Report of the External Peer Review Panel

September 4-6, 2014

New Academic Complex on Main Campus

Indian Institute of Technology Delhi
Hauz Khas, New Delhi-110016
www.iitd.ac.in

INDIAN INSTITUTE OF TECHNOLOGY DELHI

The *lamp* is knowledge. The *exponential curve* spiralling outwards represents the Institute's central theme of engineering. The encircling *gear* depicts the nation's industries where the students are headed. The *elephant* through its purity and strength depicts the city of Delhi. The two flowers, the *lotus* and *rose* represent India and England, the two countries whose close ties have brought the Institute into being.

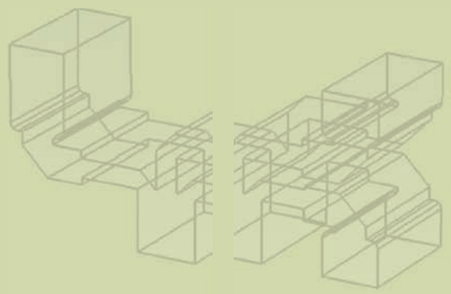


Table of Contents

	Acknowledgements	iii
	Prologue	iv

Report Contents

1	**Executive Summary**	1
	Introduction and context of Review	1
	High Priority Recommendations	1
	Next Steps	3
2	**A. Main Report**	4
3	**B. Key Recommendations**	6
	R1. Vision and Strategy	6
	Content	6
	R2. Reputation and Ranking	7
	R3. Infrastructure	9
	Specification and Prioritisation	9
	Delivery and Quality Management	9
	Maintenance	10
	R4. Learning and Teaching Innovation	10
	R5. Staff Development and Benefits	11
	Engagement and Team Culture	11
	Training, Development and Motivation	12
	Establishment Levels	12
	R6. Transparency	12
	R7. Modernisation in Service Delivery	12
	R8. Autonomy	13
	R9. Alumni	13

4	**C. Observations/Notes from Discussions and Other Inputs (Supporting Evidence)**	14
	Vision and Strategy	14
	Curriculum and Courses Offered	15
	Teaching Environment	15
	The Estate (Infrastructure)	16
	Research and Development	16
	Research and Development Environment	17
	Governance and Financial Resources (Management, Financial Resource Management, Transparency, Infrastructure)	17
	Internal Stakeholder Engagement (Students, Faculty, Non-Faculty)	18
	External Stakeholder Engagement (Industry, Alumni, Community Leadership, Government)	18
	Contribution to National Development Goals/ Priorities	18
	Social Responsibility and Other Areas of Impact	19
	The Role of the Alumni Organisation	19
	Diversity	19
Epilogue		20

APPENDICES

5	Appendix I: Schedule of the External Review Panel Meetings	A1
6	Appendix II: Brief Profiles of External Review Panel Members	A5
7	Appendix III: Internal Review Report	A11

Acknowledgements

The Committee extend their appreciation to the IITD Director, the Chairman BOG and all the Senior Faculty for (i) excellent support provided to the committee (ii) giving opportunity to meet cross-section of staff in IITD separately, (iii) a very comprehensive review Program / Presentations for the committee.

We are grateful for the openness of all individuals with whom we met. We were impressed to observe that every member of staff we met, listened to and engaged with - at all levels – expressed deep pride in their association with IIT Delhi, and a passion for their work. All feedback we received was delivered in a constructive manner.

Prologue

In September 2014, IIT Delhi's 459 faculty were engaged in educating 3,590 undergraduate and 4,239 postgraduate students on a 300 acre campus with built-up area of 3,00,000 sq.m. The research leads to about 1300 journal publications annually, at an average of 2.8 per faculty. The amount of external funding is Rs. 115 Crore, which is of the order of the amount paid out as salaries in IIT Delhi. Of the total area, 1,00,000 sq.m. is used for classrooms and laboratories.

The major stakeholders of the Institute are the faculty with stakes in establishing a system where individual excellence can flourish. The MHRD has stakes in advancing the technology base of the country. The students who later become Alumni have stakes in leaving behind a better institution for the next generation of students. The industry has stakes in developing manpower and getting technological solutions for their problems.

IIT Delhi has been overwhelmed by a twofold increase in students from Y2K and is embarking on massive infrastructure development to accommodate the increase. In addition to meeting national needs for developing human resources, a new focus on product development through technology demonstrators and incubation units is envisaged. To meet the challenges, it was deemed necessary to first assess the health of the existing structures and then engage with institution builders across the globe to obtain options for the road ahead and structural reorganisation needed to push ahead.

This document lays out the salient points of the state of the institution and the road ahead as of September 2014.

Director, IIT Delhi

Executive Summary

Introduction and context of the Review

The Council of IITs 46th meeting on January 7, 2013 agreed that all IITs would undertake an external peer review of their operations. The external peer review was to follow an extensive internal review. The external review panel for IIT Delhi (IITD) was selected by MHRD in mid-2014.

IITD conducted an extensive internal review of each Department and the findings were presented to the External Committee. The external review took place at IIT Delhi from 4th-6th September 2014.

IITD has maintained number 1 ranking amongst the IITs and other universities in India in recent years. Although it's world ranking in the various ranking schemes for research Universities has been around 220 or lower, data shows (Pitch Book 2014) that IIT graduates have ranked number 4 (after Stanford, UC Berkeley, and MIT) in entrepreneurship. IITD is conscious of its image and ambitions and working towards achieving excellence. The committee is pleased to see IITD's very ambitious expansion plans including initiatives like IRD, FITT, two "off campus" technology parks, more than doubling lecture halls, hostels and laboratory space.

But there are challenges. Higher education is rapidly transforming into a highly competitive global market. National research funds are allocated with a bias towards institutions with high international rankings and reputations. National funding agencies (e.g., DST), charities and research foundations (e.g., Wellcome DBT) and corporate sponsorships are increasingly focused on the impact of research. Significant funds are becoming available for international partnership research work (e.g., DST-NSF, DST-RCUK). The market for teaching and research talent is increasingly international – as is the market for high quality, high potential students. IIT Delhi must successfully compete internationally at a higher level.

High Priority Recommendations

We highlight and summarise the high priority recommendation R1 through R5. Full details of these five recommendations, and the further recommendation R6-R9, are in part B of the main body of this report.

R1. Review, Revise and Re-energise the Mission, Vision and Strategy:

IITD has mission goal of achieving excellence in teaching and research and a place amongst top institutions in the world. While focus on education and research is basic and cannot be diluted, responding to societal needs of India in terms of focus on relevant technology and generating employment through its graduate and post graduate students has to be added. Hence, the updates mission should be "**excellence in education, research and innovation through entrepreneurship**".

Initiate an institute-wide strategic development exercise involving all key stakeholders - internal and external. The goal is the development of a Vision and Strategy for the overall Institute.

R2. Establish a proactive strategy for building IIT Delhi's international reputation and ranking:

A high ranking helps attract and retain strong faculty, helps attract strong international research students and postdoc researchers, and this establishes a virtuous circle. Improving international rankings for IIT Delhi is a long term objective but work must begin today. Reputation and ranking are very much within the reach of the IIT; gaining an understanding of the key levers is vital. Ambitious but achievable targets must be set. All staff must see success in this as a shared responsibility.

R3. Infrastructure: Transform the estate to match IIT Delhi's world-class aspirations:

In order to achieve the aspirations for higher global ranking it is vital that the IITD rethinks and revitalises its approach to its infrastructure. Changes are required at all stages of estate development, including Specification and Prioritisation, Delivery and Quality Management, and Maintenance. Much work is underway already, however concerns remain – and it is vital that significant resources be made available to deliver an internationally competitive infrastructure.

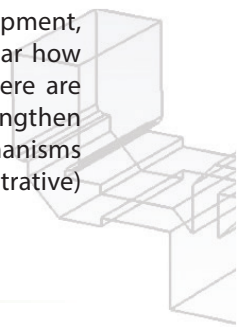
R4. Adopt and adapt to global changes in engineering education to differentiate IIT Delhi's graduates:

Learning and teaching in engineering is experiencing global change. Students have higher expectations of their learning. New approaches to engage, challenge & develop students and to prepare and "future proof" them are being developed. IITD must embrace these developments and lead in their adoption and implementation its own way.

IITD should identify one or two institutional projects that are multidisciplinary, societal, can attract large student and faculty participation, challenging and related to chosen areas of excellence.

R5. Foster a more inclusive and engaged culture for all members of the IIT community:

This includes a number of specific recommendations relating to staff development, benefits and improved engagement. All members of staff made very clear how proud they are to be part of the IIT and its achievements. However, there are divisions, barriers and missed opportunities that, if addressed, would strengthen the organisation. For example, IITD senior management should create mechanisms for greater interaction with non-academic staff (both technical and administrative) to remove the trust deficit that was seen.



Next Steps

The committee has outlined a significant number of recommendations. Those of highest priority have also been summarised in this executive summary. All recommendations have been classified as short-term-local or longer-term in their implementation. Looking to the future, the committee recommends that an external review be repeated every five years. In addition a follow-up meeting should occur between nine months and a year following each review to provide feedback on progress against recommendations. Internal reviews should probably occur at a higher frequency; perhaps every three years.

The committee members are willing to remain engaged to help with implementation.

Discussing the road ahead

A. Main Report

The Council of IITs 46th meeting on January 7, 2013 agreed that all IITs would undertake an external peer review of their operations. IIT Delhi held its external peer review from 4th-6th September, 2014.

This external peer review is timely. The IIT System has an excellent reputation but global competitiveness is growing. Universities must now compete internationally for the best faculty, for the best students, and indeed for the best collaborative research partners and funds. International rankings are of growing importance.

The committee met at IIT Delhi from 4th-6th September 2014, and during this time gathered evidence for this report through members of all key stakeholders groups at IITD. During the external review the committee met with the following stakeholders:

- Chairman BOG
- Director
- Deputy Directors
- BOG committee members and Internal BOG members
- Deans
- Associate Deans
- Heads of Departments, Centres and Schools
- Faculty
- Heads and members of several laboratories (including Nanoscale Research Facility, Applied Research in Electronics, Civil Engineering and the Foundation for Innovation and Technology Transfer)
- Registrar and all Group A Officers
- Alumni
- Students
- Librarian
- Staff

The committee toured the Zanskar hostel and the Recreation and Creative Activities (RCA) facilities.

The committee was also provided with copies of:

1. The internal review documents from each Department, School and Centre
2. A substantial listing of observations and recommendations from alumni

The detailed recommendations are presented next, in part B. The findings/evidence are presented in part C. Part D includes Appendices I & II being the schedule of the Executive Review Panel Meetings and the profiles of the committee members and their affiliations respectively.

IIT in the midst of the light scatter of New Delhi

B. Key Recommendations

There are nine main recommendations **(R1-R9)**. In this section each is broken down into smaller parts. Key aspects of the first five recommendations are very briefly summarised in the Executive Summary.

R1. Vision and Strategy

Initiate an institute-wide strategic development exercise involving all key stakeholders – internal and external. The goal is the development of a Vision and Strategy for the overall Institute. The committee has specific recommendations regarding the content, formation, communication and cultural adoption of the Vision and Strategy.

Content

The Vision and Strategy must come from the IIT and its stakeholders. However, the committee feel these elements must be included to support continued growth to global excellence:

R1.1. At a high level we recommend structuring, developing and communicating the Strategy around a model that explicitly demonstrates the value chain from ***Learning – Innovation – Impact.*** Define goals at the institute level, department level, leadership level and individual level. Learning creates knowledge in individuals and teams. Innovation creates new knowledge, IPR, papers, new products and new services. Impact defines the mechanism for creating societal value from the new knowledge, IPR, papers, new products and new services. It includes raising capital and scaling to impact large number of people.

Specific recommendations for the Vision and Strategy content are:

R1.2. Given budget, land and recruiting constraints, IITD must prioritize. It cannot do everything well. It needs to shed activities when new ones get added. Select a few areas in which IITD would like excel. These areas should be chosen based on core strength of the institute, national priority and perhaps exclusive to each IIT to provide wider coverage as nation. Set a goal to be among top 10 to 20 in these select areas. Attracting top faculty is difficult. So some of the focus areas will have to be grown around current and new faculty leaders.

R1.3. Set a holistic vision to raise the standard of every department including support services, infrastructure, HR practices to become world class in every aspect of running an organization. This holistic vision will raise the aspirations of all the people associated with IIT Delhi. Create a task force to determine if the academic offerings of IITD be enlarged by considering the breadth of course offerings at institutions such as MIT.

R1.4. Create a road map to increase funding from private industry and alumni. The proportion of private funding in the overall budget of the institute should eventually move to 50%.

R1.5. Scale up the Foundation for Innovation and Technology Transfer. Include representatives from the venture community and business leaders from alumni. Every department must have regular interactions with the venture community every month.

R1.6. To increase its international footprint and achieve an elevated place in the world ranking, IITD will have to increase its international collaboration, larger exchange of faculty and student and more collaborative research.

R1.7. Include innovation and entrepreneurship into the IIT mission of excellence in education and research. Like the last review 10 years back that added research to education which has yielded significant results in terms of increase in publications, number of Ph.Ds, it would be one more dimension that will result in increasing its relevance to the country, focus on relevance technology to the country, wealth and employment generation in India. Entrepreneurship and translation as a third rail beyond teaching and research is needed. Provide suitable mechanisms to enable this.

R1.8. Committee recommends for focus on multidisciplinary research and development through industry and multi institution participation.

R1.9. Formation : Create a leadership team including all stakeholders –sections of employees, students, alumni, government officials – to reach the goal of being part of top-100 in 10 years. Create a detailed execution plan and publish this. Track progress on an annual basis.

R1.10. Communication : Initiate a series of communication workshops reaching out to all staff to develop an awareness of the strategy, and to establish a personal appreciation for each member of staff of their role and contribution to the strategy's achievement.

R1.11. Cultural adoption : Set as a goal that every member of staff can articulate how they and their organization contribute to the achievement of the goal and work out a strategy.

R2. Reputation and Ranking

Improving international rankings for IIT Delhi is a long term objective. There are many factors involved in achieving this. The most important are:

R2.1. Identify 5 impact areas where the institute will be identified with and will be the go-to place worldwide. The institute must attract the best students and faculty from around the world.

R2.2. IITD should decide which international ranking systems are most relevant to its key stakeholders. It should then engage directly with the organisation(s) that manage those rankings to develop a strategy for improving its position. These organisations can work with IITD to develop a strategy tailored to your aspirations and situation.

R2.3. We recommend that consideration be given to establishing a small (5-10) international peer group of similarly aspiring universities (a peer group); this group should work together on sharing best practice.

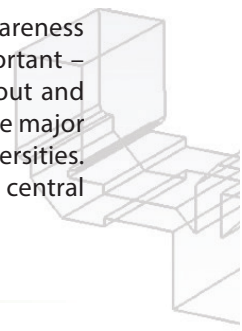
R2.4. Research is a major factor in international rankings. Examine other national frameworks for research assessment. The UK is strong in this (perhaps over the top) through its Research Excellence Framework (REF) exercise. The REF exercise completes in the UK this year – it repeats every 5-6 years and is used to rank all universities on their research outputs, environment, reputation and impact. Papers and citations are not enough. The MHRD Minister just recently (12/9/14) announced a desire to establish a national ranking scheme. IITD could be a leader and pilot an approach in India first. There are a number of advantages in either doing something like this first – or taking the lead in the initiative. Starting early is essential.

R2.5. It will be useful to do a study to compare the operating framework of top ranking state funded universities with that of the IITs. This can provide some insights into the role of such constraints and point to the reforms needed. The study can also frame realistic goals for improving international ranking – see also **R2.2.**

R2.6. A self-assessment of IITs contributions beyond teaching, i.e., technology that impacts society, is worth compiling. There seems to be little memory of IITD's past achievements. Such a study will help inspire new faculty and students, as well as help IITD develop better strategic plans.

R2.7. IITD needs much more faculty (and perhaps even student) exchanges with the top schools (say top 25 in QS ranking). Such exchanges are now extremely weak and represent a huge obstacle to improving academic quality at the institute. The biggest impediment appears to be finance, since sabbatical salary at IITD is not adequate to support cost of living in the many countries. IITD needs to develop a full plan to correct this major deficit.

R2.8. A significant investment in marketing for IITD is required to build awareness of IITD's activities and achievements. A change in culture is important – staff must be interested in talking about their work, in reaching out and sharing their discoveries and contributions. Again, the UK REF drove major changes in the "marketing" of research and its impact by all universities. The responsibility lies with all members of academic staff, not just a central marketing organisation.



R3. Infrastructure

In order to achieve the aspirations for higher global ranking it is vital that the IIT rethink and revitalise its approach to its infrastructure. Changes are required at all stages of estate development, including Specification and Prioritisation, Delivery and Quality Management and Maintenance. Much work is underway already, however concerns remain – and it is vital that significant resources be made available to deliver an internationally competitive infrastructure.

Specification and Prioritisation

R3.1. Improve infrastructure related to office space for Ph.D. students and in hostels. The overcrowding in hostel rooms should be avoided and the intake reduced until the requisite infrastructure that includes sufficient recreational areas is ready.

R3.2. To compete successfully for overseas students, overseas visiting scholars it is essential that hostel accommodation be developed and maintained to international standards.

R3.3. All new space should be developed with greater sensitivity to international developments in curriculum design and corresponding changes to learning and teaching approaches (e.g, project-based work that demands more flexible and reconfigurable space), accommodation standards, student interaction and stimulation, and the requirements of world leading engineering research institute.

Delivery and Quality Management

R3.4. Address infrastructure quality in the short term, especially of the new buildings being constructed and delivered in the next 1 year. Changes in oversight and construction governance may be required in order to ensure this happens.

R3.5. A number of initiatives should be taken to enhance hostel quality:

- The development of a quality manual that specifies the standard of workmanship, maintenance and cleanliness is needed.
- Use Alumni in the building and hotel industry to help with quality improvement.
- Let students take some ownership of the maintenance – e.g. a student committee with some powers to authorise / accept maintenance work.
- The Director should visit each hostel once every 12 months and satisfy for himself that they meet minimum standards.

Maintenance

R3.6. Establish a maintenance methodology that embraces the estate (hostels, laboratories, housing), and significant equipment purchases. That methodology should prioritise funding to maintain existing capital items – but also include new capital that has been completed recently or will be completed shortly – e.g., the new lecture/lab building; and the new technology translation facilities. A case for additional funding may be required to ensure that the estate is regularly maintained.

R3.7. Stray dogs should be removed to a pound rather than be tolerated on the campus, and in the classroom.

R4. Learning and Teaching Innovation

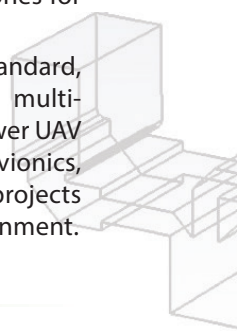
Learning and teaching in engineering is changing. New approaches to engage, challenge & develop students and to prepare and "future proof" them are being developed. IIT Delhi must embrace these developments and lead in their adoption and implementation its own way.

R4.1. Integrate entrepreneurship explicitly into the curriculum (see recommendation **R1.7**). The recent report by PitchBook Data (2014) that places IITs 4th globally in producing venture capital backed founders is impressive given that entrepreneurial training is only just now appearing in the curriculum. A more explicit and integrated treatment of entrepreneurship and teaching problem solving skills will yield extraordinary results.

R4.2. Establish a group with pedagogic expertise, and establish a centre for learning and teaching that can provide support to the wider community in new developments.

R4.3. Innovate in the classroom with technology and new paradigms for teaching that develop problem solving skills. Classrooms must transform into workshops and learning must happen by doing. A pilot exploration of new engineering education approaches should be established – the Conceive Design Implement Operate (CDIO) initiative is one strong example. (Aston University and Liverpool University are key leaders in this area in the UK; the idea comes originally from MIT). But the specific approach is not as important as the need to explore new models and find the right ones for IITD. This recommendation is also connected with **R3.3.**

R4.4. Based on expertise and selected disciplines for achieving world standard, institute should create a few "Institutional Projects" which are multi-disciplinary and of societal application. Development of a Solar Power UAV (for example) could be project if an institute wants to excel in avionics, aerodynamics, instrumentation and flight control systems. Such projects inspire students to do something new in an interdependent environment.



R5. Staff Development and Benefits

Engagement and Team Culture

R5.1. Engage with administrative and technical staff and address their key issues – those that are within the BOG purview. Create a mechanism to engage them on an ongoing basis.

Longer term, create an HR department that can deliver the needed support to all staff – academic, administrative, technical.

R5.2. Generally, there is lack of connect and feeling of frustration in most of the staff as IITD has not formulated recruitment and promotion rules, hence staff is not getting any promotion except an upgradation after 10 years as per GoI norms. This upgradation in certain lower level grades is so low that it is just meaningless. The committee strongly recommends quick formulation of appropriate rules, in line with other scientific institutions in the country, and their implementation.

R5.3. Consider merging the multiple Establishment tracks into a single model providing a common framework of benefits to all (consider a cafeteria model in which staff can purchase additional benefits that may suit their individual situations).

R5.4. Benefits offered to the support staff should match those of other institutes, e.g., IIT Mumbai and IIT Madras. Some general facilities like medical, residential etc are not at par with other IITs. The level of these facilities should be consistent from a PAN-IIT perspective. It may help to examine best practices at all IITs and reinvent a differentiating IIT model that can benefit all staff.

Training, Development and Motivation

R5.5. Introduce training for all staff in HR matters. This should include the creation of an induction "module" for staff – though HR training should not be confined to induction.

R5.6. It is noted that support staff training has not been addressed at any level. With present challenges of changing technology and procedures, training of scientific / technical staff and also administrative staff is a must. While reducing the staff at group C group D level should be the focus, with training of each employee at least once in two years.

R5.7. The support scientific staff in some cases have very good qualifications and experience, however there is no provision to migrate to higher level and this drives frustration. The Institute will strengthen overall if provision for growth and category change is needed, whenever an employee is able to qualify.

R5.8. It is noted that a good academic performer (in terms of teaching and research) attains full professorship at the age 40 and there is no external driver (other than his/her own will to excel) to push him/her hard beyond comfort zone. IITs, and IITD in particular, should develop mechanism to continuously encourage pursuance of excellence though awards, rewards, recognition through national academies etc.

Establishment Levels

R5.9. It is noted that the support staff levels have reduced significantly over the years, though the strength of students and faculty has increased. While reduction in certain categories like Group 'D' may be justified, as focus is on outsourcing the services, reduction in scientific support staff is burdening the load of faculty in terms of maintenance of laboratory and equipment. There should be substantial increase in scientific support staff. Support staff, such as technicians play an increasingly important role in student support as well – especially as learning and teaching approaches becomes more project oriented.

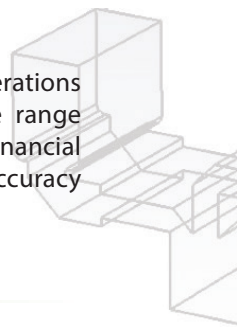
R6. Transparency

Conduct an open review of key processes with a view to put in place changes that will raise the level of trust and engagement in all staff at all levels. The review should engage with staff at all levels. Staff should be engaged to identify processes warranting assessment; topics should likely include:

- Annual reporting and feedback. It is noted that some academic staff did not appreciate the role of Confidential Report (APAR) and also found that assessment is not conveyed to the faculty. A systematic transparent approach on lines of GoI APAR is recommended.
- Opportunities for 360 feedback introduction to allow staff to communicate feedback to management.
- Overall communications within the institute with a goal to enhance.
- Negotiations regarding the use of space.

R7. Modernisation in Service Delivery

It is now fairly common for universities to have most of the routine operations conducted online with self-service by students, faculty and staff. The range of services could be registrar-related to teaching and assessment, to financial services, purchasing and benefits. Such a system can improve quality, accuracy and timeliness of such services.



R7.1. This will require a fairly sophisticated IT services department to maintain the system and good IT software services company to develop the base software. Such IT systems will require significant investments but will pay off handsomely. An examination of best practices at international partner universities should be undertaken, a proposal for transformation should be developed, and an appropriate level of investment must be committed. Quality IT infrastructure is essential to efficient working and to providing a world-class environment.

R7.2. In the shorter term, consider the implementation of process reviews in key areas (e.g., finance approvals) with a particular focus on identifying "quick wins" – e.g., the identification of Fast-track mechanisms to cover 80% of the normal cases.

R8. Autonomy

The Committee recommends that IIT council should prepare draft resolution for Govt of India to seek greater autonomy from the Parliament for the IITs functioning. The IIT must develop specific areas where such autonomy is required – it would include:

- A stronger position with respect to requests from government for major strategic shifts (e.g., accepting more students; mentoring new IITs; etc.) in the absence of additional funding.
- Matters relating to the introduction of new HR practices required for competitiveness and IIT differentiation.

The conceptual framework of the Government under which IITs operate does impose a huge burden. If IITs want to be world class, there has to be an honest study and discussion of this issue.

R9. Alumni

Take an aggressive approach to engaging with IITDs alumni, to include them as part of IIT vision and resource, and to harness additional funding for the infrastructure. Examples elsewhere have shown that alumni can contribute in a very signification manner. Learn from other IIT's experience, e.g., IIT Madras. The alumni presented the committee with scores of observations and recommendations. A strong and open engagement with alumnus is needed to bring their experience, time and pride to bear to propel IITD forward.

C. Observations/Notes from Discussions and Other Inputs (Supporting Evidence)

All recommendations in section B are supported by evidence obtained from stakeholder meetings, visits and materials provided. Here we list some specific findings, and in some cases make reference to external papers/documents that provide evidentiary support.

We classify evidence herein along these lines:

- Vision and Strategy
- Curriculum and Courses offered
- Teaching environment
- The Estate (Infrastructure)
- Research and Development
- Research and Development Environment
- Governance and Financial Resources (management, financial resource management, transparency, infrastructure)
- External Stakeholder Engagement (industry, alumni, community leadership, government
- Contribution to National Development Goals and Priorities
- Social Responsibility and other areas of Impact
- The Role of the Alumni Organisation
- Diversity

Vision and Strategy

1. The committee noted that the academic staff in general has a bit of disconnect with the vision and mission of the IITD and work in their own isolated world of department / lab. IITD has to create / strengthen forums for better connectivity and sharing the vision.
2. In the discussions with various stakeholders it was evident that the vision and strategy were created recently. There seems to inadequate buy-in or confidence in achieving these. These don't seem to reflect the capabilities and capacities that are available today.
3. The goals and strategy must raise the aspirations of all. The physical space (visible to everyone including visitors) must reflect the aspirations of the institute.
4. The Institute as a whole should have a clearly articulated vision as well as a strategic plan. This should also be replicated at the level of the departments, schools, and centres. The vision should be to be in the top-20 in the world in technology institutes.

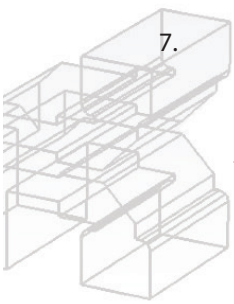
5. To reach its stated goals, the Institute should develop clear processes related to assessment of faculty, courses, and programs. A system of incentives should be built up to reward those who are more effective.

Curriculum and Courses offered

1. There seem to a proliferation of courses. The institute must identify fewer courses with large number of electives.
2. The curriculum does not specify how online content will be leveraged including MOOCs.
3. The curriculum lacks explicit integration of entrepreneurship and commercialization of new products.
4. The curriculum should also address the question of creativity. Entrepreneurship is one way to encourage creativity.
5. Students were very outspoken about the lack of imagination in teaching.

Teaching Environment

1. MOOCs and online content are not leveraged today.
2. Transform the classroom to teach application of knowledge and experimentation.
3. Teaching assistants and technical staff are not given maximum leverage. They are not trained to be current in their knowledge.
4. The classroom infrastructure will be improved after the new lecture building is commissioned. But the back-end of this environment in the hostels needs tremendous improvement.
5. The committee did not see computing laboratories for general use in the library or elsewhere. Such laboratories are essential.
6. The presence of stray dogs in the campus and also in sometimes in the classrooms and the hostels is unacceptable. We were informed that they are tolerated because IIT does not wish to go against the government's policy that dogs should not be removed to a pound and that they should be left in their "natural habitat". While we understand that this touches upon the difficult question of animal rights, no one in the world would want their children to study in a campus with stray dogs if they had a choice to go to another place that did not have stray dogs.
7. An environment of good taste is another. Not only was the construction -- and design and fittings -- of the new hostel Zanskar in poor taste, so was the amateurish design of the passageways connecting the academic blocks. The committee was also taken aback by the large laboratory room in the new building that is coming up. The idea of rows of tables in the huge room is terrible. IIT needs to work with interior



designers who specialize in classroom design to determine how large spaces need to be broken up and made into interesting partitioned areas. In short IIT needs to ramp up the quality of its infrastructure -- both in physical construction and design.

8. The committee notes that all IITs, (old and new) have gone through a very difficult period during last 5 years, due to very steep rise in student strength driven by the GoI directive. The plans for improvements in infrastructure facilities have been upended by crisis management related to the sudden increase of numbers. Even today, the laboratory space, lecture halls and hostels are highly inadequate. It will take perhaps one more year to get new lecture halls and hostels, which are in the finishing stage.

9. Even though the Government has provided funds towards this expansion, many parts of the infrastructure have become inadequate. Additional initiatives like creating facilities to bring the industry to the campus through incubating centers, technology parks etc. have had to be kept in abeyance.

The Estate

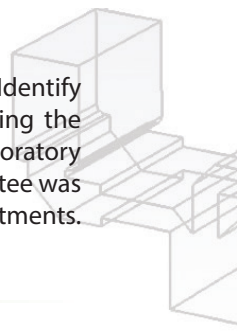
1. The hostels are in a very poor shape and the students are clearly disadvantaged by this. The research labs we visited were of a reasonable standard. The committee did not visit faculty housing, but some members who are familiar with housing for senior faculty, say they are in good shape. Since the CPWD maintains all these facilities, the committee believes, the issue is more of priority and attitude rather than finances. A number of initiatives should be taken to enhance hostel quality.

2. The committee is pleased to see very ambitious expansion plans of the IITD which includes initiatives like IRD, FITT, two "off the campus" technology parks, more than doubling lecture halls, hostels and the laboratory space. This however needs very significant increase in resources, both funds and man power for next 5 to 8 years. It is estimated that increased funds of approximately 1000 crores would be need, spread during this period.

3. Presently, there is serious lack of infrastructure, particularly the hostels, lecture halls, lab space and industry incubation. However, committee agrees with the ambitions plan of the IITD, which were presented to the committee. Committee recommends that adequate resources be made available / generated to bring this plan to reality.

Research and Development

1. Research concentration is of critical importance to small organisations. Identify 5 areas where the institute will be known globally. Invest heavily in getting the best faculty and attracting the best students. Invest in creating the laboratory infrastructure. Some of the labs seem to be good candidates and the committee was impressed by the visit to the Civil, Nano, Bioengineering and Microwave Departments.



2. The level of international collaboration is low.
3. We were impressed with several laboratories that we saw.
4. We were also impressed with the new facility of the Foundation for Innovation and Technology Transfer.
5. IIT should work towards increasing the quality of the publications. Citation may be an imperfect measure, but it does address the question of quality to a degree.
6. University rankings are useful but not the whole picture. The real thing is (beyond the teaching mission) what have IITD done to contribute to India's and world's technology base. A good study and self assessment is needed. There are some bright spots, but too few.

Research and Development Environment

1. The Institute appears to be providing an excellent R&D environment.
2. However, there was significant discussion by faculty working in experimental disciplines about the lack of space, and support for their work.
3. There should be strong assessment of the quality of work performed at the Institute.
4. At present there is no framework in India for Research quality assessment. Paper citations alone are not enough.
5. It was a surprise that IITD does most of the administrative work manually and IT enabling has not been implemented for certain administrative reasons.
6. The level of faculty (and student) exchanges with top rated universities is very poor. This is a huge deficit.

Governance and Financial Resources (Management, Financial Resource Management, Transparency, Infrastructure)

1. Create cross functional team to look into time taken for approval processes. Simplify these so that productivity can increase.
2. Raise private sector funding to make this 50% of the overall budget.
3. Self-governance and assessment need to be strengthened.
4. Should use open source enterprise resource planning (ERP) systems.
5. Agreeing to increase the enrolment to 10,000 when the infrastructure cannot support it is a mistake. IIT should fight it and ask for more capital investment.
6. Faculty spend large amounts of time in second-order administrative work – i.e., chasing and re-working and responding to queries and so on. There appears to be acceptance of responsibility to support a certain level of bureaucracy – but the

view is that this has become unnecessarily excessive. Faculty are seeking a fast-track mechanism for processing of straight-forward requests. The present culture is one of "finding reasons to decline or reject administrative requests", rather than one of trust.

7. Committee was puzzled that the IITs do not have basic freedom of opening new departments, as IITs are formed out of Parliament Act. Such a freedom is must in the fast changing world as new disciplines emerge overnight. Nano technology, 3D printing / manufacturing, biosensors were not even known some 10 years back.

8. Committee also noted that other than once in a while odd interventions by the GoI, like adhoc increase in number of seats to meet a political objective the Govt. intervention otherwise in day to day working is not much.

Internal Stakeholder Engagement (Students, Faculty, Non-Faculty)

1. Create a leadership team from across including all stakeholders in defining, leading, executing the vision and goals of the institute. This engagement has to improve.

2. Create a sense of ownership and pride in the institute infrastructure. This is the visible part that engages visitors. A good work environment improves productivity since people will spend more time at work.

3. These need to be strengthened. Internal governance should be more inclusive.

4. The engagement with the internal stakeholders should include transparent procedures related to hiring and purchases.

External Stakeholder Engagement
(Industry, Alumni, Community Leadership, Government)

1. Engage with government to get full support for the vision and goals. Get budgetary support and decision making authority.

2. Engage with alumni to create a leadership team that will guide the institute longer term.

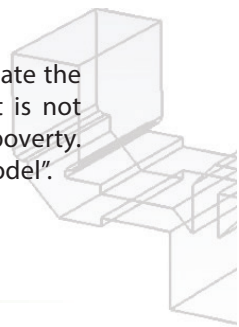
3. These should be strengthened. Faculty and alumni should be encouraged to contribute to public policy.

4. These are also important to prevent unreasonable directives from the government as in the past in the sudden increase of enrolment.

Contribution to National Development Goals/Priorities

1. The "Impact" part must include achieving national priorities. India can create the "new model" for development. The 20th century model for development is not sustainable. It left many people without education, well paying jobs or in poverty. IIT Delhi can play an important role in becoming a sandbox for the "new model".

2. The waterless toilet is an example of the above.



3. The contribution to the national goals such as technology to improve the condition of life in villages related to quality of water and sanitation should be prioritized.

4. The role played by IIT Delhi in improving the quality of the technical personnel in academic and industry areas in India is to be commended.

Social Responsibility and Other Areas of Impact

1. Greater effort should go into making the campus a green campus.

2. Likewise, issues related to the aesthetics of buildings and public places should be stressed.

The Role of the Alumni Organisation

1. The alumni organisation presented the committee with 17 pages of recommendations from alumni who were not able to meet with the committee. In addition we heard from 17 alumni present at the review meeting. It is very difficult to capture all of their suggestions. Some key themes repeated in a number of alumni comments are:

   a. Hostel accommodation and overall infrastructure at IITD is poor. Surprise visits by the Director and Wardens should be in place. Food quality is poor. (Note: these are from a very recent alumnus).

   b. Teaching is out of date and requires changes – in particular, more practicals, demos and lab work is needed; classroom hours should be reduced and lab hours increased.

   c. Teaching staff lack industrial experience.

   d. Laboratory conditions are poor; equipment maintenance was lacking, and cleanliness was lacking. Machines/rigs require up-gradation and repair.

   e. There is a view that the IIT is not producing engineers – but rather, engineering graduates.

2. The Alumni Organization should play a greater role in providing feedback to the Institute as also in raising funds that can be used with greater flexibility in critical infrastructure.

3. We believe that increased engagement with alumni will increase their support to the IIT.

Diversity

1. Considering the quota for OBC and SC/ST and near-parity of women students one can assume that the diversity is good.

2. Diversity could be enhanced through attracting more international students.

Epilogue

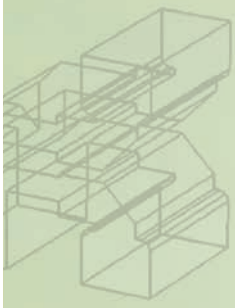
IITD has been ranked first amongst educational institutes in India in recent years but its world ranking as a research university has been around 200 or higher. The engineering departments are ranked in the top 50. The committee noted that IITD is forward looking and has ambitious expansion plans including two "off campus" technology parks, more than doubling lecture halls, hostels and laboratory space to make the infrastructure world class which is the perceived lacuna based on the internal reports.

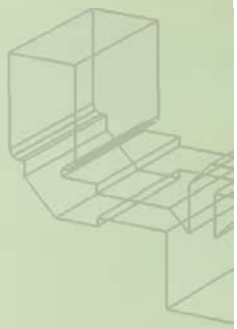
Challenges are perceived from the market for teaching and research talent becoming increasingly international – as is the market for high calibre students. IIT Delhi must progressively compete internationally to achieve higher levels. While focus on education and research is basic and cannot be diluted, responding to societal needs of India through focus on relevant technology and generating employment through enterprise of its students has to be added. All staff must see success in this as a shared responsibility. Even though all stakeholders were seen to be proud of association with IITD, the senior management should create mechanisms for greater interaction with non-academic staff (both technical and administrative) to remove the trust deficit that was seen.

There is a need to adopt and adapt to global changes in engineering education to differentiate IIT Delhi's graduates. IITD must embrace new approaches, like Conceive-Design-Implement-Operate (CDIO) to engage, challenge and "future proof" students. The focus on implementing and operating can be restored through high profile institutional projects that are multidisciplinary, societal, can attract large student and faculty participation, challenging in the chosen areas of excellence.

The recommendation of the review committee have been received by the IIT community and we see it as a way forward. The community seeks your support; you being the society we live in, the Govt. of India as the creator, the fraternity of the alumni and the technology leaders of the future.

APPENDICES





Appendix I : Schedule of External Review Panel Meetings

Program for External Review of IIT Delhi, 4th – 6th September, 2014

Day & Date	Event
Wednesday Sept. 3	Arrival of Expert Committee Members

Day & Date	Time	Event	Attendees	Venue
Thursday Sept. 4	0900-0930	Meeting with Chairman BOG and Director		Director's Office
	0930-1000	Welcome address by Chairman BOG	Committee members, Chairman BOG, Director, Deputy Directors, Deans, Associate Deans and all Heads of Departments, Centres and Schools. Internal Members of BOG, Registrar, Librarian	Senate Room
	1000-1130	Overview of IIT Delhi by Director		Senate Room
	1130-1215	Report on Internal Review and Department Vision by Deputy Director (S&P)		Senate Room
	1215-1300	Functional Reforms by Deputy Director (Operations)		Senate Room
	0130-1500	Lunch	Committee members, Chairman BOG, Director, Deputy Directors, Deans, Associate Deans and all Heads of Departments, Centres and Schools. Internal Members of BOG, Registrar, Librarian	Main Guest House

Day & Date	Time	Event	Attendees	Venue
Thursday Sept. 4 (Contd...)	1500-1600	Academics at IIT Delhi by Dean (Academics)	Committee members, Chairman BOG, Director, Deputy Directors, Deans, Associate Deans and all Heads of Departments, Centres and Schools. Internal Members of BOG, Librarian	Senate Room
	1600-1645	Research at IIT Delhi by Dean (R & D)		Senate Room
	1645-1800	Interaction with all Heads of Departments/ Centres		Senate Room
	2000-onwards	Dinner	Committee members, Chairman BOG, Director, Deputy Directors, Deans, Associate Deans and all Heads of Departments, Centres and Schools. Internal Members of BOG, Librarian, Fellows of National and International Academies, President & Secretary of Alumni Association & Registrar	Clarion Collection, Qutub Hotel

Day & Date	Time	Event	Attendees	Venue
Friday Sept. 5	0900-1100	Meeting with Faculty (Dean Faculty to Coordinate)	Only Faculty	Seminar Hall
	1100-1130	Tea	Faculty	Foyer (Seminar Hall)
	1130-1230	Meeting with All Group A Officers (Registrar to Coordinate)	All Group A Officers	Senate Room
	1230-1330	Visit to Hostels and RCA (Dean of Student Affairs to coordinate)	Committee members, Deans and Assoc. Deans Infra.	Any one hostel and RCA
	1330-1430	Lunch	Committee members, Chairman BOG, Director, Deputy Directors, Deans & Registrar	Main Guest House
	1430-1630	Visit to selected Laboratories of the Institute	Committee members, Chairman BOG, Director and Deputy Directors	CARE, CIVIL, NRF and Incubation Unit of FITT
	1630-1715	Meeting with Staff (Registrar to Coordinate)	Staff Members	Seminar Hall
	1715-1800	Meeting with Alumni (Dean AA&IP to coordinate)	Only Alumni	Senate Room
	2000-onwards	Dinner	Committee members, Chairman BOG, Director and Deputy Directors	Main Guest House

Day & Date	Time	Event	Attendees	Venue
Saturday Sept. 6	0900-0930	Tree Plantation (Dean Infrastructure to coordinate)		
	0930-1000	Meeting with Dean of Student Affairs	Committee members, Chairman BOG, Director and Deputy Directors, Associate Dean (SA), Student Body	Seminar Hall
	1000-1130	Meeting with Students	Committee members, Chairman BOG, Director, Deputy Directors, Deans & Registrar	Main Guest House
	1200-1330	Closing Meeting with BOG	Committee members, Members of BOG	Senate Room
	1330-onwards	Lunch	Committee members, Members of BOG, Director and Deputy Directors	Main Guest House
	After Lunch	Report Writing & Discussion among Committee Members		

Appendix II: Brief Profiles of External Review Panel Members

Professor Arogyaswami Paulraj

Professor Emeritus Arogyaswami Paulraj, Stanford University, is the inventor of MIMO wireless communications, a technology break through that enables improved wireless performance. MIMO is now incorporated into all new wireless systems. He also pioneered MIMO-OFDMA technology that has become the core of 4G mobile systems.

Prof. Paulraj is the author of over 400 research papers, two text books and a co-inventor in 59 US patents. He has won several awards, notably the 2014 Marconi Prize and Fellowship and the 2011 IEEE Alexander Graham Bell Medal. He is a fellow of seven scientific academies including the US National Academy of Engineering and the Royal Swedish Academy of Engineering Sciences. He is also a fellow of IEEE and AAAS.

In 1999, Prof. Paulraj founded Iospan Wireless Inc. – which developed and established MIMOOFDMA wireless as the core 4G technology. Iospan was acquired by Intel Corporation in 2003. In 2004, Prof. Paulraj co-founded Beceem Communications Inc. The company became the market leader in 4G-WiMAX semiconductor and was acquired by Broadcom Corp. in 2010.

During his 30 years in the Indian (Navy) (1961-1991), he founded three national level laboratories in India and headed one of India's most successful military R&D projects – APSOH sonar. He received over a dozen awards (many at the national level) in India including the Padma Bhushan, Ati Vishist Seva Medal and the VASVIK Medal.

Professor Subhash Kak

Professor Subhash Kak is Regents Professor in the School of Electrical and Computer Engineering at Oklahoma State University in Stillwater.

His research has spanned the fields of information theory, cryptography, neural networks, and quantum information. He developed the theory of d-sequences for applications to computing and cryptography and he has worked on a variety of problems on data and network security. He has also contributed to quantum computing and proposed a new measure of information for quantum systems.

He has written on science for the general public and his work has been showcased in the popular media including Discovery and History channels, PBS, Dutch Public TV, and in a documentary on music (www.ragaunveiled.com). He has written on philosophy of mind and shown how recursion plays a fundamental role in art, music and aesthetics. Applying cryptographic theory to the study of ancient scripts, he showed that on probabilistic grounds the Indus script must be the originator of the later Brahmi script. He also found a long forgotten astronomy of the ancient world that has been called "revolutionary" and "epochmaking" by scholars and which has had considerable influence on archaeoastronomy and the understanding of the rise of science in the ancient world. In 2008-2009, he was appointed one of the principal editors for the ICOMOS project of UNESCO for identification of world heritage sites.

He is the author of 12 books which includes "The Architecture of Knowledge." He is also the author of 6 books of verse. These books have been translated into French, German, Italian, Spanish, Korean, and Serbian.

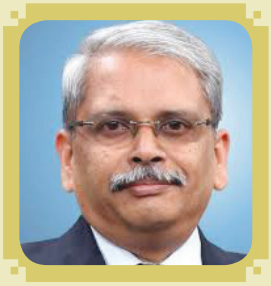
Amongst his awards are British Council Fellow (1976), Science Academy Medal of the Indian National Science Academy (1977), Kothari Prize (1977), UNESCO Tokten Award(1986), Goyal Prize (1998), National Fellow of the Indian Institute of Advanced Study (2001), and Distinguished Alumnus of IIT Delhi (2002).

Dr. P.S. Goel

Dr. Prem Shankar Goel did his B.E. in Electrical Engineering from University of Jodhpur, ME in Applied Electronics and Servomechanism from the Indian Institute of Science (IISc), Bangalore and Ph.D. from Bangalore University. He started his career initiating activity on Satellite Altitude Control System for spinning RS-1 satellite at Trivandrum and later moved to Bangalore as part of Aryabhata Project team. He was Chairman, Spacecraft System Advisory Board for IRS-1; Project Engineer, AOCS for APPLE; and Associate Project Director of INSAT-2. He was Head, Control System Division; Group Director of AOCS; Deputy Director, Mission and Control Area; Associate Director of ISAC; and was Director, ISRO Satellite Centre (1997-2005). He was secretary, Ministry of Earth Sciences (2005-2008) and later Chairman RAC, DRDO. Currently, he is Prof MGK Menon DRDO Chair and Honorary Distinguished ISRO Professor.

Dr. Goel developed spin-axis orientation system for Bhaskara I and II satellites; magnetic control for spinning satellites; momentum biased 3-axis control system for APPLE; zero momentum biased 3-axis control system for IRS-V, and configuration momentum biased 'altitude control system' for highly stabilized INSAT-2. He developed very agile control system with step and stare capability to spot imaging mission TES and guided the evolution of re-entry capability for SRE mission. He has contributed significantly to the development of magnetic altitude control system, mission planning for remote sensing, communication and scientific missions. He has published over 100 research papers in refereed journals.

Dr. Goel was awarded Padma Shri (2001). He also received the life time Achievement Award of the Aeronautical Society of India and Distinguished Scientist Award of ISRO. He is a Fellow of Indian Academy of Sciences, Bangalore; National Academy of Sciences (India), Allahabad; Institution of Electronic & Telecommunication Engineers, New Delhi; Aeronautical Society of India, Bangalore; and Academy of Sciences for the Developing World (TWAS). He is an Honorary Fellow of Electrochemical Society of India, Bangalore and Indian Institute of Technology, Mumbai. He is also a Member of the International Academy of Astronautics, Paris. Currently, Dr. Goel is the President of Indian National Academy of Engineering.



Mr. S. Gopalakrishnan

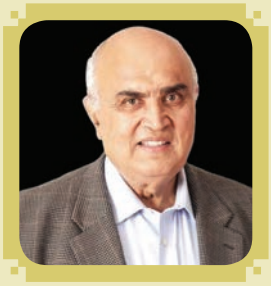
Mr. Senapathy 'Kris' Gopalakrishnan served as the Vice Chairman of Infosys from 2011 to 2014, and as its Chief Executive Officer and Managing Director from 2007 to 2011. Kris is one of the co-founders of Infosys.

Recognized as a global business and technology thought leader, he was voted the top CEO (IT services category) in Institutional Investor's inaugural ranking of Asia's Top Executives. He was selected as one of the winners of the 2nd Asian Corporate Director Recognition Awards by Corporate Governance Asia in 2011. Kris was also selected to Thinkers 50, an elite list of global business thinkers, in 2009. He was elected President of India's apex industry chamber, the Confederation of Indian Industry (CII) for 2013 – 14, and served as one of the co-chairs of the World Economic Forum in Davos in January 2014.

In January 2011, the Government of India awarded Kris the Padma Bhushan, the country's third highest civilian honor.

He serves on the Board of Governors of Indian Institute of Technology, Madras, and Indian Institute of Management, Bangalore. He is the Chairman of the Board of Governors of IIIT, Bangalore, and is also on the Board of Trustees of the Chennai Mathematical Institute.

Kris holds master's degrees in physics and computer science from the Indian Institute of Technology Madras.



Dr. Kanwal Rekhi

Dr. Kanwal Rekhi is the Managing Director and Partner at Inventus Capital Partners. He co-founded Inventus Capital Partners.

He founded the Kanwal Rekhi Schools of Information Technology at both IIT Bombay and Michigan Tech. Dr. Rekhi co-founded The Indus Entrepreneurs (TiE) in 1992, where he served as the President and is a Trustee on the Global Board. He is a board member of IIT Bombay Heritage Fund.

He has been behind a number of India start-ups including Google, Exodus, Hotmail, Juniper, Lightera, India Bulls, Inc. and hundreds more. He actively advised India policy makers in the late 1990's resulting in the privatization of telecom and reforms of venture regulations encouraging fund formation in India. Also active in Indian public policy related to venture, Dr. Rekhi advised India government policy makers in reforming venture regulation. He also successfully advised the Indian Prime Minister and his government on their aggressive deregulation of telecom, leading to the explosive growth of mobile telephony in India, and laying the foundation for the country's information technology expansion. Over the 14 years prior to co-founding Inventus, he was a full-time venture-angel, investing his own capital in more than 50 startups of which he led the initial financing and was a member of the board of directors for 23 companies.

Since 1994, Dr. Rekhi has led the first venture round in numerous early-stage companies, holding 54 board positions and actively guiding entrepreneurs to 21 exits including six initial public offerings. He has actively participated in the emergence and growth of Silicon Valley and India. Dr. Rekhi has more than 20 years of executive experience at successful Silicon Valley technology companies.

He was the first Indo-American Founder and Chief Executive Officer to take a venture-backed company public on the NASDAQ. Dr. Rekhi holds two Honorary Doctorate degrees in Business and Engineering from Michigan Technological University, an M.S. in Electrical Engineering and a B.S.E.E. from the Indian Institute of Technology Bombay.

Professor Robert Berry

Professor Robert Berry is a Professor of Computer Science at the School of Engineering and Applied Science at Aston University. He is also active in the European Bioenergy Research Institute (EBRI).

He was the Executive Dean of the School of Engineering and Applied Science from September 2008 to January 2014.

Robert graduated with a BA in Computer Science from the University of Texas in 1978 and received his Ph.D. in Computer Science in 1983. Throughout his career, Prof. Robert Berry has successfully bridged the gap between academia and industry, and it was his experience working with universities that inspired him to join Aston in 2008.

He spent more than twenty years at IBM, where he held a number of positions, most recently Chief Technology Officer for Messaging Technology. Robert is an IBM Distinguished Engineer - an executive position for technical leaders in the company. He has been a member of the IBM Academy of Technology since 1999 and was Vice-President of the Academy between 2005 and 2007 serving Europe, the Middle East and Africa.

Robert's current areas of interest include instrumentation and analysis of complex systems software, systems performance, quality of service for complex systems software and event processing systems. His teaching activity includes middleware integration concepts.

Appendix III: Internal Review Report

Preamble

The Indian Institute of Technology Delhi, established in 1963, has completed 52 years at our 300+ acre campus in South Delhi. In this period, IIT Delhi has evolved from being an Institute of about 2,000 students in the 70's to 5,500 students in 2007 and 7700 in 2012.

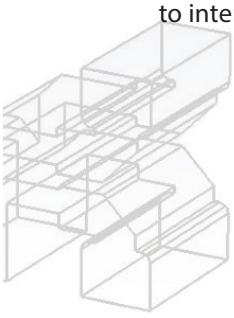
A quick snapshot of IIT Delhi is as follows. We have 3,590 undergraduate and 4,239 postgraduate students being taught by 459 faculty on a 300 acre campus with built-up area of 4,30,000 sq.m. The research leads to about 1300 journal publications annually, at an average of 2.8 per faculty and Rs. 115 Crore of external funding, which is of the order of the amount paid out as salaries in IIT Delhi. Of the total built up area, a quarter is used for classrooms and laboratories; the rest being offices, hostels and residences. About 35 patents are filed annually from IIT Delhi, resulting in Rs. 2 lakhs in royalty earnings annually. Though the income is small, we have to keep in mind that there has been no sustained effort in monetization and intention has been to enable through technology instead of focusing on revenue. Over the last three years, IIT Delhi has been consistently ranked as number one academic institution of higher learning in India, including the QS ranking, India Today and Outlook. IIT Delhi has been selected for the Outstanding Engineering Institute Award by ET NOW under National Leadership Awards. The budget is of the order of Rs. 500 Cr. per year

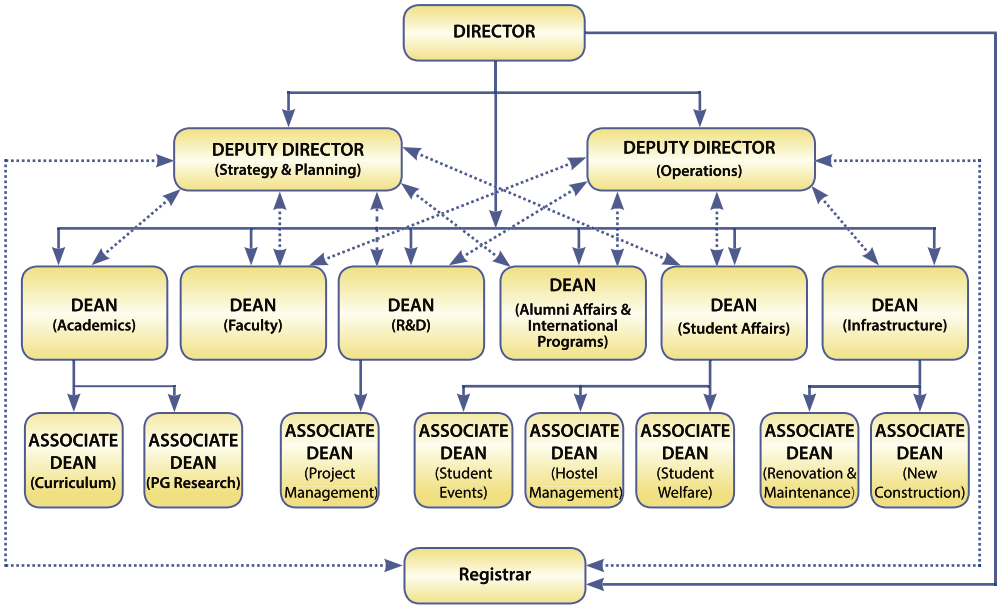
Administrative Structure

The Institute aims to strive higher through reorganization and reprioritization. While all academic powers are vested in the Academic Senate (body of full Professors) which works amorphously, direction has been targeted through modification of processes.

To this aim, in a first step, the administrative structure has evolved to reduce the layers of decision making. All operation has been centralized through Deputy Director, Operations (DD(O)), while a separate unit under another Deputy Director, Strategy & Planning (DD(S&P)) focuses on Strategy and Planning for the future.

Further, operation at the Deans level has been modified with the running of day to day matters being delegated to Associate Deans and administrative staff. The Deans are progressively becoming the interaction points with groups outside the IIT Delhi system, to interpret societal needs and prioritize activity under their purview.



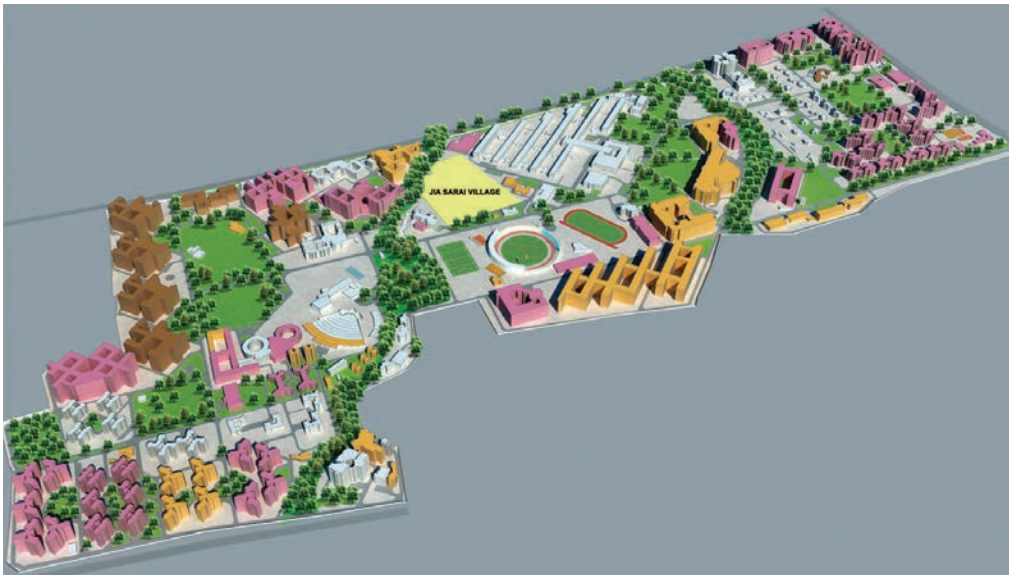


Organisation structure for policy making

The Budget is the Institute's key policy document of all planned revenue and capital expenditure. It is the focus of planning, decision making and judicious allocation of resources. Financial decision making starts in a distributed mode where Head of financial units generate an annual budget request to Prof. in charge (Planning) for funds after discussing with faculty boards. Students have a direct say in fiscal planning relating solely to students non-academic concerns. A subcommittee of the academic senate (BERP) chaired by the Director and DD (S&P) sets the medium term priorities for education and research. These are compiled alongwith statements of priorities and prioritized by the Budget Committee (members only internal to IIT Delhi). These estimates are then scrutinized by the Finance Committee and approved by Board of Governors, each year during the month of September. The Budget Committee of the Institute meets two weeks into the financial year, the second week of April, after allocation of funds from the ministry is known. Normally, allocation of regular operational budget (excluding salaries and utilities), which is about 10% of the total budget, is passed on to the academic units. Other capital expenditure (90%) is controlled through the office of the DD (O) with regards to pace and procedure of expenditure. Expenditure is expected to be 17%, 23%, 27%, 33% for capital expenditure during the four quarters and uniformly for non-plan utilization. Research grants are however under full control of the Principal Investigators, with the Dean R&D ensuring compliance with funding agency norms, IIT Statutes and law of the land. Prioritization for long term goals and block monitoring is done by the Finance Committee and the Board of Governors biannually.

In a significant initiative, in order to provide good governance and also to ensure prompt service to its community, a citizen charter for various sections i.e. Stores, Audit, Accounts, Establishments and Public Information Office providing the time schedule within which a particular service should be delivered has been established. Though top-down by structure, the Director has open-floor meeting with faculty, staff and students separately to outline new initiatives and their goals. The deliberations are used to obtain feedback and as an oversight mechanism.

Infrastructure



IIT Delhi Master Plan – 2015

Main Campus Redevelopment

IIT Delhi has one the largest student to area ratio of all the IIT's and we have felt a significant crunch of space for classrooms, laboratory and office space. In the figure above, the structures in pink are new construction and this is the first time older structures are being dismantled for greening and reconstruction.

Structures on campus are 30-50 years old and barring the iconic Multi-Storey Building, mostly horizontal. There is acute shortage of hostels on campus and often three students are accommodated in a room planned for double occupancy. Overall dearth of parking and obsolescence of utility setup is an issue.

Significant redevelopment of the main campus has been planned by the office of the Dean Infrastructure which when completed (next 3 years) will triple the available academic space and double the space available for common services on campus. The salient numbers are shown in the figure below.

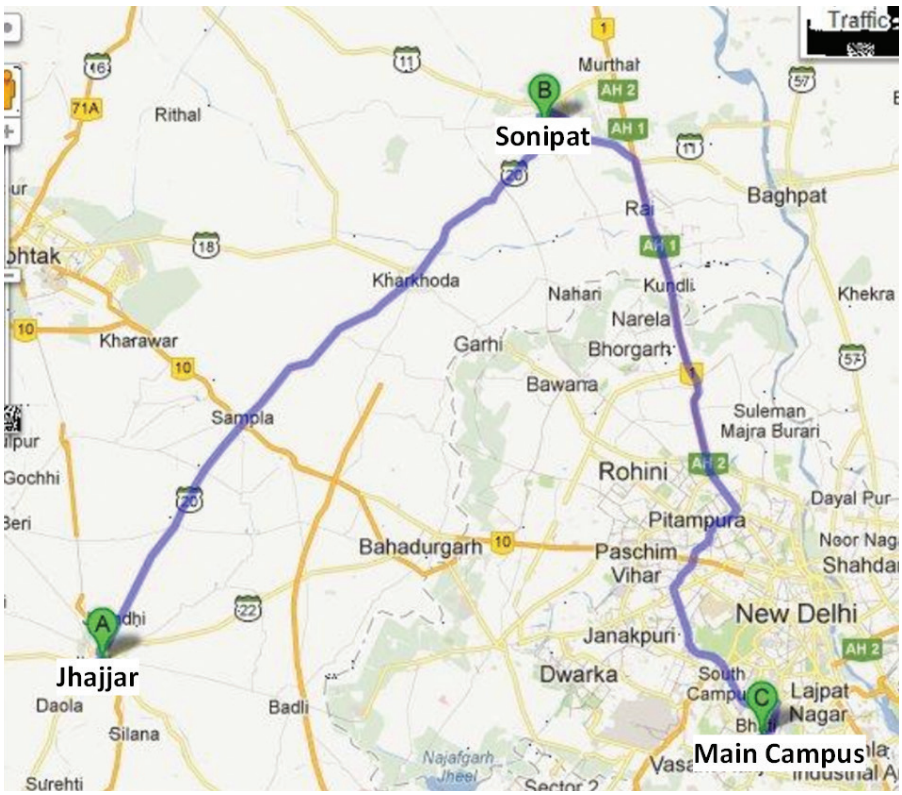
Architects conception of new academic spaces

	Covered Area as on date		Proposed additional Area		Total Area	
	Ground Coverage	Covered Area on all Floors	Ground Coverage	Covered Area on all Floors	Ground Coverage	Covered Area on all Floors
Academic	44048	153870	40742	281165	84790	435035
Residential	102513	353073	14100	361188	116613	741261
Sports & Cultural Activities	6962	13744	6349	16638	13311	30382
Community Facility	10108	15596	12161	26974	22269	42570
Services	3283	5730	6316	12632	10139	18362
Total Area	**167454**	**542013**	**79668**	**698597**	**247122**	**1240610**
	16.15%	52.30%	7.70%	67.45%	23.85%	119.75%

Proposed build-up in numbers

Extension Campuses

Being within 12 km of the International airport has been beneficial in hosting a large number of international visitors, but has capped our vertical growth to 8 stories. To accommodate we have persisted with successive governments and are expanding geographically for the first time to two destinations in Haryana, Sonipat and Jhajjar.



Location of extension campus at Sonipat and Jhajjar

In the 50 acres at Sonipat, the activity planning is at an advanced stage with initial plan as shown ahead:

Architects conception of Sonipat buildup

The planned activities are:

- Technology Park
- HPC Facility
- Convention Center
  - o PG Executive training
  - o Other Faculty Training

In the 50 acres at Jhajjar, the activities planned are:

- Bio-Science Park
- Biological Studies Pilot Plant
- Biomedicine Technologies to leverage proximity to AIIMS extension campus

Computer and Internet Services

The Computer Services Centre provides Computing, IT and Networking facilities to the Institute community of more than ten thousand users. The network infrastructure has been significantly augmented with the times, especially to reflect the each authenticated user typically has three wireless connections alive and to support the enhanced E-services within the institute over the last decade.

- 2 × 10 Gbps campus backbone, with each distribution switch connected to the core with two active 10 Gbps fibre links.

- Redundant core systems mirrored at the main data centre and the disaster recovery data centre.
- Active-active fully routed (layer 3) network.
- Academic area, guest houses and cafeterias fully WiFi enabled.
- Support for 10 Gbps uplink from laboratories.
- Network backbone within the data centres fully virtualized.
- 2 Gbps external connectivity through NKN and other ISPs.
- BGP routing enabled.
- I GPON connectivity to 1200 residences being commissioned.

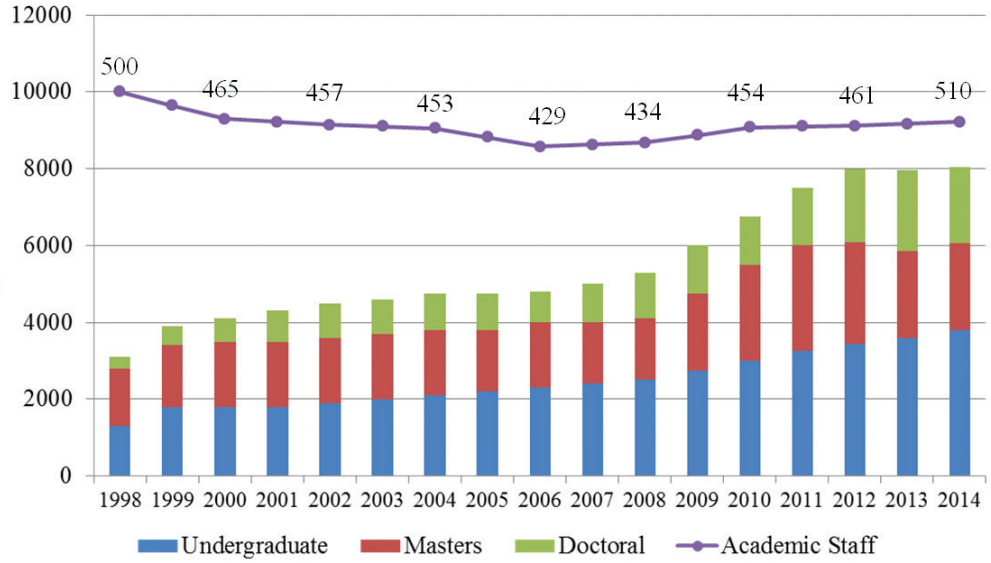
IIT Delhi is transiting from a distributed computing structure where individuals and small groups used dedicated machines, and off late were limited by rapid technology changes. The central computing infrastructure has been revamped at and estimated budget of Rs. 50 Cr. to provide the following:

- Baadal computing cloud:
  - 48 blade servers each with 2 6 core Intel(R) Xeon(R) CPU X5670 @ 2.93GHz and 16 GB RAM and dual 10Gbps Ethernet.
  - Over 400 virtual machines assigned to users (mostly Ph.D. students) over 3 last years.
- GPU cluster:
  - 16 nodes, each with 2 8 core ES-2670 (Sandybridge) CPU, 64 GB RAM and 2NVidia K20 GPUs.
  - The nodes have 56 Gbps IB interconnect. 35 TFlop peak performance.
- HPC cluster:
  - About 1000 TFlop peak performance.
  - Mixture of 60% conventional computing (Haswell processors).
  - 30% GPU computing (Nvidia K40).
  - 10% accelerated computing (Intel Xeon Phi).
  - 1 Peta Byte storage.
- Data centre:
  - 540 KW of compute load with high-density (25 KW) server racks.
  - Expected date of completion is October 31, 2014.

Major Tasks

Over the years, we have built a strong research tradition, which is easily seen in the impressive statistics that the Institute can boast of in terms of various research indicators. The number of Ph.Ds is about 200 per year now. Our target of continuously searching for and significantly increasing the intake of quality candidates into our Ph.D. programmes is on the right course and we have grown to a significant level in this direction over the last few years.

Specialist areas like atmospheric sciences, laser optics, industrial textiles, biotechnology, energy, transportation, telecommunication, optical communication, signal processing, computer aided design & manufacturing, artificial intelligence and robotics have been developed as signature programmes.



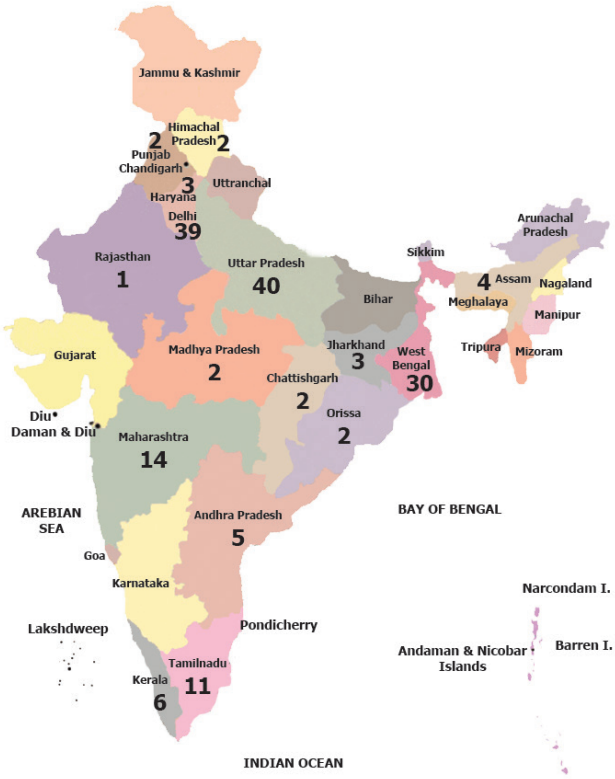
Growth of Manpower on Campus

It is worth noting that teacher student ratio is 1:16 transiting from 1:12 in 2008 quite sharply. The ratio of PG to UG student has been increasing steadily. At the same time the number of supporting staff has gone down from 1769 (in 1998) to 753 (in 2014).

The growing visibility of the Institute has been steadily leading to a larger role in partnerships. The Institute has been actively involved in collaborative programs with national and international organizations/universities to remain at the forefront in scientific and technological development and to share the knowledge for mutual benefits. IIT Delhi has currently 114 operational MoUs/Agreements with Foreign institutions/Organizations and 57 MoUs/Agreements with Indian Institutions/Organizations. The main objectives of collaboration include exchange of students and faculty, joint research, and fellowships for training and research at doctoral and post-doctoral levels.

Faculty

It is a cliché to say that the quality of an academic institution largely depends on its faculty. IIT Delhi faculty is one of the finest in the country and is recognised internationally for their quality of research, teaching and curriculum development. They also contribute greatly for the development of the nation by being associated with a large number of decision making bodies, providing crucial guidance and advice on policy matters and technical issues. Our faculty members serve on the editorial Boards of reputed journals, peer-review papers for publications, serve on committees for recruitment of professionals, and are on the Boards of many institutions and organizations. We are proud that many of our alumni are attracted to come back to us (60% have an IIT Degree) and 40% have international Ph.Ds.



State-wise roots of IIT Delhi Faculty

Further, the IIT Delhi faculty is a cosmopolitan mix even in the Indian context, with less than 25% having their bachelor's degree from within a 100km radius of Delhi. We use this as an indicator of the ease with which faculty of diverse origins get productively assimilated within the IIT system.

Searching and recruitment of bright faculty is facilitated by a variety of means, including round-the-year search and recruitment and on-line submission and processing of applications have been enabled. Young Faculty Fellowships have been awarded to boost joining and retention of new faculty. To encourage the new faculty for developing research facilities in the area of their expertise, New Faculty Research Grant of the order of Rs. 7 Crores has been put aside annually.

During the previous year, international bibliographic databases have indexed 2320 research articles published by faculty members and researchers of the institute in international journals including 1713 articles indexed in Scopus. The faculty members have also presented a similar number of papers in national and international conferences. In a typical year, 200 faculty members attend international conferences and 100 national conferences as session chairs or presenters.

Our target is to increase the Ph.D. enrolment to five times its current numbers to a strength of 10000 over the next two decade. Increasing faculty strength and diversity to drive research to increase the breadth of the programs, especially with regard to translating research into industrial products, has been a priority of late. On the other hand IIT Delhi currently has about 450 (+30 emeritus) faculty on roll against a sanctioned strength of 784 based on a 1:10 teacher student ratio which represents a gap of about 40%. Currently, through usual process, we hire about 70 a year and facing retirements of about 20 a year, which amounts to a net increase of about 7% of the target strength.

Unfortunately, all older IITs have the same issue. IIT Delhi has also been looking at foreign hires to contribute towards increasing diversity and filling the void and has taken the steps to obtain necessary approvals from the Govt. and make the first offer to foreign Ph.Ds. The largest contribution could be in the area of product design and energy management. We hope that the attitude of students, which primarily looks up to the OECD nations for technology would change, leading to increased numbers of our own undergraduates looking to carry on for further education in IIT Delhi.

Faculty Awards/Recognitions

The distinguished faculty continues to make a difference to the world of Science, Engineering, Humanities and Management, and to earn recognition and awards, which bring glory to the Institute. While the number of awards is too large to be listed in this document, we would like to specially mention the Padma Bhushan award to one and Padma Shri to six and Shanti Swaroop Bhatnagar prize to 14 faculty as significant achievements in a highly competitive domain.

Academic Activities

Unlike the operational matters, all academic matters are decided by the Academic Senate, and implemented through the Dean of Academic Affairs. The programs are reviewed

once a decade through an extensive process that lays down a policy document and then detailing that may take up to three years. In a recent major revamp, all teaching, undergraduate and postgraduate, along with academic research has been unified along with the offices of Dean UG and PG.

B. Tech. Degrees	Masters degrees offered by Departments/ Centres/ Schools
Chemical Engineering	M. Tech. (45 streams)
Civil Engineering	MBA (3 streams)
Computer Science & Engineering	**Ph.D.**
Electrical Engineering	Tenth of the National Output in Engineering
Electrical Engineering (Power)	
Engineering Physics	**Interdisciplinary**
Mechanical Engineering	TRIPP
Production and Industrial Engineering	Opto-Electronics
Textile Technology	VDTT

Academic degrees offered at IIT Delhi

Our Bachelors' programs, which are the most sought after even on global scales, and for which the entry is through the Joint Entrance Examination, our intake has steadily increased over the last few years leading to enrolment of students with the approximate breakup of B.Tech. 3500; M.Sc. 330; M.Tech.1800; MBA 330; M.Des. 40; Ph.D. 2000. These figures include 1316 women in post graduate studies with the percentage of women in Ph.D. reaching 37%.

There were 17 foreign students from 5 countries pursuing postgraduate education at the Institute during the year 2011-12. In order to make IIT Delhi more international in character and to make better use of international intellectual resources, we are constantly working towards increasing the strength of international students and faculty in the campus.

Over the years, the Institute has expanded its teaching and research interests in a wide range of areas of national importance and current relevance, including among others, Atmospheric Sciences, Embedded Systems, Environmental Science &

Engineering, Rural Industrialization, Bioinformatics, Nanotechnology, Fibre Optics and Optical Communications, Biotechnology, Bio-catalysis, Smart and Industrial Textiles, Transportation, Photo-thermal energy conversion, Material Science, Photo-acoustic Microscopy, Power Technology, Signal processing, Opto-electronics, Solar Technology, Smart Buildings and Infrastructure, Artificial Intelligence and Robotics and others. Most recently, Biosciences, with a thrust on research in communicable and non-communicable diseases has been setup.

Post-Graduate Programs

The Institute is proud of its graduate school, offering Master of Technology programs in many specializations, besides MBA, M.Des, M.Sc. and Ph.D. programs. These programs provide an excellent platform to the students admitted into them, to acquire advanced knowledge in their respective fields.

The graduate students are also offered the opportunity to serve as teaching assistants, which enriches their academic experience and enhances their communication skills. A number of new steps have been taken to strengthen the teaching assistantship program. The scheme for grant of partial financial assistance to Ph.D./M.Tech./M.Des./M.S.(R)/MBA students and post-doctoral persons (working in various projects) for attending conferences outside the country is one such. The Institute also provides full travel assistance to every Ph.D. student of the Institute, for attending at least one international Conference (to present his/her research paper) during their education at IIT Delhi. We believe that such an international exposure will play an important role in improving the quality of our doctoral education and research.

Typical semester credits are 8-9 lectures for PG, 3 - 5 laboratory credits for PG, and typically PG students do 2-3 projects in 4 semesters. A number of steps are underway to re-define the expected outcome and hence strengthen the PG programmes. A comprehensive review based on the feedback collected from the outgoing M.Tech. students, is under consideration.

Undergraduate Programs

The Senate of the Institute is constantly engaged in reviewing and approving new courses to improve the curriculum. Several new minor area programs have been designed with a view to offer a second area of specialization of their choice. A revised curriculum structure has been approved by the Senate and the process of implementation is underway at present. Typical semester credits are 15-16 lectures for UG; 8-9 PG, Credits 5-6 laboratory credits for UG; 3-5 PG, and typically UG students do 2-4 projects in 8 semesters; PG students do 2-3 projects in 4 semesters.

In order to recognize, nurture and encourage academic achievers among undergraduates, the Institute has established the following pre-graduation awards: (i) Institute Medal for

Academic Excellence for obtaining the highest CGPA amongst non-graduating students of each entry year, and (ii) Institute Medal for Consistent Academic Achiever in a program for obtaining consistently high SGPA amongst all students registered for the program in the pre-graduation academic session.

Under a new Academic Welfare Scheme introduced by the Institute for weak students, a special student advisor is identified in each department for students who need special help, at the beginning of each semester. Special extra classes are being conducted for such students and the student advisor closely monitors the attendance and performance of these students and also provides support to help improve their performance.

A Special Orientation Programme for Entry Level students was also conducted with the objective of enhancing their learning skills, English language and communication skills, inter-personal relationships and motivation. This programme was conducted with the help of Centre for Research and Education for Social Transformation (CREST), Calicut, Kerala. All those who participated, appreciated the program.

Exposure of students to biology and allied technology is being boosted through the reviewed curriculum. The School of Biological Sciences has initiated a Minor area programme in Biology for engineering undergraduate students. This programme comprises 2 core courses and a lab course which are mandatory. Other academic units offer bio related courses in specific application domains.

Reaching Out

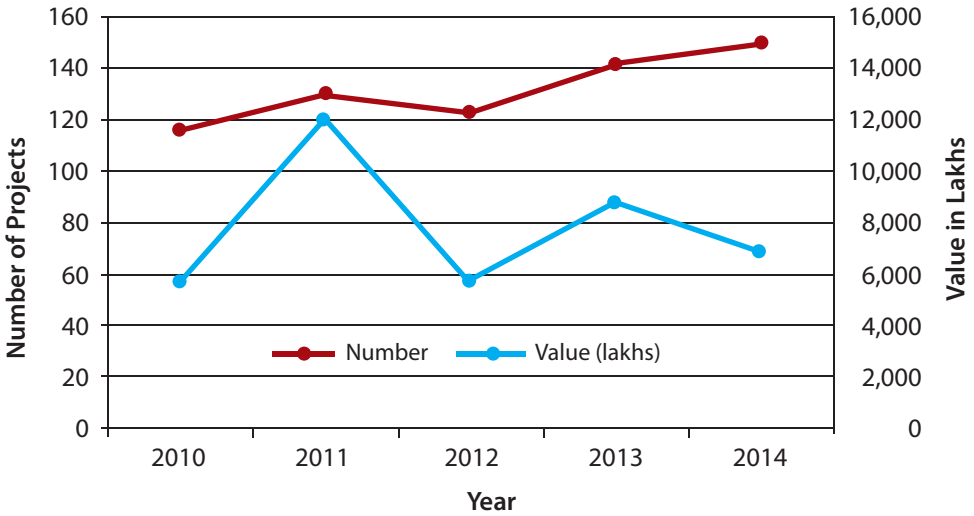
IIT Delhi is the national coordinator for the Virtual Labs project which is an initiative of the Ministry of Human Resource Department under National Mission on Education through ICT. In the virtual labs project, about 120 web enabled experiments have been designed for remote operation and viewing. A facility to build up nano-technology products and central consolidation of high technology analytical machines to make them accessible to the industry has been undertaken. Recognising that cyber security is important area for global business and modern society, IIT Delhi has taken a lead role in establishing a Centre of Excellence in Cyber Systems and Information Assurance (CSIA).

To meet the growing up gradation needs of both private and public sector organizations, 400 plus short term courses have been organised. To help in inducing and inculcating research culture among the faculty of engineering and science institutes outside IIT system, a Summer Faculty Fellow Research Programme is conducted in which about 500 faculty members from various engineering Institute/colleges are associated with IITD faculty mentors for two months to provide orientation towards research through interaction with the mentors, other research students and exposure to the facilities and labs. This was initiated with the aim of enhancing the exposure to research-as-a-career option to professionals within or outside IIT Delhi. We note that about 25 of the 500 who join this programme go on to register for a Ph.D. in different institutions, which is encouraging.

Research and Development

The faculty of IIT Delhi by charter conducts research and development to increase the level of knowledge and provides consultancy to the industry. This is in addition to the research incidental to handholding post graduate students though their training.

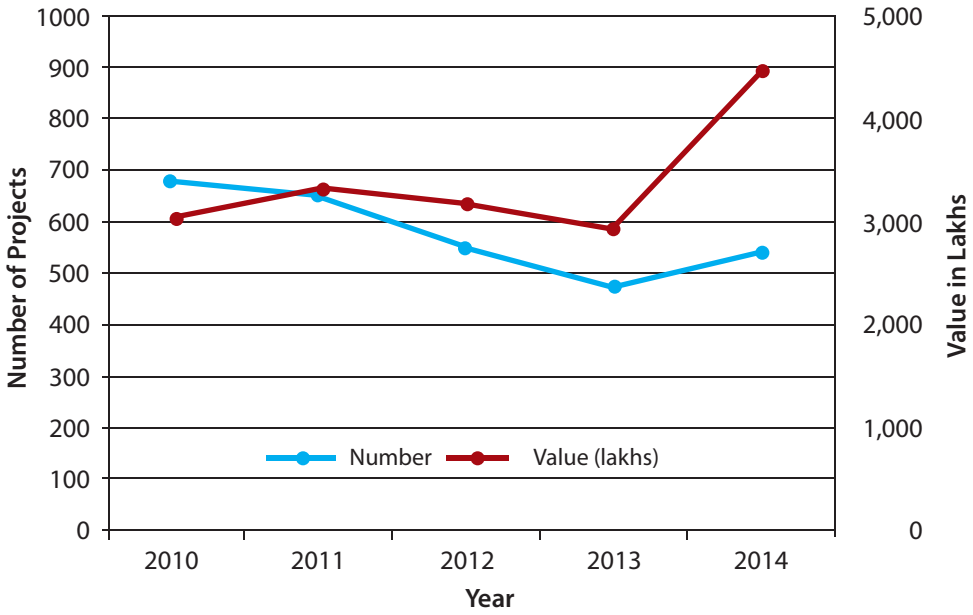
IIT Delhi has developed special focus areas like atmospheric sciences, laser applications, industrial textiles, biotechnology, energy, transportation, microprocessor applications, computer science, optical communication, signal processing, computer aided design & manufacturing, and artificial intelligence and robotics. The financial amounts are summed up in the tables below:



Sponsored projects in numbers

The average sponsored project is of Rs. 50 lakh in value while the average consulting project is of around 5 lakhs in value.

The overheads accruing from these projects are used to award the Summer Undergraduate Research Award (SURA) Scheme, typically 45 undergraduate projects, and research grant of Rs.1 lakh each to faculty members who joined the Institute. Assistantships of about 70 lakhs are awarded to the Ph.D. scholars in exceptional cases after the completion of 4 years till the end of 5th year. It has now been decided to extend such support in the form of Gap period of maximum 6 months assistantship for both M.Tech./M.S.(R) and Ph.D. students who are drawing their fellowship/assistantship from the projects. A scheme entitled "Technology Development Project Initiation Award for Students (TDP-IAS)" for Undergraduate students (in their 3rd semester onwards) and Postgraduate students individually or as a team of the Institute to develop technologies to market.



Consultancy projects in numbers

Research scholars are awarded a travel grant under "Research Scholar Travel Award" (RSTA) upto a maximum of Rs.1,00,000/- from Research Promotion Fund. Institute has also initiated a major endeavour in the space of "Design & Innovation" with support from MHRD. The objective of this proposed multi-disciplinary initiative is to create an academic eco-system to take innovative ideas and prototypes from labs/classrooms to users, industry and society. As a part of this activity the institute will offer multiple design and innovation courses and capstone projects by virtue of which increasing number of ideas can translate into products and services with real impact on the society at large.

Similarly, to promote design and innovation as a co-curricular activity, a Student Innovation Centre has already been established with support from Alumni of 1986 batch. This Centre provides facilities, support and space for interdisciplinary student teams to build innovative products of their choice outside their curricula.

Foundation for Innovation and Technology Transfer

Established by the Institute in the year 1992, Foundation for Innovation and Technology Transfer (FITT) is a legally established society "for the IIT, of the IIT". It is the formal technology transfer organization of the Institute and allows interaction of academia with the industry on marketplace terms. It has been in a mission mode ever since, for building and maintaining an enhanced interface with industry and engaging itself to create partnerships and linkages with business and community to enable innovation and knowledge transfer for common good. FITT has over 125 corporate members representing various industrial and R&D units.

FITT works towards protecting IIT Delhi's intellectual assets and in converting the research resultants into products and processes. The technology transfer at the Institute also involves incubating business development around such innovations.

Out of 42 applications processed for IP protection, the Institute approved 23 for filing. FITT organized a number of visits by IITD faculty to industries in order to assess their R&D needs so as to initiate industry relevant R&D programs in the Institute. A capacity building program called the "Professional Candidate Registration" program implemented at the Institute by FITT gets qualified candidates from the industry and research organizations to undertake relevant professional course modules in IIT Delhi. Other than enhancing their knowledge and skill-set, professionals get to see appreciate the knowledge base of the IIT Delhi system if they had not interacted earlier. About a 100 professionals register for this program annually.

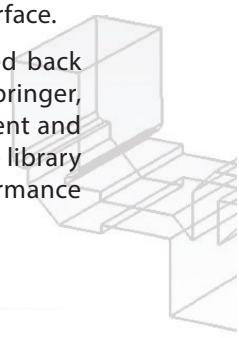
FITT has been responsible for some notable developments in the Institute concerning S&T commercialization and innovation led entrepreneurship. Under the Technology Business Incubation Unit (TBIU) scheme of IIT Delhi, FITT facilitates nurturing of nascent technological concepts / ideas into commercially viable opportunities. Twelve companies (out of thirty seven admitted so far in the past decade) are currently resident and fourteen start-ups are in scale-up phase or in commercial operation. After its recognition as a TePP Outreach Centre by DSIR, FITT has been actively fostering technology entrepreneurship amongst individual innovators and start-ups. Several faculty scientists of the Institute have been supporting this program as Technology Angels. The Ministry of Micro, Small and Medium Enterprises (MSME), has also involved FITT for promoting innovation and entrepreneurship amongst micro and small enterprises leveraging the knowledge / resources at IIT Delhi. Amongst its repertoire of activities, FITT operates as one of the three BIG partners (in the country) for implementing the Biotechnology Ignition Grant (BIG) scheme of BIRAC – a Govt. of India enterprise.

Central Library

Access to Electronic Journals

The faculty, students and researchers at IIT Delhi have access to more than 12,000 electronic journals and 6 bibliographic databases. Journals subscribed in print and journals online are accessible from the publishers' website. Links to these electronic journals are available through the Library website as well as through the LibSysWebOPAC interface.

To fee up physical space, as a special initiative, the Library has also purchased back files of electronic journals from Elsevier's Science Direct, Wiley InterScience, Springer, JSTOR and Taylor & Francis from their volume one onwards on "one-time payment and perpetual access basis". This has freed up significant space from old issues in the library building which is to be used to house the next-generation data and high performance computer centre.



Access to Electronic Text Books

The initiative taken last year to add electronic books to the Library collection was further strengthened. More titles of E-books have been added under the Text Book and Book Bank schemes to support undergraduate students, chosen on the basis of their wide usage by the students/faculty.

INDEST-AICTE Consortium

IIT Delhi Central Library continues to be the headquarters of INDEST activities on behalf of Ministry of Human Resources Development, Govt. of India. This is one of the biggest and most successful consortium initiatives so far taken in Asia. It provides access to electronic resources to its member institutions comprising of more than 1200 members including 48 core member institutions, 60 AICTE supported institutions and more than 1000 institutions that have joined the consortium under its self-supported category.

Joint INDEST-AICTE Consortium & INFLIBNET Project under NMICT Initiative of MHRD.

IIT Delhi is the coordinating institute for the Joint INDEST-AICTE Consortium & INFLIBNET Project (N-LIST) under centrally sponsored scheme of National Mission on Education through Information and Communication Technology of MHRD.

The project provides for cross-subscription to e-resources subscribed by the two Consortia, i.e. subscription to INDEST-AICTE resources for universities and UGC-INFONET resources for technical institutions. Under this programme, IITs, IISERs, and some of the NITs are provided access to Project Muse, Annual Review and Nature (27 titles) while, nearly 100 Universities are provided access to Web of Science.

Educational Technology Services Centre

The Educational Technology Services Centre (ETSC) is actively engaged in promoting the use of Educational Technology within the institute and also at the national level. Some of its activities are: design, development and dissemination of video and web-based instructional resources; provision and maintenance of A/V equipment for classroom teaching; organization of training programmes for faculty, staff and professionals across the country and undertaking sponsored research and consultancy projects; audio/video conferencing for faculty selection interviews and meetings; e-learning and distance education using video conferencing facility; transmission of an independent 24x7 EKLAVYA technology channel and telecasting video courses.

The Centre has established multiple classrooms with multi-camera recording and editing facilities. A Studio-Classroom is also available for on-line recording of courses.

IIT Delhi has been significant contributor to the National Programme on Technology Enhanced Learning (NPTEL) Sony ANYCAST systems are used for non-linear editing and recording. Video conferencing facilities have been installed in two lecture theatres and in

the Conference Room of ETSC. The facility is being used for faculty interviews, meetings and distance education. For connectivity both ISDN and IP based network connection are used. A dedicated two-way video link is also provided for live delivery of classes to Addis Ababa University (Ethopia) under a special agreement with IIT Delhi. Two lecture delivery rooms for Remote Delivery have been equipped with remote teaching facility.

Role of Non-Teaching Staff

One of the important factors for IIT Delhi success, image and branding has been the cordial relationship between the administration and the non-teaching staff. Every employee in IIT Delhi considers himself/herself as part of Team-IIT Delhi and this feeling of belongingness expresses itself in our enhanced output. To enhance the efficiency of employees, training programmes on computer skills, communication skills, use of Hindi in official work and refresher training programmes are conducted. Executive Development Programmes and training to update and upgrade their knowledge on administrative rules and provisions of Government of India are taken up.

IIT Delhi was amongst the first educational institutes in the country to make extensive use of automation in administrative functions a few decades ago. Our Administrative Computerization Unit (ACSS) is responsible for development and maintenance of software requirement of various administrative units of IIT Delhi. ACSS and Computer Services Centre of the institute are contributing towards the new initiatives/changeover of functionalities of the institute from the existing Ingres character based system to modern ERP systems. The Institute accounts, grades, registration, purchase systems and library have been computerised for a decade. Currently Moodle is used for managing courses and the faculty annual reports are being collected in a searchable database for the last three years in a new initiative. Online SLA for maintenance request is being progressively implemented across various services.

Student Activities

IIT Delhi takes pride in its teaching traditions built over the years for providing education to our students which not only helps them become great scholars and specialists in their subjects of study, but also transforms them into creative and socially responsive human beings. Our aim is not only to teach students, but also make them wise, by helping them to develop an understanding of the complexities of human condition and the difficulties of living an examined life. We believe that a good education challenges its students to ask questions that may be disturbing, but are deeply important. That is the only way to come to grips with the basic questions of life at a personal level. The office of the Dean of Students Affairs manages and channelizes the energy of the students to constructive and creative endeavours, including progressive roles to play in their destiny as they progress through the IIT Delhi system.

The Institute believes in the maxim that no deserving student, however weak in financial backing, should be denied the opportunity of education at IIT Delhi. To encourage and to

provide financial incentives to meritorious students and assistance to the needy students of the institute, individuals, trusts and organisations have been instituting scholarships, awards, etc. at the Institute. As of now, all students with a family income of less than 4.5 lakhs an annum are covered by a scheme that waives their tuition fees.

By charter, IIT Delhi is a residential institution. Institute provides accommodation to 6,200 full time students. A new boys' hostel Udaigiri with 500 seats has started functioning, two new hostels to accommodate another 1,400 seats have been provisioned. Further, a comprehensive renovation of older hostels has also been taken up to boost capacity. The figure below shows the plan to boost the capacity, including doubling the capacity of women hostel accommodation. An eventual total about 12,000 seats would also accommodate research staff working on sponsored projects as well.

BOYS HOSTELS	
Existing	**Capacity**
11 Hostels	6,000
Proposed	**Capacity**
Hostel E	1,056
Hostel F	1,500
Hostel G	1,500
Vertical Buildup	1,000
Total	**5,056**
Grand Total	**11,056**

GIRLS HOSTELS	
Existing	**Capacity**
3 Hostels	1,200
Proposed	**Capacity**
Hostel 4	414
Hostel 5	700
Hostel 6	500
Total	**1,614**
Grand Total	**2,814**

TOTAL HOSTELS	
Existing	**Capacity**
14 Hostels	7,200
Proposed	**Capacity**
	6,670
Grand Total	**13,870**

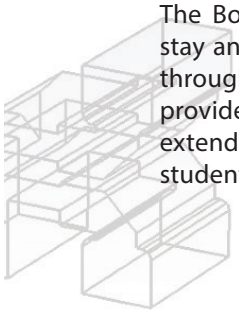
Existing and proposed housing for students on campus

Students Affairs Council

The Student Affairs Council (SAC) and its five constituent boards plan, organize and manage the various student activities throughout the year.

Through the Board of Hostel Management (BHM), recruitment of adequate manpower for hostels has been done and new equipment installed in the hostels to meet the needs of students. BHM also organized celebrations of Independence Day and Republic Day functions at the Institute level.

The Board for Student Welfare (BSW) helps the student community to facilitate their stay and activities in the Institute. Financial assistance was provided to needy students through summer/winter jobs. The students from economically weaker background were provided book and financial aid in the form of grants/loans. One of the major services extended by the BSW is the Students Counselling Service (SCS). The SCS counsels students undergoing stress related ailments and helps them recover their balance.



The Relaxation room located in SCS equipped with Bio-Feedback machines in the Students Counselling Centre is of great help to the needy students suffering from tension, stress, stammering and depression. BSW organized Hindi learning lessons for foreign students visiting the Institute under the student exchange programme with various countries. BSW also organized the inter college festival SPERANZA 2011.

The National Service Scheme (NSS) aims at arousing social consciousness and developing the personality of the educated youth by involving them in community development during their leisure hours. The motto of NSS is Not Me, But You. Development of confidence, patience, leadership qualities, and sense of involvement in task of nation building along with personality development are a few amongst some of the most tangible outcomes of NSS. Some of the activities organized by NSS include blood donation camps, paper recycling and conservation campaign, cloth collection drive, AIDS awareness campaign, campus cleanliness, food wastage reduction and many other activities.

The all India student seminar on Science & Technology "TRYST" is organized annually and is an hallmark event in the student calendar in the country.

The Board for Recreational and Creative Activities (BRCA) was founded with the aim to provide students with an opportunity to develop their skills and discover their talent in the field of music, dramatics, debating, quizzing and other such activities. The BRCA organizes a number of events including RENDEZVOUS and Students Week.

The Board for Sports Activities (BSA) is a constituent body of the Student Affairs Council. It is responsible for the coordination of the various sports activities in the institute. It ensures that adequate facilities are given to sportspersons and provides a forum for the students and staff to discuss and formulate policy towards the betterment of sports activities in the campus. Sports in IIT Delhi has been a meeting ground of students, staff and faculty and both the students and staff teams excel in the Inter-IIT sports meet.

The Board for Student Publications (BSP) has been very active in enhancing the creative and journalistic interest of the students. The basic goals and objectives of the BSP are to identify and support literary talent through literary activities in the campus and to create community awareness about issues which concerns students. Publications of BSP, both English and Hindi, provide excellent forum for expression of student opinion about a wide spectrum of issues reflections on the campus life and literary creations. BSP also organizes the inter college festival "Literati".

The NCC unit of IIT Delhi is affiliated to 7 Delhi Battalion NCC. The Unit organized regular training and parade for NCC Award for the Best Cadets. Winter camps were also organized by this Unit.

Quality Improvement Programme

Under the national Quality Improvement Programme, faculty members from different engineering colleges in the country are admitted to M.Tech. and Ph.D. Programmes.

Short term courses were also organized under this programme for the benefit of teachers of other engineering colleges.

Continuing Education Programme

The Institute pays particular attention to the organization of short-term courses under its Continuing Education Programme to meet the growing need of both private and public sector organizations. The courses offered by the Institute include those sponsored by the industry/government organizations for the benefit of their own engineers/personnel as also the ones floated by the Institute which are financed through the fee levied on the individual participants. During the year under report, 25 short-term courses were organized by various Departments/Centres of the Institute. In addition, there are 08 web based courses run in CEP mode for practitioners as online executive development programmes by the Department of Management Studies. In addition, 1 workshop on "3 D Culture System & Tissue Engineering" was also organised.

CEP started Summer Research Faculty Fellow Programme in 2008. The main objective of this programme is to help in inducing and inculcating research culture among the faculty of engineering and science institutes outside IIT system. The visiting faculty fellows stay in IIT Delhi during the summer and work with a faculty mentor, who is a regular faculty member of IIT Delhi. About a hundred faculty fellows join the programme associating with forty odd faculty mentors in IIT Delhi. About a quarter of the fellows who join the program register for a Ph.D. in different institutions, which is encouraging.

Curriculum Development Activities

The Overall Curriculum Development scheme under QIP of the Institute aims at developing curricula, authoring manuals, monographs, books, slide series and also encourages interaction between faculty members at different levels through workshops, seminars, etc. During the year under review, 1 book writing proposal was finalized and 1 workshop was organized. 4 software based course development package and slide series were made. This scheme is open to all departments and is financially supported by the All India Council for Technical Education.

International Collaboration

IIT Delhi has established strong bilateral links with several leading centres of teaching and research all over the world to remain at the forefront of scientific and technological developments. At present, a large number of collaborative research projects are in operation with the institutions in the United Kingdom, France, USA, Japan, Germany, Switzerland, Hungary, Canada, Sweden, Portugal, Denmark, Korea, Ireland and Ethiopia. Major research project activities have also been undertaken in the areas of national importance. These collaborations include students and faculty exchange, joint research and fellowships for training at the doctoral and post-doctoral levels.

IIT Delhi has also entered into collaboration with Mauritius Government to establish an IIT like Institution for Higher Education and Research in Mauritius.

Support from Alumni

The Alumni are a very valuable resource for the Institute, and increasingly, they have started to make a difference to the way things are done at IIT Delhi. About 30 Scholarships, 15 Awards, 12 Chair Professorships, 8 Faculty Fellowships have been constituted by Alumni. Further alumni endowments for the Amar Nath & Shashi Khosla School of IT by Mr. Vinod Khosla, Lemon Tree Research Centre by Mr. Patanjali Keswani and the Kusuma School of Biological Sciences by Mr. Anurag Dikshit are greatly appreciated. Other than these grants which are in cash and against actual cost of construction, the financial inflows are summed up below:

Year	In Rs. Lakhs
2013	80.50
2012	275
2011	128
2010	450
2009	164

Alumni giving back

In a new initiative, all alumni funding would be routed through a Development Office, under the Dean AAIP to facilitate alumni involvement and allow the gifted funds to be managed efficiently at the point of interaction.

Vision of IIT Delhi

The senate of the institute has defined its vision in the following terms: "To contribute to India and the world through excellence in scientific & technical education and research, to serve as a valuable resource for industry and society; and to remain a source of pride for all Indians".

We are trying to achieve this vision by becoming a place where exploration of truth and knowledge is pursued earnestly, where young people can be freed from the presumptions and prejudices with which they were raised, freed by the power of ideas to pursue their own path in life – a place where our students feel inspired to develop an approach towards life and profession that brings dignity and honour to human affairs. We share the universal dreams of all great research universities of the world and wish to be known as a place where science and technology are pursued at their frontiers to bring benefit to

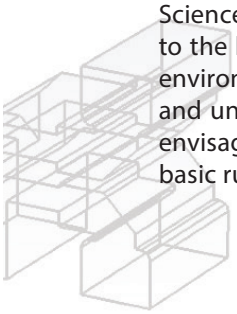
the society. While newer institutions of technical learning must grow to become centres for imparting training in generation of new knowledge, we expect that older institutes of technical learning to address a new paradigm.

Though faculty hired over the last two decades has improved publication and patenting rates, indicative of a high level of attainment in generation of new knowledge, we estimate that only 20% of the faculty is oriented towards addressing the modern product design. By involving faculty with strength in this aspect in the decision making process, one of the issues identified has been the need to have manpower trained to identify knowledge (patents and publication) that can be translated into market applications.

Development of infrastructure had lagged and currently 2,00,000 sq.m. of new construction is being added to argument the classroom and laboratory infrastructure and revamp the fabrication facilities. The infrastructure of the future is through the Science Parks and convention centres being setup in the main and the two extension campuses at Jhajjar and Sonipat in Haryana. Through the science parks, IIT Delhi aims to setup immersive environment to experiment with technology development for the faculty and students. We also hope to demonstrate at the medium scale the process of selective translation of knowledge to economic benefit of the nation as a whole. The Humanities faculty in IIT Delhi has been doubled over the last 5 years to improve the social context. The proximity of two major educational centres in the vicinity, JNU for humanities and AIIMS for medicine is being systematically leveraged to target engineering of biological systems and increase the capability within IIT to interpret the social context and need for engineering intervention.

In summary, the ecosystem to support product development has improved across the nation. In a change from setting up furniture workshops in the earlier years, IIT Delhi recognises the need to have cutting edge facilities for prototyping and trials. Over the next decade, investment to the tune of 2,000 Cr. is needed for setting up cutting edge facilities, to allow rapid evaluation of intellectual capital through prototyping of electromechanical systems with computing and communication, possibly testing them in environment involving biological products. Availability of non-plan budget is currently constraining chemical based technology including biology research and development of electronic devices.

Lands of 50 acres each at Sonipat and Jhajjar, have been approved by the Government of Haryana. Development of a Science Research Park and Bio Research Park is planned along with convention centre for mid-career training at these extension campuses. A smaller Science/ Research Park is also being established at IIT Delhi campus as a model precursor to the larger establishments and enable immersion of students in an industrial research environment. The presence of the industry in the science parks will lead to utilisation and underwriting this investment and boost product development in the country. It is envisaged that an outlay of 200 Cr. per year over the next decade, over and above the basic running cost is needed to achieve this target.



Strength of IIT Delhi lies in its ability to sustain an academic haven mindful of the developmental challenges facing the nation at large. The highly qualified faculty and bright students leading to high academic reputation.

Weaknesses of IIT Delhi lies in the absence of a charter to grow into a full-fledged University encompassing all disciplines. We have weak international student and faculty presence. Space limitation has limited development of state of the art laboratory spaces and consequently hands on experience of students.

Opportunities lie in demand for new technologies within the country and consequent expansion of the graduate programs. Growing to be a technical education hub for ASEAN countries and developing India centric appropriate technologies.

Threats to IIT Delhi are from the notion of exclusivity marring the spirit of enterprise. Marginalisation of graduate student stipends selection to PSU jobs through GATE based selection leading to attrition of Masters level students.

Architect's conception of Science Park on Main Campus