सत्यमेव जयते

Report of the Comptroller and Auditor General of India on Performance Audit of Setting up of new Indian Institutes of Technology (IITs)

लोकहितार्थ सत्यनिष्ठा
Dedicated to Truth in Public Interest

IIT Bhubaneswar | IIT Gandhinagar | IIT Hyderabad | IIT Indore

IIT Jodhpur | IIT Mandi | IIT Patna | IIT Ropar

Union Government (Civil)
Ministry of Education
Report No. 20 of the year 2021
(Performance Audit)

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Comptroller and Auditor General of India
on
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Preface

This report of the Comptroller and Auditor General of India has been prepared for submission to President of India under Article 151 of the Constitution of India for being laid before the Parliament.

The Indian Institutes of Technology (IITs) are autonomous institutions for education and research in engineering matters in India. Prior to 2008, there were seven IITs, the number was increased to 15 by 2009 and 23 by 2016. This was done to facilitate the expansion of educational and research facilities to meet the skilled manpower needs of the country. This report contains the results of the Performance Audit on setting up of eight new IITs during 2008-09 and covers the activities of these IITs pertaining to the period 2014-19.

The audit has been conducted in conformity with Auditing Standards and Regulations on Audit and Accounts 2007 of the Comptroller and Auditor General of India. The Performance Audit attempted to assess availability of land, creation of infrastructure for achieving the envisaged student enrolment, procurement of equipment and services, general financial management and academic/research activities of IITs. This report also covered oversight mechanism in administering these IITs.

The report has been finalised after considering the response of the individual IITs and Ministry of Education (MoE), Government of India.

Audit wishes to acknowledge the co-operation extended by the IITs and the MoE at various stages during the conduct of this Audit.

Executive Summary

Indian Institutes of Technology (IITs) are autonomous, apex institutions for engineering education and research in India. They are governed by the Institutes of Technology Act, 1961 (Act). Seven IITs were set up between 1951 and 2001**.** The eleventh five-year plan (2007-12) envisaged setting up of eight new IITs for the expansion and upgradation of institutions rendering technical education to meet the skilled manpower needs of the country, while also providing for social equity.

A Performance Audit (PA) on setting up of these eight new IITs (IIT Bhubaneswar (IITBBS), IIT Gandhinagar (IITGN), IIT Hyderabad (IITH), IIT Indore (IITI), IIT Jodhpur (IITJ), IIT Mandi, IIT Patna (IITP) and IIT Ropar) established during 2008-09 was taken up with the objective to assess whether creation of infrastructure, procurement of equipment and services, academic and research activities, governing and oversight and financial management was done in an economical, efficient and effective manner. Audit scope covered a period of five years from 2014 to 2019.

The major observations of the PA are as under:

Chapter – III: Creation of Infrastructure

- All the eight new IITs commenced their academic activities initially from temporary campus and subsequently initiated construction of permanent campuses in the land allotted to them by the respective state governments. It was noticed that in IIT Hyderabad, IIT Indore, IIT Jodhpur and IIT Patna, sufficient land as envisaged (500-600 *acres*) by the Ministry of Education (MoE) was available while in IIT Bhubaneswar, IIT Gandhinagar, IIT Mandi and IIT Ropar, issues in allotment and transfer of land persisted even after a decade of their establishment. The lack of requisite land was a major impediment for the IITs in providing planned facilities to the students.

- Though the infrastructure works like construction of academic buildings, hostels, laboratories etc., were undertaken in a phased manner in all IITs from 2012, the pace of their creation did not correspond with the pace of envisaged increase of student/faculty. The delays were significantly high in respect of five IITs (IITH up to 56 months, IIT Mandi up to 41 months, IIT Ropar up to 39 months, IIT Gandhinagar and IITI up to 37 months).

- The non-achievement of targets of infrastructure development in a timely manner affected student intake in all eight IITs, along with timely installation of equipment and proper fund management.

- This also resulted in spill-over of the infrastructure development beyond the six years project period. This necessitated revision of the capital outlay from ₹6,080 crore to ₹14,332 crore and the project period to 13 years.

Apart from delays and upward cost revision, there were significant infirmities such as award of works to consultants/contractors on nomination basis without tender procedures

thus violating General Financial Rules, deficient contractual agreements imposing indefinite liability/financial commitments on the IITs, idling of assets created, non-provision of accessibility to the persons with disabilities and non-construction of FoB/Underpass jeopardizing the safety of students and other users. Substantial delays in supply of equipment, delays in commissioning/installation of equipment due to failure of IITs in ensuring the site readiness and making proper assessment of required accessories resulted in the laboratory/research requirement of students not being met, thus affecting the quality of their learning.

Chapter – IV: Financial Management

- Audit noticed that proportion of the internal receipts (fees, interest, consultancy works, publications etc.) to the recurring expenditure of the IITs was very low even after having been established over a decade. This forced these IITs to be heavily dependent on Government of India (GoI) grants for meeting recurring expenditure.
- In IITH, inordinate delay of three years in utilizing available funds of Japan International Cooperation Agency (JICA) loan was noticed which resulted in non-achievement of intended objective of advancement of academic and research activities in the Campus in timely manner (Phase-II).

Chapter – V: Academic Programmes and Research Activities

- Ministry of Education (MoE) envisaged an overall targeted intake of 18,880 students in the initial six years (2008-14) across eight IITs. It was noticed that only 6,224 students (33 *per cent*) could be admitted in all the eight IITs during this period, thereby not fully achieving its objectives of maximizing educational opportunity to students.
- In PG/Ph.D programmes, vacancies were observed across all eight IITs indicating a need for realistic assessment of the student intake as well as evaluation of these programmes with an objective of attracting required suitable students.
- MoE permitted increase in sanction of faculty positions linked with the increase in students i.e., sanction of faculty posts to be increased by one for every increase of students by 10 (1: 10 ratio). Despite the efforts put in by the IITs and increase in faculty recruitment from year-to-year, vacancies ranging from 5 to 36 *per cent* in faculty positions were observed in seven IITs. This inhibited speedy expansion of student intake. In the long run, the vacancies will have an impact on the quality of education as vacancies increase the workload on existing faculty in these premier institutions.
- There was inadequate representation of students belonging to reserved categories (SC/ST/OBC) in PG and Ph.D enrolment in all eight IITs, showing that the benefits of education at premier technical institutes is not reaching these students. In PG courses, the shortfall in SC student intake ranged upto 30 *per cent (*IITGN*)* and that of ST students ranged between seven *per cent* (IIT Ropar) and 69 *per cent* (IIT Gandhinagar). Similarly, in Ph.D courses, the shortfall ranged from 25 *per cent* (IIT Hyderabad) to 75 *per cent* (IIT Ropar) in respect of SC students and 65 *per cent* (IIT Bhubaneswar) to 100 *per cent* (IIT Jodhpur) in respect of ST students.

- In the area of research, non-government funded sponsored projects was low in all IITs. The non-government funded projects ranged from 0.35 *per cent* to 14.31 *per cent* in terms of project funds. All the eight IITs were able to attract substantial funding from government sources towards sponsored research projects. It was also noticed that though a number of patents were filed, no patents were obtained in five IITs during 2014-19 indicating the need for improvement in outcome of research activities. MoE envisaged establishment of Research and Technology Development Council in the governing structure of each IIT to provide policy guidance for research and development activities. It was noticed that the establishment of the councils was still in nascent stages in most of these IITs, thus impeding the necessary thrust required to be given to the pace of R&D activities in these IITs.

Chapter – VI: Governing and Oversight Bodies

- The Act and Statutes stipulate for constituting governing bodies such as Board of Governors, Senate, the Finance Committee and the Buildings and Works Committee. Further, the Act/Statutes also provide for a Chairman of Board, Director, Deputy Director and Registrar as Officer of the IIT who are required to perform such duties as may be prescribed under the Act and the Statutes. It was noticed that inadequate supervision by the governing bodies led to delays in execution/completion of the infrastructure works, thereby impacting *inter alia* student intake, introduction of courses, effective execution of research activities etc., as observed in the report.

Chapter I: Introduction

1.1 About IITs

Indian Institutes of Technology (IITs) are autonomous, apex institutions for engineering education and research in India. As of March 2020, there are 23 IITs across the country. Out of these 23 IITs, seven IITs were set up between 1951-2001, eight IITs during 2008 and 2009 while the other eight IITs were set up between 2012-2016.

IITs offer academic courses in various branches of engineering and technology at both Undergraduate (UG) and Postgraduate (PG) levels. Admission into the courses offered by all IITs is based on merit in entrance tests, viz., Joint Entrance Examination (JEE-Advanced) for B.Tech. courses, Graduate Aptitude Test in Engineering (GATE) for M.Tech. and Joint Admission Test for M.Sc. courses (JAM).

1.2 Powers and duties of IITs

All IITs are governed by the 'Institutes of Technology Act, 1961' (hereinafter referred as Act) a Central Statute, which declared the IITs to be institutions of national importance. The Act envisages that the IITs provide for instruction and research in such branches of engineering and technology, sciences and arts, as the IITs may think fit. It also lays down that the IITs take steps for the advancement of learning and dissemination of knowledge in such branches, to hold examinations, to confer honorary degrees, to frame statutes and ordinances etc.

In line with the provisions of the Act, IITs offer Undergraduate programmes[1] in various branches of engineering and technology, Postgraduate programmes[2] with specialization and Ph.D. programmes in engineering, science and interdisciplinary areas. The IITs also conduct basic, applied and sponsored research.

1.3 Organisation structure of IITs

The organisation structure of the IITs as mandated by the Act and Statutes is as depicted in ***Chart 1.1***:

[1] Bachelor of Technology (B.Tech.), Bachelor of Architecture (B.Arch.), Bachelor of Design (B.Des.)
[2] M.Tech., M.A., M.Sc., M.Des., M.Phil., MBA

Chart 1.1: Showing organisation structure of IITs

The Visitor	• The President of India is the Visitor of all IITs. • The Visitor may appoint people to review the work/progress of any IIT and to hold inquiries into its affairs.
Council of IITs	• A central body to coordinate the activities of all the IITs., headed ex-officio, by the Union Minister of Education. • Chairman & Directors of all IITs are members. • Advises on matters relating to admission standards, degrees, also lays down policy regarding cadres, methods of recruitment and conditions of service. • The Council appoints Director of each Institute with the prior approval of the Visitor.
Board of Governors (BoG)	• Each IIT is governed by its BoG responsible for the general superintendence, direction and control of the IIT. • The Chairman of the BoG is nominated by the Visitor and he/she presides over the Board meetings and ensures that the decisions taken by the BoG are implemented.
Senate	• The Senate of the IIT is responsible for maintenance of the standards of education and examination in the IIT.
Finance Committee (FC)	• Responsible for providing its views and make recommendations to the BoG on any financial matter relating to the Institute. It also provides advice and guidance relating to resource mobilization.
Building and Works Committee (BWC)	• The Building and Works Committee of each IIT, under the direction of the BoG, is responsible for construction of all major capital works of the Institutes.
Director	• Principal academic and executive officer of the IIT • Responsible for the administration of the IIT and for imparting of instruction and maintenance of discipline. • A number of Deans and the HoDs advise and assist the Director on the matters of education and research.
Registrar	• Custodian of records, the common seal, the funds of the IIT etc. • Acts as the Secretary of the Board, the Senate and such committees as may be prescribed by the Statute. • Responsible to the Director for the proper discharge of his functions

1.4 Sources of finance

To enable the IITs to discharge their functions efficiently under the Act, the Central Government, after appropriation made by Parliament by law, pays to each IIT in each financial year, such sums of money and in such manner as it may think fit. These consists of Grants (capital and recurring nature) and Loans (both from internal as well as external agencies) provided through Government of India. Besides, IITs are empowered to generate internal revenues in the form of fees and other charges, as envisaged by the Act.

Chapter II: Audit Framework

Why we chose this topic?

The Eleventh five-year plan (2007-12) envisaged setting up of eight new IITs for the expansion and upgradation of institutions rendering technical education to meet the skilled manpower needs of the country, while also providing for social equity.

The setting up of new IITs was approved (July 2008) by the Cabinet and eight new IITs viz., IIT Bhubaneswar (IITBBS), IIT Gandhinagar (IITGN), IIT Hyderabad (IITH), IIT Indore (IITI), IIT Jodhpur (IITJ), IIT Mandi, IIT Patna (IITP) and IIT Ropar were set up during 2008 and 2009.

A Performance Audit (PA) was undertaken to assess the setting up of these new IITs i.e., whether the targets set have been achieved as envisaged and whether there is scope for improvement in the overall functioning of these IITs.

2.1 Audit Objectives

The PA was taken up with the objectives as to assess whether:

a. Infrastructure creation of the IIT was carried out economically, efficiently and effectively;

b. Procurement of equipment and services was made in an economical, efficient and effective manner;

c. The governing and oversight bodies provided effective stewardship and managed the financial resources in economical, efficient and effective manner; and

d. Academic programmes and research activities were introduced and carried out as envisaged, in an efficient and effective manner.

2.2 Audit Criteria

Audit criteria were derived from the following:

a. Institutes of Technology Act 1961, as amended from time to time, Rules and Regulations thereunder,

b. Statutes of the respective IITs,

c. Outcome Budget of Ministry of Education (MoE) - 2016-17,

d. Report of Dr. Anil Kakodkar Committee appointed by MoE to recommend *Autonomy Measures to Facilitate IITs Scaling to Greater Heights* (Accepted by IIT Council),

e. Detailed Project Report (DPR) of MoE on setting up new IITs (2008),

f. Minutes of meetings of IIT Council/BoG and various committees,

g. Central Public Works Department Manual/Code and General Financial Rules (GFRs) 2005 and GFRs 2017 and

h. Agreements of selected infrastructure works.

2.3 Audit Scope

The Performance Audit was conducted under Section 19(2) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971 read along with Section 23(2) of the Institutes of Technology Act, 1961 covering the activities of IITs over five years (2014-19)[3] in areas of overall management including:

- Creation of infrastructure
- Procurement of equipment and services
- Financial management
- Academic performance

2.4 Audit Methodology

The Performance Audit commenced with entry conference held during August 2019 by the five participating field Audit offices of the CAG[4] with the respective Director of the eight IITs under their jurisdiction. In these entry conferences, audit objectives, scope, audit criteria and audit sampling were informed and discussed. Thereafter, the PA was conducted during 2019 and 2020.

Audit Methodology included scrutiny of records, obtaining information through standardised annexures and joint physical inspection of selected infrastructure works.

Exit conferences were held with the respective IITs during November/December 2020 wherein major audit findings and other issues were discussed by the jurisdictional audit office.

2.5 Audit Sampling

Audit sampling was adopted in four Audit areas. Samples were drawn for detailed examination using Simple Random Sampling without Replacement (SRSWOR) method (as detailed vide ***Appendices 2.1*** and ***2.2***) as shown in the ***Table 2.1***:

Table 2.1: Audit area-wise Universe and Sample selected for detailed examination

Sample	Audit area	Universe	Sample selected
1	Infrastructure Projects/works	307	**136**
2	Procurement of Equipment and Services	9925	**437**
3	Research Projects	1717	**208**
4	Faculty	996	**307**

[3] In respect of some areas for better presentation, the data since inception of the respective IITs has been considered. This includes data related to the formation of the IIT, shifting from temporary/transit campus, master plans for infrastructure and introduction of courses. However, in respect of financial management, the availability of fund and its utilization was considered for the period 2014-20.

[4] Represented by the respective Director General/Principal Director of Audit (Central).

2.6 Acknowledgment

Audit acknowledges the co-operation extended by the IITs' Management during the course of the Performance Audit.

2.7 About the Report

This report is prepared taking into consideration the replies of IITs to the initial observations/draft report and the observations of the Ministry of Education (MoE) to the draft report along with discussions/confirmations during exit conference with respective IITs.

Chapter III: Creation of Infrastructure

The Detailed Project Report (DPR) of MoE (erstwhile MHRD) provided that the new IITs would be residential institutes of an area about 500 to 600 *acres* each. The campus of each of these IITs would house the academic area and residential area for students, faculty and staff. The campus of the IITs would also contain facilities like guest house, health care (at the level of primary health clinic), small shopping centre along with banks, sports facilities, postal facilities, elementary and secondary schools for the children of faculty, staff and married students. The IITs were also to be fully equipped with laboratory equipment and computing equipment for the students to facilitate the learning process in line with the courses offered.

All the eight IITs commenced their activities from temporary/transit campuses before shifting to permanent campuses. The permanent campuses were to be developed in phased manner.

3.1 Audit Methodology and Sample selection

Under this audit area, Audit examined creation of infrastructure by eight IITs during the five-year period 2014-19 pertaining to (i) land allocation/availability (ii) planning by way of phasing the construction activities by respective IITs (iii) execution of phase-wise construction activities and (iv) supply and installation of equipment.

Audit assessed whether the activities mentioned at (ii) to (iv) above were carried out economically, efficiently and effectively.

A sample was drawn for audit examination from the total works/procurement contracts executed during the period 2014-19 by each IIT. The total sample drawn from the population of all works/procurement contracts executed by eight IITs during the period 2014-19 was as shown in ***Table 3.1***:

Table 3.1: showing works executed, sampling method and sample selected

No. of IITs	Total works executed during 2014-19	Sample Method	Sample size
8	307 (Infrastructure projects/works)	Simple Random Sampling without Replacement (SRSWOR) method	136
	9925 (Procurement of Equipment and Services)		437

Audit observations relating to creation of infrastructure are discussed below.

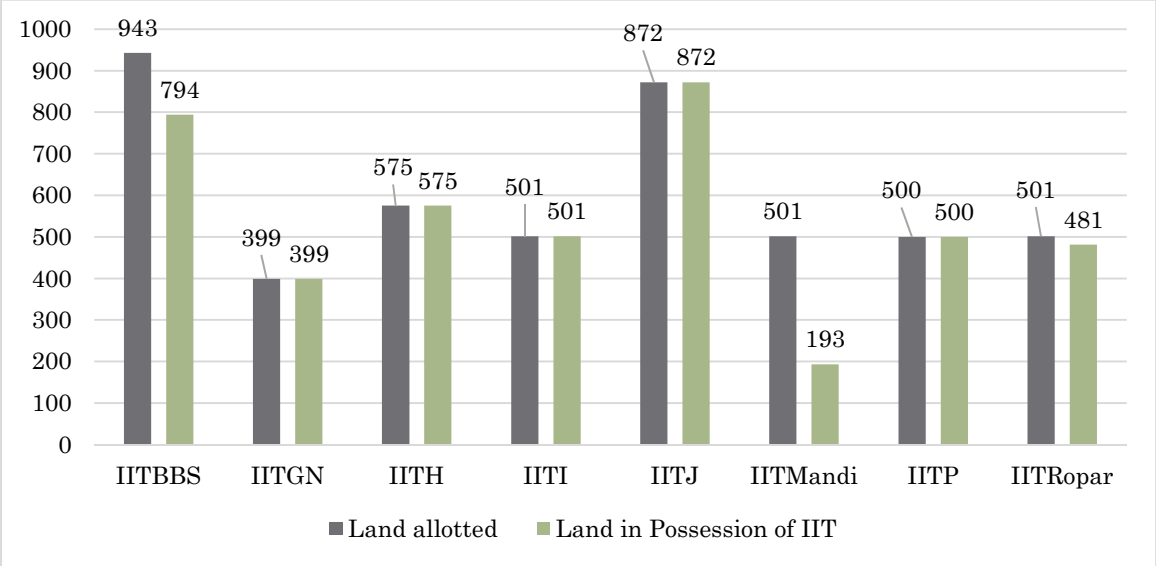
3.2 Availability of Land

Government of India (GoI) requested (2006) the respective state governments to identify and allot 500-600 *acres* of land (preferably land in possession of the government) free of cost, to each of the eight IITs, with necessary social and physical infrastructure like electricity, water, rail and road connectivity. The DPR also considered availability of 500-600 acres while planning for infrastructure development.

From the data furnished by the IITs, Audit observed that the allotment and transfer of land by the state governments commenced during 2008-2012. As of November 2020, allotment and transfer of land was completed in four IITs (IITH, IITI, IITJ and IITP) while in four other IITs (IITBBS, IITGN, IIT Mandi and IIT Ropar), large land portions were pending possession as shown in ***Chart 3.1***:

Chart 3.1: showing land availability in IITs

(Area *in acres*)



In IITGN, although 399 *acres* of land had been allotted to the Institute, 150 *acres* of land was in unsuitable condition. Hence, 165 *acres* of land compensating the unusable land was sought from the state government. The reasons for shortfall in allotment/possession of land are discussed IIT-wise at Paras 3.4.1(a), 3.4.2(a), 3.4.6(a) and 3.4.8(a) below.

3.3 Master Plans and construction activities

Each IIT developed their own Master Plan which was approved by respective BoG/BWC. These Master Plans include detailed infrastructure requirements and allocated land for various academic and non-academic purposes like housing, transportation, infrastructure etc. and their development in phased manner. The major construction works in all the eight IITs were undertaken in Phase-I and Phase-II during 2012-19. The IITs have also executed other works like construction of compound wall, shifting of power stations, construction of roads etc. To execute these works, the IITs adopted two modes of execution i.e., (i) execution of works directly by the IITs by engaging contractors and (ii) entrusting the work to public works agencies like Central Public Works Department (CPWD), National Building Constructions Corporation (India) (NBCC) Ltd. etc., on deposit basis.

3.3.1 Phase-I and II: Overall Delays in Construction

Phase-I and Phase-II development in all the IITs comprised works as shown in ***Table 3.2***:

Table 3.2: Details of phase-wise works

Phase-I	construction of academic buildings, student hostels, residential accommodation for faculty and staff, laboratories in proportion to student/faculty/staff population.
Phase-II	construction of additional academic buildings, student hostels, faculty housing, staff housing, laboratories, Incubation Parks, Technology Research parks, guest houses, sports facilities etc. in proportion to the student/faculty/staff population as per the Master Plan.

Regarding phase wise construction works, audit observed the following:

(i) While construction activities under Phase-I were initiated in all the IITs during 2012, buildings under Phase-I were complete only in two IITs (IITBBS and IITJ), while they were incomplete in remaining six IITs as of March 2019.

(ii) Phase-II works were initiated during the period 2014-19 in five IITs (IITBBS, IITH, IITI, IITJ and IITP). Audit observed delays in execution of Phase-II building works in two IITs, namely IITBBS and IITI. Phase-II works were yet to be initiated in rest of the three IITs (IITGN, IIT Mandi and IIT Ropar).

Some of the facilities that were delayed in these IITs were academic buildings including research facilities, hostels, health centres and sports facilities. As such, envisaged campus development remained incomplete in IITs, despite a lapse of seven years since initiation of construction activities as shown in ***Table 3.3***:

Table 3.3: Completion of buildings under Phase-I and Phase-II as of March 2019

Name of the IIT	Phase-I Buildings		Phase-II Buildings	
	Planned	Completed	Planned	Completed
IITBBS	13	13	26	0
IITGN	7	3	Not initiated	Not initiated
IITH	8	6	10	0
IITI	13	12	11	0
IITJ	19	19	32	7
IIT Mandi	107	70	Not initiated	Not initiated
IITP	18	15	16	0
IIT Ropar	33	14	Not initiated	Not initiated
Grand Total	**218**	**152**	**95**	**7**

3.3.2 Delays observed in sampled works

The test-check of the constructions works was conducted on the sample selected as detailed at Paragraph No. 3.1. It was observed that in respect of the sampled works, the completion under Phase-I, Phase-II and other works were delayed in all the eight IITs as shown in ***Table 3.4***:

Table 3.4: Delay in execution of sampled Phase-I, Phase-II and other works to the end of 31 March 2019

Name of the IIT	Phase-I		Phase-II		Other works	
	No. of works delayed	Delay range (in months)	No. of works delayed	Delay range (in months)	No. of works delayed	Delay range (in months)
IITBBS	7	1-20	2	1-5	Nil	Nil
IITGN	16	1-37	Construction not started		Nil	Nil
IITH	1	52	In Progress		10	2-56
IITI	4	5-37	4	1-14	Nil	Nil
IITJ	1	17	In Progress		5	2-6
IIT Mandi	8	2-41	Construction not started		3	3-36
IITP	3	15-22	Construction started but not part of sample		8	2-18
IIT Ropar	9	4-39	Construction not started		1	18
Total	**49**	**1-52**	**6**	**1-14**	**27**	**2-56**

The delays were significantly high in respect of five IITs, viz., IITH (upto 56 months), IIT Mandi (up to 41 months), IIT Ropar (upto 39 months), IITGN and IITI (upto 37 months).

The reasons for delays *inter alia* included excessive time taken in finalization of designs, obtaining regulatory clearances, statutory approvals, default on part of contractors, shortage of labour and remoteness of area etc. These are discussed IIT-wise in the subsequent paragraphs.

Delays which occurred in execution of phased works impacted, among other things, the effective performance of these IITs as it resulted in low student intake, delays in installation of equipment and inadequate residential accommodation.

These delays also resulted in overall cost overrun of ₹8,252 crore for all the eight IITs [refer Paragraph No. 4.1.1(a)], while the works concerned remained incomplete at the end of the targeted timelines. Due to these incomplete works, the IITs faced constraints in expanding their envisaged student intake and enrolment (refer Paragraph 5.1.2)

3.4 IIT-wise significant audit findings in infrastructure development

3.4.1 IIT Bhubaneswar

IITBBS commenced its activities under the mentorship of IIT Kharagpur at the latter's campus with effect from 2008. The scheduled date of shifting was July 2015 and the permanent campus of IIT Bhubaneswar (located at Arugul) started its academic operations from the academic session 2015-16 onwards.

a) Availability of land

Government of Odisha allotted (2009-10) 943.27 *acres* to IITBBS and accordingly the master plan of the Institute was prepared for development of infrastructure projects in phased manner. The allotted land included 305.11 *acres* of forest land. Out of the forest

land, 148.91 *acres* was not handed over[5] to the IIT till date (November 2020). As such, the reduction in availability of allotted land would prove to be a limiting factor in future expansions.

MoE replied (September 2021) that the conversion of forest land was pending at state government level and was under pursuance by the IIT. MoE did not specify if they had taken any steps to resolve this issue. The fact remains that the Master Plan, on the basis of which infrastructure was to be developed, was prepared taking into account around 900 acres of land. As such, the lack of requisite land hampered complete development of the IIT.

b) Execution of works

Phase-I works (11 works) in IITBBS were executed by CPWD. Out of these, only four works (faculty housing and administrative building) were completed as per schedule. The remaining seven works (lab complex, schools of electrical sciences, mechanical sciences, infrastructure, basic sciences, boys' hostel and compound wall) scheduled to be completed by October 2013 to March 2016 were however, completed by October 2014 to May 2016. Thus, the delay ranged between one and twenty months (as of 31 March 2019).

Phase-II works were executed by NBCC. Out of three works, two works (boys' hostel and package works) which were scheduled to be completed by October 2018/February 2019 were not completed by March 2019. The delay in completion ranged between one month and five months (as of 31 March 2019). Further, third work of Sewage Treatment Plant was under progress as of March 2019 (Scheduled completion by November 2019).

MoE replied (September 2021) that the delay in completion of Phase-I/II works was attributable to CPWD and NBCC. The main reasons were shortage in deployment of manpower and mistakes in the designs. IITBBS has been constantly monitoring the pace of execution by these PMCs. MoE also stated that two works have already been rescinded and penalty of ₹38.45 crore[6] has already been realised from defaulting contractors due to constant persuasion by IITBBS.

However, the fact remained that despite penalty being charged on the executing agencies, the development of permanent campus has been delayed significantly, thereby affecting the availability of intended infrastructure facilities during the delayed periods.

c) Faulty execution of fire safety works

National Building Code, 2005 (NBC)[7] provides that while taking up construction of building projects, the design should include statutory fire-fighting strategies.

In IITBBS, a consultant (Consulting Engineering Service (CES) India Pvt. Ltd.) was engaged (May 2010) to provide Project Development and Project Management Services for various buildings like hostels, staff quarters, guest houses etc., under Phase-I. It was observed that designs which were non- compliant with the fire safety norms of NBC 2005

[5] Handing over of land means transfer of possession of land. In case of emergency, the possession of land in advance is permitted by the State Government pending formal approval of alienation process.
[6] ₹12.08 crore-CPWD and ₹26.37 crore-NBCC
[7] Published by Bureau of Indian Standards (BIS)

were adopted for construction and buildings were built, thereby exposing the occupants to fire hazards. As a result, certain portions of six[8] buildings already constructed had to be dismantled (June 2015) at a cost of ₹32 lakh. Later, IITBBS estimated that an additional ₹2.18 crore would have to be incurred for installing firefighting systems to meet the requirements of NBC 2005.

This showed lapse of monitoring on the part of the BWC in ensuring that the buildings were appropriately designed meeting fire safety norms. Due to this lapse, IITBBS suffered a financial loss of ₹32 lakh.

MoE replied (September 2021) that the committee formed for finalising the remaining claims of CES, has recommended the recovery of ₹32.08 lakh from CES. Besides, the IIT has decided not to release ₹92.55 lakh to this consultancy agency due to such deficiencies.

The reply is not acceptable as it does not address the disruption caused to the scheduled activities of teaching and residence to the students/faculty and staff members.

3.4.2 IIT Gandhinagar

IITGN commenced its activities during August 2008 from a temporary campus at Vishwakarma Government Engineering College, Chandkheda under the mentorship of IIT Bombay. It later shifted to its permanent campus at Palaj, Gandhinagar during July 2015 to March 2016.

(a) Availability of land

The Government of Gujarat allotted (September 2010) 399 *acres* of land. Out of this, 150 *acres* was in ravines and prone to flooding and erosion. In lieu of this 150 *acres*, a request was made by IITGN for 165 *acres* of alternate land, which was not acceded by the state government. Thus, only 249 *acres* suitable for construction was available with IITGN as of November 2020. As such, the extent of land allotted by the Gujarat government (50 *per cent*) did not meet the required 500-600 *acres* of land to be made available to IIT as per the DPR. IITGN itself stated that the shortage in land availability is detrimental to future expansion of the campus.

MoE replied (September 2021) that the despite regular follow-up at various levels by the IIT to get the extra land allotted, the state government had not allotted additional land. In July 2016, state government had written to MoE that there was no need for additional transfer of land to IITGN. Thereafter, the IIT has been regularly following up with MoE to pursue the case with state government. However, MoE did not take up the issue of insufficient land to IITGN by the state government.

Hence, lack of the required land was a major constraint for the IIT in providing the requisite facilities to its students.

[8] Hostel with capacity for 800 boys, hostel with capacity for 200 girls, staff quarters, guest house, shopping complex and community centre

(b) Execution of works in Phase-I

Twenty-six works under Phase-I were initiated by IITGN[9]. Out of these works, 14 were completed (academic buildings, faculty/staff housing, boundary wall, electrical connections, hostels etc.) and two works (Institute's guest house and Director's residence, amphitheater and sport facilities) were under progress. It was seen that in respect of these 16 works executed, there was a delay ranging between one month and thirty seven months as of 31 March 2019. The balance ten works (water pipeline connection, HT connection and other allied activities) were completed within scheduled time.

MoE's reply (September 2021) stated that all three major works of housing, hostel and academic buildings in Phase-I were started from June/August 2013 and the entire process of shifting from old campus to new campus was completed in March 2016. Municipal facilities (sewer lines, water supply, electricity etc.) were not readily available and all these arrangements were made by the IIT. Due to the gamut of activities in the period from taking over the land up to occupying the buildings after completing all bulk services, the Phase-I works may not be treated as delayed.

The reply is to be viewed against the fact that in respect of the major works that were executed by CPWD namely academic buildings, faculty and staff housing, CPWD attributed the delays to late receipt of drawings, inconsistencies in architectural and structural drawings, post execution revisions, frequent changes etc. This showed poor initiative and laxity on part of the IITGN in ensuring the required pace and timeliness of campus development.

(c) Tendering and awarding of works

Rules 163 to 176 of GFR 2005 stipulate the process of identification, shortlisting and selection of consultants and outsourcing of services. CVC Circular No 23/7/07 dated 5 July 2007 also *inter alia* states that a tendering process or public auction is a basic requirement for the award of contract by any government agency.

Audit scrutiny showed that architectural consultancy services for five works[10] which included the construction of academic buildings, sports complex etc., in Phase-I was awarded on nomination basis at a consultancy fee of ₹7.64 crore, without following the said provisions of GFR. Further, it was also seen that the Owner's Architect and later a company owned by the Owner's Architect were also appointed on a nomination basis. A civil engineer from the company owned by the Owner's Architect was also appointed on a nomination basis.

Ministry replied (September 2021) that the works were awarded to architectural consultants by extending the scope of their services in accordance with the terms and conditions on valid reasons, based on their performance in the existing contract.

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[9] Out of 26 Phase–I works, eight major works were entrusted to CPWD, one to PWD and balance works were carried out by the IIT itself.

[10] (i) Bedroom and Studio Apartments, (ii) Academic buildings, (iii) Permanent Boundary wall and Entrance Gates, (iv) Central Arcade, Sports complex and Sports Ground, (v) Open Air Theatre, Car Parking and River Promenade

The reply is not acceptable, as IITGN did not follow the GFR while awarding the contracts to architectural consultants on nomination basis. Selection of architectural consultants through direct negotiations would not provide the benefits of competition in relation to quality and cost while also leading to lack of transparency in selection. MoE, accepted that IITs should follow the GFR for all matters related to engaging of consultants on nomination basis.

(d) Blocking up of funds for Research Park

Department of Science and Technology (DST), GoI approved (September 2016) Grant-in-Aid of ₹90 crore to IITGN for construction of a Research Park and released ₹40 crore and ₹16.10 crore in September 2016 and March 2019 respectively. Audit observed that although the funds were received by IITGN in September 2016, IIT released an advance of ₹29.60 crore to CPWD (as per the MoU) only in June 2018 for the construction of the Research Park. As such, there was a delay of 22 months on part of IIT in releasing the funds to CPWD which delayed the construction of Research Park.

MoE replied (September 2021) that the initial time taken is normal for the selection of architectural consultant, development of RFP, tendering process, award of work contract etc., for such a large value and new innovative project.

The reply is not acceptable as the funds were lying idle for 22 months with IITGN. The delay also deprived the students and faculty of the timely benefits of the envisaged Research Park which was not yet completed (September 2021).

3.4.3 IIT Hyderabad

IIT Hyderabad commenced its activities from a temporary campus at the Ordnance factory estate, Yeddumailaram, during 2008 under the mentorship of IIT Madras. Later, the Government of Andhra Pradesh (erstwhile) handed over 575.04 *acres* of land during 2008-12 at Kandi village, Sangareddy district, Telangana for permanent campus. As per the data made available to audit, the first academic building was completed in June 2016 and other buildings, namely hostels, dining, staff housing etc. were completed during February 2017 to April 2019.

(a) Execution of works: Delay in Phase-I construction

All the works under Phase-I were taken up as a single contract (construction of permanent campus) during the year 2012 and were scheduled for completion by November 2014.

A building-wise analysis revealed that there were delays ranging between two to five years in completion of the buildings like Chemical Engineering block, Mechanical Engineering block, Civil Engineering block, hostel blocks and residential housing. Only 31 *per cent* of agreement value amounting to ₹222.74 crore was spent within the agreement period of 24 months and none of the buildings was completed within the original agreement period of 24 months. As a result, the planned campus facilities as mentioned above could not be offered timely to student/staff and other residents.

MoE replied (September 2021) that the delay in construction in Phase-I was attributable to reasons like initial land disputes, shifting of service lines, frequent strikes over Telangana/Seemandhra agitations, serious hindrances in movement of labour and material, general elections, delay in release of funds by GoI in 2015-16, demonetization, implementation of GST and natural calamities which were beyond the control of any stakeholder. The IIT also replied (August 2021) that an amount of ₹4.94 crore was recovered from the contractor towards levy of compensation for delay.

The fact remained that the delay in construction resulted in depriving the students and faculty of the benefits of full-fledged infrastructure. Audit observed that at least three batches of students starting from 2014 completed their graduation without availing the complete benefit of the new campus like new academic buildings/laboratories and permanent hostel facilities.

(b) Inordinate delay in taking up of Phase-II

Phase-II works were estimated to cost ₹1,776.50 crore. Out of this, Japan International Co-operation Agency (JICA) sanctioned a loan of ₹1,501.72 crore to GoI during January 2014. The remaining ₹274.77 crore was funded by GoI and the release of funds started from 2013-14. The project period was four years from 2013-14 to 2016-17. Phase-II works included, among other works, construction of Laboratory complexes under Technology Incubation Park (TIP) and Technology Research Park (TRP). TIP and TRP were intended to provide space for start-ups.

It was observed in audit that the work pertaining to Phase-II was however awarded during March 2019, i.e., after five years from the date of loan agreement and scheduled to be completed by March 2022 (36 months from March 2019). As a result of the delay, the intended objective of advancement of academic and research activities in the Campus could not be achieved till date. This reflected inaction on the part of BWC/BoG in monitoring fund release and taking up of the construction activities in timely manner.

MoE replied (September 2021) that the work was delayed due to want of sanctions from the respective authorities, approval of designs, preparation and inviting of tenders and awarding of works to the contractor of this magnitude of project besides understanding and fulfilling the requirements of JICA guidelines and instructions.

The reply is not acceptable as reasons attributed in the reply were not justified for an inordinate delay of five years in awarding the contract (2019) after having signed the loan agreement with JICA for Phase-II infrastructure works in January 2014.

(c) Construction of STPs after occupancy of buildings due to delay in tendering and avoidable expenditure of ₹56.62 lakh

Two Sewage Treatment Plants (STPs) were proposed (September 2014) by BWC in the campus to meet sewage treatment requirements of hostels and academic buildings. IITH intended to re-use the treated effluent for Heating, Ventilation and Air-conditioning (HVAC), toilet flushing and horticulture in the permanent campus. The cost was estimated at ₹17 crore for civil works of both STPs (₹10 crore) and Electro-Mechanical (EM) works for first STP (₹ seven crore).

Audit observed that although the BWC was aware that STPs were to be built before occupancy of the buildings, it could not decide upon the appropriate technology for their operation. As such, the work relating to STPs was not considered during the tendering (August 2012) for Phase-I works. It was further observed that the STP works (Civil works) were entrusted in September 2014 during the execution of Phase-I works, to Phase-I contractor only. The contract was awarded as an additional item of work instead of putting this work to tender. This was in violation of GFR whereby IIT lost the opportunity of competitive prices. Moreover, the EM works of STP were separately awarded in March 2018 and completed in June 2019. Meanwhile, as the buildings were occupied during 2015, IIT planned for temporary sewage disposal by way of septic tanks, dispersion channels, soak pits etc. at an expenditure of ₹56.62 lakh (2015-18).

MoE replied (September 2021) that the work was executed in year 2018 as an extra/additional item with the ongoing contractor with their quoted agreement rates of the year 2012. It was completed along with Phase-I construction works and that there was no delay in construction of STP.

The reply is not acceptable since the STPs being prerequisite for occupation of the building, should have been completed before the buildings were occupied and in the absence of the STP, IITH had to make alternative arrangements for sewage disposal involving an avoidable cost of ₹56.62 lakh. Further, the civil works of STPs should have been tendered as required under GFR.

(d) Instances of undue benefit to Consultants

(i) Avoidable financial burden - ₹12.86 crore

IITH appointed (September 2011) a consultancy firm (M/s Tata Consulting Engineers Ltd.) as Project Management Consultant (PMC) for providing consultancy services, prior to awarding of Phase-I construction works. The consultancy fee for PMC was fixed at 1.81 *per cent* of the cost of construction works and the consultant was engaged for 36 months. The contract also provided for the payment of additional compensation for monitoring the progress of work even beyond the contractual period.

The contract for the construction project (Phase-I works) was awarded in November 2012 at a contract value of ₹643.97 crore and was to be completed within 24 months thereafter. Accordingly, the fee payable to PMC worked out to ₹11.66 crore (1.81 *per cent* of ₹643.97 crore) at the end of 36 months.

It was observed that the contract work of construction project (Phase-I) could not be completed within the stipulated period of 24 months (i.e., by November 2014) and was inordinately delayed by five years before completion in April 2019. As the consultancy fee for PMC was fixed at 1.81 *per cent* of the cost of construction works (₹643.97 crore), the consultant was paid ₹8.54 crore (09/2011 till 03/2019) for the completed portion of the work. Additionally, the PMC was paid on monthly basis, a total ₹12.86 crore[11] from 2015-16 to 2018-19 for delayed period beyond 42 months[12]. As such, the consultant got two parallel payments (from 03/2016 till 03/2019) i.e., the original consultancy fee

[11] ₹3.89 crore (2015-16), ₹2.75 crore (2016-17), ₹3.52 crore (2017-18) and ₹2.70 crore (2018-19)

[12] Monthly payment for the extended period would commence from the 43rd month from the date of appointment.

(@1.81 *per cent* of ₹637.97 crore) as well as monthly compensation from the 43rd month for the same consultancy services without providing any additional service. This led to avoidable payment on account of the additional compensation paid to the consultant.

MoE replied (September 2021) that delays had been thoroughly examined by PMC as well as BWC and accordingly justified delay had been worked out and that the contract was granted Extension of Time with the approval of competent authorities.

The reply is not acceptable since the contract was deficient as it provided dual payment for the same consultancy services during the extended period of the contract. This provided undue advantage to the consultant amounting to ₹12.86 crore (March 2019).

(ii) Indefinite time frame in contract

A contract was entered (March 2011) for providing consultancy services (design) for 'Architectural, Structural, Mechanical, Electrical and Plumbing (MEP) and Educational Technologies for the Computer Science and Engineering (CSE) Department'. The consultancy fee was fixed at five *per cent* of the 'accepted bid value'[13] of the proposed building, irrespective of completion cost. Provision for stage-wise[14] payments in ten installments was made in the agreement, based on the progress of the work and the final payment was to be made when the consultant submitted the 'As-Built drawings'[15]. As such, the contract had no completion date and the consultant was to be paid as and when the milestones mentioned in the contract were completed. A consultancy fee amounting to ₹42.02[16] lakh was paid (March 2011 to December 2012) for the work done up to Stage 6[17].

It was observed that the actual construction work of the CSE department, was taken up only in July 2019 i.e., after a delay of eight years, at an awarded cost of ₹47.38 crore. IITH recalculated the six stage-wise payments previously made to the Consultant as the earlier payments were made based on the estimated cost and not the accepted bid value[18]. Hence, the payment to the consultant was revised to ₹70.36 lakh[19] (September 2019) based on the 'accepted bid value' of the work done till December 2012. Resultantly, an additional fee amounting to ₹28.34 lakh (₹70.36 lakh - ₹42.02 lakh) was paid in September 2019. As such, delay of eight years in awarding the contract for the construction imposed an additional liability on the IIT, due to a natural escalation in costs over time.

MoE replied (September 2021) that the fees were payable on percentage basis of the value of the work irrespective of the duration of consultancy. The IIT had taken note of the audit observation and would henceforth implement the same in upcoming architectural agreements.

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13 Awarded value of the contract for the construction of the building

14 Schedule of payment as per the agreement is at stage (1st stage) 5% on Signing the contract, (2nd stage) 10% on approval of conceptual designs, (3rd stage) 10% on approval of the modified conceptual designs and drawings, (4th stage) 10% on approval of drawing by statutory bodies,(5th Stage) 20% on approval by the Institute "Good for construction" drawings, (6th stage) 10% on approval of the Institute, schedule of items with specifications, detailed estimate and tender documents, (7th stage) 10% on award of construction contract, (8th stage) 10% on 50% construction of completion of construction work, (9th stage) 5% on completion all construction works , (10th stage) 10% on submission of As-Built drawings

15 Design of the building

16 Based on the 'estimated cost' of ₹28.30 crore

17 Pre- award

18 ₹47.38 crore

19 The consultancy fee was reduced by IIT (April 2014) from 5.0 *per cent* to 4.5 *per cent* of the 'accepted bid value'

The reply is to be viewed against the fact that the contract was deficient as it was an open-ended contract and not constricted within a specific timeframe which imposed an indefinite liability on IIT Hyderabad.

(e) Non - accessibility of facilities to persons with disabilities

Ministry of Social Justice and Empowerment launched 'Accessible India Campaign' to ensure persons with disabilities have access on equal basis with others, to physical environment, to transportation, to information and communications technologies and system and to other facilities and services opened or provided to the public.

Audit observed that the toilet block for male and female users of the workshop building in Heavy Labs-3 was planned and built (2019) without provision of access for physically challenged students and other users.

MoE replied (September 2021) that the said requirement would be factored in all future constructions by providing entrance ramps and grab bars to extend access to the physically challenged students immediately.

(f) Construction of Foot-over-Bridge (FoB)

The permanent campus is located along National Highway 65 (NH65) connecting Andhra Pradesh, Telangana, Karnataka and Maharashtra. The main entry to the IITH Campus abuts the NH65 carrying the traffic of Hyderabad, proceeding to other districts of Telangana and Maharashtra and *vice versa*.

The BWC accorded (September 2017) approval for construction of FoB in a convenient location near the main entry of IITH to ensure safety of students, faculty, staff and other users of IIT campus. However, as on date (October 2020), the FoB has not been constructed, thus endangering the safety of IITH students, faculty and other stakeholders.

IITH in its reply (November 2020) stated that National Highways Authority of India (NHAI) had stipulated certain clauses including bearing the expenditure and had asked the IITH to acquire the land on the counter side of IITH for this purpose. NHAI also indicated that the FoB was to be transferred to NHAI once it was built. IIT being a central government organisation was not permitted to acquire land for such a purpose from GoI funds. Therefore, those clauses had hindered the IITH from undertaking any further steps in this direction.

Pursuance of this matter by MoE with NHAI/MoRTH could have addressed this issue. However, MoE did not take up this matter with NHAI/MoRTH (September 2021).

3.4.4 IIT Indore

IITI commenced its activities from a temporary campus at Institute of Engineering and Technology of Devi Ahilyabai University from academic year 2009-10 under mentorship of IIT Bombay. Later, the Government of Madhya Pradesh allotted a total land of 501.42 *acres* during 2012 at Indore, Madhya Pradesh. It started functioning from new campus from February 2016.

(a) Execution of works

Out of 20 sampled works, four works pertain to Phase-I which were examined in Audit. All the four works were executed by IITI and were scheduled to be completed between January 2015 and September 2016. Out of the four works, three works (workshop building, hub building and campus infrastructure works) were completed between June 2015 and August 2017 with delays ranging between five and nineteen months. One work (construction of permanent campus at Simrol) costing ₹307.95 crore, which was scheduled to be completed by February 2016, was yet to be completed, running into delay of 37 months as of March 2019.

Out of 16 Phase-II works examined, seven works were scheduled to be completed prior to 31 March 2019 while the other nine works were due for completion only after March 2019. Out of these works, two works (faculty housing and football ground) remained in progress as of March 2019 with delays ranging between four and seven months, while two works (footpath and ancillary works) were completed with delay of one to 14 months.

MoE stated (September 2021) that due to non-performance of the contractor, the contract for Phase-I was rescinded and BoG has taken a decision to impose liquidated damages of ₹30.61 crore for contractor's responsibility towards delay. No specific reply for the delay in Phase-II was provided by Ministry. However, it was stated that almost all the works are completed before the extended time of 31 March 2021.

The reply is to be seen in the light of the fact that Phase-I works were allotted to a new contractor in August 2021 with a timeline of six months to complete the work. Thus, students were deprived of the intended benefits of the campus even after lapse of more than five years since scheduled completion of permanent campus in February 2016.

(b) Non completion of Indoor Sports Centre

Indoor Sports Centre (ISC) was to be constructed under the work 'Construction of Permanent Campus Phase-IA(a) Part A' which was awarded (June 2014) to M/s Simplex Infrastructure Limited (SIL). It was scheduled to be completed by February 2016; however, this was not completed even till March 2019.

Audit observed that against the tendered amount of ₹12.63 crore, financial progress of only ₹7.20 crore (56 *per cent*) was achieved till March 2019 i.e., even after a delay of more than 57 months against the scheduled period of 20 months for completion.

MoE replied (September 2021) that due to non-performance, the contract was rescinded in June 2020 and balance work was awarded in August 2021 for completion of balance works at the risk cost of the contractor.

The reply may be seen in light of the fact that the indoor sports center could not be constructed even till November 2020, despite a lapse of six years.

(c) Assets created and not put to use

(i) Heating, Ventilation and Air-conditioning (HVAC) facilities were to be established under the work 'Construction of Permanent Campus Phase-IA (a) Part A'. The work was allotted to M/s Simplex Infrastructure Limited (SIL) (June 2014) at a cost of ₹15.18 crore.

Audit observed that even after a delay of more than four years from the scheduled date of completion (February 2016), the HVAC work was not completed by the contractor. This was due to inadequate deployment of resources and procurement of materials which resulted in idling of HVAC equipment worth ₹7.63 crore and depriving the IIT of its intended benefits.

MoE replied (September 2021) that due to non-performance, the contract with the contractor was rescinded in June 2020 and balance work was awarded in August 2021 for completion of balance works at the risk cost of the contractor.

The fact remained that equipment worth ₹7.63 crore was lying idle even after a lapse of more than three years and the planned services could not be delivered.

(ii) As per Rule 21 of GFR 2017, every officer incurring or authorizing expenditure from public moneys should be guided by high standards of financial propriety.

A football ground was to be constructed (July 2018) on the south side of the sports complex in IITI campus. The site of football ground was changed[20] (January 2019) to the north side of sports complex despite the fact that the north side of the campus was full of black cotton soil and located in a low-lying area. IITI ignored the possibility of water logging and work was awarded to contractors in July 2018 and May 2019. Further, the contract was closed in September 2018 and July 2019. An amount of ₹92.15 lakh was paid to the contractors.

It was observed that after closure of the contracts, the football field was uneven and there were bushes all over the football ground. Thus, the football ground was not in a ready condition even after incurring expenditure of ₹92.15 lakh[21].

MoE replied (September 2021) that the location was decided taking into consideration its vicinity and convenience. The filling and development work was executed to prevent water logging since it was necessary for developing the football ground as well as athletic track as per the orientation shown in the master plan. Balance work of development of football ground has been awarded to CPWD in February 2021 and CPWD has initiated the work of hiring of consultants for this purpose.

Fact remained that the football ground could not be put to use despite incurring expenditure of ₹92.15 lakh.

[20] For developing an athletic track

[21] ₹17.57 lakh paid to M/s NH Brothers + ₹74.58 lakh paid to M/s Jibbu Constructions

3.4.5 IIT Jodhpur

IITJ commenced it's activities with the mentorship of IIT Kanpur from a temporary campus at Muganiram Bangar Memorial (MBM) Engineering College, Jodhpur from 2009-10 onwards. The Government of Rajasthan allotted a total land of 872 *acres* at Karwad, in Jodhpur in 2011 for development of permanent campus. IITJ completely shifted its academic and research operations to its permanent campus by March 2018.

(a) Execution of works

In IITJ, entire Phase-I work was entrusted to CPWD. The work of development of the permanent campus costing ₹285.85 crore was scheduled to be completed by March 2017. It was however, seen that the work was completed by August 2018, with a delay of 17 months.

MoE replied (September 2021) that works were delayed due to variations in plinth area, additional works and structures, new items and use of new technology.

The fact remains that the envisioned facilities could not be provided timely to students and staff of the IITJ.

(b) Assets created not put to intended use

A joint physical verification revealed that a swimming pool (Jal Building) constructed up to plinth level under Phase-II was abandoned after incurring expenditure of ₹1.85 crore. Construction work taken up in October 2017 was stopped in September 2018 in compliance with the guidelines issued (July 2018) by MoE stating that the grants were not to be used for development of certain infrastructure such as swimming pools.

As per the reply received (September 2021) through MoE, IITJ replied that the plan of swimming pool was not being abandoned and whenever the IIT mobilises the fund from other sources, the incomplete work of swimming pool can be completed.

The reply of IIT may be read in the light of the fact that Ministry's guidelines (July 2018) *inter-alia* stated that the IIT could mobilise the funds (for categories of works in negative list) from other sources. However, IIT did not pursue the issue with the Ministry for ratification of expenditure made prior to the issue of guidelines (2018). IITJ could not also arrange for funds for completing the work of swimming pool which rendered the entire expenditure of ₹1.85 crore unfruitful as of November 2020.

(c) Non-construction of Underpass

To ensure safety of students crossing from one part of the Institute to another, IITJ planned (February 2011) to connect its western and eastern parts by an underpass to National Highway (NH 65). The work of preparation of General Architectural Drawing (GAD), Design and cost estimates was given (January 2016) to Public Works Department (PWD) NH, Jodhpur as deposit work for ₹0.18 crore. Audit observed that even after passage of three years, the construction of underpass could not be started.

MoE replied (September 2021) that that DPR, GAD, estimates and feasibility reports have been obtained in October 2019 and that demand for construction work was not raised by PWD till date.

The fact remained that construction of underpass would have eased the safe passage between two separate parts of the campus and non-construction of same resulted in constantly jeopardizing the safety of students and other users.

3.4.6 IIT Mandi

IIT Mandi commenced its activities from temporary campus in IIT Roorkee in 2009-10 and later shifted to another transit campus in Government College at Mandi from 2010-11. IIT Mandi shifted to its permanent campus at Kamand, Mandi in October 2012 and shifting process was completed by April 2015.

(a) Availability of land

Government of Himachal Pradesh allotted 501 *acres* of land to IIT Mandi. Out of this, 308 *acres* was forest land for which approval was pending from Ministry of Environment, Forest and Climate Change, GoI. Out of the remaining 193 *acres*, 19 *acres* was disputed and *sub judice*. Thus, the IIT had only 173 *acres* (35 *per cent* of the allotted land) for infrastructure development. Further, the IIT had to incur an expenditure of ₹3.02 crore[22] towards shifting of power stations and lines and diversion of roads passing through the campus.

MoE replied (September 2021) that necessary permission for transfer of forest land was accorded in February 2021 by Hon'ble Supreme Court and accordingly the State Government issued orders (March 2021) for transfer of 308 *acres* land to IIT.

However, the fact remained that only 35 *per cent* of the allotted land was available for campus development even after 10 years of its establishment.

(b) Execution of works

Major construction works under Phase-I were entrusted to CPWD and NBCC. Audit examined 14 construction works taken up by IIT Mandi during 2014-19 under Phase-I. Of these, 11 works were scheduled to be completed by March 2019. However, six out of these 11 works (like academic buildings, laboratory building, recreation centre etc.) which were scheduled to be completed between October 2012 and August 2017 were completed between October 2013 and February 2018 with a delay ranging between two months and 26 months. Two major construction works, (i) 'construction of Phase-I North' viz., academic buildings, guest house, gymnasium, hospital and auditorium buildings and (ii) 'different buildings' viz., 22 hostel blocks, 28 faculty housing buildings, dining and club house, were entrusted to NBCC/ CPWD. The construction of these buildings was scheduled to be completed by May 2018 and October 2015 respectively. However, the construction of these buildings was yet to be completed (March 2019) and delays of 10 months and 41 months respectively were observed.

[22] ₹2.20 crore for shifting of power lines/stations and ₹0.82 crore for diversion of a road.

In one specific case, it was observed that the construction of academic and residential complex (52 buildings) was entrusted to CPWD which in turn awarded the work to a contractor for a tender value of ₹179.48 crore with a stipulation to complete the work by October 2015. Audit observed that the project was delayed by five years with nine out of 52 buildings remaining incomplete as of November 2020.

MoE replied (September 2021) that the slow progress/delay in completion of works by the executing agencies was attributable to remote location with extreme weather conditions, non/short availability of labour, non-availability of material and trained workers in local market etc. In respect of the specific case of delay, it was replied that out of 52 buildings awarded (2013-14) by CPWD to M/s SIL (original contractor), 42 buildings were withdrawn and have been awarded to eight different contractors by CPWD and 10 buildings were left with M/s SIL. All the buildings, except one (B11), have been completed.

The fact remained that the development of campus was delayed by five years, depriving the students and other users of the benefits of the full-fledged infrastructure.

(c) Non accessibility of facilities to persons with disabilities

Ministry of Social Justice and Empowerment launched 'Accessible India Campaign' to ensure persons with disabilities have access on equal basis with others, to physical environment, to transportation, to information and communications technologies and system and to other facilities and services opened or provided to the public.

Audit observed that out of the 80 completed buildings, facilities of ramps and toilets for wheelchairs was constructed only in 32 buildings and Braille symbols and auditory signals in elevators or lifts was provided only in eight buildings.

The IIT replied (September 2021) ramps have been provided in all the buildings. The toilet facilities for wheelchairs were not available in four academic buildings and three hostel buildings. Moreover, process of Braille symbols and auditory signals has been initiated. MoE replied (September 2021) that efforts would be made to provide these facilities in other buildings as per availability of fund.

The fact remains that non-provision of easy accessibility of facilities to persons with disabilities caused inconvenience to these users.

3.4.7 IIT Patna

IITP commenced its activities, under the mentorship of IIT Guwahati, from a temporary campus at Navin Government Polytechnic in Patna in the year 2008-09. Later, the Government of Bihar allotted a total land of 500.45 *acres* during 2011 at Bihta, Patna. IITP shifted to its new campus in July 2015.

(a) Execution of works

Audit examined all three Phase-I works (entrusted to CPWD, NBCC and EIL) executed during 2014-19. These three works included academic buildings, hostels, faculty housing, hospital, school and workshops. The works were scheduled to be completed between June 2014 and December 2017. Delays were observed in completion of two works, namely

academic building and residential complex, ranging between 18 months and 22 months (as of March 2019). The third work which included hostels, staff quarters etc. and scheduled for completion by December 2017 was still in progress with the delay of 15 months (as of March 2019).

MoE replied (September 2021) that the works awarded to NBCC were delayed due to complete stoppage of works due to agitation by local people for land compensation, change in layout of internal brick work partition in all buildings. The reasons for delays in works entrusted to EIL were yet to be received from the contractor and hence 10 *per cent* amount was being withheld as per instructions of BWC.

The fact remains that delays in construction led to delay in availability of infrastructure to the students/staff.

3.4.8 IIT Ropar

IIT Ropar commenced its activities, under the mentorship of IIT Delhi, from the premises of former Government Women Polytechnic, Rupnagar. Later, the Government of Punjab allotted (2009) 501 *acres* of land for development of the permanent campus. The IIT started shifting it's activities to the permanent campus from July 2018. Complete shifting to the permanent campus was not achieved as of March 2019.

(a) Availability of land

501 *acres* of land was allotted to IIT out of which 20 *acres* of land was under dispute/litigation. In August 2019, the campus got flooded. A portion of the boundary wall and some equipment/furniture were damaged and IIT Ropar suffered a loss of ₹3.46 crore due to the damage caused by the floods. Further, expenditure would have to be borne by IIT Ropar for replacement of the damaged items.

IIT Ropar while accepting the audit observation, stated (November 2020) that the issue of works related to protection of the IIT from such incidents has been taken up with state government. MoE did not provide any specific reply in this regard.

(b) Execution of works

Out of the 12 works examined, 11 works pertained to Phase-I construction. All the 11 works were entrusted to CPWD. Nine out of these 11 works, consisting of administrative, academic, residential and hostel blocks etc., scheduled to be completed between April 2017 to April 2019 were completed with a delay ranging between 4 months and 39 months.

MoE replied (September 2021) that apart from delayed finalization of drawings and change in scope of works, additions to the drawings were also one of the reasons for delayed completion of Phase-I works.

The fact remained that the campus could not be fully utilised by the students due to delay in its completion.

(c) Tendering and awarding of works

For Phase-IA, the contract for architectural consultancy was awarded to M/s Sikka Associates (SA) and an agreement was entered into with this firm. Accordingly, it was

agreed to pay 1.80 *per cent* of the project cost of the buildings and services, as per the tendered cost or actual cost, whichever would be less, for the works designed by the consultant. IIT also awarded (November 2015) the consultancy contract to SA for Phase-IB on same terms and conditions, on a nomination basis, without calling for fresh tenders. This was in violation of the selection process as envisaged in Rules 163 to 176 of GFR 2005.

MoE replied (September 2021) that both works are sub-divisions of the one original project. The work was distributed in three phases only to facilitate the execution of work properly because a lot of changes had to be made in the designs of the project at every stage.

The reply of the IIT is not tenable as Phase-IB works was not part of Phase-IA works and a separate approval was obtained from BWC for Phase-IB works. Hence, the procedures laid in GFR 2005 were required to be followed.

3.5 Procurement of equipment

Each IIT has its own procurement policy/manual detailing therein the purchase procedures, guidelines and proper delegation of powers. An examination of the process of procurement of equipment and services by IITs over the period 2014-19 was conducted for selected sampled cases. The impact of delays in procurement, installation and idling of equipment on the intended objectives (administrative, academic and/or research projects) was studied and analysed. Similarly, the process exercised by these IITs in procuring services and adherence to the terms and conditions as stipulated in the agreements were also examined.

3.5.1 Supply of equipment

Time schedules are important part of any contract and the suppliers must deliver the goods within the scheduled date mentioned in the Purchase Order (PO).

During analysis of the data and connected records pertaining to procurement of equipment (selected sample), Audit observed that in 106 out of the 340 sampled cases, there were delays in supply of equipment (including high value equipment[23]) ranging between 31-536 days[24] as detailed in ***Table 3.5***:

Table 3.5: Details of delays in supply of equipment

Name of the IIT	No. of equipment procured *	No. of cases of where delay in supply is more than one month	Range in delay in supply (in days)
IITBBS	33	11	32-293
IITGN	36	7	43-244
IITH	45	12	31-187
IITI	39	10	32-184
IITJ	40	10	33-455
IIT Mandi	41	12	32-322

[23] IITBBS (₹1.87 crore), IITGN (₹6.22 crore), IITH (₹4.97 crore), IITI (₹1.26 crore), IITJ (₹4.15 crore), IIT Mandi (₹7.65 crore), IITP (₹17.49 crore) and IIT Ropar (₹7.14 crore)

[24] Cases where the delays were marginal i.e. less than 30 days were excluded

Name of the IIT	No. of equipment procured *	No. of cases of where delay in supply is more than one month	Range in delay in supply (in days)
IITP	50	32	41-530
IIT Ropar	56	12	33-536
Grand Total	**340**	**106**	**31-536**

*Data in respect of date of supply was not furnished by seven IITs in 34 cases[25]

These substantial delays in supply of the equipment delayed subsequent stages of installation and utilization. As a result, the faculty and students could not get the facility of these resources which defeated the intended purpose of their procurement. The IIT-wise specific cases of delays in supply and resultant delays in installation/commissioning of equipment have been discussed in subsequent paragraphs.

3.5.2 Commissioning/Installation of equipment

Audit observed that there were delays in installation of equipment after the delivery of the equipment in three IITs.

3.5.2.1 IIT Bhubaneswar

(i) Delay in construction of laboratory led to delay in installation of equipment

IITBBS issued a PO (March 2015) for procurement of 'Sliding surface and screw cutting all geared head lathe' with accessories (one medium and one heavy duty) for use in the central workshop of the School of Mechanical Sciences. The delivery was to be done within eight months (by November 2015). It was seen that the delivery date was extended to December 2015 for the medium duty machine and January 2016 for the heavy-duty machine. Audit observed that both these machines were delivered in January/March 2016. Further, Audit observed that the installation of the machines was done in July/June 2017 after a lapse of more than 19/15 months from the date of scheduled delivery, though the equipment was procured on an urgent basis. Examination of records showed that the delays were on account of non-availability of site and uneven floor for fixing the machine.

MoE replied (September 2021) that the delay was due to non-completion of workshop building and non-handing over of the site by CPWD in time.

Thus, the delay in the delivery of the equipment coupled with the delay in installation resulted in non-achievement of the objective of its procurement. As the procurement was done on urgent basis, the delay also reflects ineffective monitoring, control and co-ordination of the procurement process by the IITBBS.

(ii) Non installation of equipment

A PO was placed (31 March 2015) for procurement of equipment (two Linear Actuators) to cater to the laboratory and research requirements of UG/PG students at the School of Infrastructure.

[25] IITGN (5 cases), IITH (8 cases), IITI (1 case), IITJ (7 cases), IITP (9 cases) and IIT Ropar (4 cases)

Audit observed that the equipment was installed (17 October 2017) after one and half years from the date of delivery (21 April 2016) due to non-readiness of site and non-availability of certain accessories necessary for installation and functioning of the equipment.

MoE replied (September 2021) that the requirement of accessories was incidental and not known prior to unpacking of equipment.

The delay in installation of equipment due to failure in making proper assessment of the required accessories and ensuring their timely availability resulted in the lab/research requirements of students not being met, thus affecting the quality of their learning.

3.5.2.2 IIT Hyderabad

Delays in installation of equipment was observed in five cases namely 'High Sensitive Vibrating Sample Magnetometer' (in Physics department), 'High Resolution Electron Microscope & X-ray diffraction System' (in Material Sciences and Metallurgical Engineering Dept.), 'Rotary Cyclic Triaxial Apparatus' (in Civil Engineering Department) and 'Signal Generator with Accessories' (in Electrical Engineering department) intended for research and laboratory activities. The delay in commissioning/utilization of equipment ranged from 90 to 475 days.

MoE replied (September 2021) that the delays were nominal in most of the cases and in case of X-ray diffraction system the delay was due to shifting of the campus.

The fact however remained that the delays impacted the availability of the intended facility/resources to the students as well as faculty and IITH failed to provide the benefits of these training aids to its students.

3.5.2.3 IIT Indore

During scrutiny of records of procurement of equipment, Audit noticed that there were delays ranging from 3 to 125 weeks in installation of 19 items of equipment in five Departments as shown in ***Table 3.6***. As a result, students enrolled in courses where they had to use the labs could not derive full benefit.

Table 3.6: Departments and equipment where installation was delayed

Name of the Department	Name of the equipment
Bio Science & Bio engineering	Inverted Microscope, Image quant LAS 400, Bench Top High speed cell sorter and high-speed Flow cytometer
Mechanical Engineering	Metallic belt deposition unit
Civil Engineering	Universal Testing Machine, Hydrology System, Freeze Thaw cabinet, Server (Master node IU and Compute node) and Fatigue Testing Machine
Metallurgy Engineering & Material Science	High Temperature furnace, Vacuum Diffusion Bonding Unit, inverted optical Microscope, LAMBDA 750 UV Infrared

Name of the Department	Name of the equipment
	Spectrophotometer, High Temperature Wear Testing Machine, Solar Cell Simulator, Contact Angle Measurement system, Vacuum Arc Melting Cum Suction Casting Unit and Master Nodes
Chemistry Department	Research Spectrometer

MoE replied (September 2021) that due to delay in site readiness and construction work and non-availability of space, there was delay in installation of equipment. It further stated that the IIT issued an advisory to all user departments to ensure site readiness.

Thus, the delay in installation for substantial periods deprived the students and faculty of the intended benefits of the procurement. It also reflected ineffective monitoring by IITs in terms of ensuring the availability of pre-requisites on time.

3.5.3 Shortfall in Laboratory facilities

Laboratories are a crucial part of an engineering institute as they provide means for testing theories and gain hands-on knowledge of various concepts. Ministry in its DPR envisaged that the IITs would need laboratory equipment as well as computer equipment and that the list of such equipment will be based on the academic curriculum of the IIT as well as research programme to be developed by the faculty of the IIT. It was expected that all laboratories and buildings would be fully developed over a period of eight years.

Audit observed shortfalls in the availability of laboratory facilities in respect of four IITs as detailed in ***Table 3.7***:

Table 3.7: Shortfall in laboratory facilities in IITs

IIT	Audit findings
IITGN	Shortage in minimum required equipment was observed in respect of six laboratories in Electrical Engineering (EE Lab 1 and Lab 2), MSE (Interface Lab), Mechanical Engineering (Energy Systems/Research Lab) and Chemistry Department (Organic and Chemical Biological Lab and Inorganic Lab). While accepting the fact, IITGN replied (September 2021) that it has subsequently overcome the shortfalls in availability of equipment and presently there is no shortage of equipment.
IITH	Audit noticed from the data furnished (in respect of seven out of fourteen Departments) that there was a significant increase of about 64 *per cent* in laboratories' catering capacity from 2014-15 (898 students) to 2018-19 (1472 students). However, a shortfall of 15 *per cent* in laboratories' catering capacity (261 students) still existed to the end of AY 2018-19. In response, IITH replied (November 2020) that the space that was available in three different academic blocks was shared with all the departments depending on their size and more space will bemade available to the departments (individual blocks), once the second phase is completed.
IITJ	Only eight labs were available against requirement of 12 labs in Chemistry Department and 137 equipment were found short against requirement of 424 equipment in 22 laboratories in the IITJ.

IIT	Audit findings
	IITJ replied (September 2021) that the IIT managed the situation by keeping a smaller batch of students, putting extra time slots, running several shifts during a day etc. The reply is not acceptable, since it could be seen from the reply that the students were put to inconvenience by requiring to avail these lab facilities during extra hours.
IITP	Audit observed that there were shortfalls in availability of equipment in 33 out of 65 laboratories across 10 Departments. IITP replied (September 2021) that inadequate allocation of grants by the Ministry hindered the growth of laboratories across all departments.

Thus, laboratory infrastructure created in the IITs was not sufficiently equipped to cater to the needs of the students even after lapse of 10 years from their setting up.

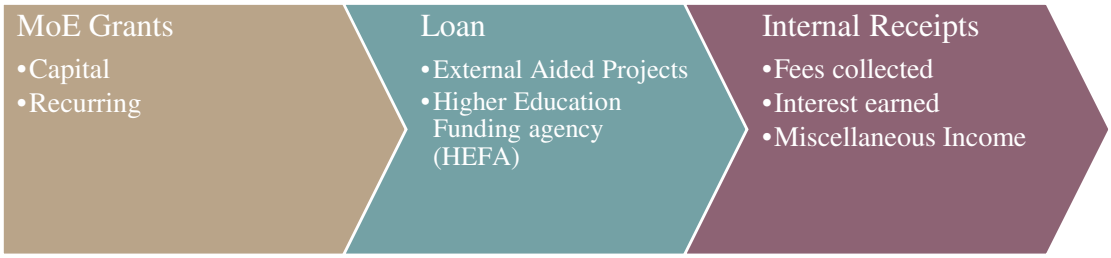
MoE did not respond specifically to this issue (September 2021) regarding shortfall in laboratory facilities.

Chapter IV: Financial Management

IITs are autonomous institutions under MoE which receive Grants (both Capital and Recurring), Loans (both from internal and external agencies) from GoI. They also generate internal revenues through fee, publications, interests, consultancy works among other things.

The sources of funds of these IITs during the years 2014-15 to 2019-20 is shown in the ***Figure 4.1***:

Figure 4.1: Sources of funds for IITs



Audit examined the financial management across these eight IITs under four broad areas viz., fund availability, its application, resource mobilization and investment of funds.

4.1 Management of Financial Resources

4.1.1 Grants

(a) Revision in the Capital outlay - MoE approved (July 2008) project cost of ₹6,080 crore (₹760 crore per IIT) for establishment of eight new IITs over a period of six years (2008-14). This was further revised twice as detailed in ***Table 4.1***:

Table 4.1: Initial cost and revised cost during 2008 to 2021

(₹ in crore)

Name of the IIT	Initial cost estimates * 2008 (A)	Revised cost estimates 2016 (B)	Upward revision in revised estimates 2019 (C)	Difference in cost estimates (2008-2019) (D)	*per cent* of Difference E=C-A/100
IITBBS	760	1880	1893	1133	*149*
IITGN	760	1716	1716	956	*126*
IITH	760	2075	2092	1332	*175*
IITI	760	1902	1911	1151	*152*
IITJ	760	1605	1648	888	*117*
IIT Mandi	760	1466	1556	796	*105*
IITP	760	1678	1688	928	*122*
IIT Ropar	760	1668	1828	1068	*141*
TOTAL	**6080**	**13990**	**14332**	**8252**	

Source of Information: Ministry of Education

*Cost estimates include components like Civil work, equipment, salary, non-salary

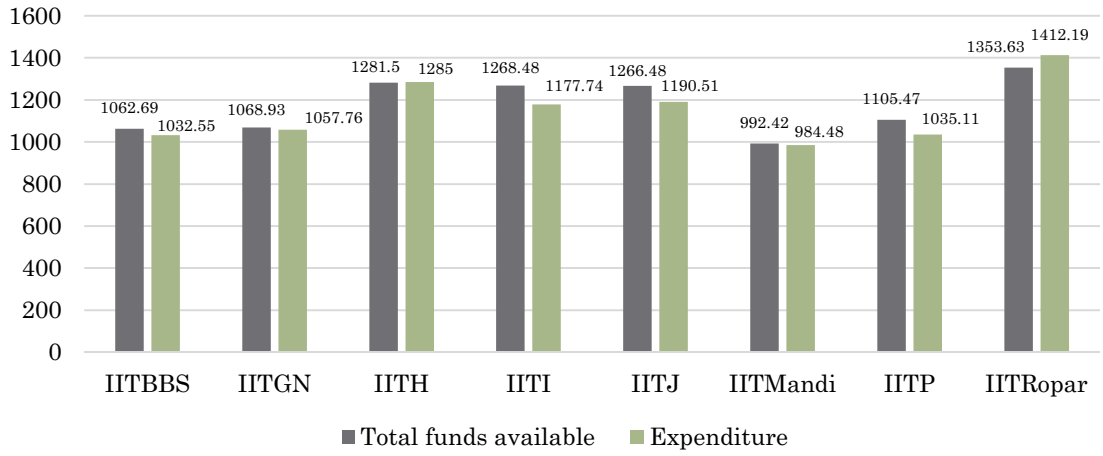
The revision was necessitated by time and cost overrun due to delays in handing over of sites by State Governments which further resulted in cost escalation, delay due to procedures involved in getting statutory approvals, cost enhancement in various other factors like rise in equipment costs, salaries, taxes etc. and site-specific infrastructure provisions like underpass, foot over bridge etc. Thus, the non-completion of infrastructure development within project period resulted in spill-over of the infrastructure development beyond six years, necessitating the revision of the capital outlay from ₹6,080 crore to ₹14,332 crore for a period of 13 years.

(b) Utilisation of funds

Ministry allocates and releases head-wise funds to IITs based on Budget Estimates submitted by IITs. The IIT-wise position of utilisation of available funds (including internal receipts) is as mentioned in the following ***Chart 4.1:***

(₹in crore)

Chart 4.1: Showing utilisation of available funds 2014-20



It was observed that the initial grants were to be utilised by 2014, but that could not be achieved by IITs due to delay in execution. Despite delayed execution, almost all the funds received by the IITs for infrastructure development had been utilised by 2019-20. At the end of 2020, the amount unutilised was ₹224.26 crore.

It was also observed that expenditure incurred was within the available funds in respect of all the eight IITs except IIT Ropar where it was marginally in excess by 4 *per cent* (₹58.56 crore excess) to the end of 2019-20.

4.1.2 Utilisation of Japan International Cooperation Agency (JICA) Loan

GoI entered (2014) into an MoU with Japan International Cooperation Agency (JICA) in respect of IITH for infrastructure development (Phase-II) for the period 2013-14 to 2016-17. The total cost approved for the project was ₹1,776.50 crore[26]. The scope of the work included construction works, procurement of goods and services and consulting

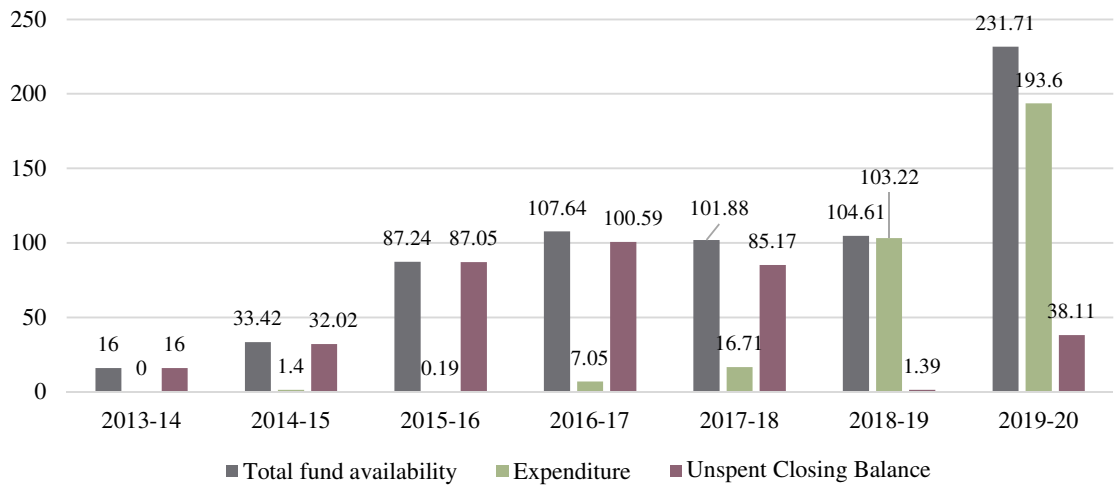
[26] It comprised of 84.5 *per cent* contribution by JICA amounting to ₹1501.14 crore and remaining 15.5 *per cent* contribution by GoI amounting to ₹275.36 crore.

services over a period of four years for Phase-II in IITH. The project period was extended by the Ministry (June 2017) upto 2022-23 without cost overrun.

The details of the fund availability, expenditure and the unspent funds during the period 2013-14 to 2019-20 are as shown in the ***Chart 4.2***:

(₹ in crore)

Chart 4.2: JICA fund position in IITH



Audit observed that before the time extension was granted to the project in 2019, against the available funds of ₹107.64 crore (upto 2013-17 which was initial project period), IITH had spent only ₹8.64 crore (8.03 *per cent*) on the project. Subsequently, from 2017-18 the utilization of funds picked up and unspent JICA funds was ₹38.11 crore at the end of March 2020.

IITH in its reply (November 2020) stated that JICA grants were effectively utilised for the construction of the campus as and when there was delay in receipt of the grants from the MoE without keeping them idle.

MoE did not provide any reply on this matter (September 2021).

The reply of IITH is not tenable, as the JICA fund was released for Phase-II activities from 2013-14. However, the effective utilization started from 2016-17 only i.e., after three years from its release. Thus, despite availability of funds, IITH could not make use of it in timely manner which necessitated the time extension.

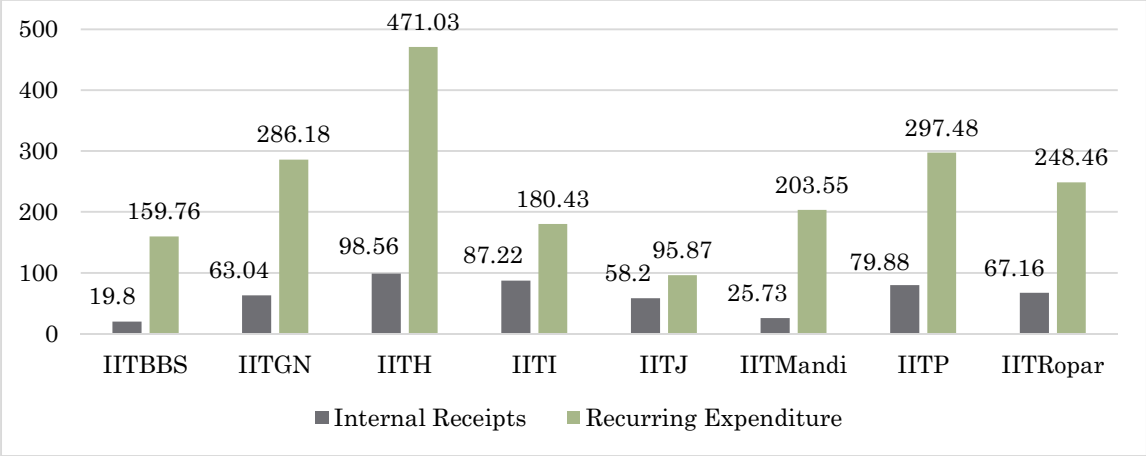
4.1.3 Generation of Internal Receipts

Rule 230 (6) of GFR 2017 stipulates that the grant sanctioning authorities should take into account the internally generated resources while awarding the grants. They should also consider laying down targets for internal resources generation by the grantee Institutions or Organisations every financial year, particularly where grants are given on recurring basis every year.

IIT-wise details of Internal Receipts against Recurring Expenditure are shown in ***Chart 4.3***:

Chart 4.3: Generation of Internal Receipts vs Recurring Expenditure (2014-19)

(₹in crore)



Audit observed that the proportion of the internal receipts against the recurring expenditure was very low in IITs ranging between 12 *per cent* (in IITBBS) and 61 *per cent* (in IITJ) even after having been established over a decade. Low proportion of internal receipts forces the IITs to be heavily dependent on grants for meeting recurring expenditure.

Audit also observed that no targets were set for the generation of internal receipts by the MoE for any of the eight IITs.

Ministry was silent on this issue (September 2021).

Chapter V: Academic Programmes and Research Activities

The Detailed Project Report (DPR) of the Ministry for setting up of new IITs noted that only 5,000 seats were available in the existing IITs as against three lakh aspirants appearing in the Joint Entrance Examination (JEE) during 2006. It was felt that an equal number of talented and deserving students got left out due to lack of opportunity and the situation could be corrected to some extent by establishing additional IITs.

Further, regarding research activities, the DPR stated that the spirit of education in the IITs is 'research-based learning' by exposing students to laboratory work in intensive manner. It was also stated that the new IITs are intended to have strong sponsored research activity and develop a research and technology development atmosphere with sizable infrastructure.

5.1 Academic Activities

Out of the eight IITs reviewed, academic activities in six IITs[27] commenced during academic year 2008-09 and the other two IITs (IITI and IIT Mandi) during 2009-10.

A performance assessment of these activities was undertaken to check whether the academic programmes and research activities were introduced and carried out as envisioned under three broad audit areas viz., i) Courses and Curriculum, ii) Teaching Environment and iii) Research and Development.

5.1.1 Introduction of Academic Courses

Section 4 of the MoE's DPR discusses 'Academic Model of the new IIT' which visualises the setting up of schools in different technical areas like Engineering Technology, Design and Creative Arts, Management, Health science and Technology, Natural (or Basic) Sciences, Humanities and Social Sciences, rather than setting up departments in various disciplines. This model would encourage academic staff to work together in an interdisciplinary environment and provide a more enriching academic environment to the students. The Senate of IITs were empowered to set up or abolish academic departments, schools and centers and give recommendation to the BoG in this regard.

In line with this vision, each IIT offers various courses/programmes through the respective Schools and Departments. The Perspective Plan of each IIT specifies the targets for setting up of schools/departments and the introduction of courses.

Regarding the introduction of courses, while six IITs had introduced courses as per targets, Audit noticed shortfall in achievement of the targeted introduction of courses in two IITs viz., IITBBS and IITJ as mentioned below.

(i) In IITBBS, out of 27 courses projected in the Perspective Plan (March 2016) for introduction by 2018-19, ten courses (mentioned in the ***Table 5.1***) were not introduced till date. As such, students were not offered the option of taking up these courses in IITBBS, inhibiting their choices.

[27] IITBBS, IITGN, IITH, IITJ, IITP and IIT Ropar

Table 5.1: List of courses proposed but not introduced in IITBBS

Programme	Specialization/Branch
B.Tech	Energy Engineering, Product design & Development in Industrial Engineering and Management, Environmental Science and Technology and Bio Engineering
M.Tech	Construction Engineering and Management, Electrical Engineering, Cyber Security and Forensic Engineering, Circuits and VLSI Engineering, Material Science and Engineering

Accepting the fact, MoE replied (September 2021) that opening and closing of courses is a dynamic scenario in the IITs. The IITBBS achieved the student strength of 2,486 in AY 2020-21 despite facing difficulties like delayed infrastructure. Nineteen new courses were added during 2015-20. However, 10 projected course plans have not been discarded and these may be taken up in future.

The fact remains that the planning of courses without ensuring the availability of overall resources including necessary infrastructure resulted in the non-introduction of these courses at the appropriate time, depriving students of intended specializations as envisaged.

(ii) In IITJ, Post-Doctoral Fellowship programme which was envisaged to commence from 2011-12 was not started as of March 2019.

Ministry replied (September 2021) that Institute had amended the existing guidelines for engaging post-doctoral fellows which were approved by BoG in October 2019 and efforts are being taken to engage the post-doctoral fellows in due course of time.

5.1.2 Creation of Student intake and Enrolment

(i) Creation of student intake

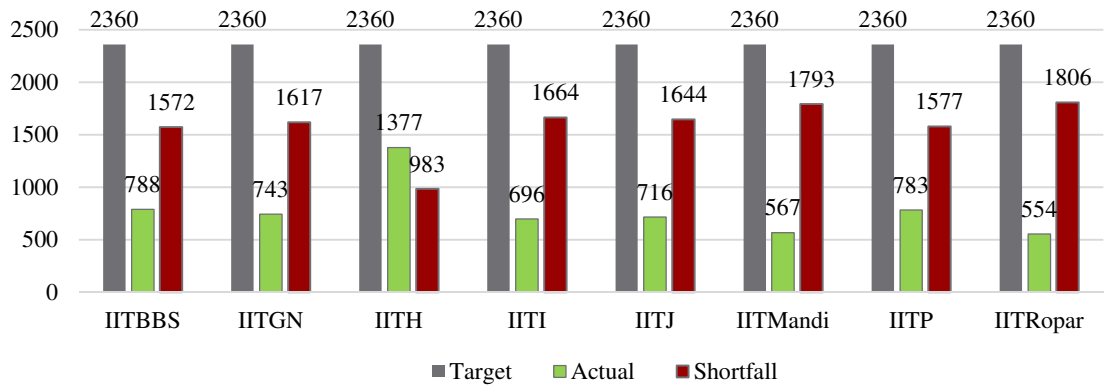
MoE's DPR on setting up of new IITs during Eleventh five-year plan period stipulated the year-wise intake of students during the first six years as shown in ***Table 5.2***:

Table 5.2: Planned cumulative intake of students by the eight IITs at the end each year during first six years

Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Student intake to the end of year	200	500	900	1450	1900	2360

The actual intake as well as the shortfall in intake as compared to the targets laid down in the DPR are depicted in ***Chart 5.1***:

Chart 5.1: Showing IIT-wise overall targetted intake, actual intake and shortfall at the end of sixth year (2013-14)



It was observed that none of the eight IITs attained the stipulated cumulative intake of 2,360 students at the end of the sixth year (2013-14). The percentage of non-achievement of targeted intake was highest in IIT Ropar (77 *per cent)* and lowest in IITH (42 *per cent).* As against the overall targeted intake of 18,880 students[28], only 6,224 students (33 *per cent*) were admitted in all the eight IITs during the first six years, thereby not fully achieving its objectives of maximizing educational opportunity to students. Further, it was observed that till 2018-19, only IITH was able to achieve the targeted student intake.

As per the responses received through MoE (September 2021), IITBBS stated that it has achieved the planned growth already and its intake in 2020-21 reached to the student strength of 2486. IITGN replied that the intake could not be increased due to functioning from a temporary campus till 2015-16, limited hostel accommodation and limited infrastructure. IITGN also stated that it has been increasing its student strength systematically after moving to the permanent campus. IITH stated that the intake was fixed based on the resources available and as approved by the Senate. IITI replied that due to limitations of temporary campuses faced by it and issues relating to allotment and acquiring of land, it could move to permanent campus at the end of calendar year 2015 and thus, it could not meet the targets during initial period. IITI stated that it has reached the student strength of 1900 students in the 10th year. IITJ replied that the temporary campuses have limitations in terms of space and other issues and added that student strength increase depends upon the availability of facilities. IIT Mandi replied that it could not achieve the targets due to non-availability of suitable and sufficient infrastructure, insufficient labs and equipment, shortage of faculty and staff, insufficient communication/transport facilities due to remoteness of the area. Accordingly, year-wise targets were fixed and enrolment was done in view of the availability of facilities. IITP replied that due to limited resources and infrastructure the desired strength of students could not be achieved and IIT Ropar did not provide any reply in this regard.

As seen from the reply, the fact remained that slow pace of infrastructure development resulted in shortfall in creation of targeted student intake as envisaged. Hence in its initial

[28] 2360 students for each of the eight IITs

years, the IITs failed to provide the desired access to technical learning, an avowed aim of setting up these campuses.

(ii) Enrolment of students

Data on the course wise enrolment of students during the period 2014-19 in the eight IITs was examined to assess whether the available student intake capacity was put to optimal use, thereby achieving the intended objectives of academic performance.

The observations and findings of this analysis are discussed in the succeeding paragraphs.

a) UG Programmes

IITs offer Undergraduate programmes (B.Tech. and B.Des.) in various disciplines of Engineering and Technology. The enrolment of students in UG courses averaged 96 *per cent* of the total available intake in these eight IITs. The shortfall was eight *per cent* in IITJ while the shortfall was two *per cent* in IITH.

b) PG Programmes

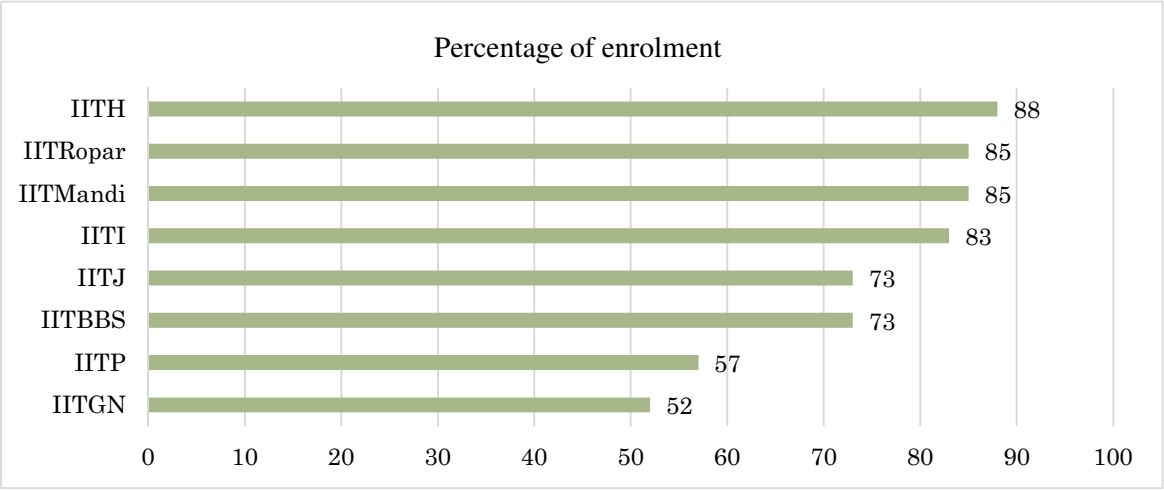
IITs offer Postgraduate programmes (M.Tech., M.Sc., M.A. and MBA apart from M.Phil) invarious branches of Engineering and Technology and other branches. There are two modes of intake for PG i.e.,

a. MoE funded PG courses (entrance through GATE for M.Tech and through JAM for M.Sc.)

b. Project funded/industry sponsored/externally agencies funded/self-sponsored.

It was noticed from the information provided by IITs on intake, enrolment and vacant seats in PG programmes, that there was shortfall in enrolment into PG programmes against the available intake in all of the eight IITs during 2014-19 which ranged from 12 *per cent* (IITH) to 48 *per cent* (IITGN). The overall average shortfall was 28 *per cent* across eight IITs (2,193 students against 7,713 seats). This is shown in the ***Chart 5.2***:

Chart 5.2: Percentage of enrolment in PG programmes during the period 2014-19



The shortfall was minimal in case of IITH, IIT Mandi, IIT Ropar and IITI ranging 12-17 *per cent*, while it was high in IITP and IITGN ranging between 43-48 *per cent,* indicating huge number of PG seats remaining vacant.

As per the responses received through Ministry (September 2021), IITBBS replied that a fraction of PG students do not join even after the waiting list is fully exhausted due to various reasons and left over vacancy is beyond its control. IITGN replied that seats in M.Tech remain vacant because enough suitable candidates are not found despite huge number of aspirants. IITI replied that the enrolment is low due to withdrawal of students after admissions, less representation of candidates from reserved categories etc. IITI stated that it has been striving to increase the enrolment of students in PG programmes. IITJ stated that temporary campus had limitations in terms of space and other issues and that student strength increase depends on availability of facilities. IIT Mandi replied that the reasons were limited applications, withdrawal of students due to various reasons, lack of communication facilities and stated that efforts are made to inspire the candidates and not allow the seats to remain vacant. IITP replied that key reason was less availability of suitable applicants besides shifting of selected candidates to older IITs/joining job assignments after taking admissions. IIT Ropar did not provide any specific reply.

There was no action taken by the MoE in this regard to guide all the IITs to enroll more PG candidates.

c) Ph.D programme

IITs offer various Ph.D programmes in Engineering and Science disciplines and inter-disciplinary areas. The information of IIT-wise intake, enrolment and vacancies during the period 2014-19 was examined. It was noticed that out of the eight IITs reviewed, five IITs (IITI, IITJ, IIT Mandi, IIT Patna and IIT Ropar) offered their Ph.D programmes without fixing the intake in these courses. The remaining three IITs (IITBBS, IITGN and IITH) fixed the year-wise intake themselves at the beginning of each academic year.

Enrolment data showed that in the three IITs (IITBBS, IITGN and IITH) which had fixed their intake, there was a shortfall in admissions, as depicted in ***Table 5.3***:

Table 5.3: Intake vis-à-vis admission in Ph.D programme during the period 2014-19

Name of the IIT	Total student intake capacity	Total students admitted	Shortfall in admissions	Shortfall (percentage)
IITBBS	1530	308	1222	80
IITGN	1216	432	784	64
IITH	952	788	164	17

The percentage of shortfalls were significant in the case of IITBBS and IITGN indicating, among other things, a lack of interest by the students in the Ph.D programmes offered by these IITs. IITs might like to reassess the utility of these courses and take the initiative to restructure these courses to make them more attractive to students.

Further, the failure to fix intake targets by IITI, IITJ, IIT Mandi, IITP and IIT Ropar deprived these IITs of a holistic approach in ascertaining the present status and future requirements of resources for effective and efficient operation of these Ph.D programmes. This would also affect the availability of skilled manpower from these IITs in the long run.

As per the responses received through Ministry (September 2021), IITBBS replied that enrolment of Ph.D students has increased over last four years and all possible measures are

being taken to improve the enrolment of Ph.D students. IITGN replied that to ensure only high quality candidates are shortlisted, only those candidates with appropriate credentials and research interests are offered admissions. IITI replied that one of the reasons for fewer number of students was paucity of highly motivated research-oriented applicants. IITJ replied that departments take admission of Ph.D students considering the faculty strength and as well as resources available. IIT Mandi replied that no year wise intake was fixed and reasons for less intake were strict selection procedures, limited infrastructure etc. IITP replied that Ph.D students were admitted only after determining their suitability through test/interview. IIT Ropar replied that there was no specific intake for Ph.D courses and scholars are admitted based on faculty/research requirements.

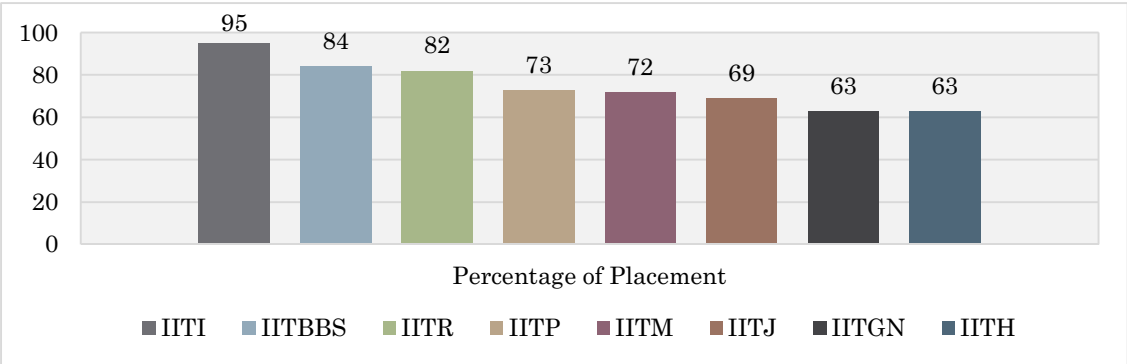
The replies need to be viewed in light of the fact that the targets are fixed by each IIT themselves every year after considering all the resources available. Substantial vacancies despite this indicate that a realistic assessment of the student intake as well as evaluation of the Ph.D programme is not being done even after a decade.

Thus, the objective of providing opportunities in new technical areas to aspiring students by setting up of new IITs was only achieved partially.

5.1.3 Campus Placements

Students' placement is one of the metrics for ranking of the Higher Educational Institutions. All IITs have Placement Cells which oversee the placement of students. Placement cells send invitations to companies/organisations and in consultation with the companies, allot dates for campus interviews. After conducting interviews, students are selected for placements by the recruiters. These placement cells of the IITs maintain a database of all the students selected by the companies. The placements according to each IIT is shown in ***Chart 5.3***:

Chart 5.3: Showing IIT-wise percentage of Placements during the period 2014-19



As seen from the chart above, in terms of percentage of placements, IITI had the highest number of placements (94.69 *per cent)* followed by IITBBS and IITP. IITGN and IITH need to improve on the placement prospects of their students.

MoE stated (September 2021) that IITP and IITBBS are making efforts to increase the placements of students. However, no specific reply was received in case of remaining six IITs.

5.2 Teaching environment

Clause 26 of Act provides for formation of departments of teaching, the qualifications of teachers of the IITs, the method of appointment and the determination of the terms and conditions of service of teachers and other staff. IITs issue rolling advertisement where applicants can apply throughout the year and depending upon the need of the IITs and availability of suitable candidates, interviews are conducted periodically.

5.2.1 Shortfall in Faculty positions

MoE sanctioned (August 2008/February 2009) 30 posts per year for initial three years at the time of setting up of IITs. Further, the Ministry permitted the increase in sanction of the faculty positions linked with the increase in the intake of students i.e., sanction of faculty posts is increased by one for every increase in intake of students by 10 (1:10 ratio). Subsequently, the Kakodkar Committee also recommended *inter alia* the faculty student ratio (FSR) as 1:10. IIT Council, while accepting (November 2011) the recommendations of Kakodkar Committee considered the increase in faculty strength across all IITs in the country from around 4000 (2011) to 16000 by 2020, enabling creation of a large pool of high-quality faculty and researchers.

During Audit, it was observed that the IITs have been recruiting faculty consistently. However, the pace of recruitment of faculty did not correspond to the student intake/ enrolment, resulting in vacancies in faculty positions. This shortage was observed even to the end of March 2019 in all IITs except in IIT Ropar. The shortfall was significantly higher in IITP (1:14), IITI (1:14), IITGN (1:15) and IITBBS (1:16) as shown in the ***Table 5.4***:

Table 5.4: Faculty student ratio in respect of eight IITs for the Academic Year 2018-19

Name of the IIT	Student Strength	Number of Faculty as per 1:10 FSR	Number of Faculty in Position	Shortfall	Percentage of shortfall	Faculty Student Ratio
IITBBS	2133	213	137	76	**36**	1:16
IITGN	1495	150	100	50	**33**	1:15
IITH	2572	257	197	60	**23**	1:13
IITI	1822	182	127	55	**30**	1:14
IITJ	964	96	91	5	**5**	1:11
IIT Mandi	1281	128	119	9	**7**	1:11
IITP	1622	162	119	43	**27**	1:14
IIT Ropar	1476	148	161	-13	**-9**	1:9
Total	**13365**	**1336**	**1051**	**285**	**19**	**1:13**

As per the responses received through MoE (September 2021), the IITs replied that the vacancies were due to non-availabilityof suitable candidates despite best efforts to recruit faculty. IITGN, IITBBS, IIT Mandi also added that the shortfall was managed with the services of adjunct faculty from other technical institutes. IITJ did not provide any reason in this regard.

The reply is to be viewed in the light of the fact that inadequate FSR may adversely affect

the quality of education and increase the workload on existing faculty in these premier IITs. This would also constrain their research activities. Further, since the vacancies exist despite rolling advertisement, the IITs need to revisit the recruitment policies without compromising teaching standards by initiating measures like good teaching facilities, good start-up grants, attractive campus environment with residential accommodation and schools for children etc., for attracting quality faculty, as recommended by the Kakodkar Committee.

5.2.2 Faculty Workload and Appraisal System

Kakodkar Committee suggested (April 2011) that as a part of appraisal system, faculty could decide what percentage of his/her time and focus in the next year, would be spent on each of the following five parameters namely (i) Teaching (and project guidance), (ii) Research/MS/Ph.D guidance/Research-oriented projects, (iii) Technology development & Industry interaction, (iv) Development of policy/standards and (v) Service. Besides, the goals could also be specified qualitatively in each of these areas, depending upon what the faculty wishes to do. Kakodkar Committee also gave a broad outline for self-appraisal, departmental review and periodical external review of these appraisals.

Against the above criteria, the faculty appraisal system in respect of all the IITs was as in *Table 5.5*:

Table 5.5: Faculty appraisal system in IITs

Name of the IIT	Appraisal System
IITH	Senate has mandated that each faculty should teach at least six credits in an Academic Year. It was observed that there was no stipulated research output in terms of publications and research projects for any faculty. Institute replied (September 2021) that workload is being monitored periodically and appraisal system has been introduced.
IITI	Audit observed that faculty had not started setting annual goals for which the IIT replied (September 2021) that self-assessment of the faculty members was periodically collected to check the progress in teaching, research work, industry interaction and their service. The faculty members mention various achievements in the self-assessment form and are endorsed by the Head of Department.
IIT Mandi	No specific norms were fixed by the IIT. The IIT replied (September 2021) that the typical teaching load for a faculty was three courses of three or four credits in an academic year. Further, the teaching load to a faculty member was assigned by the Programme Faculty Group (PFG) for eachunder - graduate and graduate programme. Each faculty member was expected to submit a self-appraisal report every year which includes detail of his/her workload with respect to teaching, which would be reviewed by a committee headed by the Director.
IIT Ropar	IIT Ropar stated (September 2021) that efforts are on to look at the five parameters as suggested by IIT Council. It also added that it has established a mechanism for entrustment of teaching assignments, research activities in interdisciplinary areas besides vigorous evaluation of faculty was done at each stage of their career growth.
IITP	No specific norms were fixed by the IIT for appraisal system. IITP replied that teaching load was distributed equally viz. one theory and two labs. The reply was silent on appraisal system.

Name of the IIT	Appraisal System
IITJ	In IITJ, the course allocation is done by a department faculty board which entrusts and monitors the teaching load of the faculty members in the department. However, specific norms for appraisal of faculty were not available. IITJ replied that (September 2021) the point is noted for compliance.
IITGN	IIT expects faculty members to contribute their time in the areas of teaching (30%), research (50%) and service (20%).
IITBBS	Information in this regard is not provided by the Institute.

Also viewed against the criteria given by the Kakodkar Committee, the IITs have not fully implemented the Committee's recommendation with regard to faculty workload and appraisal system. MoE may consider developing broad outlines for self-appraisal and departmental review which may then be taken up by all IITs for optimal performance.

Ministry replied (November 2021) that IITs being autonomous institutions, have their own system of reviewing the performance and appraisal of faculty members. The Ministry added that the recommendation of Audit will be circulated to IITs for necessary action in this regard.

5.3 Other findings

5.3.1 Inadequate representation of Reserved categories in Student enrolment

As per the Central Educational Institutions (Reservation in admission) Act, 2006, out of the annual permitted strength in each branch of study or faculty, 15 *per cent*, seven and half *per cent* and 27 *per cent* seats shall be reserved for the Scheduled Castes (SC), the Scheduled Tribes (ST) and Other Backward Classes (OBC) respectively.

Audit observed that the representation of the reserved category was not as prescribed, particularly, in respect of PG and Ph.D admissions as shown below in ***Table 5.6***:

Table 5.6: Year-wise representation of category-wise student representation in Postgraduate/Ph.D courses for the five-year period of 2014-19

IIT	Percentage of Shortfall in enrolment in PG courses			Percentage of shortfall in enrolment in Ph.D courses		
	OBC	SC	ST	OBC	SC	ST
IITBBS	No shortfall	7	37	8	28	65
IITGN	5	30	69	37	68	84
IITH	No shortfall	25	34	1	25	73
IITI	12	No shortfall	13	10	70	97
IITJ	No shortfall	12	55	16	60	100
IIT Mandi	13	23	66	32	61	96
IITP	No shortfall	6	54	No shortfall	61	85
IIT Ropar	6	18	7	36	75	94

(i) The percentage of shortfall in enrolment of SC students in post-graduate courses was significantly higher in IITGN (30 *per cent*), IITH (25 *per cent*) and IIT Mandi (23 *per cent*). The shortfall in ST students was high in all the eight IITs ranging between 7 *per cent* (IIT Ropar) and 69 *per cent* (IITGN).

(ii) The percentage of shortfall in enrolment of Ph.D courses was very high in respect of ST category ranging from 73 *per cent* (IITH) to 100 *per cent* (IITJ). In respect of SC students also, the shortfall was significantly higher (more than 50 *per cent*) in all IITs except IITH and IITBBS where it was 25 *per cent* and 28 *per cent* respectively. Under the OBC category, the shortfall was high in IITGN (37 *per cent*), IIT Ropar (36 *per cent*) and IIT Mandi (32 *per cent*).

As per the responses received through MoE (September 2021), IITBBS replied that efforts are being made to enroll adequate students as per the percentage prescribed by GoI. IITGN replied that despite adopting measures like waiver of tuition fee, peer group assisted learning, lower application fee, relaxations given during shortlisting and admission process, seats remain vacant because enough suitable candidates are not found. IITH did not address the shortfall while IITI replied that the shortfall was due to inadequate response by the students belonging to these categories and also stated that it has resolved to fill up the vacancies through special admission drives. IITJ replied that the shortages are mainly due to less number of applicants from specific categories. IIT Mandi replied that the shortfall is attributable to limited number of applications from the reserved category candidates. IITP replied that the shortfall was due to inadequate number of applications from suitable candidates in reserved category. No specific reply was provided by IIT Ropar. The Ministry did not state whether it had thought of any measures for filling up the shortfalls.

5.3.2 Peer-group Assisted Learning (PAL)

IIT council approved (October 2015) Peer-Group Assisted Learning (PAL) strategy wherein educationally and socially backward students were to be tagged to bright student volunteers from senior classes. It was intended to be a fully funded initiative of MoE and was to be operationalised by the IITs to enable fresh students to cope with the academic pressures of IITs.

Audit observed that the initiative was not operationalised in IITBBS, IITJ, IITP and IIT Mandi thereby, denying the intended benefits of the PAL strategy as envisaged by IIT Council.

As per the responses received through Ministry (September 2021), IITBBS replied (November 2020) that they arranged extra classes to improve academic performance of backward students. IIT Mandi replied (September 2021) that the Institute had not received any guidelines/instructions/funding in this regard. IITJ stated (September 2021) that the point is noted for compliance. IITP replied (September 2021) that steps like active interaction of student representatives with freshers, organisation of peer groups in classrooms etc., were being implemented. The MoE also had not taken steps to ensure that all IITs followed this initiative to ensure effective learning opportunities to those who needed it.

The replies need to be seen in light of the fact that the objective of PAL to ensure fresh students from educationally/socially disadvantaged sections are able to cope with the academic pressures of IIT. Non-initiation of the PAL scheme defeated the purpose of reducing the vulnerability of educationally and socially backward students. MoE's lead in implementation of this initiative across all IITs would be instrumental in achieving the objectives of this strategy.

5.4 Research Activities

The areas covered during audit also included identification of thrust areas for Research and Development by IITs, completion of research projects within the sanctioned grants and timelines, achievement of targets for publications, citations, conferences and faculty-wise targets and achievements there against to graduate Ph.D students etc., during the audit period 2014-15 to 2018-19. Significant audit findings are discussed in subsequent paragraphs.

5.4.1 Sponsored Research Projects

The DPR envisaged that the new IITs would have a strong sponsored research activity. IITs receive funds from both government and non-government/industry sources for Sponsored Research Projects and faculty members of the IITs are actively engaged in these. Research projects are sponsored by different funding agencies like DST[29], CSIR, DRDO etc. During 2014-19, the eight IITs had executed 1,712 Research projects with an outlay of ₹857.71 crore.

Some of the areas of research included 5G Research and Building Next Gen Solutions, Mobile sensor network technologies, metal additive manufacturing, artificial intelligence, bio-inspired engineering, catalysts, energy and health care.

It was observed that all the eight IITs attracted sizeable funding from Government sources like DST etc. However, the number and cost of non-government sponsored projects in all IITs was low. It was noticed that IIT Mandi, IITP, IIT Ropar and IITH were able to attract between 3.5 to 14.31 *per cent* of total non-government funding among the eight IITs while the others attracted very low levels of funding.

As per the responses received through Ministry (September 2021), IITBBS and IITGN replied that they would continue with efforts to attract more non-government funding/industry sponsored projects. IITI replied that due to various efforts the number has increased to five research projects in FY 2020-21. IIT Mandi replied that it would be ensured to attract funding from non-government sources.

IITs being premier engineering and research Institutes, may take effective measures to attract substantial funding from non-governmental sources to develop research and technology-oriented environment by tying up with industry partners through MoUs.

[29] Department of Science and Technology (DST)

5.4.2 Patents filed and obtained

As per the Patents Act, 1970, patent is granted for an "invention" which means a new productor process involving an inventive step and capable of industrial application.

As per Para 7.1 of Kakodkar Committee Report, one of the key roles of IITs should be of driving innovation and entrepreneurship, which result in patents and publications - the traditional measures of performance of faculty and research institutions.

The details of patents filed by the eight IITs for the period 2014-19 are as detailed in the ***Table 5.7***:

Table 5.7: Statement showing details of patents filed by the eight IITs

Name of the IIT	IITBBS	IITGN	IITH	IITI	IITJ	IIT Mandi	IITP	IIT Ropar
Patents filed	18	19	94	44	28	35	31	30
Patents obtained	0	0	16	0	4	0	0	2

During the audit period, IITH filed 94 patents, followed by IITI, IIT Mandi, IITP and IIT Ropar. However, there was a large variance between the patents filed and obtained by the eight IITs which needs to be reviewed at highest level. In five IITs viz. IITBBS, IITGN, IITI, IIT Mandi and IITP, no patents were obtained during the five-year period indicating that the research activities could not bring out fruitful results.

As per the responses received through Ministry (September 2021), IITBBS replied that it expects that most of these patents filed would be cleared in coming days. IITGN replied that subsequently two patents have been granted and decision of grant of rest applications is expected in due course. IITI replied that the Institute has been granted seven patents for its inventions. IITP replied that as on date a total of five patents have been granted against the 42 applications filed and remaining applications are in various of stages for grant of patent. IITH, IITJ and IIT Ropar did not offer any specific comments.

The fact remains that for the period 2014-19 there was a large variance between the patents filed and obtained by the IITs.

5.4.3 Research Publications

The DPR for the new IITs envisaged that the new IITs should establish a strong reputation of research through publication record of its faculty and students. Strong emphasis should be placed on publishing the results of research activities in international and national journals. The degree of excellence will depend on the publication record of students and the faculty. Further, the number of research publications is one of the metrics used in NIRF[30] which decides the performance of the higher education institutes and their ranking.

Publications made by the IITs during 2014 to 2019 is shown in ***Table 5.8***:

[30] National Institutional Ranking Framework

Table 5.8: Research publications by eight IITs

Name of the IIT	IITBBS	IITGN	IITH	IITI	IITJ	IIT Mandi	IITP	IIT Ropar
No. of Publications	1844	1368	2230	3081	606	1427	1350	412
Average per faculty	3.12	3.10	2.64	6.42	1.85	3.03	2.61	2.56

Audit observed that in IITI (6.42) the average publications per faculty was highest, whereas in IITJ (1.85) the average publications per faculty was found to be lowest. In the remaining IITs, the average ranged between 2.56 and 3.12.

As per the responses received through Ministry (September 2021), IITBBS replied that it is encouraging the faculty to carry out more research work and publish more research papers and as a result, the number of publications increased from year to year. Remaining IITs did not provide any specific replies in this regard.

The fact remains that the IITs were lagging behind in the publication of research papers, which was a major focus area for the IITs.

5.4.4 Ph.D students graduating per faculty

In order to produce more number of Ph.D students graduating from the IITs every year, Kakodkar Committee recommended that the IITs quickly get 0.6 Ph.D student to graduate for each faculty member every year and then strive to get to one Ph.D student to graduate per faculty each year in the years to come.

Audit, observed that most of the IITs have not achieved the desired average of 0.6 Ph.D graduates per faculty despite being established over a decade as shown in the ***Table 5.9***:

Table 5.9: Statement showing achievement of average number of Ph.D graduate per faculty in all eight IITs in AY 2018-19

Name of the IIT	Number of Faculty members	No. of Ph.D graduations	Average Ph.D graduated per faculty
IITBBS	137	32	**0.23**
IITGN	100	24	**0.24**
IITH	197	69	**0.35**
IITI	127	83	**0.65**
IITJ	91	4	**0.04**
IIT Mandi	119	29	**0.24**
IITP	119	40	**0.34**
IIT Ropar	161	24	**0.15**
Grand Total	**1051**	**305**	**0.29**

Only IITI was able to achieve the prescribed 0.6 Ph.D graduations per faculty during Academic year 2018-19. IIT Ropar (0.15) and IITJ (0.04) remained far behind the desired ratio.

As per the responses received through Ministry (September 2021), IITBBS replied that owing to increase in enrolment of more students into Ph.D courses, the numbers would increase in coming years. IITGN replied that it had achieved ratio of 0.53 and 0.78 graduate per faculty respectively during 2020-21 and 2021-22. IIT Mandi, IITP and IITH replied that efforts are being made to increase in the number of registrations in Ph.D programmes.

As could be seen from the replies, the IITs have indicated that more efforts are being put in the coming years to increase enrolment of Ph.D candidates. This needs close monitoring by the MoE to ensure that the objective of more number of Ph.D students graduating from IIT system is achieved.

5.4.5 Non-Establishment and functioning of Research and Technology Development Council

MoE's DPR envisaged establishment of a Research and Technology Development Council in the governing structure of each IIT, to provide policy guidance for research and development activities. Audit observed that no such Council was established by the IITBBS, IITH, IITI and IITP during the period 2014-19. As a result, the policy guidance from a specialised body for research and development activities was lacking.

As per the responses received through Ministry (September 2021), IITBBS replied that no specific instructions in this regard were received from Ministry and that R&D activities were being regularly monitored by the Dean (R&D) and reviewed by the Director. IITH replied that the establishment of Research and Technology Development Council was at planning stage. IITI replied that they are formulating a committee to setup a road map for technology transfer and related activities and IITP replied that it had subsequently constituted an Institution's Innovation Council (IIC).

The fact remains that establishment of research councils for initiating and promoting research at Institute level was still in nascent stages in most of the IITs. This impeded the necessary thrust required to be given to the pace of R&D activities in the IITs.

5.4.6 Adherence to timelines in progress of Research Projects

Audit test-checked 208 sampled cases of research projects in eight IITs for assessing the cost and time over runs. Out of 189[31] projects for which information was provided to Audit, 96 projects were scheduled to be completed by March 2019. Out of these, Audit observed delays in 17[32] research projects (18 *per cent*) in six IITs (IITBBS, IITH, IITJ, IIT Mandi, IITP and IIT Ropar) with delay ranging from 22 days to 644 days as of March 2019.

As per the responses received through Ministry (September 2021), IITBBS replied that all efforts are being taken to complete the projects within the said period/extended time. IITH replied that there were delays in completion of projects due to fund flow issues. IITJ attributed the delay to non-working of equipment, incomplete data set, non-response from funding agency etc. IIT Mandi replied the delay was attributable to fund flow issues,

[31] Out of 208 sampled cases complete data was not provided by IITs for 19 cases.
[32] 8 completed, 9 in progress

remoteness of the area. However, the IIT Mandi added that whenever there is delay in completion of the project, a request with valid reasons was made to the funding agency for grant of extension for completion. IITP replied that time overrun always has the concurrence of funding agency and has no negative impact on the final outcome of the project. IIT Ropar did not offer any specific reply.

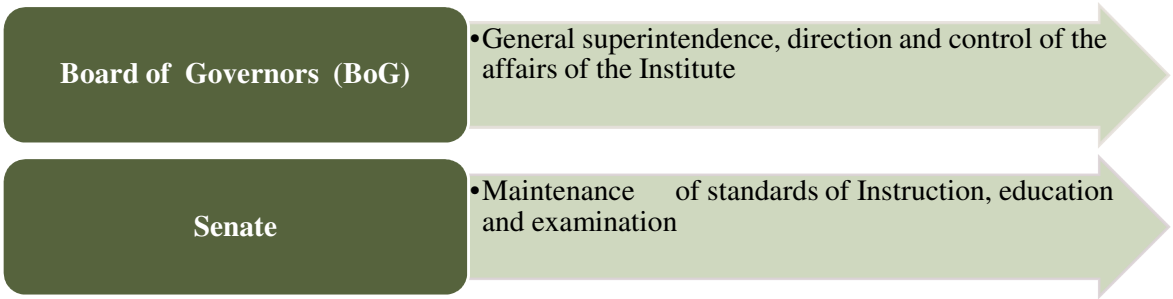
The replies are not tenable for the reason that the IITs have to plan and execute research projects taking all the issues into consideration. Inordinate delays in completion of research projects would result in non-achievement of intended objectives.

Chapter VI: Functioning of Oversight Mechanism

Oversight mechanism is a system or process used by organisations to monitor and ensure that their work is effective, of envisioned quality and that all applicable rules and regulations are followed. A well-structured oversight mechanism with governing bodies at appropriate levels institutionalises smooth functioning of the organisation and ensures that the intended outcomes are achieved economically, efficiently and effectively.

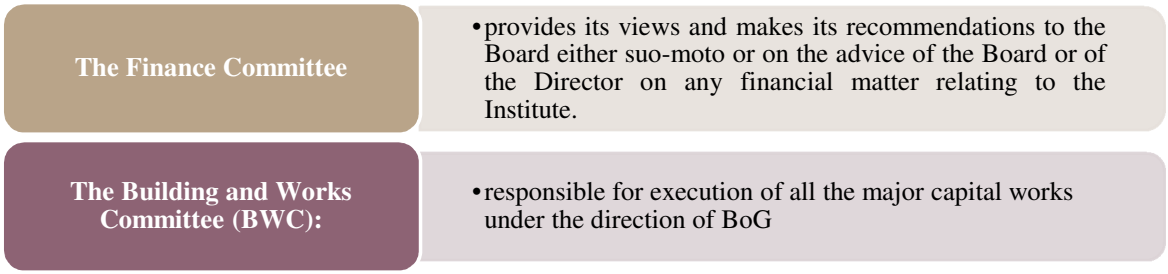
The Institutes of Technology Act, 1961 stipulates (Section 10) for constituting of Governing bodies such as Board of Governors, Senate (refer Para 1.3 Chapter I). The responsibilities of these governing bodies as stipulated by the Act are as in the ***Chart 6.1***:

Chart 6.1: Showing role of BoG and Senate



The Act also mandates that such other authorities as may be created by the Statutes of respective IITs may be formed. Accordingly, the Statutes of all eight IITs declared the creation of the following additional authorities as depicted in the ***Chart 6.2***:

Chart 6.2: Showing role of Finance committee and BWC



Further, the Act/Statutes also provide for a Chairman of Board, Director, Deputy Director and Registrar as officers of the IIT who are required to perform such duties as may be prescribed under the Act and the Statutes.

6.1 Composition and functioning of Governing Bodies/Availability of Officers of the IIT

All the eight IITs have formed the BoG, Senate, Finance Committee and BWC as stipulated by the Act. Audit examined the performance of these bodies with reference to their composition, functioning and discussions/decisions as contained in the Minutes of the meetings and the follow up action thereof.

The significant findings are as discussed below.

6.1.1 Meetings of Governing Bodies

The Act and Statutes stipulate for a minimum number of meetings to be held every year by each governing body. Conducting the meetings as prescribed facilitates regular monitoring of the activities and taking timely remedial measures.

It was noticed that there were shortfalls in number of meetings held by the BoG, Senate, Finance Committee and BWC in all IITs during the five-year period 2014-19. The shortfalls observed during the five-year period i.e., 2014-19 were as shown in ***Table 6.1***:

Table 6.1: Shortfalls in number of meetings of governing bodies during 2014-19

Authority	Shortfall in number of meetings
BoG	2 (IITJ) and 4 (IITGN)
Senate	4 (IITP), 5 (IITJ), 2 (IITGN), 3 (IITH), 10 (IITI), 6 (IIT Mandi) and 3 (IIT Ropar)
BWC	1 (IITBBS), 1 (IITP) and 7 (IITH)
FC	1 (IITGN) and 4 (IITH)

It can be seen from the table above that the Senate in the IITs was not meeting as frequently as mandated. There were shortfalls in meetings of the BoG, BWC and FC also. Shortfalls in meetings of the Senate would affect its role in monitoring issues relating to maintenance of standards of education. Shortfalls in the meeting of BWC and BoG shows that inadequate supervision took place during the infrastructure development period which led to delays in construction in all IITs as pointed out in Paragraph no. 3.4.

IITGN replied that five meetings of Senate in 2014 and 10 meetings of BWC in 2018 were held. IITJ replied that fewer meetings were held in 2016 because most of the procedure, routine and other matters were placed and approved in the four meetings of BoG conducted in the year 2015. IIT Mandi replied that shortfall was due to lesser number of faculty, students etc. and there was no shortfall in meetings after 2018. IIT Ropar replied that the meetings as per norms would be ensured in future. IITH replied that the meetings could not take place during the period mentioned by Audit and stated that it would ensure that the meetings are convened regularly at the prescribed intervals.

The reply may be seen in the light of the fact that due to shortfalls in the prescribed number of meetings, the monitoring authorities lost the opportunity to take timely review and corrective action on ongoing infrastructure projects and other activities. Audit noticed that lack of coordination between IIT authorities with the executing agencies led to inordinate delays in timely completion of infrastructure projects impacting the timely utilization of funds, introduction of courses, creation of student intake and effective execution of research activities as pointed out in Chapters 3, 4 and 5.

6.1.2 Effectiveness of the Functioning of Governing Bodies

The effective functioning of the governing bodies directly impacts the development of infrastructure, introduction of courses and overall functioning of the IITs. The governing

bodies are *inter-alia* responsible for taking decisions on questions of policy relating to the administration and working of the IIT.

(i) Audit noticed that during the period 2014-19, as highlighted in "Chapter III – Creation of Infrastructure", there were considerable delays in the execution of infrastructure works across eight IITs. There were delays of 20-52 months in completion of the projects (Phase-I and Phase-II) in all IITs. It was also observed that the delays were ratified on case-to-case basis by providing Extensions of Time. These had inevitable repercussions on the financial costs of these projects also, leading to cost escalation in most cases. Thus, timely action and effective superintendence was not exercised by these governing bodies to prevent delays.

(ii) On the academic front too, non-achievement of targets set with regard to student intake/student enrolment, faculty student ratio, non-establishment of Research and Technology Development council, indicate that the governing bodies need to re-align and re-visit their mechanisms of supervision and monitoring with respect to frequency of the meetings and follow-up of the decisions taken therein while strengthening the process wherever necessary.

(iii) The role of Finance Committee (FC) which is mandated to provide its views, make its recommendations to the Board on any financial matter and provide advice and guidance relating to resource mobilization is crucial for financial management of the IITs. However, audit observed that insufficiency of internal resources led to increased dependency on government aid, availing of loans without proper assessment of timely absorption capacity of construction activities, resultant idling of the loans availed, which point towards scope for better financial management and more effective monitoring by FC and other governing bodies.

6.2 Specific instances of lapses in oversight

(i) IIT Gandhinagar

IITGN entered into an MoU with CPWD during May 2012 for construction of new campus. As per the MoU, there would be a two-level monitoring system in place consisting of both CPWD and IIT authorities. Audit observed that BWC set up the Project Progress Monitoring Committee (PPMC) for monitoring of infrastructure works only in November 2013 i.e., after a lapse of 18 months.

Through the responses received from the Ministry (September 2021), IITGN replied that monitoring by PPMC in greater technical details had been found very useful.

Thus, delayed action of BWC in constituting the PPMC which was to monitor the infrastructure works resulted in inadequate monitoring during this period as delays were observed in execution of the works as pointed out in para 3.4.2 (b).

(ii) IIT Bhubaneswar

As per Statute 7(2) of IITBBS, the Finance Committee is responsible for providing its views and making recommendations to the Board on any financial matter relating to the IIT.

IITBBS entered (October 2014) into a tripartite[33] agreement for supply of 5 MLD[34] water to its campus. The agreement was executed by the Director without approval of BoG/FC which was against the said stipulation of their Statutes. Further, the requirement of water was not properly estimated as on November 2018 the actual requirement was only for 0.5 MLD against the 5 MLD agreed. As per records furnished to audit, the agreed volume of water (5 MLD) would be required in the year 2030 i.e., after complete development of the campus.

The water supply project was functional since June 2018 and the agency claimed water supply charges of ₹3.32 crore (March 2019) though no water was drawn by the IIT till date through this project.

Thus, improper/unplanned assessment of water requirement at initial stage and signing of agreement, without prior approval of governing bodies and incorporating bulk supply condition instead of actual consumption resulted in involvement of financial liability of ₹3.32 crore on the IIT without any commensurate outcome.

The Ministry did not give a specific reply to the audit observation.

(iii) IIT Hyderabad

As per the Statute 8(2) of IITH, the BWC is, *inter alia*, responsible, under the direction of the Board, for construction of all major capital works after securing from the Board the necessary administrative approval and expenditure sanction. BWC is also responsible to give the necessary administrative approval and expenditure sanction for minor works including maintenance and repairs.

Audit observed that as against two meetings in a year, BWC met only once during 2014-15, 2016-17 and 2017-18 and no meetings were conducted in 2015-16 and 2018-19. It was also observed that the BWC in its ninth meeting (September 2014) ratified, in one sitting, 175 construction works taken up between 2012-15 (175 works costing ₹9.33 crore).

In response, IITH replied (November 2020) that the BWC was mandated to meet twice in every year and the meetings could not take place during the periods mentioned by audit. IIT accepted the lapse and informed that henceforth it would ensure that the meetings would be convened regularly at the prescribed interval. In respect of the specific observation on ratification of works in one sitting by the BWC, IIT replied that in view of requirement of works on immediate basis the works were taken up within the powers of Director and were subsequently ratified by BWC.

The reply may be viewed in the light of the fact that due to non-conduct of regular BWC meetings the IIT lost the opportunity of proper discussion/review on the execution of referred works and was left with no option other than granting *ex-post facto* ratification.

(iv) IIT Indore

As per the delegation of powers of IITI, the Director was delegated financial powers to award the works upto ₹50 lakh and the works beyond ₹50 lakh should be referred to BWC.

[33] Public Health Engineering Organisation (Bhubaneswar), MEIL (Bhubaneswar) and IITBBS
[34] Millions Liters per Day

It was observed that the Chief Engineer and Project-in-Charge of CPWD awarded (December 2015) a work to a contractor for construction of RCC road amounting to ₹92.97 lakh without calling for tender and without the prior approval of BWC.

The Ministry replied (September 2021) that as per delegation of powers, the Director of Institute has the power to sanction new works costing up to ₹ two crore and therefore, this work was not required to be referred to BWC for approval.

On scrutiny of documents provided by IIT Indore, it was seen that the delegation of powers (2010) referred in Ministry's reply was for incurring expenditure. However, as per the delegation of financial powers (2012) for works expenditure, works beyond ₹50 lakh should be referred to BWC. Thus, the reply of the Ministry is not acceptable in this case.

Chapter VII: Conclusions and Recommendations

7.1 Conclusions

Audit concluded that infrastructure creation in the IITs were deficient as many state governments concerned did not make the requisite land available to the IITs, hindering infrastructure development. Projects taken up under Phase-I and Phase-II suffered from large delays in construction and in execution of works, thus rendering the planned infrastructure not being available to students in all the eight IITs. Further, there were instances of non-compliance of statutory requirements for construction of buildings, delays in tendering, awarding contracts on nomination basis, instances of undue benefits to consultants/contractors, instances of facilities created but not used due to delays in completion/deficient construction. Delays were also noticed in supply and installation of equipment due to non-readiness of site/non-availability of required infrastructure. Audit observed that the availability of laboratory facilities in respect of four IITs was deficient. Thus, students were deprived of the indented benefits of an efficient learning environment.

Audit observed that there were infirmities in the financial management exercised by the IITs. The capital outlay had to be revised as there were delays in taking up the construction of infrastructure development. There was slow utilization of Japan International Cooperation Agency (JICA) Loan which inhibited the growth of IITH campus in a timely manner. IITs were unable to generate sufficient internal receipts and thus remained dependent on the government for grants.

Regarding academic programs and research, it was seen that two IITs (IITBBS and IITJ) could not introduce the targeted number of courses. None of the eight IITs could attain the stipulated cumulative intake of students at the end of the sixth year. There was a shortfall in enrolment into PG programs in all the eight IITs. Five IITs (IITI, IITJ, IIT Mandi, IITP and IIT Ropar) did not fix an intake for the Ph.D courses while the rest had shortfalls in admissions in these courses. IITs had vacancies in faculty positions which would adversely affect the ability of IITs to provide quality education. Further, the representation of reserved categories of students' enrolment in most the IITs was very low. It was also seen that all the IITs received very low levels of funding for research projects, sponsored from non-government sources. Thus, they remained dependent on the government for funding of their research activities. There was also a large variance between the patents filed and obtained by all the eight IITs and no patents were obtained during the five-year period, indicating that the research activities could not bring out fruitful results. Research and Technology Development Council to guide research activities was not set up in four IITs.

Audit observed that the governing and oversight bodies existing in the IITs did not provide effective stewardship and management of resources. There were shortfalls in number of meetings held by the BoG, Senate, Finance Committee and BWC in all IITs during the five-year period 2014-19. Further, specific instances of lapses due to inadequate working of the governing bodies was also observed in four IITs.

7.2 Best Practices

The DPR envisaged good practices like sufficient green cover, energy conservation, rainwater harvesting, wastewater treatment etc., to be adopted during development of the campus. Audit observed the following good practices in the various IITs.

- IITGN campus has developed water management system comprising of raw water received from the Narmada Canal and its own Water Treatment Plant (WTP) with chlorination arrangements and distribution channels. A Sewage Treatment Plant (STP) has been set up and the treated water is primarily used for irrigation purposes. Also, Solar collectors with inverters were installed without battery storage system and are being used to provide energy to the Academic Complex and student hostels during the day. During construction period of 2013-2015, nearly 15,000 trees of native varieties were planted.
- In IITI, a water recycling plant and sewage treatment plant has been installed. Also, rooftop of seven buildings have been equipped with solar panels which are integrated with electrical sub-stations.
- In IIT Ropar, treated water is reused for harvesting. Further, more than 7,000 trees were planted for afforestation of campus. Rooftop solar panels have been mounted on few buildings.
- In IITP, STP has been used to conserve water in order to have a sustainable environment. Further, rooftops of majority of the buildings of the IIT have been covered with solar panels.

7.3 Recommendations

1. ***The Ministry, in coordination with IITs, may take proactive steps with the state governments for ensuring the land availability to IITs is as planned and suitable for development of permanent campus to create the intended intake.***
2. ***Infrastructure growth may be speeded up to ensure requisite sites are ready for procurement and timely installation of scientific equipment to ensure that faculty and students avail the benefit of these resources in time and achieve the intended research outcomes.***
3. ***The Ministry and IITs may identify avenues for generation of adequate internal resources in order to reduce the dependency on government grants and strengthen the financial position of all IITs.***
4. ***The IITs may take steps to increase the number of courses as well as student intake, in line with targets set out in the DPR to ensure availability of quality education to a larger pool of students.***
5. ***The IITs may periodically review the availability of faculty and the means of attracting faculty to fill the vacant positions and to maintain adequate FSR.***

6. ***Being premier engineering and research institutes, measures may be taken by the IITs to focus more on research by means of papers published, patents granted as well to attract funding from non-government sources to develop research and technology-oriented atmosphere.***
7. ***IITs may fix targets for enrolment in PG and Ph.D programmes and make efforts to ensure that these targets are met.***
8. ***MoE may take steps to galvanize the Council of IITs as well as Senate of each IIT so that new teaching methodologies, introduction of topical courses, setting high academic standards are attained, so that the IITs meet the emerging manpower needs of the country.***
9. ***Governing bodies should exercise greater supervision over the activities of IITs for effective functioning and should meet as frequently as mandated in Act/Statute.***

The MoE accepted most of the audit recommendations and has circulated these to all the IITs for acting on the recommendations.

New Delhi
Dated: 10 December 2021

(PRAVIR PANDEY)
Director General of Audit
(Home, Education & Skill Development)

Countersigned

New Delhi
Dated: 10 December 2021

(GIRISH CHANDRA MURMU)
Comptroller and Auditor General of India

Appendices

Appendix 2.1
(Reference: Paragraph 2.5)

Statement showing Sampling Methodology for selection of Sample

Universe	Strata	Sample Size
Infrastructure Projects **All infrastructure works/projects taken up, ongoing, entered, in progress, completed or abandoned during the five-year period ending 2018-19.**	₹100 crore or above	All (maximum of two)
	₹50 crore or above and less than ₹100 crore	All (maximum of three)
	₹10 crore or above and less than ₹50 crore	All (maximum of five)
	₹ one crore or more and less than ₹10 crore	10 *per cent* (minimum 5 and maximum 10)
	Less than ₹one crore	10 *per cent* (minimum 10 and maximum 25)
Equipment and Services **All equipment procured and services taken during five-year period ending with 2018-19**	Costing more than ₹ one crore	All (maximum of 10)
	between ₹50 lakh and ₹ one crore,	10 *per cent* (minimum 15 maximum 20)
	less than ₹50.00 lakh	10 *per cent* (minimum 25 maximum 35)
Research Projects **All Research projects taken up, on-going, completed or closed during the five-year period ending with 2018-19.**	No stratification	10 *per cent* of the projects (minimum 20 maximum 40)
Faculty **All faculty serving/served (Regular/Contract/Ad-hoc excluding Guest faculty) during audit period.**	No stratification	All faculty of selected departments (Minimum of 4 departments ensuring that 20 *per cent* of number of faculty are covered)

Appendix 2.2

(Reference: Paragraph 2.5)

Details showing Audit Universe and Sample Size

Sl. No.	Audit Area	Universe size (Sample Size)								Total
	Sample	IITH	IITGN	IITBBS	IITI	IITJ	IITP	IIT Mandi	IIT Ropar	
1.	Infrastructure Projects/ works	73(19)	31(26)	19(14)	23(20)	7(7)	16(14)	125(24)	13(12)	**307(136)**
2.	Procurement of Equipment and Services	3252(60)	775(54)	743(38)	1953(49)	420(64)	2277(62)	148(41)	357(69)	**9925(437)**
3.	Research Projects	514(40)	177(30)	132(20)	266(32)	65(20)	207(26)	174(20)	182(20)	**1717(208)**
4.	Faculty	204(72)	100(39)	96(22)	128(47)	91(42)	124(34)	93(19)	160(32)	**996(307)**

Glossary

Term		Details
AY	:	Academic Year
Act	:	Institutes of Technology Act, 1961
B.Arch	:	Bachelor of Architecture
B.Des	:	Bachelor of Design
B.Tech	:	Bachelor of Technology
BE	:	Budget Estimates
BoG	:	Board of Governors
BWC	:	Building and Works Committee
CAG	:	Comptroller and Auditor General of India
CES	:	Consulting Engineering Service
CPWD	:	Central Public Works Department
CSE	:	Computer Science and Engineering
CSIR	:	Council for Scientific and Industrial Research
CVC	:	Central Vigilance Commission
DoE	:	Department of Expenditure, Ministry of Finance
DRDO	:	Defence Research and Development Organisation
DST	:	Department of Science and Technology
EE	:	Electrical Engineering
EIL	:	Engineers India Limited
EM Works	:	Electro-Mechanical Works
EoT	:	Extension of time
FC	:	Finance Committee
FoB	:	Foot over Bridge
FSR	:	Faculty Student Ratio
GAD	:	General Architectural Design
GATE	:	Graduate Aptitude Test in Engineering
GFR	:	General Financial Rules
GoI	:	Government of India
GST	:	Goods and Service Tax
HEFA	:	Higher Education Financing Agency, a joint venture company of Canara Bank and Ministry of Education, GoI
HoD	:	Head of Department
HVAC	:	Heating, Ventilation and Air Conditioning
IIT	:	Indian Institute of Technology
IITBBS	:	IIT Bhubaneswar

Term		Details
IITGN	:	IIT Gandhinagar
IITH	:	IIT Hyderabad
IITI	:	IIT Indore
IITJ	:	IIT Jodhpur
IITP	:	IIT Patna
ISC	:	Indoor Sports Centre
JAM	:	Joint Admission Test for M.Sc.
JEE	:	Joint Entrance Examination
JICA	:	Japan International Co-operation Agency
M.A	:	Master of Arts
M.Des	:	Master of Design
M.Phil	:	Master of Philosophy
M.S	:	Master of Science
M.Sc	:	Master of Science
M.Tech	:	Master of Technology
MBA	:	Master of Business Administration
MBM	:	Muganiram Bangar Memorial
MEIL	:	M/s Megha Engineering and Infrastructures Limited
MEP	:	Mechanical, Electrical and Plumbing
MHRD	:	Ministry of Human Resource Development
MLD	:	Million Litres per Day
MoE	:	Ministry of Education (erstwhile Ministry of Human Resource Development)
MoRTH	:	Ministry of Road Transport and Highways
MoU	:	Memorandum of Understanding
MSE	:	Materials Science and Engineering
NBC	:	National Building Code
NBCC	:	M/s National Buildings Construction Corporation
NH	:	National Highway
NHAI	:	National Highways Authority of India
NIRF	:	National Institutional Ranking Framework
OBC	:	Other Backward Classes
PA	:	Performance Audit
PAL	:	Peer-group Assisted Learning
PFG	:	Programme Faculty Group
Ph.D	:	Doctor of Philosophy
PMC	:	Project Management Consultancy
PO	:	Purchase Order

Term		Details
PPMC	:	Project Progress Monitoring Committee
PWD	:	Public Works Department
R&D	:	Research and Development
RCC	:	Reinforced Cement Concrete
RFP	:	Request for Proposal
SA	:	M/s Sikka Associates
SC	:	Scheduled Caste
SIL	:	M/s Simplex Infrastructure Limited
SRSWOR	:	Simple Random Sampling without Replacement
ST	:	Scheduled Tribe
STP	:	Sewage Treatment Plant
TIP	:	Technology Incubation Park
TRP	:	Technology Research Park
UG	:	Undergraduate
VLSI	:	Very Large Scale Integrated Circuit