 'How to be a smart investor' c. Free tuition classes d. Computer education e. Personality development programs f. Education awareness camp g. Enhancing communal harmony h. Women cell
12	MNIT (Jaipur)	a. Time to time advise to farmers for better crop yield b. Water saving campaign
13	NITRR (Raipur)	a. Entrepreneur training b. Clean environment programs
14	VNIT (Nagpur)	a. Summer schools b. Short term courses c. Seminars d. Cultural programs
15	NITJ (Jalandhar)	a. Formed Various Clubs and Committees to deal with problems faced by local peoples
16	NITJSR (Jamshedpur)	a. Training programs b. Awareness campaign
17	NITS (Silchar)	a. Adoption of border villages to develop them as modern villages b. Improvising Internal road network c. Telemedicine projects d. Health Camps
18	NITH (Hamirpur)	a. Yoga Programs b. Internet awareness programs c. Real estate development
19	NITUK (Uttarakhand)	a. Women Empowerment b. Environmental Awareness Programs

20	NITG (Goa)	a. Laser Mission 10X faculty of H&SS department visited 40 schools
21	NITAP (Arunachal Pradesh)	a. National Students' Essay competition on every year 11th may b. Drawing Competitions c. Operation and training on applications and use of solar Lantern

#### 4.5 Observation and conclusion

From among the older NITs, NITRKL is having 235 faculty members which is maximum among all the NITs. Each of NITRKL, NITK, NITT and NITW is having more than 200 faculty members. Further NITSRI is having the least number of faculty members which is 82 only. Similarly, maximum and minimum percentage of female faculty members is 29% and 6% in MANIT and NITJSR respectively. From among the new NITs the faculty strength is the highest (52) in NITM and the lowest (27) in NITMZ and NITPY respectively. The maximum (41%) and minimum (6%) female faculty percentage are working in NITD and NITSKM respectively.

Another interesting observation on faculty analysis is that NITRKL and NITK are having 89% faculty members with PhD degree which is the highest, but this percentage is the lowest (44%) in NITSRI. The institutes having more than 80% faculty members with PhD degree are NITK, NITRKL, NITW, MNNIT, and MANIT. Further, from among the new NITs, NITG and NITMZ are having maximum (88%) and minimum (26%) number of PhD holders as faculty members.

It is further observed that during the period of study the faculty members of NITK has received the highest (68) numbers of awards and recognitions. It is followed by NITRKL (62), and NITW (55). The faculty members of NITH have received minimum (6) numbers of awards and recognitions.

During the period of study maximum (116) numbers of foreign visits have been made by faculty members of NITT whereas it is the lowest (11) for MNIT. However, from among the new NITs, the faculty members of NITAP have made maximum (7) number of foreign visits and minimum (5) by NITM.

In almost all NITs the faculty members are contributing in various ways to the growth and development of the society. By analyzing Table 4.9, it is learnt that more social activities are carried out by faculty members of MNNIT and NITP.

## **Chapter – 5**

### **Analysis of Information related to Students of NITs**

This chapter analyzes the data pertaining to students. It covers analysis and interpretation of the results related to student strength, awards and recognitions, summer training and higher study abroad. It also analyzes the data collected under participation in international conferences and carrying out interdisciplinary projects by students.

### 5.1 Total student strength of NITs

**Table 5.1: Total student strength in NITs as on 2013**

#### Old NITs

NIT	NIT W	NIT K	MN NIT	SVN IT	NIT RKL	NIT DGP	MNI T	MA NIT	NIT SRI	NITC
Total student strength	4563	3811	4307	3234	2722	4144	3340	4132	2299	4653

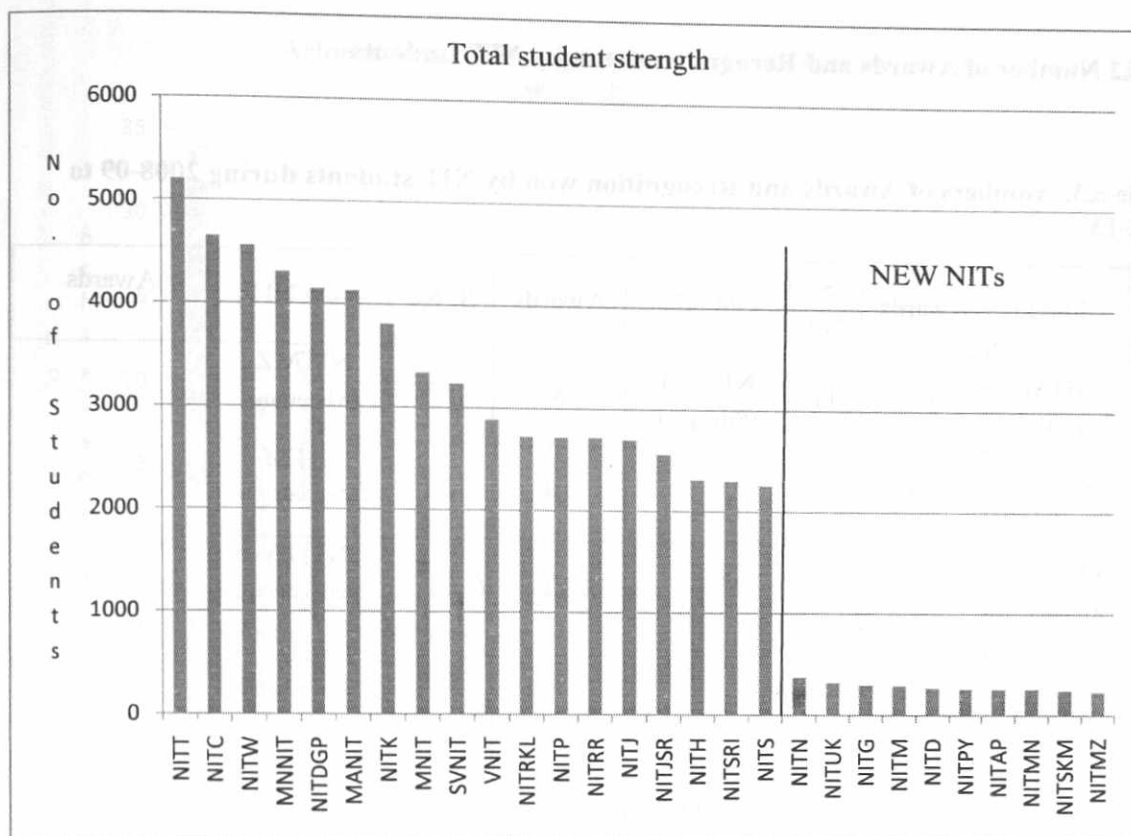
#### Old NITs

NIT	NITT	NITP	NITH	NITRR	VNIT	NITJ	NITJSR	NITS
Total student strength	5198	2716	2310	2715	2889	2694	2556	2256

#### New NITs

NIT	NIT UK	NITS KM	NIT MZ	NIT N	NIT D	NIT MN	NIT G	NIT AP	NIT M	NIT PY
Total student strength	314	243	229	372	267	254	298	256	287	261





**Fig. 5.1: Total student strength in NITs as on 2013**

Observations

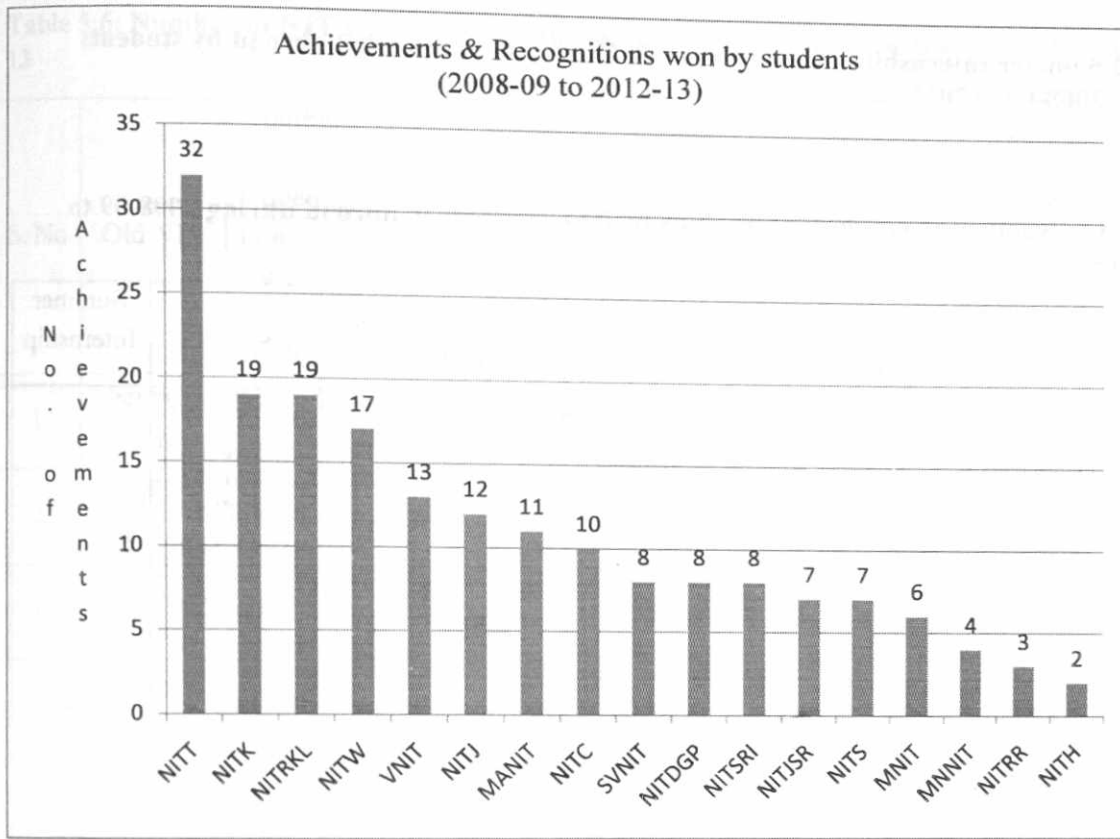
**Table 5.2: Maximum and minimum total student strength in NITs**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (5198), NITC (4653), NITW (4563)	NITH (2310), NITSRI (2299), NITS (2256)
New NITs	NITN (372), NITUK (314), NITG (298)	NITMN (254), NITSKM (243), NITMZ (229)

## 5.2 Number of Awards and Recognitions won by NIT students

**Table 5.3: Numbers of Awards and Recognition won by NIT students during 2008-09 to 2012-13**

S. No	Old NIT	Awards	S. No	Old NIT	Awards	S. No	New NIT	Awards
1	NITW (Warangal)	17	11	NITSRI (Srinagar)	8	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	19	12	NITC (Calicut)	10	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	4	13	NITT (Trichy)	32	21	NITPY (Puducherry)	
4	SVNIT (Surat)	8	14	NITRR (Raipur)	3	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	19	15	VNIT (Nagpur)	13	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	8	16	NITJ (Jalandhar)	12	24	NITD (Delhi)	
7	MNIT (Jaipur)	6	17	NITJSR (Jamshedpur)	7	25	NITMN (Manipur)	
8	NITH (Hamirpur)	2	18	NITP (Patna)	-	26	NITG (Goa)	
9	MANIT (Bhopal)	11				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	7				28	NITSKM (Sikkim)	



**Fig. 5.2: Number of Awards and Recognitions won by NIT students during 2008-09 to 2012-13**

**Observations**

**Table 5.4: Maximum & minimum number of Awards & Recognitions won by NIT students during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (32), NITK (19), NITRKL (19), NITW (17)	MNNIT (4), NITRR (3), NITH (2)
New NITs	NIL	

**5.3 Summer Internship, Higher Study & Conferences attended abroad by students  
2008-09 to 2012-13:**

**Table 5.5: Number of summer internships by NIT students in abroad during 2008-09 to 2012-13**

S. No	Old NIT	Summer Internship	S. No	Old NIT	Summer Internship	S. No	New NIT	Summer Internship
1	NITW (Warangal)	39	11	NITSRI (Srinagar)	0	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	52	12	NITC (Calicut)	11	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	8	13	NITT (Trichy)	48	21	NITPY (Puducherry)	
4	SVNIT (Surat)	5	14	NITRR (Raipur)	2	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	49	15	VNIT (Nagpur)	9	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	0	16	NITJ (Jalandhar)	3	24	NITD (Delhi)	
7	MNIT (Jaipur)	7	17	NITJSR (Jamshedpur)	4	25	NITMN (Manipur)	
8	NITH (Hamirpur)	0	18	NITP (Patna)	6	26	NITG (Goa)	
9	MANIT (Bhopal)	1				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	6				28	NITSKM (Sikkim)	

**Table 5.6: Number of NIT students gone abroad for higher studies during 2008-09 to 2012-13**

S. No	Old NIT	Number of students gone for higher studies	S. No	Old NIT	Number of students gone for higher studies	S. No	New NIT	Number of students gone for higher studies
1	NITW (Warangal)	90	11	NITSRI (Srinagar)	9	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	85	12	NITC (Calicut)	41	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	33	13	NITT (Trichy)	89	21	NITPY (Puducherry)	
4	SVNIT (Surat)	29	14	NITRR (Raipur)	4	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	84	15	VNIT (Nagpur)	42	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	32	16	NITJ (Jalandhar)	6	24	NITD (Delhi)	
7	MNIT (Jaipur)	34	17	NITJSR (Jamshedpur)	8	25	NITMN (Manipur)	
8	NITH (Hamirpur)	18	18	NITP (Patna)	36	26	NITG (Goa)	
9	MANIT (Bhopal)	28				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	12				28	NITSKM (Sikkim)	

**Table 5.7: Average number of international conferences attended by NIT students abroad during 2008-09 to 2012-13**

S. No	Old NIT	Conference Attended (abroad)	S. No	Old NIT	Conference Attended (abroad)	S. No	New NIT	Conference Attended (abroad)
1	NITW (Warangal)	15	11	NITSRI (Srinagar)	-	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	17	12	NITC (Calicut)	6	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	4	13	NITT (Trichy)	19	21	NITPY (Puducherry)	
4	SVNIT (Surat)	3	14	NITRR (Raipur)	1	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	16	15	VNIT (Nagpur)	6	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	5	16	NITJ (Jalandhar)	2	24	NITD (Delhi)	
7	MNIT (Jaipur)	3	17	NITJSR (Jamshedpur)	2	25	NITMN (Manipur)	
8	NITH (Hamirpur)	1	18	NITP (Patna)		26	NITG (Goa)	
9	MANIT (Bhopal)	3				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	3				28	NITSKM (Sikkim)	

Table 5.3: Master's Degree  
Awarded during 2008-09 to 2012-13

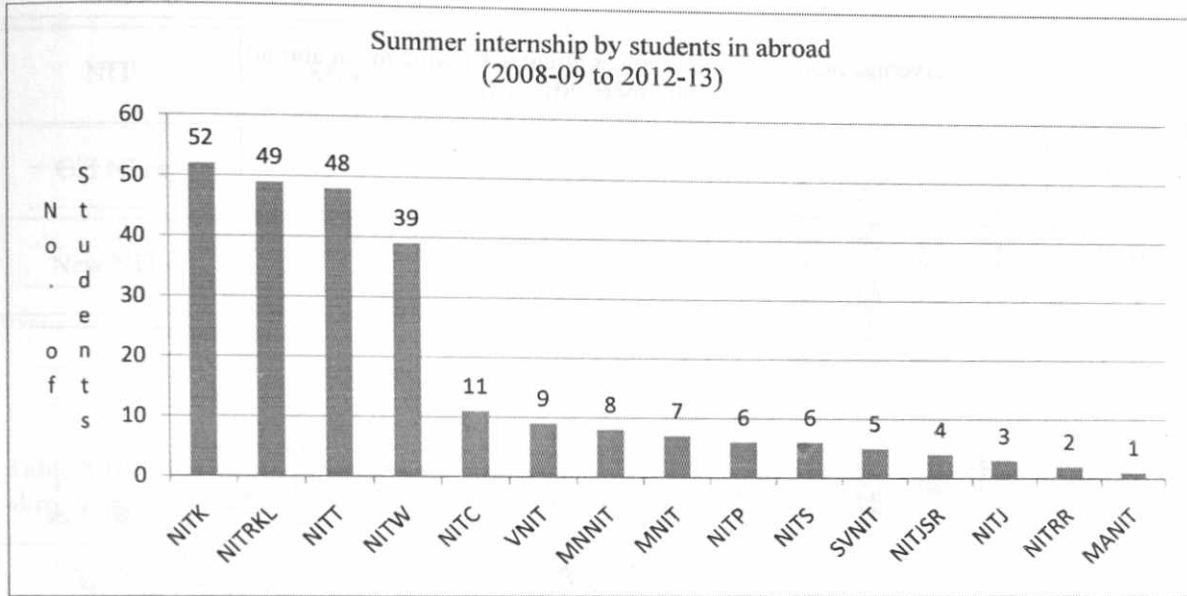


Fig. 5.3: Number of summer internships by NIT students abroad during 2008-09 to 2012-13

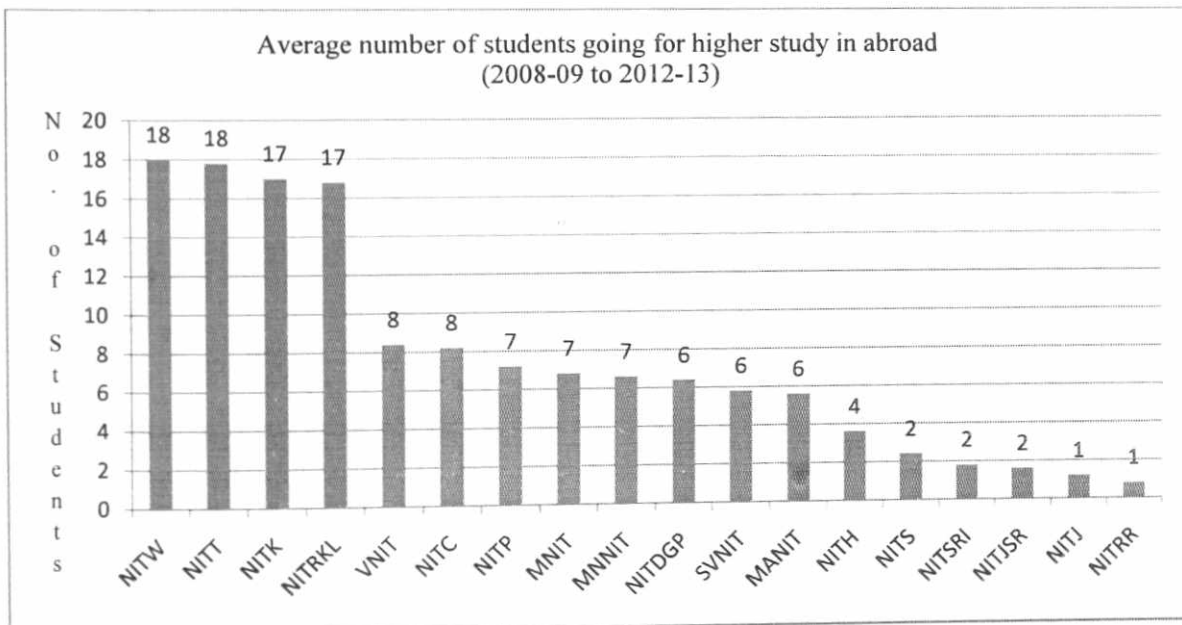
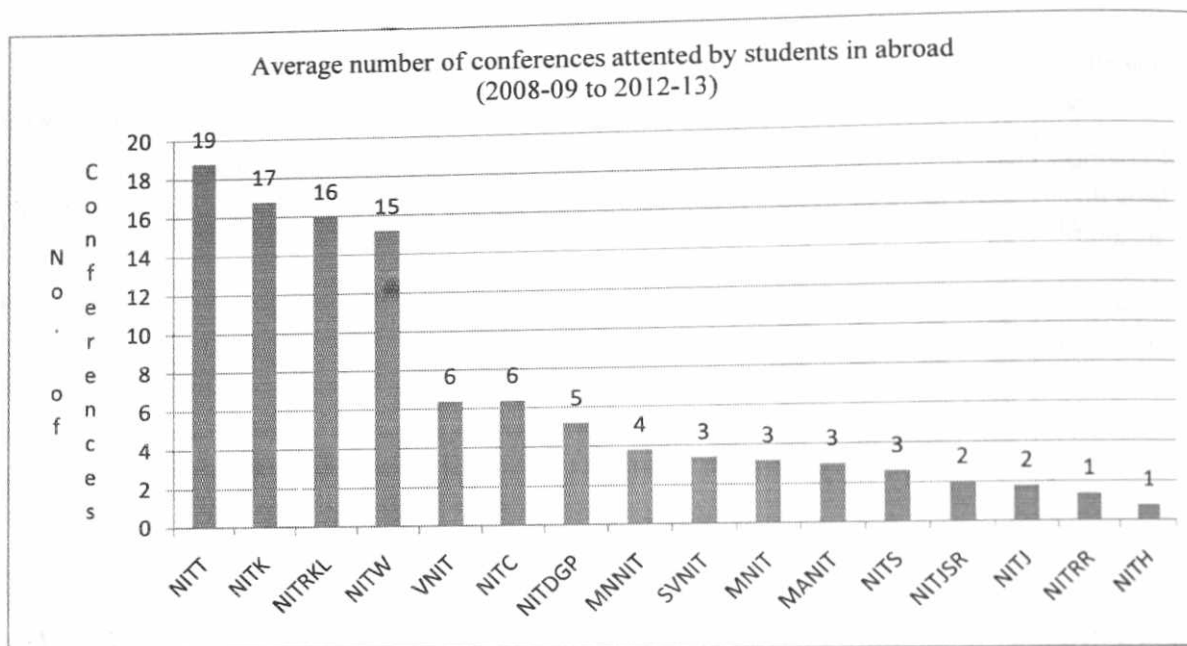


Fig. 5.4: Average number of NIT students gone abroad for higher studies during 2008-09 to 2012-13



**Fig. 5.5: Average number of International Conferences attended by NIT students abroad during 2008-09 to 2012-13:**

Observations:

**Table 5.8: Maximum & minimum number of summer internships by NIT students in abroad during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITK (52), NITRKL (49), NITT (48)	NITJSR (4), NITJ (3), MANIT (1)
New NITs	NIL	



**Table 5.9: Maximum & minimum number of NIT students gone for higher studies in abroad during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITW (90), NITT (89), NITK (85)	NITJSR (8), NITJ (6), NITRR(4)
New NITs	NIL	

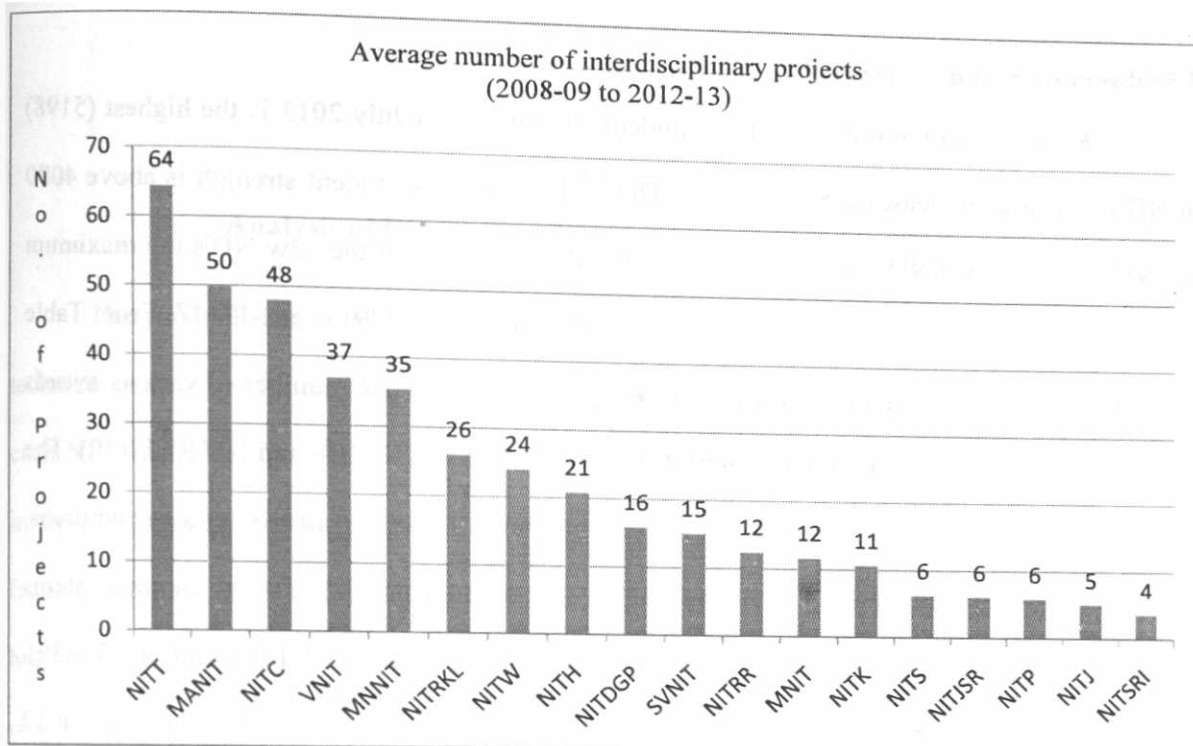
**Table 5.10: Maximum & minimum number of Conferences attended by NIT students in abroad during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (19), NITK (17), NITRKL (16)	NITJSR (2), NITJ (2), NITRR (1), NITH (1)
New NITs	NIL	

#### 5.4 Number of interdisciplinary projects undertaken by students:

**Table 5.11: Average number of interdisciplinary projects undertaken by NIT students during 2008-09 to 2012-13**

S. No	Old NIT	Interdisciplinary projects	S. No	Old NIT	Interdisciplinary projects	S. No	New NIT	Interdisciplinary projects
1	NITW (Warangal)	24	11	NITSRI (Srinagar)	4	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	11	12	NITC (Calicut)	48	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	35	13	NITT (Trichy)	64	21	NITPY (Puducherry)	
4	SVNIT (Surat)	15	14	NITRR (Raipur)	12	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	26	15	VNIT (Nagpur)	37	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	16	16	NITJ (Jalandhar)	5	24	NITD (Delhi)	
7	MNIT (Jaipur)	12	17	NITJSR (Jamshedpur)	6	25	NITMN (Manipur)	
8	NITH (Hamirpur)	21	18	NITP (Patna)	6	26	NITG (Goa)	
9	MANIT (Bhopal)	50				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	6				28	NITSKM (Sikkim)	



**Fig. 5.6: Average number of interdisciplinary projects undertaken by NIT students during 2008-09 to 2012-13**

Observations:

**Table 5.12: Maximum & minimum average number of interdisciplinary projects taken by NIT students during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (64), MANIT (50), NITC (48)	NITS (6), NITJSR (6), NITP (6), NITJ (5), NITSRI (4)
New NITs	NIL	

### 5.5 Observation and conclusion

From among the old NITs, total student strength as on July 2013 is the highest (5198) in NITT which is the least (2256) in NITS. The NITs where the student strength is above 4000 are NITT, NITW, MNNIT, NITDGP, NITC, and MANIT. Among the new NITs the maximum (372) students pursuing education is at NITN and the minimum (229) is at NITMZ. From Table 5.3, it is evident that students of NITT have received maximum (32) number of various awards and recognition during the period of study. It is followed by NITK (19), and NITRKL (19). The students of NITH have received the lowest (2) numbers of various awards and recognitions. From Tables 5.5, it is observed that the highest number of students (52) undergo summer interns in foreign countries from NITK. It is followed by NITRKL (49), NITT (48), and NITW (39). The rest of NITs sends around 10 or less number of students as intern abroad. Similarly, about 17 to 18 students per year go to foreign countries for pursuing higher study in NITW, NITT, NITK, and NITRKL. This number is less than 10 in other NITs. The students are encouraged to participate in international conference abroad and to present their research papers and this number is around 15 to 19 per year in NITT, NITK, NITRKL, and NITW. However in other NITs this number is less than 6 per year. Thus, it may be inferred that students of these four NITs receive more encouragement to pursue higher study or summer training abroad. Of course it is a fact that these four NITs attract top rankers from the entrance test.

Interdisciplinary projects help students of one branch to learn the use of technology and tools of the other branches. In present day the students are encouraged to carry out interdisciplinary projects. From Table 5.11, it is observed that students of NITT carry out the highest (64 per year) number of interdisciplinary projects. It is followed by MANIT (50 per year), and NITC (48 per year). This number is the lowest in NITSRI (4 per year).

## Chapter – 6

### **Analysis of Research and Consultancy activities of NITs**

The research and consultancy activities are important indices on the performance of a technical institution. In this chapter the data pertaining to research and consultancy activities of each NIT has been obtained and analyzed and the results are presented in Tabular form. The interpretation of results in terms of research publications, patents, time devoted to research by faculty members, centre of excellence and initiatives taken by NITs to enhance R&D activities has been made. The analysis of the results has been presented in the conclusion section of this chapter.

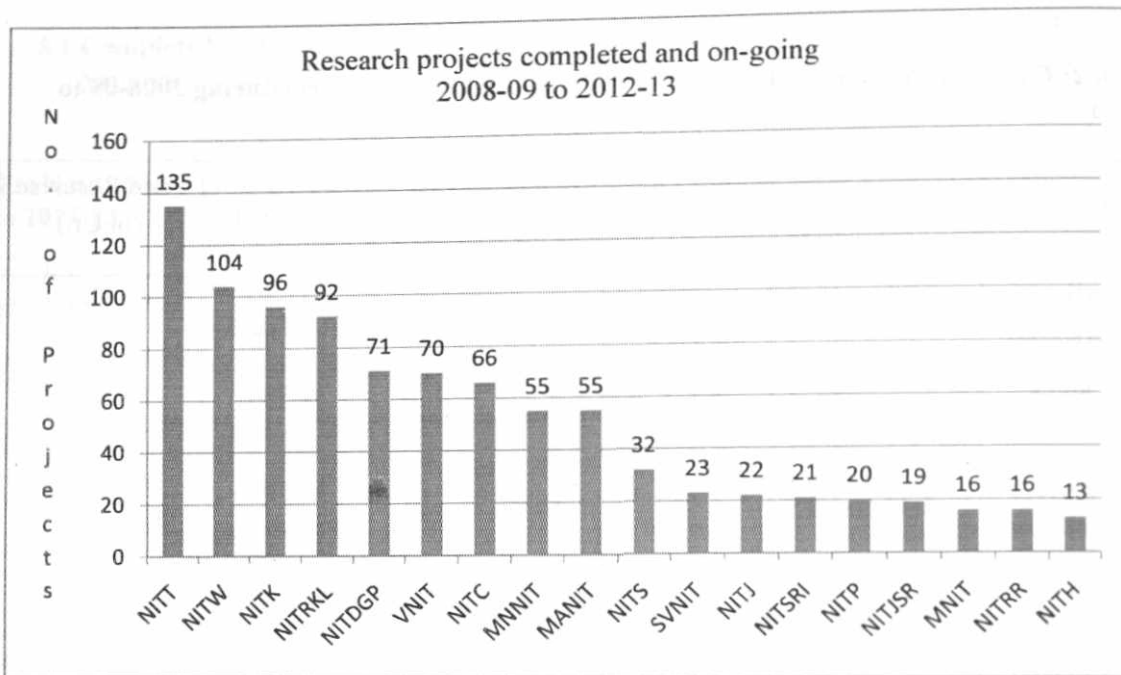
**6.1 Completed and Ongoing research projects with fund received during 2008-09 to 2012-13:**

**Table 6.1: Number of Completed and Ongoing Research projects in NITs during 2008-09 to 2012-13**

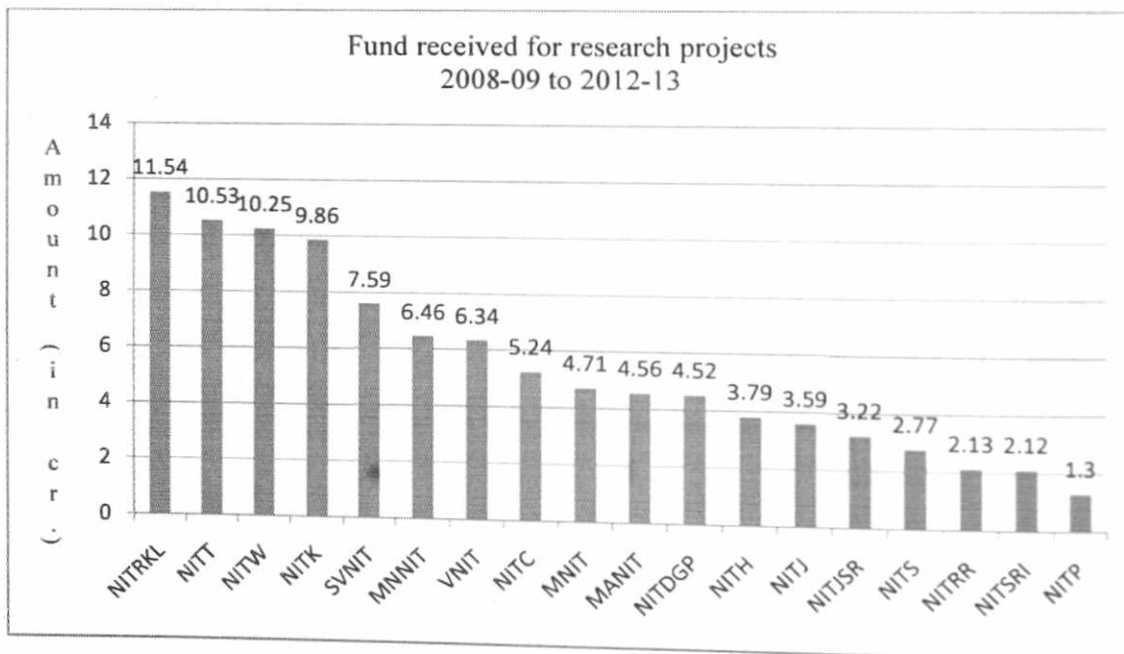
S. No	Old NIT	Research Projects	S. No	Old NIT	Research Projects	S. No	New NIT	Research Projects
1	NITW (Warangal)	104	11	NITSRI (Srinagar)	21	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	96	12	NITC (Calicut)	66	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	55	13	NITT (Trichy)	135	21	NITPY (Puducherry)	
4	SVNIT (Surat)	23	14	NITRR (Raipur)	16	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	92	15	VNIT (Nagpur)	70	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	71	16	NITJ (Jalandhar)	22	24	NITD (Delhi)	
7	MNIT (Jaipur)	16	17	NITJSR (Jamshedpur)	19	25	NITMN (Manipur)	
8	NITH (Hamirpur)	13	18	NITP (Patna)	20	26	NITG (Goa)	
9	MANIT (Bhopal)	55				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	32				28	NITSKM (Sikkim)	

**Table 6.2: Fund received by NITs for the research projects (in Crore) during 2008-09 to 2012-13**

S. No	Old NIT	Fund Received (In Cr.)	S. No	Old NIT	Fund Received (In Cr.)	S. No	New NIT	Fund Received (In Cr.)
1	NITW (Warangal)	10.25	11	NITSRI (Srinagar)	2.12	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	9.86	12	NITC (Calicut)	5.24	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	6.46	13	NITT (Trichy)	10.53	21	NITPY (Puducherry)	
4	SVNIT (Surat)	7.59	14	NITRR (Raipur)	2.13	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	11.54	15	VNIT (Nagpur)	6.34	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	4.52	16	NITJ (Jalandhar)	3.59	24	NITD (Delhi)	
7	MNIT (Jaipur)	4.71	17	NITJSR (Jamshedpur)	3.22	25	NITMN (Manipur)	
8	NITH (Hamirpur)	3.79	18	NITP (Patna)	1.30	26	NITG (Goa)	
9	MANIT (Bhopal)	4.56				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	2.77				28	NITSKM (Sikkim)	



**Fig. 6.1: Number of Completed and Ongoing Research projects in NITs during 2008-09 to 2012-13**



**Fig.6.2: Fund received by NITs for the research projects (in Crore) during 2008-09 to 2012-13**



Observations

**Table 6.3: Maximum & minimum number of research projects completed and ongoing during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (135), NITW (104), NITK (96)	NITJSR (19), MNIT (16), NITH (13)
New NITs	NIL	

**Table 6.4: Maximum & minimum amount of fund received by NITs in Croreduring 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRKL (11.54), NITT (10.53), NITW (10.25)	NITH (3.79), NITJSR (3.22), NITP (1.30)
New NITs	NIL	

6.2 Ongoing consultancy projects with fund received during 2008-09 to 2012-13:

Table 6.5: Ongoing Consultancy projects in NITs as on 2013

S. No	Old NIT	Consultancy Projects	S. No	Old NIT	Consultancy Projects	S. No	New NIT	Consultancy Projects
1	NITW (Warangal)	14	11	NITSRI (Srinagar)	14	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	22	12	NITC (Calicut)	19	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	23	13	NITT (Trichy)	28	21	NITPY (Puducherry)	
4	SVNIT (Surat)	15	14	NITRR (Raipur)	9	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	18	15	VNIT (Nagpur)	12	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	6	16	NITJ (Jalandhar)	12	24	NITD (Delhi)	
7	MNIT (Jaipur)	11	17	NITJSR (Jamshedpur)	15	25	NITMN (Manipur)	
8	NITH (Hamirpur)	7	18	NITP (Patna)	19	26	NITG (Goa)	
9	MANIT (Bhopal)	19				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	22				28	NITSKM (Sikkim)	

**Table 6.6: Fund received by NITs for the consultancy work (in Crore)**

S. No.	Old NIT	Fund Received (In Cr.)	S. No.	Old NIT	Fund Received (In Cr.)	S. No.	New NIT	Fund Received (In Cr.)
1	NITW (Warangal)	3.83	11	NITSR (Srinagar)I	2.25	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	4.91	12	NITC (Calicut)	4.86	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	2.72	13	NITT (Trichy)	4.62	21	NITPY (Puducherry)	
4	SVNIT (Surat)	3.49	14	NITRR (Raipur)	2.05	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	3.76	15	VNIT (Nagpur)	2.95	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	1.52	16	NITJ (Jalandhar)	2.17	24	NITD (Delhi)	
7	MNIT (Jaipur)	2.08	17	NITJSR (Jamshedpur)	1.33	25	NITMN (Manipur)	
8	NITH (Hamirpur)	1.84	18	NITP (Patna)	2.64	26	NITG (Goa)	
9	MANIT (Bhopal)	2.85				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	1.95				28	NITSKM (Sikkim)	

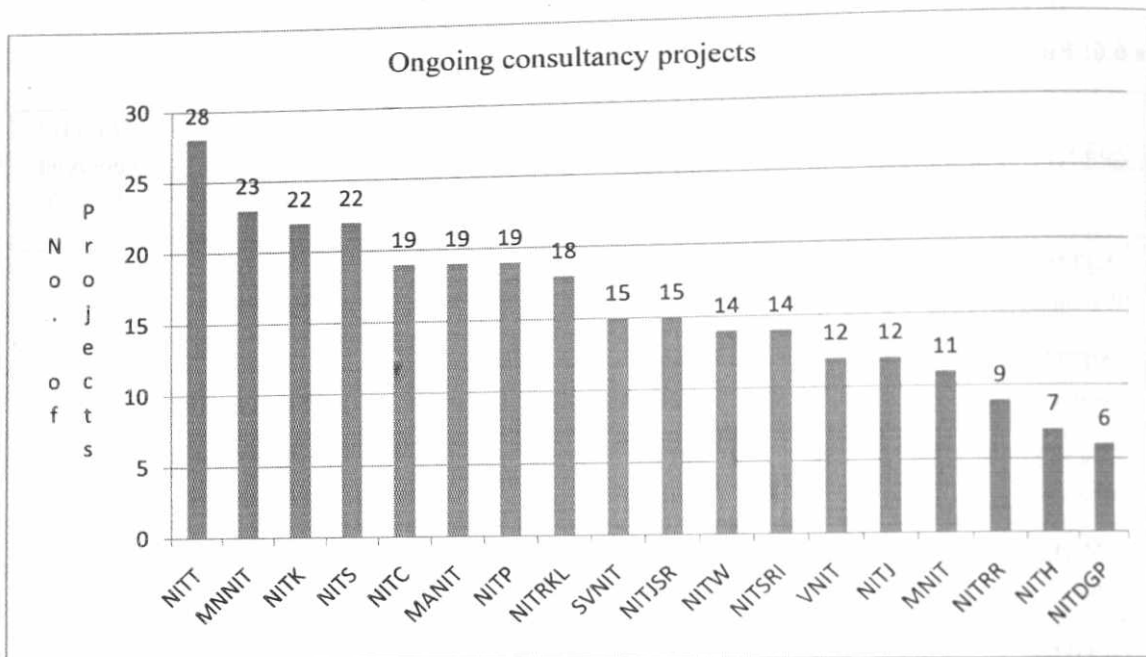


Fig. 6.3: Ongoing Consultancy projects in NITs as on 2013

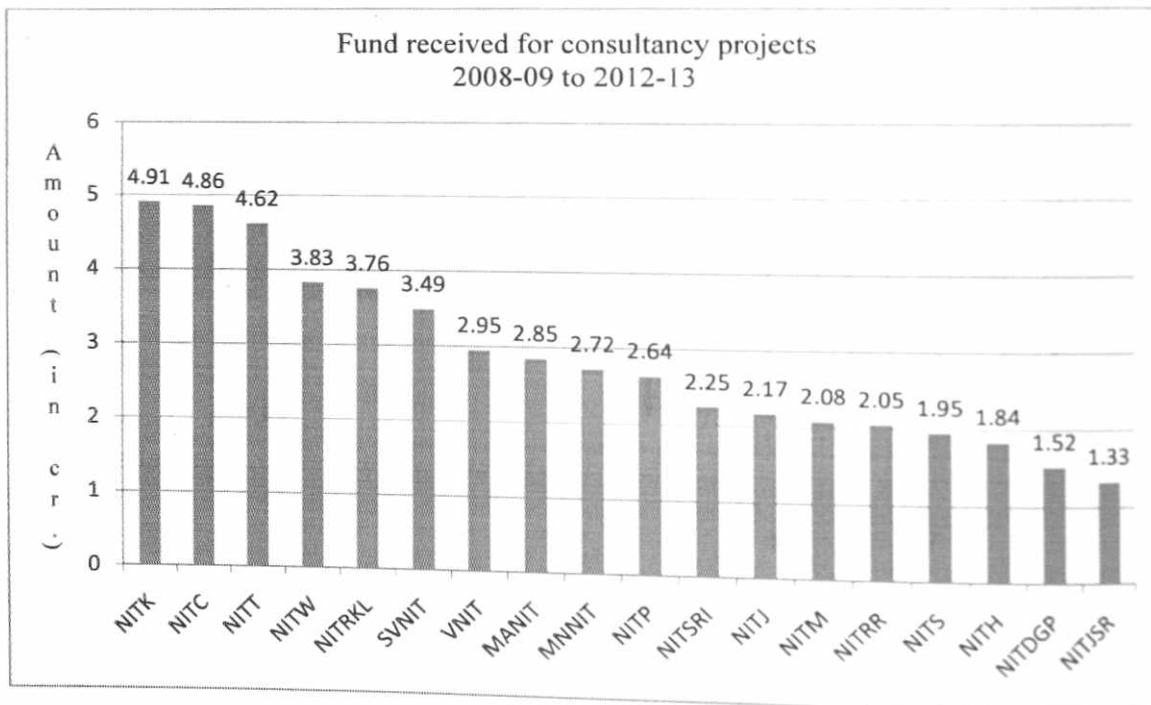


Fig. 6.4: Fund received by NITs for the consultancy work (in Crore)

Observations:

**Table 6.7: Maximum & minimum number of ongoing consultancy projects in NITs**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITT (28), MNNIT (23), NITS (22)	NITRR (9), NITH (7), NITDGP (6)
New NITs	NIL	

**Table 6.8: Maximum & minimum fund received by NITs for consultancy projects (in Crore)**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	MNNIT (5.72), NITK (4.91), NITC (4.86)	NITH (1.84), NITDGP (1.52), NITJSR (1.33)
New NITs	NIL	

### 6.3 Publications and h-index details (from Scopus Database)

**Table 6.9: Total Research Publications by NITs during 2008-09 to 2012-13**

S. No	Old NIT	Research Publications	S. No	Old NIT	Research Publications	S. No	New NIT	Research Publications
1	NITW (Warangal)	1028	11	NITSRI (Srinagar)	288	19	NITMZ (Mizoram)	79
2	NITK (Surathkal)	1495	12	NITC (Calicut)	1113	20	NITM (Meghalaya)	275
3	MNNIT (Allahabad)	1823	13	NITT (Trichy)	2396	21	NITPY (Puducherry)	121
4	SVNIT (Surat)	1870	14	NITRR (Raipur)	301	22	NITUK (Uttarakhand)	110
5	NITRKL (Rourkela)	2459	15	VNIT (Nagpur)	1236	23	NITN (Nagaland)	74
6	NITDGP (Durgapur)	1704	16	NITJ (Jalandhar)	783	24	NITD (Delhi)	109
7	MNIT (Jaipur)	1333	17	NITJSR (Jamshedpur)	434	25	NITMN (Manipur)	147
8	NITH (Hamirpur)	921	18	NITP (Patna)	259	26	NITG (Goa)	142
9	MANIT (Bhopal)	1227				27	NITAP (Arunachal Pradesh)	215
10	NITS (Silchar)	1050				28	NITSKM (Sikkim)	245

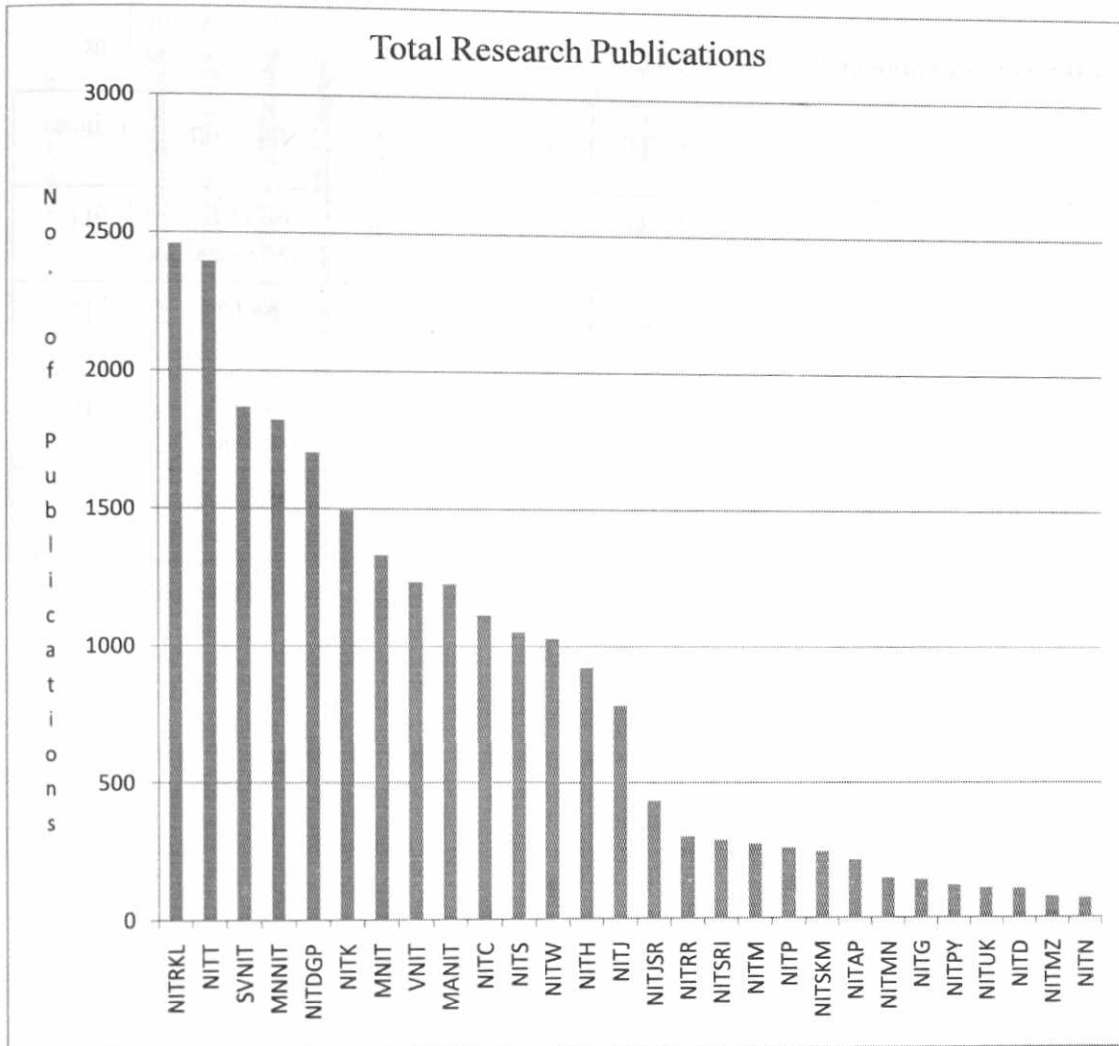
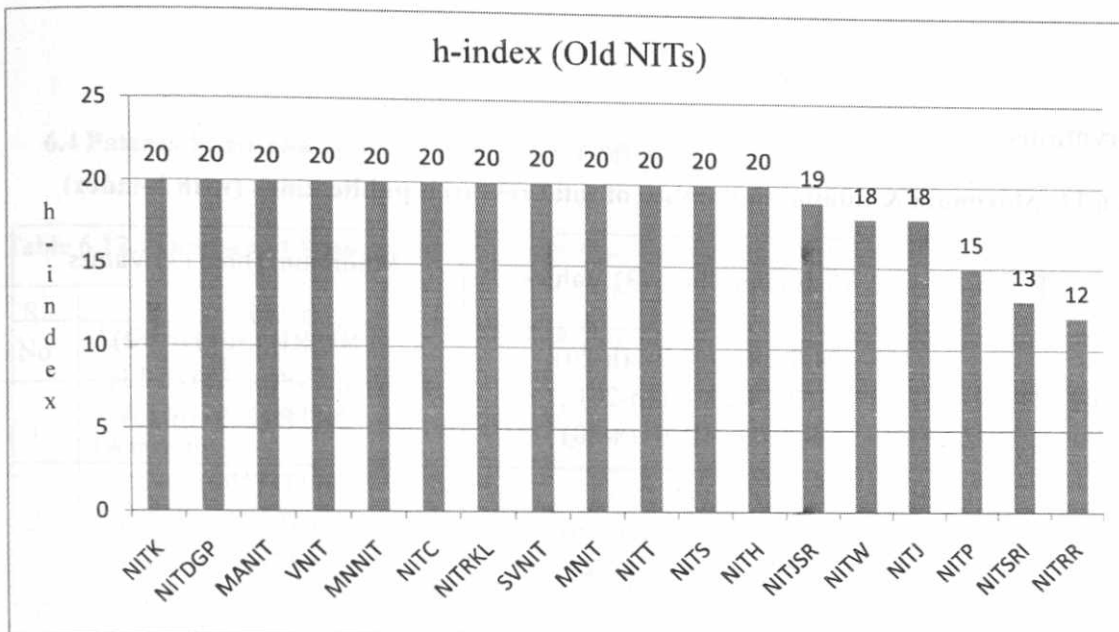


Fig. 6.5: Total Research Publications by NITs during 2008-09 to 2012-13

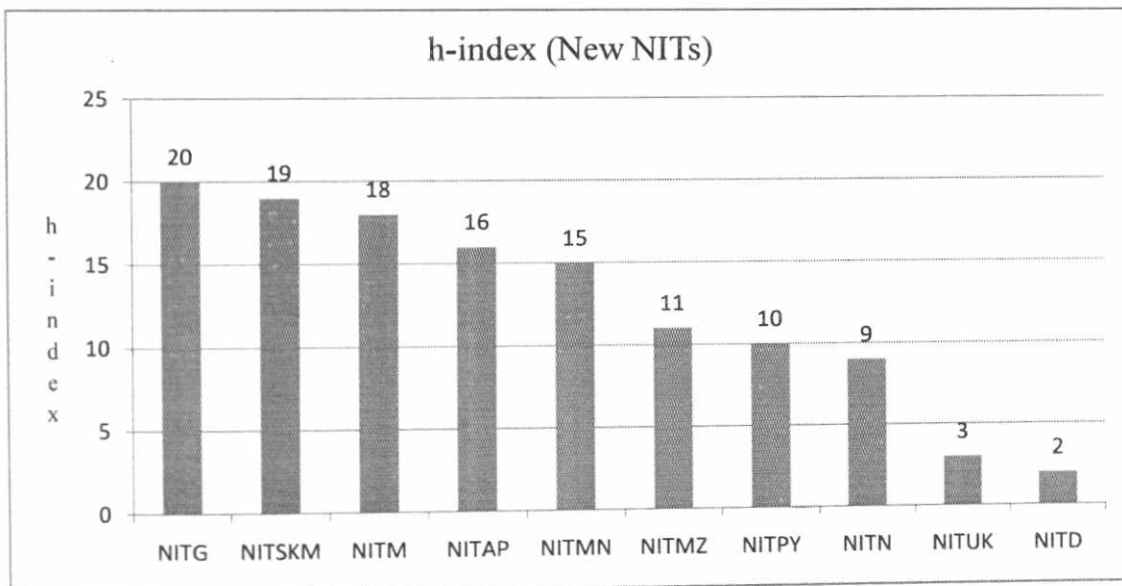
**Table 6.10: h-index value of NITs as on 2013**

S. No	Old NIT	h-index	S. No	Old NIT	h-index	S. No	New NIT	h-index
1	NITW (Warangal)	18	11	NITSRI (Srinagar)	13	19	NITMZ (Mizoram)	11
2	NITK (Surathkal)	20	12	NITC (Calicut)	20	20	NITM (Meghalaya)	18
3	MNNIT (Allahabad)	20	13	NITT (Trichy)	20	21	NITPY (Puducherry)	10
4	SVNIT (Surat)	20	14	NITRR (Raipur)	12	22	NITUK (Uttarakhand)	3
5	NITRKL (Rourkela)	20	15	VNIT (Nagpur)	20	23	NITN (Nagaland)	9
6	NITDGP (Durgapur)	20	16	NITJ (Jalandhar)	18	24	NITD (Delhi)	2
7	MNIT (Jaipur)	20	17	NITJSR (Jamshedpur)	19	25	NITMN (Manipur)	15
8	NITH (Hamirpur)	20	18	NITP (Patna)	15	26	NITG (Goa)	20
9	MANIT (Bhopal)	20				27	NITAP (Arunachal Pradesh)	16
10	NITS (Silchar)	20				28	NITSKM (Sikkim)	19





**Fig. 6.6: h-index value of old NITs as on 2013**



**Fig. 6.7: h-index value of new NITs as on 2013**

Observations

**Table 6.11: Maximum & minimum number of total research publications (with h-index)**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRKL (2459) (h-20), NITT (2396) (h-20) , SVNIT (1870) (h-20)	NITRR (301) (h-12), NITSRI (288) (h-13), NITP (259) (h-15)
New NITs	NITM (275) (h-18), NITSKM (245) (h-19), NITAP (215) (h-16)	NITD (109) (h-2), NITMZ (79) (h-11), NITN (74) (h-9)

**Note:** The h-index is an author-level metric that attempts to measure both the productivity and citation impact of the publications of a scientist or scholar. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications.

**6.4 Patents Filed and Granted to NITs during 2008-09 to 2012-13:**

**Table 6.12: Number of Patents filed by NITs during 2008-09 to 2012-13**

S. No	Old NIT	Patent Filed	S. No	Old NIT	Patent Filed	S. No	New NIT	Patent Filed
1	NITW (Warangal)	7	11	NITSRI (Srinagar)	6	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	11	12	NITC (Calicut)	8	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	2	13	NITT (Trichy)	9	21	NITPY (Puducherry)	
4	SVNIT (Surat)	18	14	NITRR (Raipur)	12	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	16	15	VNIT (Nagpur)	18	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	12	16	NITJ (Jalandhar)	0	24	NITD (Delhi)	
7	MNIT (Jaipur)	3	17	NITJSR (Jamshedpur)	6	25	NITMN (Manipur)	
8	NITH (Hamirpur)	0	18	NITP (Patna)	0	26	NITG (Goa)	
9	MANIT (Jaipur)	7				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	0				28	NITSKM (Sikkim)	

**Table 6.13: Number of Patents granted to NITs during 2008-09 to 2012-13**

S. No	Old NIT	Patent Granted	S. No	Old NIT	Patent Granted	S. No	New NIT	Patent Granted
1	NITW (Warangal)	5	11	NITSRI (Srinagar)	4	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	2	12	NITC (Calicut)	4	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	2	13	NITT (Trichy)	6	21	NITPY (Puducherry)	
4	SVNIT (Surat)	15	14	NITRR (Raipur)	4	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	12	15	VNIT (Nagpur)	5	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	4	16	NITJ (Jalandhar)	0	24	NITD (Delhi)	
7	MNIT (Jaipur)	2	17	NITJSR (Jamshedpur)	2	25	NITMN (Manipur)	
8	NITH (Hamirpur)	0	18	NITP (Patna)	0	26	NITG (Goa)	
9	MANIT (Bhopal)	5				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	0				28	NITSKM (Sikkim)	

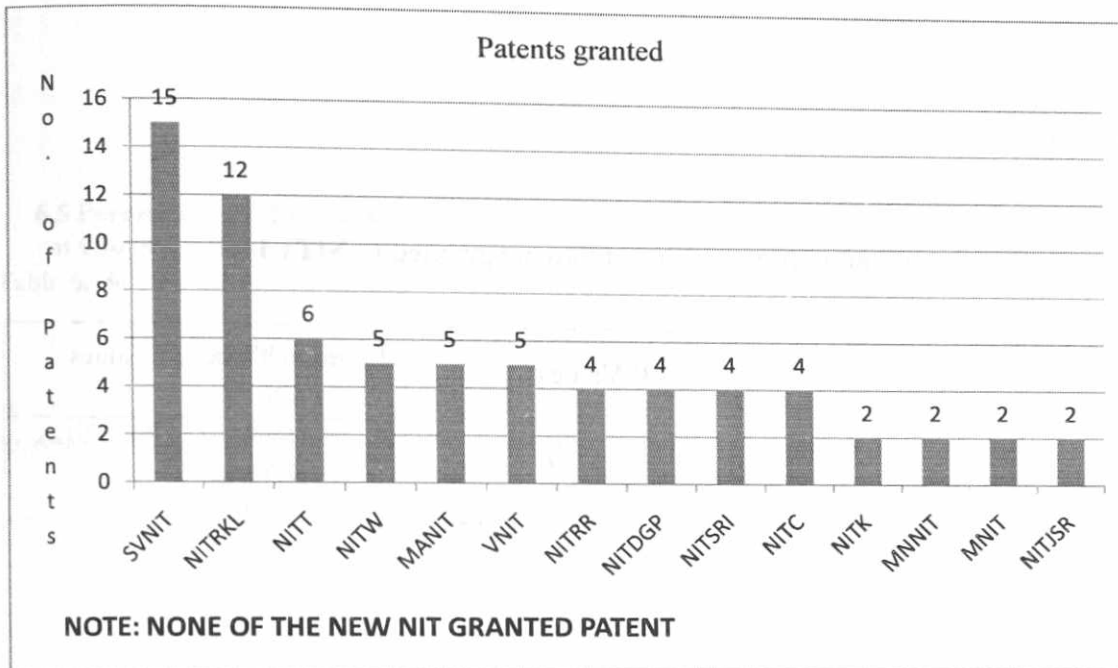


Fig. 6.8: Number of Patents granted to NITs during 2008-09 to 2012-13

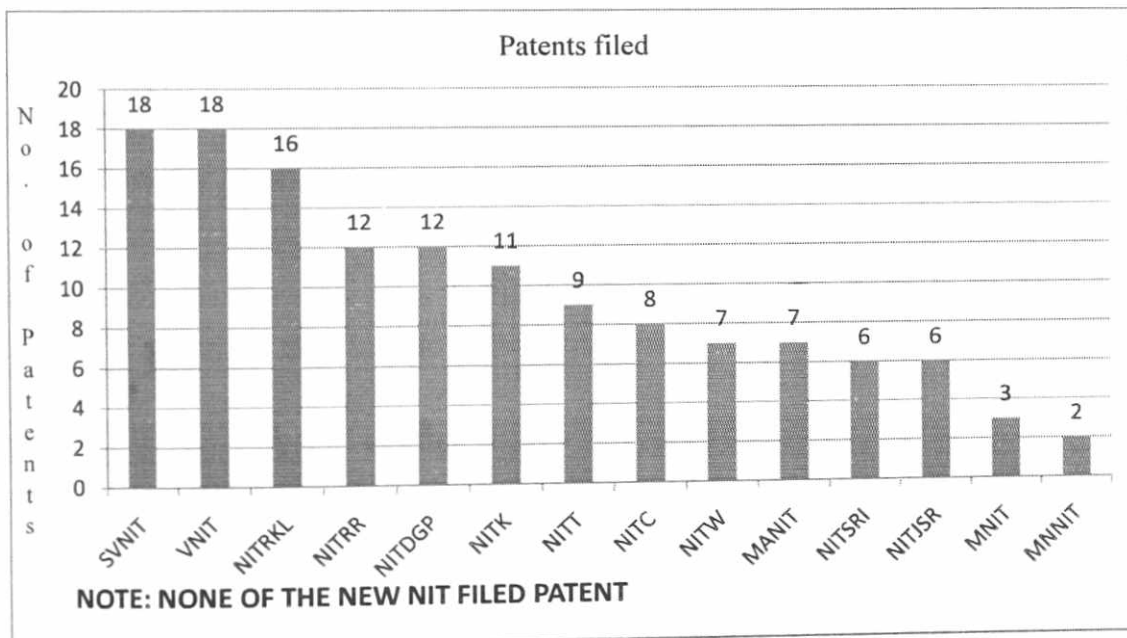


Fig. 6.9: Number of Patents filed by NITs during 2008-09 to 2012-13

Observations

**Table 6.14: Maximum & minimum number of Patents granted to NITs during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	SVNIT (15), NITRKL (12), NITRR (7)	NITK (2), MNNIT (2), MNIT (2), NITJSR (2)
New NITs	NIL	

**Table 6.15: Maximum & Minimum number of Patents filed by NITs during 2008-09 to 2012-13**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRR (19), SVNIT (18), VNIT (18)	NITSRI (6), NITJSR (6), MNIT (3), MNNIT (2)
New NITs	NIL	

### 6.5 Percentage of time allocated for research work by faculty of NITs:

**Table 6.16: Percentage of time devoted to R&D activities by faculty members of NITs**

S. No	Old NIT	Percentage of time for research activities (in %)	S. No	Old NIT	Percentage of time for research activities (%)	S. No	New NIT	Percentage of time for research activities (%)
1	NITW (Warangal)	25	11	NITJ (Jalandhar)	25	19	NITG (Goa)	30
2	NITK (Surathkal)	30	12	NITJSR (Jamshedpur)	25	20	NITAP (Arunachal Pradesh)	35
3	MNNIT (Allahabad)	25	13	NITH (Hamirpur)	35	21	NITUK (Uttarakhand)	20
4	SVNIT (Surat)	15	14	MANIT (Bhopal)	35	22	NITM (Meghalaya)	30
5	NITRKL (Rourkela)	35	15	NITSRI (Srinagar)	30	23	NITPY (Puducherry)	25
6	NITDGP (Durgapur)	15	16	NITC (Calicut)	25	24	NITMZ (Mizoram)	25
7	MNIT (Jaipur)	15	17	NITT (Trichy)	30	25	NITN (Nagaland)	35
8	NITRR (Raipur)	25	18	NITP (Patna)	25	26	NITD (Delhi)	25
9	VNIT (Nagpur)	30				27	NITMN (Manipur)	30
10	NITS (Silchar)	25				28	NITSKM (Sikkim)	30

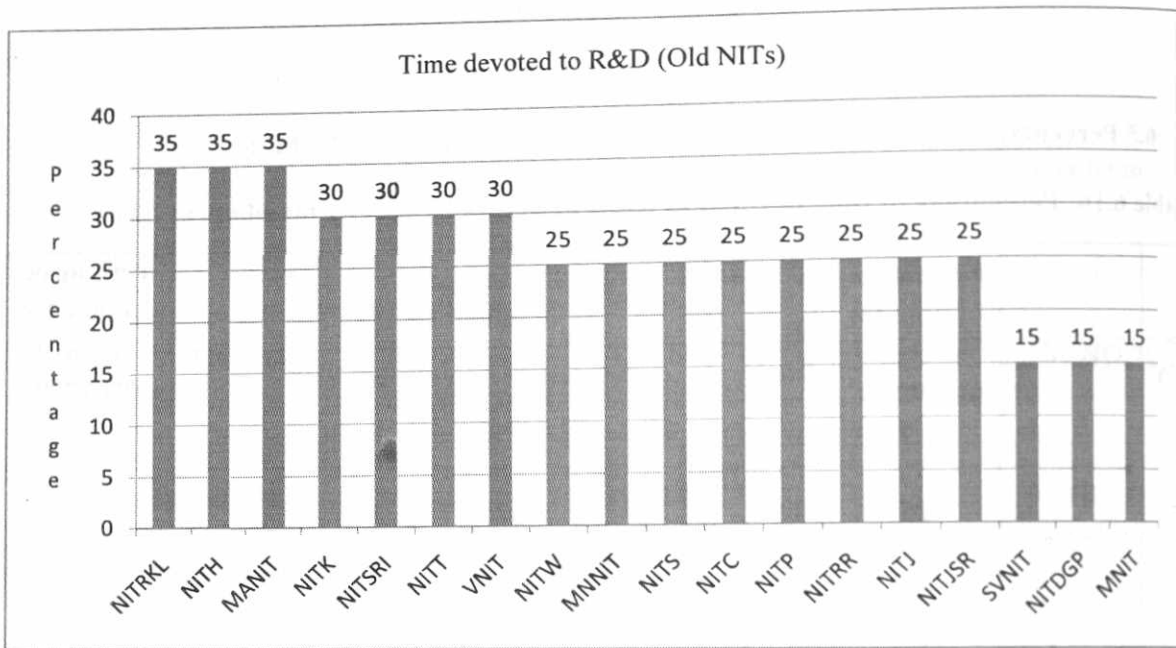


Fig. 6.10: Percentage of time devoted to R&D activities by faculty members of old NITs

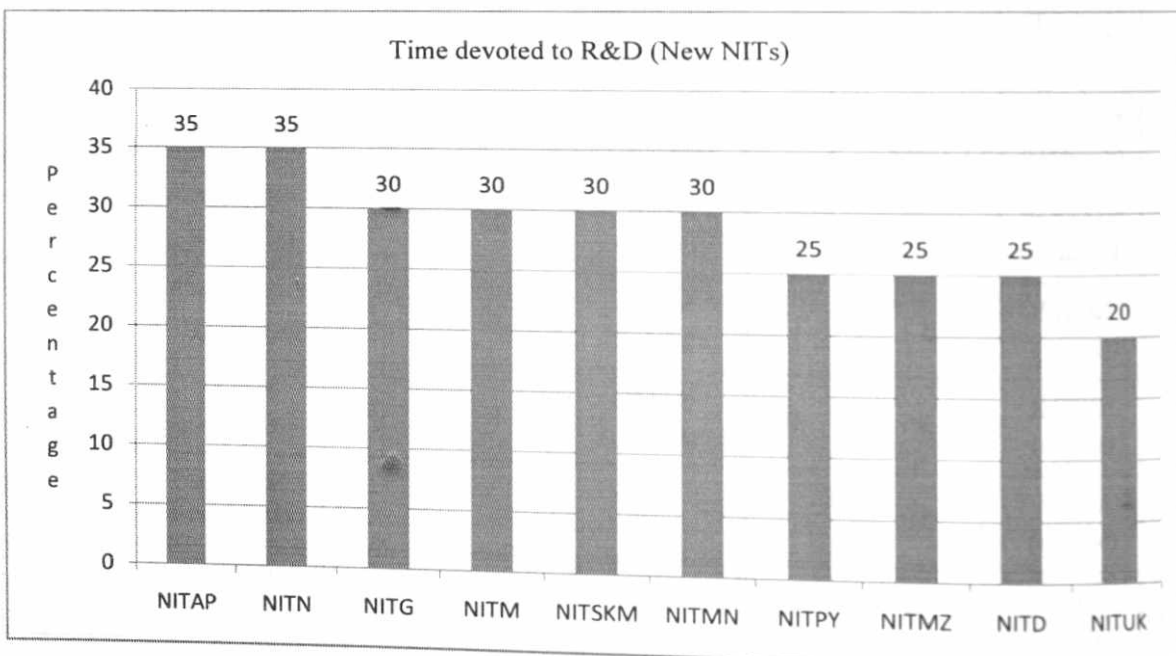


Fig. 6.11: Percentage of time devoted to R&D activities by faculty members of new NITs



Observations:

**Table 6.17: Maximum & minimum percentage of time devoted to R&D activities**

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRKL (35%), NITH (35%), MANIT (35%)	SVNIT (15%), NITDGP (15%), MNIT (15%)
New NITs	NITAP (35%), NITN (35%), NITG (30%), NITM (30%), NITSKM (30%), NITMN (30%)	NITPY (25%), NITMZ (25%), NITD (25%), NITUK (20%)

### 6.6 Centre of Excellence in NITs:

**Table 6.18: Number of centre of excellence in NITs as on 2013**

S. No	Old NIT	Centre of Excellence	S. No	Old NIT	Centre of Excellence	S. No	New NIT	Centre of Excellence
1	NITW (Warangal)	5	11	NITSRI (Srinagar)	1	19	NITMZ (Mizoram)	NIL
2	NITK (Surathkal)	6	12	NITC (Calicut)	3	20	NITM (Meghalaya)	
3	MNNIT (Allahabad)	2	13	NITT (Trichy)	2	21	NITPY (Puducherry)	
4	SVNIT (Surat)	1	14	NITRR (Raipur)	1	22	NITUK (Uttarakhand)	
5	NITRKL (Rourkela)	9	15	VNIT (Nagpur)	4	23	NITN (Nagaland)	
6	NITDGP (Durgapur)	1	16	NITJ (Jalandhar)	0	24	NITD (Delhi)	
7	MNIT (Jaipur)	3	17	NITJSR (Jamshedpur)	2	25	NITMN (Manipur)	
8	NITH (Hamirpur)	2	18	NITP (Patna)	0	26	NITG (Goa)	
9	MANIT (Bhopal)	3				27	NITAP (Arunachal Pradesh)	
10	NITS (Silchar)	0				28	NITSKM (Sikkim)	

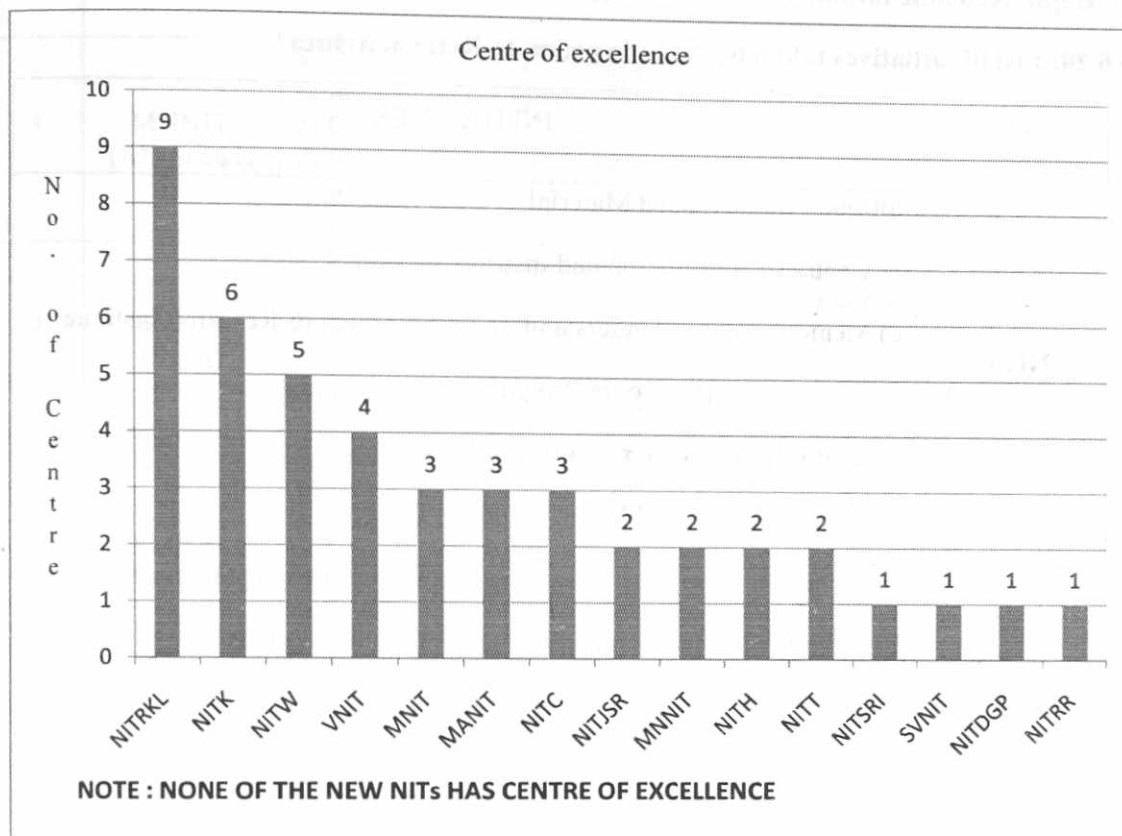


Fig. 6.12: Number of centre of excellence in NITs as on 2013

### Observations

Table 6.19: Maximum & minimum number of centre of excellence in NITs as on 2013

NIT	Maximum Three (3) Values	Minimum Three (3) Values
Old NITs	NITRKL (9), NITK (6), NITW (5)	SVNIT (1), NITDGP (1), NITRR (1), NITSRI (1)
New NITs	NIL	

**6.7 Major academic initiatives for achieving R&D excellence:**

**Table 6.20: List of initiatives taken by NITs to promote R&D activities**

S. No	NIT	INITIATIVES
1	NITW (Warangal)	<ul style="list-style-type: none"> <li>a) Centre of Advanced Material</li> <li>b) Centre of Automation and instrumentation</li> <li>c) Memorandum of Understanding with Foreign &amp; Research Institutes</li> <li>d) Interactive Class Room Programs</li> <li>e) Centre for Urban Transport Studies</li> <li>f) Centre for Sustainable and Alternate Energies</li> </ul>
2	NITK (Surathkal)	<ul style="list-style-type: none"> <li>a) Consultancy service to industry and government agencies</li> <li>b) Technical support and advice to local bodies and district administration</li> <li>c) Services in testing, calibration and certification</li> <li>d) Innovation and technology transfer to society</li> <li>e) CCE facilities regular short term training, programs for organized &amp; unorganized sector of society</li> <li>f) Technology support for the entrepreneurs through STEP</li> <li>g) Sharing the facilities and expertise with other institution</li> <li>h) Industry support for establishing and upgrading of laboratories</li> <li>i) Joint R&amp;D project with industry with a view to effective technology transfer</li> <li>j) Establishment of industry sponsored professional chairs</li> <li>k) Creating opportunities for training faculty, staff, and students by industry</li> <li>l) Providing for content/skill up gradation to industry personnel by the institute</li> </ul>

		m) Delivery of academic, courses by industry experts.
3	MNNIT (Allahabad)	a) Increasing student faculty ratio b) Increasing external funding in R&D activities c) Establishing research lab and facilities d) Increase in participation and collaboration with industry and foreign institutes e) Purchasing High end equipment
4	SVNIT (Surat)	a) Focus on more consultancy work b) Getting more funds by industries for research work c) Increase industry institute interaction d) Increase number of laboratories with modern equipments
5	NITRKL (Rourkela)	a) Technology Innovation and Industry Relations Centre b) NIT Rourkela initiatives for "Technical Excellence" among NIT staff c) A build - your-own - prototype workshop for the young Innovator d) NIT students work in teams to design and create software solutions for real world commercial problems e) NIT Students and established industrialists share ideas, techniques, successes and challenges to set up new business ventures.
6	NITDGP (Durgapur)	a) To establish centres for excellence in various areas of research. b) To improve the research facilities in the institutes such as developing centralresearch facilities, central instrumentation. c) Identify and develop interdisciplinary research areas. d) Identify projects with real time application. e) Develop Incubation centres
7	MNIT (Jaipur)	a) Make Infrastructure facilities better to work b) More research space is provided to faculty and students c) Collaboration and MoUs signed with reputed institutes and industries d) Focus on consultancy to work in close with industries
8	NITH (Hamirpur)	a) Organized technical knowledge enhancement workshops/courses for thefaculty within the institute and also to depute them within and outside thecountry. b) Creating world class laboratory facilities in the institute for carrying

		<p>outresearch in different areas of engineering and sciences.</p> <p>c) Deputing faculty members to attend and present their research papers in the International Conferences/Workshops/Seminars etc. within the country and abroad to have an exposure to the latest developments taking place in their areas of research and also providing an opportunity to interact with the experts.</p> <p>d) Inviting experts from the reputed industries to deliver expert talks for the faculty and the students of the institute and also providing industrial exposure to the faculty by deputing them for a considerable period.</p>
9	MANIT (Bhopal)	<p>a) UG Students sent for internship in industries like Microsoft, IBM, HCL etc</p> <p>b) Collaborative research through PG Projects</p> <p>c) Interaction with MP Govt. department as technical expert</p> <p>d) MOU with M/s Ericson India Pvt. Ltd. For imparting training</p> <p>e) Industrial visit and training programs organized for students</p> <p>f) Collaboration with industries and other institutes to promote research</p> <p>g) Focus on consultancy activities to generate income as well as to work with real time problems.</p>
10	NITSRI (Srinagar)	<p>a) Acquisition of additional campus</p> <p>b) Memorandum of Understanding (MoU) with other Institutions</p> <p>c) Conduct of INSPIRE Programmes</p>
11	NITT (Trichy)	<p>a) Focus on Society based research</p> <p>b) More number of Courses to be introduced</p> <p>c) More number of symposia and conferences are planned to be offered</p> <p>d) Increase Industry support</p> <p>e) Developing state of art technology</p>
12	NITC (Calicut)	<p>a) Syllabus updation on regular basis to keep students up to date with present scenario.</p> <p>b) Focus on Innovation and Technology Transfer schemes</p> <p>c) Strengthen Institute-Industry relationship</p> <p>d) More research activities to be carried out in campus.</p>
13	NITP (Patna)	<p>a) Recruitment of qualified and experienced faculty.</p> <p>b) Implementing new syllabus in all disciplines of undergraduate and post graduate courses.</p> <p>c) Offering more doctoral research programs</p>

		<p>d) To establish collaborations with the British Council for imparting lessons of English language.</p> <p>e) Develop a centre for water resources unit of the institute as a centre of excellence.</p> <p>f) Establishing better industry and institution interaction.</p>
14	NITRR (Raipur)	<p>a) Making strong alumni network for better consultancy projects</p> <p>b) Hiring qualified and experienced Human resource</p> <p>c) Efforts will be made to open QIP center at NIT, Raipur for higher studies</p> <p>d) Supporting technical and administrative staff will be periodically sponsored for continual training in new technology and modern working methods</p> <p>e) New programs has been proposed for upcoming academic sessions</p>
15	VNIT (Nagpur)	<p>a) Centre for innovation and entrepreneur</p> <p>b) Making strong institute industry interaction</p> <p>c) Arranging interactive sections with other premier institutes</p> <p>d) Various seminars to host to motivate students towards research</p>
16	NITJ (Jalandhar)	<p>a) Interdisciplinary Research and Development centre is being set up for which space and finance is has been sanctioned.</p> <p>b) Institute is planning to tie up with other institutes and renowned industries under TIFAC for new innovative ideas and technology transfer</p>
17	NITJSR (Jamshedpur)	<p>a) Connecting alumni network for better institute industry interaction</p> <p>b) Modernization of labs, enhancement of knowledge learning resources in the library</p> <p>c) "Centre for Innovation, Incubation and Entrepreneurship" is initiated to promote the innovations and creativity of students of the Institute</p> <p>d) Detailed project report has been prepared for the development of the infrastructure for next 10 years (2012-22)</p>
18	NITS (Silchar)	<p>a) Maintained strong industry institute collaboration</p> <p>b) Engage in research work beneficial to Industry as well as Society and disseminate the research findings</p> <p>c) Building national capabilities in developing technologies, opening up new vistas in Education and Research</p> <p>d) Inviting people from Industry to deliver lectures</p>
19	NITG (Goa)	<p>a) PhD Program will be introduced from the year 2014-15</p> <p>b) NIT Goa also initiated PhD program in Electronics and Communication department under Visvesvaraya PhD Scheme for Electronics and IT in association with Media Lab Asia.</p>
20	NITAP (Arunachal Pradesh)	<p>a) 2nd National Conference on "Futuristic Technical Education" (FTE-2014)" held on November 7 -8, 2014 at NIT Arunachal Pradesh</p> <p>b) Celebration of National Technology Day on 11<sup>th</sup> may every year</p> <p>c) Bi-Annual Journal Publication namely "International Journal On</p>

		Current Science and Technology (ISSN 2320 3656)” d) 3 Scientific Meeting will be held in the month of November, 2014 under TWAS/ICTP Italy
21	NITM (Meghalaya)	a) Engage in creation of knowledge and development of technologies through effective research programs b) Introduction of new academic programs c) Focus on social research
22	NITPY (Puducherry)	a) To create the infrastructure and academic environment on par with best benchmarks. b) To offer undergraduate, postgraduate and doctoral programmes in the technical fields of national importance. c) To collaborate for research and consultancy works with leading national and international laboratories, institutes, and industries. d) To train young minds in intellectual and ethical strengths for developing their capacity in the areas of science, engineering, and technology. e) To relentlessly pursue professional excellence with ethics. f) To implement continuously improving models of comprehensive education.
23	NITUK (Uttarakhand)	a) Introduction of New programs b) Procurement of equipments c) Getting research projects
24	NITSKM (Sikkim)	a) Getting research projects from different organizations b) MoUs signed with different premier institutes c) Research programs will be introduced and new labs are planned to set up
25	NITMZ (Mizoram)	a) Laboratories with the latest equipments and installed with best & latest softwares b) Promoting research in both fundamental and applied knowledge for the betterment of the society c) New program introduced
26	NITN (Nagaland)	a) Focus is on research programs b) Tie up with industries to work on real time problems c) Expansion plan by introduction of various programs



27	NITD (Delhi)	<ul style="list-style-type: none"> <li>a) New research programs to be introduced</li> <li>b) Making good laboratories to carried out research activities</li> <li>c) MoUs with various Indian and Foreign Universities</li> <li>d) Recruiting qualified faculty</li> </ul>
28	NITMN (Manipur)	<ul style="list-style-type: none"> <li>a) Encouraging faculty and students to conduct research of international standard</li> <li>b) Setting up international standard infrastructure for research activities</li> <li>c) Setting up Laboratories with latest equipment and other facilities</li> <li>d) Introducing new research programs</li> </ul>

### 6.8 Observation and conclusion

During the period of study, the first four institutes which completed more than 90 research projects are NIIT (135), NITW (104), NITK (96), and NITRKL (92). The lowest (13) numbers of research projects have been completed by NITH. No new NITs have completed any research projects yet.

In terms of maximum amount of fund received during period of study, the top NITs are NITRKL (11.54 Cr.), NITT (10.53 Cr.), NITW (10.25 Cr.). The least amount of fund received under this head is by NITP (1.30 Cr.). The institutes such as NITT, MNNIT, NITK, and NITS are having 28, 23, 22, and 22 ongoing the highest consultancy projects respectively as on 2013. In terms of consultancy amount, the top ranking institutes are NITK (4.91 Cr.), NITC (4.86 Cr.), and NITT (4.62 Cr.). The minimum earning through consultancy work is by NITJSR (1.33 Cr.). In terms of research publications the best two institutions are NITRKL (2459) and NITT (2396) during the period of study. The next three institutions are SVNIT (1870), MNNIT (1823), and NITDGP (1704) among the olds NITs. The lowest number (259) of publications has been made by faculty members of NITP. From among the new NITs, the highest (275) and the lowest (74) number of publications are by NITM and NITN respectively. It is observed that the h-index of 20 has been achieved by 12 old and 1 new NITs as is evident from Table 6.10.

During the period of study four best institutions in terms of number of patents filed and granted are SVNIT, NITRKL, VNIT, and NITT. The three old NITs which provides more time (about 35%) to faculty of their total working for carrying out R&D activities are NITRKL, NITH and MANIT. It is observed that only the faculty members of NITRKL take advantage of this time and their R&D performance is much better than many other NITs. The least time is devoted by faculty members of SVNIT (15%), NITDGP (15%) and MNIT (15%) towards R&D activities. From among the new NITs, NITAP and NITN provides the highest (35% of total time) time to faculty members for pursuing R&D activities which is the least for NITUK (20%).

In terms of number of centre of excellence, the top three institutions among the NITs are NITRKL (9), NITK (6), and NITW (5). The institutes which are having the least (1) number of centre of excellence are NITSRI, SVNIT, NITDGP and NITRR.

For improvement in R&D activities the NITs have taken various initiatives as listed in Table 6.20. Analyzing this Table it is observed that most of the old NITs have taken many innovative initiatives to promote and strengthen R&D in their own institutions. It is further observed that NITW, NITK, NITRKL, NITT, MANIT, NITP, NITH, and NITRR have provided many initiatives to provide the R&D activities. This advantage has been taken up by the faculty members of NITK, NITRKL, and NITT which is obvious from their R&D records.

## Chapter – 7

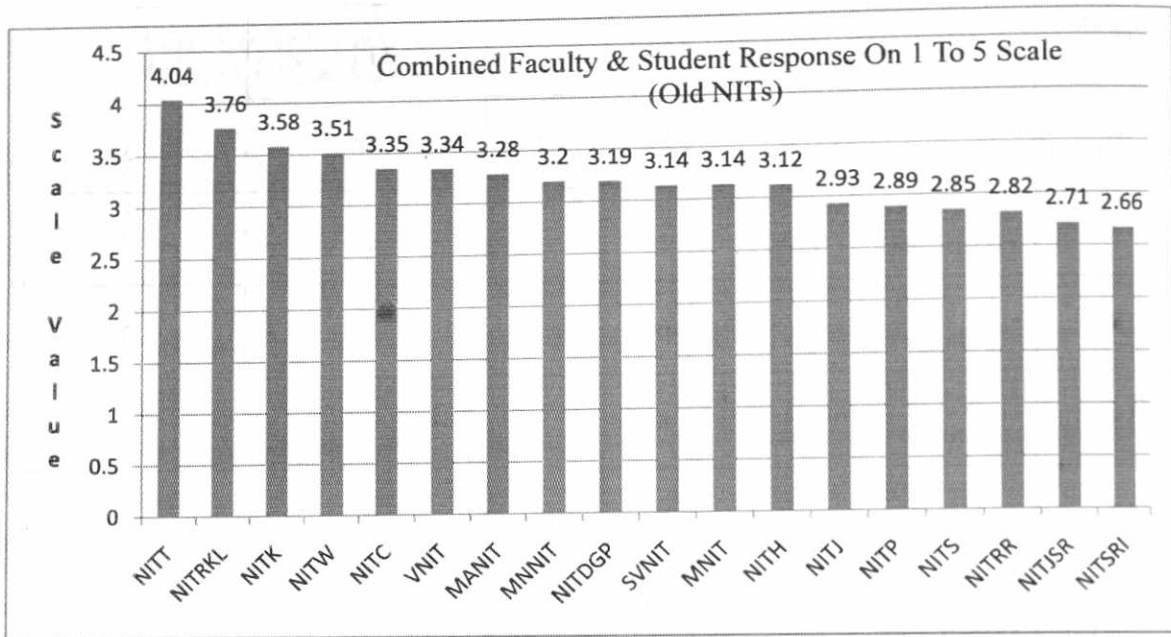
### **Analysis of Responses obtained from Faculty members, Students and Stakeholders**

This chapter makes an investigation on the responses collected by the students (samples taken from senior students from all programs) and faculty members (samples taken from all branches and who has served at least for 5 years) on various important factors such as Departmental infrastructural, Laboratory facilities for research, Creation of research facilities and ambience, Institute library, Central instrument / workshop facilities, Industry institute interaction, Industry visits, Consultancy work, Seminars / Workshops / Conferences, Students' participation in research activities, Contribution to industry, Contribution to society, Research guidance (**Annexure – 5**) and Institutional facilities, Teaching and learning, Departmental facility, Department infrastructure, Course curriculum, Laboratory, Library and computer networking, Research initiatives for students, Consultancy work, and Recognition of department (**Annexure – 6**). A mean score analysis has been carried out using the above cited parameters to evaluate the rank of each NIT. Based on these ranks; the 28 NITs are grouped into four clusters. The grouping is based on placing the seven consecutive ranks in one group. The grouping information is shown in Table 7.1. The NITs in each group show similar performance in these factors.

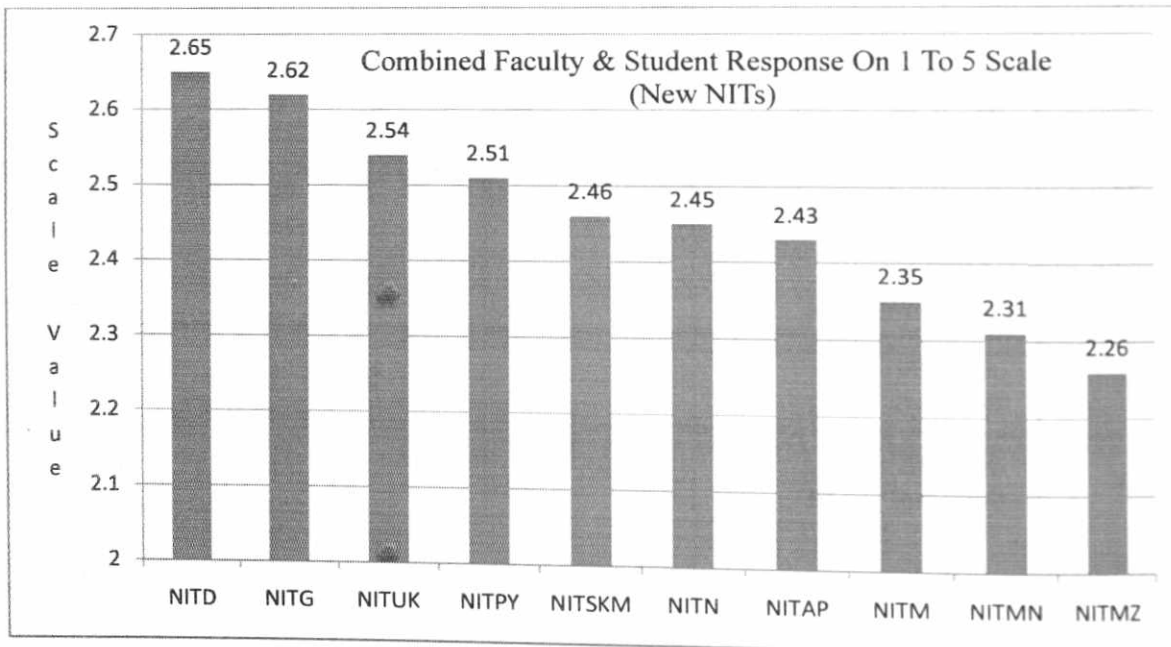
**Table 7.1: Evaluation of Overall performance from the responses marked by Students and Faculty of NITs on scale of 1 to 5**

S. No	NIT	Combined responses of faculty & student	Rank	Group
1	NITT (Trichy)	4.04	1	1
2	NITRKL (Rourkela)	3.76	2	1
3	NITK (Surathkal)	3.58	3	1
4	NITW (Warangal)	3.51	4	1
5	NITC (Calicut)	3.35	5	1
6	VNIT (Nagpur)	3.34	6	1
7	MANIT (Bhopal)	3.28	7	1
8	MNNIT (Allahabad)	3.20	8	2
9	NITDGP (Durgapur)	3.19	9	2
10	SVNIT (Surat)	3.14	10	2
11	MNIT (Jaipur)	3.14	11	2
12	NITH (Hamirpur)	3.12	12	2
13	NITJ (Jalandhar)	2.93	13	2
14	NITP (Patna)	2.89	14	2

15	NITS (Silchar)	2.85	15	3
16	NITRR (Raipur)	2.82	16	3
17	NITJSR (Jamshedpur)	2.71	17	3
18	NITSRI (Srinagar)	2.66	18	3
19	NITD (Delhi)	2.65	19	3
20	NITG (Goa)	2.62	20	3
21	NITUK (Uttarakhand)	2.54	21	3
22	NITPY (Puducherry)	2.51	22	4
23	NITSKM (Sikkim)	2.46	23	4
24	NITN (Nagaland)	2.45	24	4
25	NITAP (Arunachal Pradesh)	2.43	25	4
26	NITM (Meghalaya)	2.35	26	4
27	NITMN (Manipur)	2.31	27	4
28	NITMZ (Mizoram)	2.26	28	4



**Fig. 7.1: Evaluation of Overall performance from the responses marked by Students and faculty members of old NITs on a scale of 1 to 5**



**Fig.7.2: Evaluation of Overall performance from the responses marked by Students and faculty members of new NITs on a scale of 1 to 5**

### Observation and conclusion

A study has been carried out in this chapter using the scores on various academic related parameters from faculty members and students of each NIT and based on the average score on each factor each NIT has been assigned a rank taking 7 consecutive ranks together. The NITs have been grouped which reveals the potentiality of each NIT according to their existing students and faculty members. The common observation made by the stakeholders of all NITs lists the following as common suggestions for improvements.

**Table 7.2: Suggestions by stakeholders for improvement of NITs**

S.No.	Suggestions
1	Procedure for procurement of equipment and software should be simplified so that procurement can be faster.
2	Some flexibility should be provided in academic activities to the PI of projects for effective completion of projects.
3	Fellowship to research scholars should be enhanced and state of art facilities should be provided (In the mean time the fellowship amount has been enhanced).
4	Provision should be made to research scholars and senior students to use high end equipment and sophisticated software available in other premier academic institutions of the country to enable them to carry out better quality research.
5	To solve industry related problems, more opportunity should be provided to the students to visit industries in India and abroad.
6	More flexibility should be given to faculty members in carrying out effective research and consultancy work.

## Chapter – 8

### Grouping of NITs based on performance

This chapter makes an investigation on the responses collected through questionnaires on different heads pertaining to research, teaching, and placement activities of students. The data collected from these NITs, 22 important factors are identified and on each factor numerical score is computed using the responses provided by each NIT. This information is listed in Table 8.1 and Annexure – 2. Using data given in Annexure -2, agglomerative hierarchical clustering technique is applied and a complete dendrogram using SPSS statistical package as shown in Fig. 8.1 was obtained. The number of cases of various links having similar consistency factor are considered to be under one cluster. Accordingly the number of clusters is observed to be four. Subsequently the K-means clustering algorithm is employed to group the various NITs into 4 known clusters. The result of the simulation study is shown in Fig. 8.2 and Table 8.2 of the revised report. The analysis has resulted in grouping of NITs into four clusters and the NITs in each cluster show similar performance in these factors.

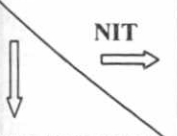


## Cluster Analysis

Table 8.1 presents the score on each of 22 factors and for each NIT. Before carrying out the cluster analysis the data on each factor is normalized using its maximum value. The normalized information on each factor and for each NIT is listed in Annexure -2. This Annexure is used to carry out agglomerative hierarchical and K-Means clustering schemes.

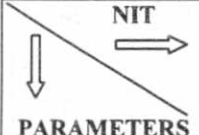
**Table 8.1: Data matrix used for cluster analysis**

For 1 to 9 NITs:

 NIT ↓ →	NITW (1)	NITK (2)	NITT (3)	NITRKL (4)	VNIT (5)	MNNIT (6)	SVNIT (7)	NITC (8)	NITDGP (9)
PARAMETERS									
Avg. Pass Percentage (B.Tech) (1)	93	91	94	92	82	78	79	83	77
Avg. Pass Percentage (M.Tech) (2)	77	75	76	72	69	65	64	68	68
No. of PhDs Awarded (3)	86	112	138	69	35	67	31	87	76
No. of existing PhD scholars (4)	243	398	429	283	327	278	156	382	407
Faculty Strength (5)	205	229	226	235	185	198	147	182	170
PhD Faculty % (6)	83	89	79	89	67	80	69	68	78
Awards & Recognitions (7)	72	87	79	81	34	26	25	29	28
Completed & Ongoing Research Projects (8)	104	96	135	92	70	55	23	66	71
Fund Received (in Cr.) (9)	10.25	9.86	10.53	11.54	6.34	6.46	7.59	5.24	4.52

Ongoing Consultancy work (10)	14	22	28	18	12	23	15	19	6
Fund Received (in Cr.) (11)	3.83	4.91	4.62	3.76	2.95	2.72	3.49	4.86	1.52
Publications (12)	1028	1495	2396	2459	1236	1823	1870	1113	1704
h-index (13)	18	20	20	20	20	20	20	20	20
Patent Granted (14)	5	2	6	12	5	2	15	4	4
Patent Filed (15)	7	11	9	16	18	2	18	8	12
Academic Event Organized (16)	75	67	83	74	30	38	39	49	41
Foreign visits by Faculty (17)	87	103	116	96	62	54	17	47	23
Time % for R&D work (18)	25	30	30	35	30	25	15	25	15
Summer Internship by students (Abroad) (19)	39	52	48	49	9	8	5	11	0
Higher studies (Abroad) (20)	90	85	89	84	42	33	29	41	32
Conferences by Students (Abroad) (21)	76	84	94	80	32	19	17	32	26
Centre of Excellence(22)	5	6	2	9	4	2	1	3	1

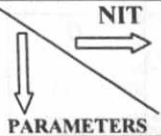
**For 10 to 18 NITs:**

 <b>PARAMETERS</b>	<b>NIT</b> <b>(10)</b>	<b>MANIT</b> <b>(11)</b>	<b>NITH</b> <b>(12)</b>	<b>NITRR</b> <b>(13)</b>	<b>NITSRI</b> <b>(14)</b>	<b>NITJ</b> <b>(15)</b>	<b>NITJSR</b> <b>(16)</b>	<b>NITS</b> <b>(17)</b>	<b>NITP</b> <b>(18)</b>
Avg. Pass Percentage (B.Tech) (1)	78	79	75	73	69	76	75	76	85
Avg. Pass Percentage (M.Tech) (2)	63	65	59	60	50	58	56	62	73

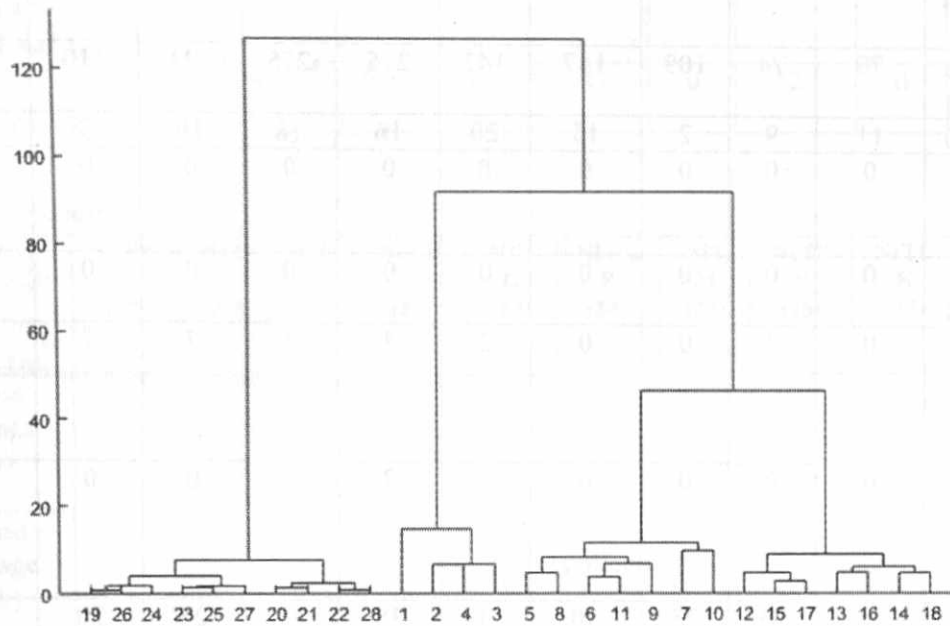
No. of PhDs Awarded (3)	73	103	27	31	11	42	0	23	11
No. of existing PhDs Scholars (4)	297	263	137	155	61	150	22	154	39
Faculty Strength (5)	167	196	105	93	82	108	101	114	94
PhD Faculty % (6)	72	80	74	57	44	70	70	54	57
Awards & Recognitions (7)	29	27	8	10	8	25	20	17	0
Completed & Ongoing Research Projects (8)	16	55	13	16	21	22	19	32	20
Fund Received (in Cr.) (9)	4.71	4.56	3.79	2.13	2.12	3.59	3.22	2.77	1.30
Ongoing Consultancy work (10)	11	19	7	9	14	12	15	22	19
Fund Received (in Cr.) (11)	2.08	2.85	1.84	2.05	2.25	2.17	1.33	1.95	2.64
Publications (12)	1333	1227	921	301	288	783	434	1050	259
h-index (13)	20	20	20	12	13	18	19	20	15
Patent Granted (14)	2	5	0	4	4	0	2	0	0
Patent Filed (15)	3	7	0	12	6	0	6	0	0
Academic Event Organized(16)	19	44	20	31	23	26	17	22	15
Foreign visits by Faculty (17)	11	61	86	48	22	34	27	37	31
Time % for R&D work (18)	15	35	35	25	30	25	25	25	25
Summer Internship by students (Abroad) (19)	7	1	0	2	0	3	4	6	6
Higher studies (Abroad) (20)	34	28	18	4	9	6	8	12	36

Conferences by Students (Abroad) (21)	16	15	4	7	1	9	10	13	2
Centre of Excellence(22)	3	3	2	1	1	0	2	0	0

**For 19 to 28 NITs:**

 PARAMETERS	NITM Z (19)	NIT N (20)	NIT D (21)	NITM N (22)	NIT G (23)	NITA P (24)	NIT M (25)	NITP Y (26)	NITU K (27)	NITSK M (28)
Avg. Pass Percentage (B.Tech) (1)	Not Applicable									
Avg. Pass Percentage (M.Tech) (2)										
No. of PhDs Awarded (3)										
No. of existing PhD scholars (4)	6	0	0	0	0	2	0	0	0	0
Faculty Strength (5)	27	33	34	29	32	31	52	27	49	33
PhD Faculty % (6)	26	30	41	48	88	29	52	52	37	61
Awards & Recognitions (7)	0	0	0	0	0	0	0	0	0	0
Completed & Ongoing Research Projects (8)	0	0	0	0	0	0	0	0	0	0
Fund Received (in Cr.) (9)	0	0	0	0	0	0	0	0	0	0
Ongoing Consultancy work (10)	0	0	0	0	0	0	0	0	0	0

Fund Received (in Cr.) (11)	0	0	0	0	0	0	0	0	0	0
Publications (12)	79	74	109	147	142	215	275	121	110	245
h-index (13)	11	9	2	15	20	16	18	10	3	19
Patent Granted (14)	0	0	0	0	0	0	0	0	0	0
Patent Filed (15)	0	0	0	0	0	0	0	0	0	0
Academic Events Organized (16)	0	4	0	0	2	8	4	7	7	0
Foreign visits by Faculty (17)	0	0	0	0	0	7	5	0	0	0
Time % for R&D work (18)	25	35	25	30	30	35	30	25	20	30
Summer Internship by students (Abroad) (19)	0	0	0	0	0	0	0	0	0	0
Higher studies (Abroad)(20)	0	0	0	0	0	0	0	0	0	0
Conferences by Students (Abroad) (21)	0	0	0	0	0	0	0	0	0	0
Centre of Excellence (22)	0	0	0	0	0	0	0	0	0	0

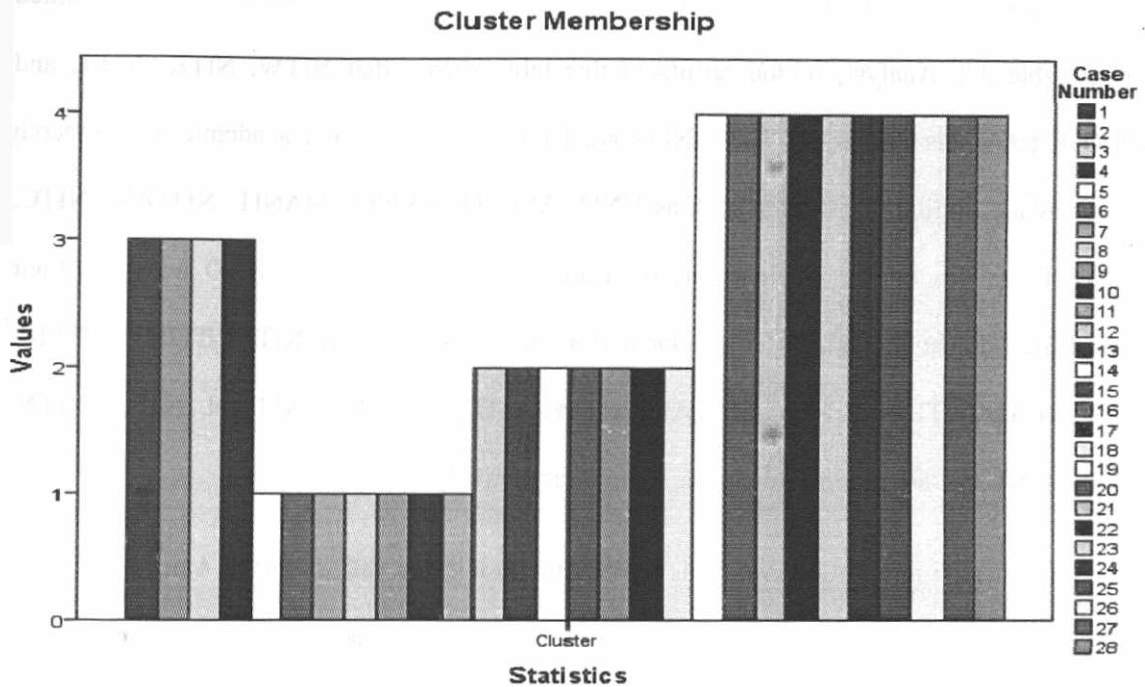


**Fig. 8.1: Dendrogram obtained from agglomerative hierarchical clustering**

The steps carried out for K-Means clustering are outlined below

1. Referring to Annexure-2, four NITs are randomly chosen and each set of 22 parameters serve as the initial coordinates.
2. Using the data of each NIT ( $i^{\text{th}}$ ) and considering the data of centre -1 the Euclidean distance  $d_{11}$  of each NIT is computed.
3. The same calculation is carried using the data of centers 2-4.
4. For each NIT four Euclidean distance  $d_{11}$ ,  $d_{12}$ ,  $d_{13}$ , and  $d_{14}$  are obtained.
5. This NIT goes to that centre whose Euclidean distance (the least of  $d_{11}$ ,  $d_{12}$ ,  $d_{13}$ , and  $d_{14}$ ) is the minimum.
6. This process is repeated for all the 28 NITs.
7. It is observed that the 28 NITs are distributed to all the four clusters.
8. Using the data of the NITs falling under one cluster; the average normalized score on each factor is evaluated. The coordinates of the centre is replaced by the 22 average values computed above.
9. The same procedure in step 8 is repeated for all centers.
10. Subsequently steps 2-9 are repeated. As a result, NITs change their position from one centre to the other centre where their Euclidean distance is minimum.

11. After many iterations (75 in this case) no NIT moves from one centre to the other. In other words each NIT find a place in a given centre.
12. At this stage the iteration is stopped and the 28 NITs fall to same fixed clusters.
13. The results of this algorithm are available in Table 8.2 and the cluster map is displayed in Fig. 8.2.



**Fig. 8.2: Cluster mapping of NITs**

**Observations**

**Table 8.2: NITs grouped in four clusters**

CLUSTER 1	CLUSTER 2	CLUSTER 3	CLUSTER 4
NITW	VNIT	NITRR	NITG
NITK	MNNIT	NITJ	NITAP
NITT	SVNIT	NITJSR	NITM
NITRKL	MANIT	NITSRI	NITPY
	NITDGP	NITS	NITMZ
	NITC	NITH	NITMN
	MNIT	NITP	NITD
			NITN
			NITSKM
			NITUK

### **Observation and conclusion**

The K-means clustering algorithm carried out on (28x22) matrix and results are presented in the Table 8.2. Analysis of the results of this table shows that NITW, NITK, NITT, and NITRKL fall under cluster -1. These NITs are having almost similar academic and research achievements. Similarly institutes such as VNIT, MNNIT, SVNIT, MANIT, NITDGP, NITC, and MNIT fall to cluster -2. In terms of academic performance and R&D activities their performance almost equivalent. On similar performance basis NITRR, NITJ, NITJSR, NITSRI, NITS, NITH, NITP and NITG, NITAP, NITM, NITPY, NITMZ, NITMN, NITD, NITN, NITSKM, NITUK are grouped to cluster 3 and 4 respectively.

Another important observation is that all the new NITs fall to cluster 4 not because of their poor academic and research performance but because they have started in the recent past and their academic contribution is obviously lesser than that of older NITs.



**Chapter – 9**  
**Core competence of NITs**

## Core Competence of NITs

Based on the analysis on academic and research data, the core competence of various NITs has been identified. The core competence has been evaluated based on five important factors these are existing CoE (A1), availability of specialized PG programs are offered (A2), availability of specialized laboratories (A3), availability of specialized faculty in the area (A4), and good quality research publications (A5). Table 9.1 presents the list of NITs and the corresponding core competence areas identified for these NITs.

Table 9.1 Core competence areas identified for various NITs

Name of NIT	Department	Availability					Area of Core Competence	Total
		A1	A2	A3	A4	A5		
NITJ	Textile	X	√	√	√	√	Textile Engineering and Management	1
MNIT	MME	√	√	√	√	√	Material Science and Engineering	3
	EE	√	√	√	√	√	Renewable Energy	
	Civil	√	√	√	√	√	Earthquake Engineering	
MANIT	Civil	√	√	√	√	√	Geotechnical	3
	EE	√	√	√	√	√	Renewable and Green Technology	
	ECE	√	√	√	√	√	Nano-Technology	
MNNIT	Applied Mechanics	√	√	√	√	√	Material Science and Engineering	2
	ME	√	√	√	√	√		

NITC	ME	X	√	√	√	√	Energy Engineering and Management	4
	ECE	X	√	√	√	√	VLSI Design and Signal processing	
	Civil	√	√	√	√	√	Traffic and Transportation Planning	
	CSE	√	X	√	√	√	Applied and Bio-Computing	
NITDGP	MME	√	√	√	√	√	Advanced Material Science and Technology	1
NITH	Civil	√	√	√	√	√	Structure Engineering	2
	ECE	√	√	√	√	√	VLSI Design Automation and Techniques	
NITK	MME	√	√	√	√	√	Material Engineering	4
	Chemical	√	√	√	√	√	Sustainable Development	
	ECE	√	√	√	√	√	Wireless Sensor Network	
	EE	√	√	√	√	√	Instrumentation & Control	
NITP	EE	X	√	√	√	√	Power and Control System Engineering	1
NITRR	ME	X	√	√	√	√	Industrial Engineering and Machine Designing	1
NITJSR	ME	√	√	√	√	√	Energy and Thermodynamics Systems Engineering	1
NITRKL	CSE	√	√	√	√	√	Analytics and Decision Sciences	6
	MME	√	√	√	√	√	Steel Technology	
	ME	√	√	√	√	√	Cryogenics and Vacuum Technology	
	Bio-	√	√	√	√	√	Tissue and	

	Technology						NanotechnologyEngineering	
	ECE	√	√	√	√	√	Industrial Electronics and Robotics	
	EE	√	X	√	√	√	Computer Vision and Pattern Recognition	
NITS	Civil	X	√	√	√	√	Structural Dynamics and Earthquake Engineering	1
NITSRI	Civil	√	√	√	√	√	Water Resources Engineering	1
NITT	Civil	√	√	√	√	√	Environmental Engineering	2
	MME	√	√	√	√	√	Corrosion and Surface Engineering	
NITW	Chemical	X	√	√	√	√	Process Control Engineering	5
	Civil	√	√	√	√	√	Energy and Environmental Engineering	
	MME	√	√	√	√	√	Advanced and Smart Materials	
	ECE	√	√	√	√	√	Nano-Science and Technology	
	ME	√	√	√	√	√	Automation and Instrumentation	
SVNIT	ME	√	√	√	√	√	CAD-CAM	2
	Civil	X	√	√	√	√	Transportation Engineering and Urban Planning	
VNIT	ECE	√	√	√	√	√	VLSI and Nano-Technology	3
	Civil	√	√	√	√	√	Water Resources	
	MME	√	√	√	√	√	Material Engineering	

### **Observation and Conclusion**

From Table 9.1 it is observed that NITRKL having maximum 6 areas of core competence followed by NITW which is 5. Out of 28 NITs under study 18 NITs are having at least one core competence. The remaining all the new 10 NITs do not have developed core competence in any specialized area. However, this finding is upto the period of investigation and based on various relevant data collected.

Ergonomics  
Conclusion  
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## Chapter -10

### Conclusion and Recommendations

## CONCLUSIONS

The overall in-depth study of NIT system in this project reveals the following important information.

### A. Older NITs

1. NIT Rourkela and NIT Jalandhar are having maximum number of B.Tech programs (12) whereas NIT Hamirpur is having least number of B.Tech programs (5). Considering both the B.Tech and M.Tech programs NIT Rourkela, NIT Surathkal, and NIT Bhopal are having maximum number of academic programs (33).
2. As per Government of India and University Grant Commission (Affiliation of Colleges Offering Technical Education by Universities] Regulations, 2014, F. No. 14-9/2013 (CPP-II)) the overall faculty-student ratio for Under-Graduate courses should be 1:15 (not later than three academic years after establishment of the institution). However, it is observed that NITRKL is the only NIT which is maintaining this ratio. All other remaining NITs are suffering from faculty shortage with more than the standard ratio. This is not a good indicator of an institution for imparting effective teaching and carrying out effective research. The Head of the institution of those NITs should take appropriate measure to recruit qualified faculty for almost all older NITs at the earliest. The overall faculty student ratio is the lowest(1:12) in NIT Rourkela which is the highest in NIT Raipur and NIT Patna (1:29). In other older NITs it is above 1:15. This indicates that there is a substantial shortage of faculty in all NITs except in NITRKL which is a matter of real concern.
3. The NIT Tiruchirappalli has undertaken highest number of research projects (135) and NIT Rourkela has received highest funding of Rs. 11.54 crores during last five

years. The research funding of NIT Patna is the least (Rs. 1.30 crores) with 20 number of projects.

4. The consultancy activities are the highest at NIT Tiruchirappalli with 28 number of consultancy projects with an earning of Rs. 4.62 crores which is the least for NIT Durgapur with an earning of Rs. 3.76 crores.
5. The overall research publication record of NIT Rourkela is the highest (2459) during last five years. It is the least for NIT Patna (259). In terms of publication record the three best NITs are NITRKL (2459), NITT (2396), and SVNIT (1870) respectively.
6. In terms of total number of patents (filed and granted) the NIT Surat (33) tops the list which is the least for NIT Allahabad (4) during last five years. In terms of patents granted the three best NITs are SVNIT (15), NITRKL (12), and NITT (6) respectively.
7. The NIT Tiruchirappalli has conducted largest number of (83) academic events such as conferences, workshops, and seminars whereas the NIT Patna has conducted least number of programs (15) during last five years.
8. The number of foreign visits by faculty members is the highest in NIT Tiruchirappalli (116) and is the lowest in NIT Jaipur (11) during last five years. In terms of foreign visits the three best institutes are NITT (116), NITK (103), and NITRKL (96) respectively.
9. There is no specific MHRD guideline regarding the span of time to be devoted by a faculty member for carrying out research. However, it is the duty and responsibility of each faculty member to carry out quality research work to keep up the standard of the institution where he/she is serving as well as for obtaining personal promotion and



satisfaction. As a rule, there are no specific guidelines from Govt. of India regarding time allocation for research for faculty members. The availability of time for research is dependent on many factors such as number of faculty members available in the department, percentage of time the faculty members are engaged in administrative related work etc. The faculty of institutes of national importance has to manage their time to all three aspects: Teaching, Research and Administrative work. For these institutes, the faculty has to work hard beyond office hours to carry out personal research, guide research students at M.Tech and PhD levels, to undertake research projects, carry out consultancy work etc. Hence officially the allocated time is not a matter of concern really. In such type of institutions the research work is jointly carried out by project personnel, research scholars, M.Tech students and the faculty himself. Hence the research output that comes out from a faculty and his associated research members is really the work of a team.

It is observed that the faculty members of NIT Rourkela, NIT Hamirpur, and NIT Bhopal devote more time about 35% in research and consultancy work whereas it is the least in NIT Surat, NIT Durgapur, and NIT Jaipur about 15%. Hence it is high time that the management of these institutions should focus more on individual's personnel research and excellence which will in return contribute to the betterment of NIT and the country as a whole.

10. As per available data collected during last five years, highest number of students of NIT Surathkal has gone for internship abroad (52) whereas, highest number of students went from NIT Warangal (90) for higher studies abroad. However from NIT

Bhopal only one student (lowest) has gone for internship abroad and from NIT Raipur four students (lowest) have gone for higher study.

11. The average percentage of placement is the highest (94%) for NIT Tiruchirappalli and is the lowest for NIT Srinagar (50%) during last five years. The annual average pay package is the highest in NIT Warangal (Rs. 5.85 Lakhs).

12. NIT Rourkela is having the maximum number of centers of excellence among all the twenty eight NITs. In terms of centre of excellence the best three NITs are NITRKL (9), NITK (6), and NITW (5).

13. Based on the combined response of faculty and students the best three rating goes to NIT Tiruchirappalli (4.04/5), NIT Rourkela (3.76/5) and NIT Surathkal (3.58/5) respectively. The lowest is (2.66/5) for NIT Srinagar.

14. For grouping the NITs on overall R&D academic performance K-means clustering technique was performed using 22 important academic parameters of all the 28 NITs, K-means clustering has been used to group them in four clusters and it was observed that NITW, NITK, NITT, and NITRKL belongs to first cluster whereas VNIT, MNNIT, SVNIT, MANIT, NITDGP, NITC, and MNIT belongs to second cluster, NITRR, NITJ, NITJSR, NITSRI, NITS, NITH, and NITP belongs to third cluster, whereas all the new NITs belongs to fourth cluster.

## **B. Newer NITs**

1. NIT Sikkim, NIT Manipur, NIT Meghalaya, and NIT Uttarakhand are having maximum number of B.Tech programs (5) whereas NIT Nagaland, NIT Delhi, NIT Goa, NIT Arunachal Pradesh, and NIT Puducherry are having the least number of B.Tech programs (3). Considering both B.Tech and M.Tech programs NIT Meghalaya is having maximum number of programs (8).
2. The overall faculty student ratio is the lowest in NIT Meghalaya and NIT Uttarakhand (1:6) which is the highest at NIT Nagaland (1:11). In this aspect the newer NITs are in a better position.
3. The overall publication record of NIT Meghalaya is the highest (275) during last five years. It is the least (74) for NIT Nagaland.
4. The faculty members of NIT Arunachal Pradesh and NIT Nagaland have devoted more time (35%) in research and consultancy work whereas it is the least for NIT Uttarakhand (20%).
5. Based on combined response of faculty and students, the highest rating goes to NIT Delhi (2.65/5) which is the lowest (2.26/5) for NIT Mizoram.

## OVERALL CONCLUSION

After carrying out in depth study and analysis of the data collected from both the older and newer NITs, it is learnt that there is steady growth on the R&D activities in older NITs. More time will be required by the newer NITs to come to the level of older NITs. This observation has been made based on the observation that the good performing NITs are coming under cluster 1 and 2. Also none of the new NITs are coming under cluster 3. The cluster 4 constitutes of all the new NITs. The performance based cluster analysis reveals that overall performance wise the ranking of NITs are in order of Cluster 1, 2, 3 and 4.

The centers of excellence created by various NITs with the help of adequate financial support from Government of India should continue to maintain their standard by continuing to upgrading and modernizing the existing facilities. This is possible by allowing these facilities to be used by other educational institutions and industries on the basis of reasonable payments. The government of India has also introduced many R&D infrastructure enhancement schemes such as DST-FIST and DBT centre of excellence schemes which have immensely helped to improve the technical infrastructure of NITs and IITs and helped the growth of CoEs. Such a strategy would enable the respective NITs to maintain the standard of the existing centers of excellence. With the motive to improve the development of centre of excellence at other NITs (Table 6.18), the Govt. of India should grant special financial support to the concerned institutes. It is observed from **Annexure-1** that the numbers of CoEs are 9, 6, 5, and 2 at NITRKL, NITK, NITW and NITT respectively. These institutions are having maximum number of CoEs along with NITT. It is also noticed that number of good research publications, number of PhDs produced are maximum in these four institutions. Interestingly these four NITs have been observed to belong to cluster 1. The R&D performance of these NITs is found to be better than other NITs.

The establishment of CoEs has enhanced the R&D infrastructure in those specific areas and hence those CoEs has substantial impact on the overall growth of an institution. From Table 9.1 it is observed that NITRKL is having maximum 6 areas of core competence followed by NITW which is 5. Out of 28 NITs under study 18 NITs are having at least one core competence. The remaining 10 NITs including all the new NITs do not have developed core competence in any specialized area. However, this finding is up to the period of investigation and based on various relevant data collected.

The data collected from the key survey questionnaire has been analyzed using 22 contributing factors. These factors have been utilized for carrying out the cluster analysis. Further, the core competence factors presented in Table 9.1 are the indicators of the performance of any NIT or any standard educational institution. The outcome of cluster analysis (Table 8.2) and core competence (Table 9.1) are important findings of the current study.

## RECOMMENDATIONS

Separate recommendations have been suggested for both older and newer NITs. If these recommendations are implemented then it is expected that the research and consultancy environment will improve in these NITs and more meaningful research outputs in terms of quality research paper, patents, products and innovations will steadily increase.

### A. Older NITs

1. The processing time for procurement of equipment and software should be reduced so that the allocated fund can be utilized in time and the laboratory facilities can be created/ upgraded within lesser time.
2. The teaching as well as administrative load should be reduced to some extent so that the faculty members can devote more time towards R&D activities. More regular faculty members should be recruited in some specific departments where faculty strength is very less.
3. The contribution of industries to enhance R&D activities in many older NITs is very poor. Special attention is needed to attract industries to participate in R&D activities.
4. The centers of excellence created in NITs need further strengthening in terms of cutting edge and sophisticated equipment and software so that better and more quality research and products can be obtained.
5. All NITs should upload on their websites the list of costly equipment and software which are functional and their potential use so that the faculty members and students of other government institutions and scientist of research laboratories can use them for their research purpose with prior permission from appropriate authority and by paying

nominal charges. This will help in sharing of resources as well as improving utilization of costly equipment and software.

6. Industries and other organizations should be encouraged to use the modern laboratory facilities and the additional earnings obtained should be utilized for maintaining the costly equipment and upgrading the available software.

#### **B. Newer NITs**

1. Steps may be taken to settle advanced and sophisticated laboratories to carry out high end research by existing faculty members and to carry out experiments at PG and PhD levels.
2. Steps should be taken to attract and retain younger faculty members to newer NITs which are located in smaller towns and remote locations.
3. Faculty members at senior levels are mostly not available in newer NITs. This is affecting both teaching and research guidance to junior faculty. Steps may be taken to improve this situation.
4. The permanent campus with all facilities should be set up as early as possible for some of the new NITs, so that the R&D activities which are presently at a poor stage will improve. Campus life of faculty and students would help to enhance the R&D activities of newly started NITs.

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## ANNEXURES

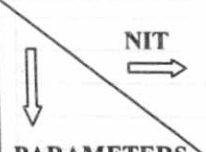
## List of Centre of Excellence: Institution wise

NIT	NAME OF CENTRE OF EXCELLENCE
NITW	1. Advanced and smart Materials
	2. Energy and Environment
	3. Automation and Instrumentation
	4. Nano-science and Technology
	5. Disaster Mitigation and Management
NITK	1. Disaster risk reduction
	2. Sustainable development
	3. Material research
	4. Virtual instrumentation
	5. Wireless sensor network
	6. Innovation
MNNIT	1. Advanced Material & Systems(COEAMS)
	2. Interdisciplinary research
SVNIT	1. CAD/CAM (Civil Engineering)
NITRKL	1. Industrial electronics & robotics
	2. Development of Nano-materials
	3. Industrial refrigeration and air conditioning
	4. Cryogenic and superconducting engineering
	5. Renewable energy system
	6. Tissue engineering centre
	7. Steel research centre
	8. Computer vision and pattern recognition
	9. Advanced analytics and decision sciences
NITDGP	1. Advanced Materials
MNIT	1. Energy and Environment
	2. Design Centre
	3. Material Research
NITH	1. Hill Architecture
	2. VLSI Design Centre
MANIT	1. Energy Centre
	2. Geo-informatics
	3. Nano- Science and Engineering Centre
NITSRI	1. Water Resources Management Centre
NITC	1. Transportation Research, Education & Training,
	2. Applied Computing,
	3. Bio-Computing
NITT	1. Corrosion and surface engineering
	2. Energy and environmental science & technology
NITRR	1. Sub-DIC Bioinformatics
VNIT	1. Combedded systems
	2. Material engineering centre
	3. VLSI and Nano Technology
	4. Remote sensing and Water resources
NITJSR	1. Energy Centre,
	2. Corrosion and thermodynamic study

Annexure - 2

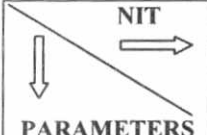
Normalized data matrix used for K-Means clustering

For 1 to 9 NITs

 PARAMETERS	NITW (1)	NITK (2)	NITT (3)	NITRKL (4)	VNIT (5)	MNNIT (6)	SVNIT (7)	NITC (8)	NITDGP (9)
Avg. Pass Percentage (B.Tech) (1)	0.99	0.97	1	0.98	0.87	0.83	0.84	0.88	0.82
Avg. Pass Percentage (M.Tech) (2)	1	0.97	0.99	0.94	0.90	0.85	0.83	0.88	0.88
No. of PhDs Awarded (3)	0.62	0.81	1	0.5	0.25	0.49	0.22	0.63	0.55
No. of existing PhD scholars (4)	0.57	0.93	1	0.66	0.76	0.65	0.36	0.89	0.95
Faculty Strength (5)	0.87	0.97	0.96	1	0.79	0.84	0.63	0.77	0.72
PhD Faculty % (6)	0.93	1	0.89	1	0.75	0.90	0.78	0.76	0.88
Awards & Recognitions (7)	0.83	1	0.91	0.93	0.40	0.30	0.29	0.33	0.32
Completed & Ongoing Research Projects (8)	0.77	0.71	1	0.68	0.51	0.41	0.17	0.49	0.53
Fund Received (in Cr.) (9)	0.89	0.85	0.91	1	0.55	0.56	0.66	0.45	0.39
Ongoing Consultancy work (10)	0.15	0.79	1	0.64	0.43	0.82	0.54	0.68	0.21
Fund Received (in Cr.) (11)	0.78	1	0.94	0.76	0.60	0.55	0.71	0.99	0.31
Publications (12)	0.42	0.61	0.97	1	0.50	0.74	0.76	0.45	0.69
h-index (13)	0.9	1	1	1	1	1	1	1	1
Patent Granted (14)	0.33	0.13	0.40	0.80	0.33	0.13	1	0.27	0.27
Patent Filed	0.39	0.61	0.50	0.89	1	0.11	1	0.44	0.67

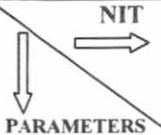
(15)									
Academic Event Organized (16)	0.90	0.81	1	0.90	0.36	0.46	0.47	0.60	0.49
Foreign visits by Faculty (17)	0.75	0.89	1	0.83	0.53	0.47	0.15	0.41	0.20
Time % for R&C work (18)	0.71	0.86	0.86	1	0.86	0.71	0.43	0.71	0.43
Summer Internship by students (Abroad) (19)	0.80	1	0.98	1	0.18	0.16	0.10	0.22	0
Higher studies (Abroad) (20)	1	0.94	0.99	0.93	0.47	0.37	0.32	0.46	0.36
Conferences by Students (Abroad) (21)	0.81	0.89	1	0.85	0.34	0.20	0.18	0.34	0.28
Centre of Excellence(22)	0.56	0.67	0.22	1	0.44	0.22	0.11	0.33	0.11

For 10 to 18 NITs:

 PARAMETERS	NIT									
	MNIT (10)	MANIT (11)	NITH (12)	NITRR (13)	NITSRI (14)	NITJ (15)	NITJSR (16)	NITS (17)	NITP (18)	
Avg. Pass Percentage (B.Tech) (1)	0.83	0.84	0.80	0.78	0.73	0.81	0.80	0.81	0.90	
Avg. Pass Percentage (M.Tech) (2)	0.82	0.84	0.77	0.78	0.65	0.75	0.73	0.81	0.95	
No. of PhDs Awarded (3)	0.53	0.75	0.20	0.22	0.08	0.30	0	0.17	0.08	
No. of existing PhDs Scholars (4)	0.69	0.61	0.32	0.36	0.14	0.35	0.05	0.36	0.09	
Faculty Strength (5)	0.71	0.83	0.45	0.40	0.35	0.46	0.43	0.49	0.40	
PhD Faculty % (6)	0.81	0.90	0.83	0.64	0.49	0.79	0.79	0.61	0.64	
Awards	0.33	0.31	0.10	0.12	0.10	0.29	0.23	0.20	0	

&Recognitions (7)									
Completed & Ongoing Research Projects (8)	0.12	0.41	0.10	0.12	0.16	0.16	0.14	0.24	0.15
Fund Received (in Cr.) (9)	0.41	0.40	0.33	0.18	0.18	0.31	0.28	0.24	0.11
Ongoing Consultancy work (10)	0.39	0.68	0.25	0.32	0.50	0.43	0.54	0.79	0.68
Fund Received (in Cr.) (11)	0.42	0.58	0.37	0.42	0.46	0.44	0.27	0.40	0.54
Publications (12)	0.54	0.50	0.37	0.12	0.12	0.32	0.18	0.43	0.11
h-index (13)	1	1	1	0.60	0.65	0.90	0.95	1	0.75
Patent Granted (14)	0.13	0.33	0	0.27	0.27	0	0.13	0	0
Patent Filed (15)	0.17	0.39	0	0.67	0.33	0	0.33	0	0
Academic Event Organized(16)	0.23	0.53	0.24	0.37	0.28	0.31	0.20	0.27	0.18
Foreign visits by Faculty (17)	0.10	0.53	0.74	0.41	0.19	0.29	0.23	0.32	0.27
Time % for R&C work (18)	0.43	1	1	0.71	0.86	0.71	0.71	0.71	0.71
Summer Internship by students (Abroad) (19)	0.14	0.02	0	0.04	0	0.06	0.08	0.12	0.12
Higher studies (Abroad) (20)	0.38	0.31	0.2	0.04	0.1	0.07	0.09	0.13	0.40
Conferences by Students (Abroad) (21)	0.17	0.16	0.04	0.07	0.01	0.10	0.11	0.14	0.02
Centre of Excellence(22)	0.33	0.33	0.22	0.11	0.11	0	0.22	0	0

**For 19 to 28 NITs:**

 NIT ↓ → PARAMETERS	NITM Z (19)	NIT N (20)	NIT D (21)	NITM N (22)	NIT G (23)	NITA P (24)	NIT M (25)	NITP Y (26)	NITU K (27)	NITSK M (28)
Avg. Pass Percentage (B.Tech) (1)	NOT APPLICABLE									
Avg. Pass Percentage (M.Tech) (2)	NOT APPLICABLE									
No. of PhDs Awarded (3)	NOT APPLICABLE									
No. of existing PhD scholars (4)	0.01	0	0	0	0	0.01	0	0	0	0
Faculty Strength (5)	0.11	0.14	0.14	0.12	0.14	0.13	0.22	0.11	0.21	0.14
PhD Faculty % (6)	0.29	0.34	0.46	0.54	0.99	0.33	0.58	0.58	0.42	0.69
Awards & Recognitions (7)	0	0	0	0	0	0	0	0.10	0	0
Completed & Ongoing Research Projects (8)	0	0	0	0	0	0	0	0	0	0
Fund Received (in Cr.) (9)	0	0	0	0	0	0	0	0	0	0
Ongoing Consultancy work (10)	0	0	0	0	0	0	0	0	0	0
Fund Received (in Cr.) (11)	0	0	0	0	0	0	0	0	0	0
Publications	0.03	0.03	0.04	0.06	0.06	0.09	0.11	0.05	0.04	0.10

(12)										
h-index (13)	0.55	0.45	0.1	0.75	1	0.80	0.90	0.50	0.15	0.95
Patent Granted (14)	0	0	0	0	0	0	0	0	0	0
Patent Filed (15)	0	0	0	0	0	0	0	0	0	0
Academic Events Organized (16)	0	0.05	0	0	0.02	0.10	0.05	0.08	0.08	0
Foreign visits by Faculty (17)	0	0	0	0	0	0.06	0.04	0	0	0
Time % for R&C work (18)	0.71	1	0.71	0.86	0.86	1	0.86	0.71	0.58	0.86
Summer Internship by students (Abroad) (19)	0	0	0	0	0	0	0	0	0	0
Higher studies (Abroad)(20 )	0	0	0	0	0	0	0	0	0	0
Conferences by Students (Abroad) (21)	0	0	0	0	0	0	0	0	0	0
Centre of Excellence (22)	0	0	0	0	0	0	0	0	0	0



**(i) Introduction Letter from Principal and Co-Investigator:**

As you are aware presently India has 82 centrally funded academic institutions out of which, seventeen erstwhile Regional Engineering Colleges were rechristened in 2003. They were taken over by Central government as fully funded institutions and were conferred with Autonomy status in academic and administrative matters to achieve rapid and qualitative development. Because of past academic experience and track record these institutions were granted Deemed University status in the year 2003 and these RECs were renamed as National Institute of Technology (NIT). These NITs were also declared as Institutes of National Importance. Subsequently the central government has created 13 more NITs and presently the total number is thirty.

The Ministry of Human Resource Development, Government of India aims to further enhance the quality of technical manpower in these institutions particularly at Post Graduate and PhD levels. Accordingly, the Central Government has substantially increased the financial support to NITs and is in the process of strengthening and expanding the R&D infrastructures and to produce quality man power in science and engineering both at Postgraduate PhD levels. In the meantime about ten years have passed from the date of creation of NITs and substantial financial inputs have provided to these institutes for their growth and development. Hence it is felt that an in depth study on R&D activities of these leading institutions is required by collecting and analyzing the relevant data. The current project work that we have undertaken from the DST, GOI is a sincere attempt in this direction.

**(ii). Introduction letter by DST official:**



**Dr. Parveen Arora**  
**Adviser & Head**  
**NSTMIS Division**  
**Tel Fax: 011-26523432**  
**Email: [parora@nic.in](mailto:parora@nic.in)**

भारत सरकार  
विज्ञान और प्रौद्योगिकी मंत्रालय,  
विज्ञान और प्रौद्योगिकी विभाग,  
टेकनोलॉजी भवन, मेहरौली मार्ग,  
नई दिल्ली-110016

GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE AND TECHNOLOGY,  
DEPARTMENT OF SCIENCE AND TECHNOLOGY,  
TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD,  
NEW DELHI-110016

D.O. No. **No. DST/NSTMIS/05/143/2011-12**

Date: **22<sup>nd</sup> September, 2014**

Subject: **Project entitled "A study on research and consultancy activities of NIT system of India"**

The National Science & Technology Management Information System (NSTMIS) division of the Department of Science & Technology (DST) has sponsored a research project on the above subject to be implemented by the National Institute of Technology, Warangal.

The project aims at studying the past and present generation trend of dynamism in the NIT system in India and would try to bring out core competence of these institutions both in academics and research. It would also study patents, publications, technologies brought out from NITs and also analyse placement scenario of various NITs.

In this regard, the project team of NIT Warangal led by the PI of the project Dr. Ritanjali Majhi has developed appropriate questionnaires to solicit information regarding the above data (copies enclosed). Further, this would also be followed by select personal visits by NIT Warangal team. The findings and recommendations culminating out of the said project will provide new insights to the DST and other policy making bodies in strengthening the S&T Sector.

I appeal to all the NITs to kindly spare some time and provide the requisite details in the enclosed questionnaires. Your kind cooperation will help immensely in the success and the timely completion of the study by the NIT, Warangal team.

Yours sincerely,

(Dr. Parveen Arora)

Encl: Questionnaires

PS: For any queries related to the DST sponsored study, please contact Ms. Namita Gupta, Sc-F, DST, New Delhi at 011-26961579 (email: [namita@nic.in](mailto:namita@nic.in))

PERFORMA FOR ACADEMIC INFORMATION OF NATIONAL INSTITUTE OF TECHNOLOGY

Name of the Institute:

Year of conversion to NIT :

**PART 1- Academic Programs****No. of Current and past academic programmes**

No. of B. Tech Programmes being offered in the preceding year of conversion of REC to NIT	No. of B. Tech Programmes being offered in 2012-2013	No. of M. Tech Programmes offered in the preceding year of conversion from REC to NIT	No. of M. Tech Programmes being offered in 2012-2013

**2. Discipline wise student's strength****1.2.1. B.Tech program and Integrated B.Tech-M.Tech programs (Discipline wise)**

(\* Please provide the answer as 55/60, when Intake =60 and No. of students graduated)

S.No	Discipline	2012-13	2011-12	2010-11	2009-10	2008-09	TOTAL
		*Number Graduated	* Number Graduated	*Number Graduated	* Number Graduated	*Number Graduated	
1	B.Tech						
2	Integrated B.Tech - M.Tech						

	<b>TOTAL</b>						

**1.2.2. M.Tech and Integrated M.Tech-Ph.D programs**

(\* Please provide the answer as 55/60, when Intake =60 and No. of students graduated) (Discipline wise)

S.No	Discipline	2012-13	2011-12	2010-11	2009-10	2008-09	TOTAL
		*Number Graduated	* Number Graduated	*Number Graduated	* Number Graduated	*Number Graduated	
1	M.Tech						
2	Integrated M.Tech - Ph.D						
	<b>TOTAL</b>						

**1.2.3. M.Sc Program**

(\*Please provide the answer as 55/60, when Intake =60 and No. of students graduated) (Discipline wise)

S.No	Discipline	2012-13	2011-12	2010-11	2009-10	2008-09	TOTAL
		*Number Graduated	* Number Graduated	*Number Graduated	* Number Graduated	*Number Graduated	
1	M.Sc						
2	M.Sc - Ph.D						

<b>TOTAL</b>							
--------------	--	--	--	--	--	--	--

#### 1.2.4.M.B.A and M.C.A

(\*Please provide the answer as 25/30,when Intake =30 and No. of students graduated)

S. No	Discipline	2012-13	2011-12	2010-11	2009-10	2008-09	TOTAL
		*Number Graduated	* Number Graduated	*Number Graduated	* Number Graduated	*Number Graduated	
1	M.B.A						
2	M.C.A						
	<b>TOTAL</b>						

#### 1.2.5.Ph.D and Post Doctoral programs

(\* Please provide the answer as 55/60,when Intake =60 and No. of students graduated) (Discipline wise)

S. No	Discipline	2012- 2013		2011-2012		2010-2011		Total
		No. of students awarded/ completed	No. of Students continuing	No. of students awarded / completed	No. of Students continuing	No. of students awarded / completed	No. of Students continuing	
1	Ph.D							
2	Post Doctoral Fellow							
<b>TOTAL</b>								

### 3.Academic growth Plan

**1.3.1. New Programmes to be introduced**

Level	Department	Specialization	Expected Year of Starting	Expected Intake
B.Tech				
Integrated B.Tech – M.Tech				
M. Tech&M.Arch				
Integrated M.Tech-Ph,D				
M.Sc				
M.B.A				
Any Other				

**1.3.2 Increase in intake of the existing programmes**

Program	Expected Year of Increase	Present Strength	Proposed strength
B. Tech&B.Arch			

M. Tech			
M.Arch			
.			
.			
:			
Integrated M.Tech and Ph.D			
.			
.			
:			
M.B.A			
M.C.A			
M.Sc			
Any Other			

## Part 2 –Academic Information related to faculty

### 2.1 Faculty

#### 2.1.1. Department wise details

Department	No. of Faculty			Faculty with Ph.D degree		No. of Faculty currently pursuing Ph.D
	No. of Male Faculty	No. of Female Faculty	Total	No. of Faculty with Ph.D	No. of Faculty received Ph.D from abroad	
:						
<b>TOTAL</b>						

#### 2.1.2. Significant Awards and Recognitions (during last five years)

Department	Title of major awards & recognitions (International/ National/ State levels)	No. Of recipients					Total
		2013	2012	2011	2010	2009	
:							
:							



<b>TOTAL</b>							

## 2.2 Research Projects (during last five years)

### 2.1. Year wise details

S. No	Academic year	No. of completed projects	No. of ongoing projects	Year wise total fund received under project head
1	2013			
2	2012			
3	2011			
4	2010			
5	2009			
	<b>TOTAL</b>			

### 2.2. Year wise sources of five major funding agencies

S. No	Year	Name of Major funding agencies	Fund received
1	2013		
2	2012		
3	2011		
4	2010		
5	2009		
	<b>TOTAL</b>		

### 2.3. Department / Centre wise project fund received on R&D head

S. No	Year	Name of the Department/ centre	Total project fund sanctioned
1	2013		
2	2012		
3	2011		
4	2010		
5	2009		
<b>TOTAL</b>			

### 2.3.Consultancy Activities (during last five years)

#### 2.3.1. Year wise details

S. No	Academic year	No. of Ongoing Consultancy works	Year wise fund received
1	2013		
2	2012		
3	2011		
4	2010		
5	2009		
<b>TOTAL</b>			

#### 2.3.2.Year wise sources of major funding agencies for consultancy

S. No	Year	Name of major funding agencies	Total Fund received
1	2013		
2	2012		
3	2011		

4	2010		
5	2009		
	<b>TOTAL</b>		

3. Department / Centre wise consultancy fund received

S. No	Year	Name of the Department/ Centre	Total fund received
1	2013		
2	2012		
3	2011		
4	2010		
5	2009		
	<b>TOTAL</b>		

4. Publications by faculty members (during last five years)

4.1. Year wise number of publications in peer reviewed journals and conferences

S. No	Year	National journals	International journals	International conferences	National conferences	Books, Monographs Published	Book chapters, Monographs Published
1	2013						
2	2012						
3	2011						
4	2010						
5	2009						
	<b>TOTAL</b>						

4.2. Department wise total publications

S. No	Name of the Department	2013		2012		2011		2010		2009	
		Journals and Books (J&B)	Conferences and Book chapters (C&B)	(J&B)	(C&B)	(J&B)	(C&B)	(J&B)	(C&B)	(J&B)	(C&B)
1											
2											
3											
:											
<b>TOTAL</b>											

## 2.5. Patents (during the last five years)

### 2.5.1. Year wise details

S. No	Year	No. of Indian patents granted	No. of Indian patents filed	No. of Foreign patents granted	No. of Foreign patents filed
1	2013				
2	2012				
3	2011				
4	2010				
5	2009				
<b>TOTAL</b>					

### 2.5.2. Department wise patent details (during the last five years)

S. No	Name of the Department	No. of Indian patents granted	No. of Indian patents filed	No. of Foreign patents granted	No. of Foreign patents filed
1					
2					
:					
:					
:					
<b>TOTAL</b>					

**2.6. National conferences (NC) / International conferences (IC) / Seminars (S) / Workshop (W) / Continuing education program (CEP) organised (during last five years)**

Year wise details

	No. of Events					TOTAL
	2009	2010	2011	2012	2013	
NC						
IC						
W						
CEP						
<b>Total</b>						

2.6.2. Department wise data

S.No	Department	Total no. of Organised /Conducted										TOTAL
		2009		2010		2011		2012		2013		
		NC+ IC	W+CE P+S	NC+ IC	W+CE P+S	NC+ IC	W+CE P+S	NC+ IC	W+CE P+S	NC+ IC	W+CE P+S	
<b>Total</b>												

2.7. Foreign Visit

2.7.1. Year wise details

Academic session	No. of faculty members		Other reason	Total
	Paper presentation	Higher study		
2013				
2012				
2011				
2010				
2009				
<b>Total</b>				

2.7.2. Department wise details (Total number of foreign visits)

Department	2009	2010	2011	2012	2013	TOTAL


**2.8 Percentage of time sharing by faculty in your institute**

<b>Average Percentage</b>		
<b>Teaching</b>	<b>Research and consultancy</b>	<b>Administrative assignment</b>

**2.9 List major contribution of faculty to Industry (last 5 years)**

<b>S.No</b>	<b>Department</b>	<b>Consultancy work</b>	<b>Continuing education program</b>	<b>Product/ software development</b>	<b>No. of technology transfers for large scale production</b>

**2.10 List major contribution of faculty to society/ upliftment of common people during last five years**

S.No	Department	Major contribution

**PART 3 -Research related information of students**

**3.1. Department wise students publications (during the last five years)**

S. No	Department	2013		2012		2011		2010		2009	
		Conference (C+B)	(J)	(C+B)	(J)	(C+B)	(J)	(C+B)	(J)	(C+B)	(J)
1											
2											
3											
<b>TOTAL</b>											

**Hint:** Conference(C), Journals(J), Book Chapters(BC)

**3.2 Students' major Achievements/Recognitions**

Department	No. of major achievements/recognition					Title/Name of major achievement/major recognition
	2013	2012	2011	2010	2009	




**Summer Internship abroad**

B.Tech students

Department	No. of Students (academic session wise)					TOTAL
	2013	2012	2011	2010	2009	

B2.M.Tech/M.Arch/MCA/MBA students

Department	No. of Students (academic session wise)					TOTAL
	2013	2012	2011	2010	2009	

:						

### 3.4 Inter-disciplinary nature of Projects/Thesis work of students (in last 5 years)

#### 3.4.1. Discipline wise details (Number Only)

Branch	B.Tech					M.Tech					Ph.D				
	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009
:															
<b>TOTAL</b>															

#### 3.4.2. Year wise projects

Academic session	B.Tech	M.Tech/ M.Sc/M.B.A/MCA	Ph.D
2009			
2010			
2011			
2012			
2013			

<b>TOTAL</b>			
--------------	--	--	--

### 3.5. Placement of students

#### 3.5.1. Year wise details for B.Tech students

Sl. No	Academic year	Number of Students in final year	Placed within the country	Placed outside India	Highest annual salary	Average package
1	2012-2013					
2	2011-2012					
3	2010-2011					
4	2009-2010					
5	2008-2009					

#### 3.5.2. B.Tech Department wise data

Department	ACADEMIC SESSIONS					TOTAL
	2012-2013	2011-2012	2010-2011	2009-2010	2008-2009	
:						
:						
:						
<b>Total</b>						

#### 3.5.3. M.Tech Department wise data

Department	ACADEMIC SESSIONS					TOTAL
	2012-2013	2011-2012	2010-2011	2009-2010	2008-2009	

:						
:						
:						
<b>Total</b>						

3.5.4.M.Sc Department wise data

Department	ACADEMIC SESSIONS					TOTAL
	2012-2013	2011-2012	2010-2011	2009-2010	2008-2009	
:						
:						
:						
<b>Total</b>						

3.5.5. MCA/MBA Department wise data

Department	ACADEMIC SESSIONS					TOTAL
	2012-2013	2011-2012	2010-2011	2009-2010	2008-2009	

:							
:							
:							
<b>Total</b>							

### 3.6 Higher Study

S.No	Departments	Percentage of passed out students opt for higher studies in											
		India					Foreign Country						
		2013	2012	2011	2010	2009	2013	2012	2011	2010	2009		
:													
.													
:													
<b>TOTAL</b>													

### 3.7. Participation of students in conferences

Program	Departments	No. of students attended										Total	
		National/International conferences in India					International conferences abroad						
		2013	2012	2011	2010	2009	2013	2012	2011	2010	2009		
B.Tech/B.Arch													

:													
:													
M.Tech/M.Sc/ M.B.A/M.C.A/ M.Arch													
:													
Ph.D													
<b>TOTAL</b>													

### Part 4 - Research Facilities

#### 4.1. Advanced / Research laboratories

S.No	Department	Name of Advancesd/Research Lab	Research area

#### 4.2. Major/High-end Equipment in departments and centres

S.No	Department / Centre	List of Equipment above Rs 25 Lakhs	Purpose

#### 4.3. Major Software in departments and centres

S.No	Department / Centre	List of Application / Software above Rs 25 Lakhs	Application / Software Purpose

**1.4. Science park(S)/ Incubationcentre (I)/Entrepreneurship cell (E)**

S.No	Facilities available	Major activities	Industries involved	Nature of involvement
S				
I				
E				

**1.5. Centre of excellence**

S.No	Name of existing Centre of excellence	Major activities and outcomes	Proposed Centre of excellence	
			Title	Year of starting

**1.6. List major academic initiatives for achieving R&D excellence to be undertaken in near future**

- a)
- b)
- c)

## Questionnaire for NIT faculty

### PART I - Personnel Details

1) Name of the Institute where working: \_\_\_\_\_

2) Age: 24-34  35-44  45-54  55-65

3) Gender: Male  Female

4) Please provide the details of your qualification and experience

Name of your Department	
Present designation	
Year of joining the institute	
Highest Degree and from which institution/ university	
Specialization	

### PART II - RESPONSE FROM FACULTY

Please provide your valuable response on a scale of 1 to 5 where *1 stands for extremely low and 5 represents extremely high by circling the appropriate option for each question given in the questionnaire*

#### **1. Departmental infrastructure**

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
1.1	DIA	Overall academic infrastructure of the department	1	2	3	4	5
1.2	DIF	Proper sitting space for faculty	1	2	3	4	5
1.3	DIE	Individual computational and high speed internet facilities for faculty	1	2	3	4	5
1.4	DIR	Residential accommodation for faculty and supporting staff	1	2	3	4	5



1.5	DIU	Adequate facilities for power backup in the department	1	2	3	4	5
1.6	DIS	Availability of senior visiting/ Emeritus faculty	1	2	3	4	5
1.7	DID	Departmental seminar halls	1	2	3	4	5
1.8	DIP	Proper sitting facility for Ph.D students with proper computational and internet facilities	1	2	3	4	5

## 2. Laboratory facilities for research

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
2.1	LRL	Availability of required number of well equipped laboratories	1	2	3	4	5
2.2	LRE	Adequate number of equipment to conduct all experiments	1	2	3	4	5
2.3	LRC	Availability of sophisticated equipment for conducting high end experiments	1	2	3	4	5
2.4	LRT	Adequate number of qualified technical staff	1	2	3	4	5
2.5	LRM	Lab equipment are repaired and timely maintained	1	2	3	4	5

## 3. Creation of research facilities and ambience

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
3.1	RFI	The research Infrastructure of the institute	1	2	3	4	5
3.2	RFC	The computational and software facilities work in carrying out good research	1	2	3	4	5
3.3	RFJ	The books and journals in e – forms are accessed from all hostels and departments	1	2	3	4	5
3.4	RFL	The advanced and research laboratories have access to all students and faculty during holidays and after institute hours	1	2	3	4	5
3.5	RFS	The campus has good power supply facilities and well illuminated	1	2	3	4	5

3.6	RFA	Facilities for fast food, tea, coffee etc., are available in the night and holidays	1	2	3	4	5
3.7	RFF	Safety and security for staff facility and students exist					

#### 4. Institute Library

S.No	Code	Factor					
			Extremely low	Low	Medium	High	Extremely High
4.1	LWF	Well furnished library with adequate space and air conditioned	1	2	3	4	5
4.2	LAR	Library has been fully automated with RFID facilities and with other software	1	2	3	4	5
4.3	LQS	Available number of qualified and trained library officers and staffs	1	2	3	4	5
4.4	LST	Availability of sufficient textbooks	1	2	3	4	5
4.5	LTR	Availability of adequate latest text and reference books	1	2	3	4	5
4.6	LJD	Availability of important journals of all the departments either in E form/ hard copy forms	1	2	3	4	5
4.7	LEJ	Facility to access to E books and journals from remote computer terminals in the campus	1	2	3	4	5

#### 5. Central Instrument / Workshop facilities (CIF)

S.No	Code	Factor					
			Extremely low	Low	Medium	High	Extremely High
5.1	CIF	Existence of well established CIF	1	2	3	4	5
5.2	CIE	All important common equipment required for various departments have been setup	1	2	3	4	5
5.3	CIS	The CIF is made available to all students, faculty and neighbouring industries on time sharing basis	1	2	3	4	5
5.4	CIM	The CIF is well maintained and available during holidays and after institute hours	1	2	3	4	5
5.5	CIQ	Qualified and trained technicians are available in CIF	1	2	3	4	5
5.6	WFH	All the high end equipment are well maintained with proper AMC	1	2	3	4	5

5.7	WFG	Well workshop with adequate equipment and other facilities in all sections exist	1	2	3	4	5
5.8	WFT	Sufficient and trained technical staff available in the work shop	1	2	3	4	5

#### 6. Industry Institute Interaction

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
6.1	IIS	Existence of science park, facilities available performance in terms of attracting industry professionals to facilitate product/ software development	1	2	3	4	5
6.2	IIE	Entrepreneurship cell for promoting small scale industries relevant to need of the area	1	2	3	4	5
6.3	IIP	The institute has a science park with required facilities exists and is active	1	2	3	4	5
6.4	IIA	The institute attracts industry professionals to resolve their industry related problems by interacting with faculty members	1	2	3	4	5
6.5	IID	The institute provides equipment, software and lab facilities to industry personnel's to develop and implement new ideas with the help of institute faculty	1	2	3	4	5

#### 7. Industry visits

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
7.1	VSP	Many UG / PG / PhD students of all departments take up industry related problems as their project regarding work	1	2	3	4	5
7.2	VSU	The students make regular visits to nearby important industries	1	2	3	4	5
7.3	VSH	Good percentage of UG/PG students carry out summer internship / training in industries	1	2	3	4	5
7.4	VSI	The faculty members visit the relevant industries to understand their problems	1	2	3	4	5

		and subsequently take it up as a project or consulting work					
7.5	VSA	The industry professionals regularly attend summer / winter courses, workshops and conferences by the institute to update their knowledge	1	2	3	4	5
7.6	VST	The technicians and lab staff of the institute visit industries to have better exposure and training	1	2	3	4	5
7.7	VSL	The industry professionals spend longer duration (three month or more in the relevant department of the institute for in-depth training / higher qualification)	1	2	3	4	5
7.8	VSW	Few workshops/seminars/conferences are jointly organized with industries	1	2	3	4	5

### 8. Consultancy Work

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
8.1	CWG	Approved guidelines exist to carry out consultancy work of industries / govt.organisations	1	2	3	4	5
8.2	CWB	Consultancy work is benefitted to both the institute and the industry	1	2	3	4	5
8.3	CWF	Faculty are enthusiastic in taking up consultancy work	1	2	3	4	5
8.4	CWE	The institute encourages in taking up of consultancy work	1	2	3	4	5
8.5	CWQ	The consultancy work taken up by the faculty is quite satisfactory	1	2	3	4	5
8.6	CWL	The laboratory and computational facilities are available for consultancy work	1	2	3	4	5
8.7	CWW	Consultancy work by faculty is given due weightage in promotion	1	2	3	4	5

### 9. Seminars / Workshops / Conferences

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High

9.1	SWE	The institute encourages conducting seminars, workshops and conferences etc.,	1	2	3	4	5
9.2	SWA	Adequate number of such events are conducted in the department	1	2	3	4	5
9.3	SWC	These events are conducted in cutting edge area of various disciplines	1	2	3	4	5
9.4	SWI	Infrastructure(Guest houses, seminar rooms and audio visual aids) in the institute exists to conduct such events	1	2	3	4	5
9.5	SWF	International conferences with adequate number of foreign participants are conducted at regular intervals	1	2	3	4	5

#### 10. Students' participation in research activities

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
10.1	SPR	Students are encouraged for carrying out R&D, work within the institute	1	2	3	4	5
10.2	SPC	In the course curriculum some provisions have been made to impart research culture to the students	1	2	3	4	5
10.3	SPF	Faculty involves UG students to be a part of their ongoing research projects	1	2	3	4	5
10.4	SPI	Institute encourages and provides financial support to students to attend conferences held in India and abroad	1	2	3	4	5
10.5	SPL	Research labs and facilities are accessible to UG/PG/PhD students in normal/ holidays	1	2	3	4	5
10.6	SPJ	Incentives are provided to students for publishing papers in good journals	1	2	3	4	5
10.7	SPD	Faculty cooperates and provides guidance for UG/PG students for doing some R&D work	1	2	3	4	5

#### 11. Research Activities

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
11.1	RAJ	No. and quality of publications by faculty in	1	2	3	4	5

		referred journals					
11.2	RAC	Participation and presentation of papers in conferences in India and abroad by faculty	1	2	3	4	5
11.3	RAB	No. of books and book chapters written by faculty	1	2	3	4	5
11.4	RAP	No. of Indian / foreign patents filed / granted	1	2	3	4	5
11.5	RAF	Frequency of national and international conferences conducted in the department	1	2	3	4	5
11.6	RAQ	Quality and number of research projects carried out in the department	1	2	3	4	5
11.7	RAM	Multi disciplinary projects are undertaken by faculty	1	2	3	4	5
11.8	RAU	Joint research projects undertaken in other institutions	1	2	3	4	5
11.9	RAA	Joint research projects with other universities abroad	1	2	3	4	5

#### 12. Contribution to Industry

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
12.1	CIF	Faculty members are involved in consultancy work with industry	1	2	3	4	5
12.2	CIR	Revenue coming from consultancy work	1	2	3	4	5
12.3	CID	Contribution of faculty in product development and technology transfer for production	1	2	3	4	5
12.4	CIE	Continuing Education program for Industry professionals	1	2	3	4	5

#### 13. Contribution to society

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
13.1	CST	Specific technical contribution for growth of economy of the country	1	2	3	4	5
13.2	CSU	Specific technical contribution for upliftment of poverty and illiteracy of common people	1	2	3	4	5
13.3	CSD	Specific technical contribution towards improvement of health of common people	1	2	3	4	5

#### 14. Research Guidance

S.No	Code	Factor	Extremely low	Low	Medium	High	Extremely High
14.1	RGL	The laboratory and computational facilities are available to students in holidays and off hours	1	2	3	4	5
14.2	RGG	All eligible faculty members guide students for PhD programs fulltime / part-time	1	2	3	4	5
14.3	RGP	No. of PhD students available in the department is good enough	1	2	3	4	5
14.4	RGF	PhD / M. Tech students spend time in foreign universities / industry to carry out part of their research work.	1	2	3	4	5
14.5	RGD	No. of students awarded PhD / MS / Post Doctoral degrees per year is increasing steadily	1	2	3	4	5
14.6	RGT	Time is available to faculty after teaching and administrative work for guiding students and carrying out effective research and consultancy work	1	2	3	4	5

15. Outline few bottlenecks that need to be removed for overall improvement in R&D and consultancy activities of the institute

- a)
- b)
- c)

16. Outline few major strengths of the institute to promote R&D activities

- a)
- b)
- c)

17. Based on your knowledge (In terms of R&D, publications, patents, product development) list the three departments in order

1)

2)

3)

18. List the three major research focus of the institute and the major activities and outputs

a)

b)

c)



## Questionnaire for the Present NIT Students

### Guidelines for filling the Questionnaire

Please provide the response in the space provided in the square bubble () with a tick mark.

### PART I- Personnel Details

1)

Name of the NIT attending	Program of Study *	Department	Year of Admission	Current semester attending

(\* Please Specify the Program of Study as B.Tech/M.Tech/MBA/M.Sc/Ph.D/Dual Degree/Any Other programmes)

(\*\*If you have completed more than one degree, please specify the details separately)

2) Gender:      Male       Female

3) Age : 18-23       24-29       30-35       36-41       42-47  Above 47

4) According to your opinion what is the present rank of the institute among all the 30 NITs \_\_\_\_\_

(Please specify the rank in the space provided)

**PART II - INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE**

Please provide your response on a scale of 1 to 5 where 1 stands for extremely low and 5 represents extremely high by circling the appropriate option for each question given in the questionnaire

**1) Institutional Facilities**

S.No	Code	Factor	Extremely low	Low	Undecided /Neutral	High	Extremely High
1.1	IAF	Academic infrastructure	1	2	3	4	5
1.2	IAU	Adequate space for accommodating the academic complex and support units	1	2	3	4	5
1.3	ISC	Seminar and conference halls	1	2	3	4	5
1.4	IAF	Auditorium facility	1	2	3	4	5
1.5	IMH	Medical facility and healthcare	1	2	3	4	5
1.6	ISG	Sports, games and gym facilities	1	2	3	4	5
1.7	ISA	Student activity centre	1	2	3	4	5
1.8	IBA	Bank-ATM/Bank and Post office facility	1	2	3	4	5
1.9	IDW	Drinking water facilities	1	2	3	4	5
1.10	ISP	Adequate space for accommodating the departments / Classrooms / Laboratories etc.,	1	2	3	4	5
1.11	IRA	Residential accommodation for teaching and non-teaching staff	1	2	3	4	5
1.12	IPB	Adequate facilities for power backup all over the institute	1	2	3	4	5

**2) Teaching and Learning**

S.No	Code	Factor	Extremely low	Low	Undecided /Neutral	High	Extremely High
2.1	TEC	Effective classroom teaching and lab practices	1	2	3	4	5
2.2	TLR	Quality of teaching	1	2	3	4	5
2.3	TIP	Industry based projects	1	2	3	4	5
2.4	TGS	Guidance in students projects	1	2	3	4	5
2.5	TCA	Tutorial classes and assignments	1	2	3	4	5
2.6	TAL	Additional learning beyond syllabus	1	2	3	4	5
2.7	TFA	Financial assistance to students for presenting research papers in conferences and workshops					
2.8	TGL	Guest lectures by eminent professors/professionals from industry	1	2	3	4	5
2.9	TAV	Audio visual facilities in classrooms	1	2	3	4	5
2.10	TCS	Coverage of the course syllabus	1	2	3	4	5
2.11	TEP	Continuous evaluation procedure	1	2	3	4	5

### 3) Departmental Faculty

S.No	Code	Factor	Extremely low	Low	Undecided /Neutral	High	Extremely High
3.1	DAN	Required number of faculty	1	2	3	4	5
3.2	DFQ	Quality of the faculty( based on the educational qualifications and based on experience)	1	2	3	4	5
3.3	DFS	Support / Helping attitude of the faculty	1	2	3	4	5

3.4	DFR	Quality of research activities carried by faculty	1	2	3	4	5
3.5	DRP	Research papers published by the faculty in reputed journals	1	2	3	4	5
3.6	DBC	Books, Monographs , Book chapters published by the faculty	1	2	3	4	5
3.7	DFP	Patents granted to the faculty	1	2	3	4	5
3.8	DFP	Faculty presenting papers in International conferences	1	2	3	4	5
3.9	DFC	R&D projects and consultancy work carried out by the faculty	1	2	3	4	5
3.10	DFP	Faculty members are known in their field in country	1	2	3	4	5
3.11	DFA	Faculty members receive awards and recognitions.	1	2	3	4	5

#### 4) Department Infrastructure

S.No	Code	Factor	Extremely low	Low	Undecided /Neutral	High	Extremely High
4.1	DSF	Proper seating facility for faculty with provision of computational and internet facilities	1	2	3	4	5
4.2	DSH	Departmental seminar halls	1	2	3	4	5
4.3	DSR	Proper seminar rooms and computational facilities	1	2	3	4	5
4.4	DWS	Proper seating facility for Ph.D students with provision of computational and	1	2	3	4	5

		internet facilities					
4.5	DLS	Adequate and proper laboratory space	1	2	3	4	5

### 5) Course Curriculum

S.No	Code	Factor	Extremely low	Low	Undecided /Neutral	High	Extremely High
5.1	CBU	Balanced and updated curriculum	1	2	3	4	5
5.2	CAE	Provision of adequate electives in the curriculum	1	2	3	4	5
5.3	CBC	Provision of the breadth courses(courses of other departments) in the curriculum	1	2	3	4	5
5.4	CEL	Emphasis on laboratory and project work	1	2	3	4	5
5.5	CPN	Course curriculum in meeting the present industry needs	1	2	3	4	5

### 6) Laboratory

S.No	Code	Factor	Extremely low	Low	Undecided /Neutral	High	Extremely High
6.1	LEL	Availability of required number of well equipped laboratory	1	2	3	4	5
6.2	LEC	Adequate number of equipment to conduct all experiments	1	2	3	4	5
6.3	LAR	Lab equipment are repaired and well maintained					
6.4	LSE	Availability of sophisticated equipment for conducting high end experiments	1	2	3	4	5
6.5	LTS	Qualified technical staffs	1	2	3	4	5
6.6	LAC	Adequate computational facility with high	1	2	3	4	5

		speed internet connectivity					
6.7	LPC	Availability of latest and sufficient personnel computers and servers	1	2	3	4	5
6.8	LPC	Availability of dedicated software	1	2	3	4	5

### 7) Library and Computer networking

S.No	Code	Factor	Extremely low	Low	Undecided/Neutral	High	Extremely High
7.1	LWF	Well maintained and furnished library	1	2	3	4	5
7.2	LQF	Qualified library staff	1	2	3	4	5
7.3	LSJ	Subscription of important and referred journals in all disciplines	1	2	3	4	5
7.4	LHI	Availability of high speed internet facility in the campus	1	2	3	4	5
7.5	LAT	Adequate availability of textbooks, reference and E books	1	2	3	4	5
7.6	LCF	Adequate computational facilities	1	2	3	4	5

### 8) Research initiatives for students

S.No	Code	Factor	Extremely low	Low	Undecided/Neutral	High	Extremely High
8.1	ROF	Organising technical seminars and paper presentations for students	1	2	3	4	5
8.2	RPS	Professional society activities of students	1	2	3	4	5
8.3	RAR	Association of students in ongoing research project	1	2	3	4	5

8.4	RRD	Provision of academic slots for carrying out R&D work	1	2	3	4	5
8.5	RFA	Financial assistance to students for presenting papers in national / international conferences	1	2	3	4	5
8.6	RPB	Publications by students	1	2	3	4	5
8.7	RPF	Patents filed by students	1	2	3	4	5

### 9. Consultancy work

S.No	Code	Factor	Extremely low	Low	Undecided/Neutral	High	Extremely High
9.1	CQD	Number and quality of consultancy activities in your department	1	2	3	4	5
9.2	CQI	Number and quality of consultancy activities in your institute	1	2	3	4	5

### 10. Recognition of Department

S.No	Code	Factor	Extremely low	Low	Undecided/Neutral	High	Extremely High
10.1	RRD	Rating in terms research and development of your department compare to other department of your institute	1	2	3	4	5
10.2	RRI	Rating in terms research and development of your department compare to same department in other similar institutes of India	1	2	3	4	5
10.3	RSC	Special recognition earned by your department	1	2	3	4	5

11) According to your knowledge name three departments which excel in research activities

- a)
- b)
- c)

12) Give three suggestions which will help to improve research and consultancy activities of your institute

- a)
- b)
- c)



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