CHAPTER 6

Toward World-Class Status? The IIT System and IIT Bombay

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In the realm of higher education in India, the Indian Institutes of Technology (IITs) have been islands of excellence. Started as an innovation in technology education outside the conventional university system, IITs have increased in number from the so-called original five established during the period 1950–63 to 16 in 2010. Degrees awarded by IITs are recognized and respected all over the world. The success that the IIT alumni have achieved in various walks of life and in a variety of professions has contributed immensely to the brand IIT.

Thus, it is not surprising that IITs consistently rank above other engineering colleges (more than 1,200 in number) under the university system in India. The first eight of the top 10 engineering colleges listed by an Outlook-GfK-Mode Survey, based on the perceptions of 300 stakeholders in six of India's metropolitan areas in June 2009, were IITs. The only Indian institutions to find a place in the Times Higher Education–QS World University Rankings for Engineering and IT Universities in 2008 were IITs: IIT Bombay (ranked 36th) and IIT Delhi (ranked 42nd). In the Shanghai Jiao Tong University's Academic Ranking of World Universities, one of the three Indian education institutions among the top 500 universities worldwide was IIT Kharagpur. Thus, if any institutions in India can

aspire to world-class status—other than the Indian Institute of Science (Bangalore)—the original five are potential candidates.

However, the success of the IIT system seems to have brought it under massive strain: "Its autonomy is seriously eroded; its infrastructure is wearing thin; laboratories are getting outdated; faculty is depleting; and the competition for admission is pushing aspirants into an unhealthy grind," observes Shashi K. Gulhati (2007, book cover), a recently retired professor of 40-year standing at IIT Delhi. The IIT system appears to be at a critical juncture: it "can slide down the hill or gear up to climb new peaks" (Gulhati 2007, viii). What explains the success of the IIT system, and what challenges does it face in sustaining the excellence that it has fostered thus far? This chapter addresses these twin questions in three parts: The first part focuses on the IIT system in general, the second part presents a case study of IIT Bombay, and the third part reflects on the problems and prospects of sustaining IITs and replicating them.

The IIT System

Origin and Development

In March 1946, at the insistence of two Indian members—namely, Sir Ardeshir Dalal and Sir Jogendra Singh—the Viceroy's Executive Council set up a committee to create the direction for development of technical education for postwar India. The 22-member committee headed by Nalini Ranjan Sarkar submitted its interim report recommending the establishment of four technical institutes different from the run-of-the-mill engineering colleges: they were designed to provide the necessary dynamism and flexibility of organization in light of expanding knowledge and a changing society. Considering that the country was still under British rule, one finds it noteworthy that the model proposed by the Sarkar Committee was the Massachusetts Institute of Technology, rather than a British institution like the Imperial College London (Indiresan and Nigam 1993, 339).

The recommendations of the Sarkar Committee, though provisional, found favor with a visionary like Pandit Jawaharlal Nehru, the first prime minister of independent India. The first IIT was founded in May 1950 in Kharagpur, near Calcutta (since renamed Kolkata), and three more campuses were established: Bombay (since renamed Mumbai) in 1958, Madras (since renamed Chennai) in 1959, and Kanpur in 1959. By an act of Parliament (the 1961 Institutes of Technology Act), these institutes were designated as "institutions of national importance." The College of Engineering, established in New Delhi in 1961, was renamed IIT Delhi

in 1963 (through an amendment to the 1961 act). The structure and functioning of these five pioneering IITs—Kharagpur, Bombay, Madras, Kanpur, and Delhi—as defined by the Institutes of Technology Act is called the IIT system.

Four of the original five IITs were established in collaboration with or with active assistance from international organizations or foreign governments: IIT Bombay, with the assistance of the United Nations Educational, Scientific and Cultural Organization and the former Soviet Union; IIT Madras, with the assistance of the Federal Republic of Germany; IIT Kanpur, under the Indo-American Program with the help of a consortium of nine U.S. universities; and IIT Delhi, with the support of the United Kingdom. Since 1973, when all international assistance and association ended, the institutes have been managing on their own with financial support from the government.

For three decades after the establishment of the original five IITs, no new IIT was established. Then, in response to student agitation in the northeastern state of Assam in the early 1990s, Prime Minister Rajiv Gandhi promised the establishment of an IIT in that state. Thus, in 1994, IIT Guwahati was founded. In 2001, the University of Roorkee (in the northern state of Uttarakhand)—which had originated as the Thomson College of Civil Engineering in 1854 and was renamed after independence—was incorporated into the IIT system, becoming IIT Roorkee. As a result, in 2001, there were seven institutes under the IIT system.

In October 2003, prime minister Atal Bihari Vajpayee announced plans to create more IITs "by upgrading existing academic institutions that have the necessary promise and potential" (Upadhyaya 2005). Established in November 2003, the S. K. Joshi Committee recommended the selection of five institutions that could be upgraded as IITs. In March 2008, the government of India identified eight states—Andhra Pradesh (Hyderabad), Bihar (Patna), Gujarat (Gandhinagar), Himachal Pradesh (Mandi), Madhya Pradesh (Indore), Orissa (Bhubaneswar), Punjab (Rupnagar), and Rajasthan—for establishment of new IITs and recommended the conversion of the Institute of Technology (Banaras Hindu University) into an IIT. Thus, as of March 2010, there were 16 institutes under the IIT system.

Two major reviews of the IIT system have been initiated by the Ministry of Human Resource Development. A committee chaired by Professor Y. Nayudamma performed the first review and submitted its report in 1986. This report became the guiding document for the second review by a committee chaired by Professor P. Rama Rao (the second review committee), which submitted its report in 2004 (Government of

India 2004). As is the case with all such government-appointed committees, the committee reports, each its own package of recommendations, were accepted "in principle," but only the recommendations convenient to the government were implemented. Beyond these two *systemic reviews*, each of the original five IITs has undertaken *institutional reviews* on specific aspects—organization, curriculum, and other topics—for adapting themselves to changing situations.

Organization of the IIT System

The president of India is known as the Visitor (the highest ceremonial authority in the IIT system, comparable to the chancellor in state universities who serves ex officio as governor of the state) of all IITs and has residual powers. Directly under the Visitor is the IIT Council, which comprises the minister-in-charge of technical education in the government of India; the chairpersons and directors of all IITs; the chairperson of the University Grants Commission; the director general of the Council of Scientific and Industrial Research; the chairperson of the Indian Institute of Science; three members of Parliament; the joint secretary of the Ministry of Human Resource Development; and three nominees each of the government of India, the All India Council for Technical Education, and the Visitor.

Under the IIT Council is the Board of Governors—the executive body of each IIT—whose chairperson is nominated by the Visitor. Under the Board of Governors is the director, who is the chief academic and executive officer of the IIT. Unlike at the universities, the director of an IIT is not the chairperson of the Board of Governors, its managing body. This situation, instead of circumscribing the freedom of the director, seems to provide a cushion from the pressures of government and labor, as well as breathing space for making important decisions (Indiresan and Nigam 1993, 349–50). Under the director are the deputy director, deans, and department heads. The registrar is the chief administrative officer of the IIT and oversees the day-to-day business operations. Under the department heads are the faculty members (professors, associate professors, and assistant professors).

Although the IIT Council provides broad policy guidelines, the internal governance of each IIT rests with its Board of Governors and its routine academic policies are decided by its senate. The senate comprises all professors of an institute and a few student representatives; the director is its ex officio chairperson. The senate defines programs, approves courses and curricula, prescribes evaluations and examinations, ratifies

results, and appoints committees to look into specific academic matters. To maintain educational standards, the senate periodically reviews the institute's teaching, research, and training activities. Unlike universities, IITs can respond to situations and implement changes without delay.

As "institutions of national importance," IITs function autonomously. They have been, by and large, free from political or governmental interference from either the center or the states in which they are located. Although the state governments in each region have their representation on the Board of Governors, they have no control over decision making at the institute level on matters like faculty recruitment or curriculum. It is remarkable that each IIT has had eminent persons drawn from spheres relevant to the system as chairpersons of its Board of Governors.

The institutes' top authority complains about the bureaucratic hurdles at the government level; faculty members complain about similar hurdles at the institute level. If one considers the enormous dependence of IITs on governmental funding, it is understandable that the government determines the quantum of grants that each IIT obtains and that the bureaucracy regulates the release of the grants. On both counts, IITs often face difficulty. Similarly, because the institutes receive grants from the public exchequer, they must observe strict accounting and auditing norms. On this issue, faculty members often face difficulty. Nevertheless, these bureaucratic hurdles are nothing compared with those faced by universities because of their humiliating dependence on state governments and the political interference to which they are subjected.

More important, student politics is kept under control in IITs. Student councils are singularly free from the influence of political parties; student agitations are almost unknown. Students respect the academic calendar, as do the faculty and the administration. Thus, functionally, the academic system is extraordinarily efficient. This situation is in marked contrast to the university system, where the academic calendar is perennially derailed by student agitations. Even reputable universities are not free from the bane of student politics and agitations in which political parties take an active interest.

Student Enrollment

Admission to IITs is extremely competitive. Candidates seeking admission to the four-year bachelor of technology program and the five-year integrated bachelor of technology and master of technology program appear for an all-India annual examination—the IIT–Joint Entrance Examination—that is known for its rigor and transparency. Admission to

postgraduate programs involves various entrance examinations: the Graduate Aptitude Test in Engineering for master of technology, doctor of philosophy (PhD), and some master of science programs, as well as joint admission to master of science programs; and the Joint Management Entrance Test for management studies. Admission to master of philosophy and PhD programs is primarily based on a personal interview, although candidates may also need to appear for written tests.

The IIT–Joint Entrance Examination is a flagship entrance examination conducted by an IIT chosen in rotation. A science-oriented examination that tests the candidate's knowledge of chemistry, mathematics, and physics, it is open only to candidates who have completed their higher secondary schooling (12 years) and have scored not less than 60 percent in the qualifying examination conducted by a recognized education board. The number of candidates appearing for this examination has steadily increased over the years: in the examination held in April 2010, nearly 450,000 candidates appeared for about 7,400 seats. With the average number of candidates vying for a seat being very high, this examination has been a "significantly effective filter" (Government of India 2004, 3).[1] Candidates obtaining higher ranks obviously have greater choice of the institute and the program of study.

It is argued that the format of the IIT–Joint Entrance Examination, tough though it may be, "cannot differentiate between the naturally brilliant grasshopper and the slog-your-butt-off ant" (Deb 2004, 48). Because this differentiation is "fundamental to the IIT system," the fact that the examination has become tougher by the year is viewed as "the principal threat the JEE [Joint Entrance Examination]—and the people who set the JEE papers—face today" (Deb 2004, 48). To improve their chances of success (however small these chances may be) at an extremely demanding examination, most IIT aspirants enroll in coaching classes that prepare candidates for the IIT–Joint Entrance Examination. It is well known that, the middle-class aspiration ("the IIT dream") being what it is, students devote four or five years of their life to this entrance examination, "turning the JEE into more a test of endurance than of intelligence or talent for science" (Deb 2004, 53).

However, at any given time 16,000 undergraduate and 12,000 postgraduate students study in the seven IITs. These numbers are in addition to the number of research scholars (MPhil and PhD). In 2002–03, IITs produced 2,274 graduates, 3,675 postgraduates (including dual degrees), and 444 PhD recipients. The faculty-to-student ratio in IITs is between 1 to 6 and 1 to 8—a great luxury by Indian university standards.

Protective Discrimination

Since its inception, the IIT system has decided admission by meritocracy, with merit determined through the IIT–Joint Entrance Examination. However, since 1973, IITs have followed the policy of protective discrimination (a type of affirmative action): 15 percent of the seats are reserved for candidates belonging to the traditionally excluded indigent caste groups listed under a schedule (scheduled castes) and 7.5 percent for those belonging to tribes that have remained outside the mainstream society listed under a schedule (scheduled tribes). Since 2008, the scheme of reservation has been extended to other underprivileged classes up to 27 percent. Thus, in all, 49.5 percent of the seats are reserved.

Furthermore, to enable candidates from the scheduled castes and scheduled tribes (but not other underprivileged classes) to compete for admission with the general category candidates, IITs grant them a handicap: they may score 5 percentage points (55 percent) less than the general category candidates (60 percent) in the qualifying examination (namely, the higher secondary school). Similarly, the cutoff mark for qualifying in the IIT–Joint Entrance Examination is significantly low: it is two-thirds of the mark of the last student admitted in the general category. Also, the upper age limit for appearing for this examination, which is 25 years for the general category students, is relaxed to 30 years for the scheduled castes and scheduled tribes.

The reservation policy as followed in the IIT system is significantly different from that of other public-funded education institutions. From among the scheduled castes and scheduled tribes candidates who do not meet the relaxed criterion (of lower cutoff marks), a select number are offered a preparatory course (comprising English, physics, chemistry, and mathematics) at the particular IIT. After one year of study, those candidates who are able to score a grade higher than the prescribed cutoff mark at the end-of-semester examination are allowed to continue with regular classes. However, there is no relaxation in the criteria for passing the examinations or graduating a course.

The reservation of seats has been a contentious issue in the IIT system. According to P. V. Indiresan and N. C. Nigam (both former directors of IIT), it has "brought into the IIT system a significant number of academically deficient students who have considerable difficulty in coping with the system in spite of remedial measures" (Indiresan and Nigam 1993, 357–58). About 50 percent of "the reserved seats remain vacant as [scheduled castes and scheduled tribes] candidates are unable to secure the threshold marks," and of those admitted, about 25 percent drop out

of the program because of their inability to cope with its demands (Indiresan and Nigam 1993, 358). Not surprisingly, the extension of the reservation strategy to other underprivileged classes resulted in violent protests (even in IITs, which are otherwise free of protests). According to Indiresan and Nigam (1993, 358), "reservation and attendant problems have brought political interference in the functioning of IITs" (see also Gulhati 2007, 34–35).

Faculty Matters

The core caliber of the IIT system lies in the stature and competence of its faculty. Over decades, the system has attracted bright scholars and committed teachers to its faculty, which has contributed much to building and sustaining the IIT brand. However, the total number of faculty members has not increased much. As of 2003, the seven IITs had a total of 2,375 faculty members, which was 27 percent less than their total sanctioned number (Government of India 2004, 49). The procedure for faculty selection at IITs is, no doubt, stringent as compared to that in engineering colleges in the university system. Most faculty members have a PhD degree, which is a prerequisite for all regular faculty appointments. However, many bright scholars would readily find more remunerative and highly prestigious jobs outside the IIT system, both in India and abroad.

Moreover, the faculty members appointed in the early years of the system have retired. The second review committee noted with concern that "more than 80 Professors have retired since 2000–01," which accounted for a drop of 7 percent (Government of India 2004, 49). New recruitment at the entry level (that is, assistant professor) may fill the gap, but does not bring the needed experience. The inverted pyramid structure (with more professors, compared to assistant professors) is a matter of concern: the number of professors (1,041) and associate professors (562) is about 2.5 to 2.9 times that of the number of assistant professors (636) (Government of India 2004). Although this may indicate a greater fraction, it is not a good sign for an ongoing system, because superannuation of senior faculty will create a void that cannot be easily filled.

The age profile of the faculty is more or less similar across the seven IITs: professors, 51–56 years; associate professors, 40–49 years; and assistant professors, 33–34 years. More worrisome are the fact that "the number of faculty members below the age of 35 years is a low fraction of the total faculty strength" (Government of India 2004, 51) and the fact that most professors in IITs at Chennai, Delhi, Kharagpur, and Roorkee were

eligible to retire by 2010, a significant proportion of them taking advantage of this option. The second review committee recommended the upward revision of the age of superannuation from 62 years to 65 years, a modification that has since been implemented. In fact, if an institute finds the need for a superannuated faculty member, that member's services may be continued up to age 70. This modification has brought some relief to the system.

Nevertheless, the shortage of qualified faculty members is daunting: it ranges from a minimum of 10 percent in IIT Bombay to a maximum of 60 percent in IIT Guwahati. The faculty shortage in the other five IITs ranges between 14 and 37 percent. If established IITs in Chennai, Delhi, and Mumbai find it difficult to recruit qualified faculty members, one can imagine the fate of the eight new IITs. If one goes by the experience of 15-year-old IIT Guwahati, it will take decades before the new IITs can recruit even 50 percent of their faculty. This situation is ominous for the IIT system.

To enlarge the pool of candidates for faculty positions, the Ministry of Human Resource Development has decided to permit the appointment of non-PhD recipients as "lecturers" (a fourth-tier academic cadre) and to reserve 10 percent of the posts to this cadre. Although this approach is supposed to be an "enabling clause" for IITs, the move is widely criticized as being retrograde because it would dilute their lofty standards. It is not that PhD candidates are lacking; unlike in the early years of IITs when they received very few applicants with a PhD, they now get 40–50 applicants with a PhD for each post. As a dean at IIT Bombay said, "we are extremely choosy about who we pick" (see Mukul and Chhapla 2009, 19).

Until recently, according to government norms for public-funded institutions, IITs could appoint only Indian nationals as faculty members. This requirement ruled out the possibility of appointing even illustrious alumni, if those alumni had changed citizenship after emigration to a foreign country. However, the norms have been amended, and "foreign nationals" can now be appointed under contract for up to five years. There is also a proposal to shortlist a pool of international faculty members for short-term teaching assignments.

Surprisingly, the mobility of the faculty members across IITs seems to be difficult. A faculty member wanting to switch institutes must go through the same induction process, as if she or he were an outsider candidate. Movement for limited periods or on a permanent basis should be a possibility; such movements bring fresh blood into the system and

enrich the academic environment of an institute. Such movement could also address critical shortages in particular departments and strengthen specific fields of technology.

That bright young people do not opt for teaching positions is a general problem of higher education in India. For a long period, in relative terms, the pay package of IIT faculty members was only marginally better than that in the university system, and was ridiculously low compared with that of a fresh IIT graduate in the private sector (see Pushkarna 2009, 16). Dissatisfied with the package, the faculty of IIT Bombay, in an unprecedented move, struck work for a day on August 24, 2009 (Chhapla 2009b). The government has since decided to implement the Govardhan Mehta Pay Review Committee recommendations in this regard.

The second review committee had emphasized the need for an urgent review of pay packages for IIT faculty members. It recommended augmenting emoluments through a "professional allowance." In a market economy, compensation rules the scarce commodity of qualified and competent teachers. This climate is particularly prevalent in the IITs considering the demand for the best faculty worldwide. Perhaps what is needed most urgently is a performance-linked emoluments system besides the standardized minimum pay package for the faculty.

IIT faculty members enjoy full academic autonomy. They can update curricula to keep pace with the latest developments and embark on challenging research projects.

Over decades, by Indian standards at least, the original five IITs have built up enviable infrastructure—libraries, laboratories, and allied facilities—that provides the best learning environment for their students and research facilities for their faculty. However, faculty productivity does not appear to be commensurate. In 2002–03, on average, every IIT faculty member produced 2.70 students (0.96 graduates, 1.55 postgraduates, and 0.19 doctoral students) and 1.4 research publications, generated Rs 830,000[2] per annum through consultancy and sponsored research, and managed 10.5 enrolled students (Government of India 2004, 27). The second review committee also found that "at an aggregate level, engineering departments have produced a higher number of publications than science departments, research centers and departments of humanities/management" (Government of India 2004, 67). As in any system, the academic productivity of the faculty is uneven, and averages do not present the realistic picture. Hence, in thinking of performance-linked emoluments, one must give appropriate consideration to teaching, research, and extension activities engaged in by the faculty.

Academic Programs

The four-year bachelor of technology is the most common first degree offered by IITs. Some IITs also offer dual degrees (bachelor of technology and master of technology, five-year) and integrated master of science (five-year) degrees. The academic calendar follows the semester system. In the first two semesters, all bachelor of technology and dual-degree students undergo a common course structure (covering basics in physics, chemistry, electronics, and mechanics). In some IITs, a single department-theme-based course is also offered. Meritorious students have the option to change departments at the end of the first year, but such change is not common.

From the second year (third semester) onward, students branch out into respective departments. Nevertheless, they must take some compulsory advanced courses from other departments to broaden their knowledge base. At the end of the third year, students undertake a summer project at an industry or an academic institute. In the final year of their study, should they so choose, students are placed in industries and organizations through the institute's placement cell.

Among the postgraduate programs (two-year) offered by the IIT system, master of technology is the most common, followed by master of science. Some IITs offer master of business administration, but admission to this program is restricted to engineers and postgraduates in science. Some IITs offer specialized programs: master of design, master in medical science and technology, master of city planning, postgraduate diploma in information technology, postgraduate diploma in intellectual property law, postgraduate diploma in maritime operation and management, and others. All IITs offer PhD degrees and some masters of philosophy as research-based advanced degrees. It is noteworthy that IITs together account for more than 60 percent of all PhD degrees in engineering awarded in India.

The IIT system follows the credit system for performance evaluation of students, with proportional weighting of courses based on their importance in the program. A continuous assessment system has been consistently followed, with due emphasis on tutorials. The main learning takes place in the libraries, laboratories, and computer centers. Student evaluation of teaching (both curriculum and teachers) is an established norm.

English is the medium of instruction at IITs. Even those who pass the IIT–Joint Entrance Examination and are admitted to the system must improve their English-language skills if they hope to perform better in their studies. As noted earlier, the scheduled castes and scheduled tribes

candidates—who are admitted as a special category (for the "preparatory course")—must pass an examination in the English language. Of course, the politicians who are opposed to English as a colonial hangover have been critical of the IITs' stand on the use of English. Yet, these critics have hardly been able to make the same changes they have made in the state universities.

Finance and Resources

Although autonomous, IITs are primarily public-funded institutions. Compared with the universities, IITs receive disproportionately high grants: "While the total government funding to most other engineering colleges is around Rs 100–200 million per year, the amount varies between Rs 900 and 1,300 million per year for each IIT" (Wikipedia 2008). Nevertheless, the total budget of the IIT system is nowhere near that of the model (the Massachusetts Institute of Technology) to which it aspired. However, with the donations received from their alumni and the industry, some IITs have been able to develop a sound endowment, the interest from which helps fund many developmental activities. Furthermore, unlike public-funded universities, IITs generate additional resources. Thus, for every rupee that the government spends, IITs generate an additional Rs 0.24 through sponsored research and consultancy and make a net addition of Rs 0.16 to the endowment. Recovery of funds from student fees is only Rs 0.06 (Government of India 2004, 29).

With the large public grants that they receive, IITs subsidize undergraduate student fees by approximately 80 percent, and they provide scholarships to all master of technology students and PhD scholars to encourage students to higher studies. The cost borne by undergraduate students, including boarding and meal expenses, is around Rs 50,000 per annum, whereas an institute's direct expenditure on students is Rs 72,000.

Brain Drain

If one considers the heavy investment by the government in the IIT system, the annual expenditure that the government incurs for IITs, and the fact that study at IITs is subsidized very heavily, the migration of IIT alumni abroad—*brain drain*—has attracted critical attention. The second review committee estimated that, as of March 2003, about 30 percent of the alumni (about 133,245) were working abroad. According to another estimate, since 1953, nearly 25,000 "IITians" have settled in the United States (Friedman 2006, 127–28).

Some have argued that such brain drain was inevitable because of the mismatch between the orientation of the IIT system and the nature of industrialization under a state-regulated economy. As Thomas L. Friedman (2006, 127) notes, "up until the mid-1990s India could not provide good jobs for most of those talented engineers." Furthermore, the remittances by the expatriate IITians were a major source of foreign exchange, especially during the period of substantial trade deficit.

However, since the 1990s, there has been a turnaround, resulting from globalization as well as from changes in the country's industrial policy: government is now encouraging entrepreneurs among the IIT graduates, there has been a steady flow of foreign investment, the manufacturing industry and the service sector have gotten a boost, and technical jobs have been outsourced from North America and Western Europe. All of these changes have created opportunities in India for the aspiring IIT graduates. Not only has the percentage of IIT graduates going abroad declined (from a high of 70 to a low of 30), but the country also has become attractive to those who had migrated earlier (Wikipedia 2008, endnote 62).

As "institutions of national importance," IITs are truly all-India in character regarding the composition of their faculty members and students. Over the course of their five-decade existence, each of the original five IITs has developed a name and identity of its own. The prospect of more recently established IITs developing as did the original five is an important question, especially if one considers that the IIT system is at a critical juncture. To reflect on this question, the chapter will now turn to a case study of the success story of IIT Bombay.

IIT Bombay: A Case Study

The Indian Institute of Technology–Bombay, popularly known as IIT Bombay, is the second-oldest IIT. It was established in 1958 with the assistance of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), using the contribution of the government of the USSR. Until 1973, the institute received substantial assistance in the form of equipment and technical expertise: all 59 experts and 14 technicians from reputed institutions in the USSR helped the institute in its formative years. UNESCO also offered 27 fellowships for training Indian faculty members in the USSR. Under the bilateral agreement of 1965, the government of the USSR provided additional assistance. The government of India underwrote all other expenses, including the cost of the building projects and recurring expenses.

The institute began its first academic session on July 25, 1958, in a rented building in Bombay with 100 students selected from more than 3,400 applicants for the bachelor of technology programs. As buildings were completed on the sprawling 550-acre Powai campus in the northern suburb, the institute shifted from its temporary home to this present idyllic location. By the time IIT Bombay celebrated its golden jubilee in 2008, the campus had its entire infrastructure in place and had become a landmark on Mumbai's map. With more than 6,000 people (students, professors, and auxiliary staff members) living on the Powai campus, IIT Bombay has the ambience of a mini-township.

The institute's emblem in Sanskrit proclaims *"Gyanam Paramam Dhyeyam"* (knowledge is the ultimate goal) as its motto. The vision of the institute is "to be the fountainhead of new ideas and of innovators in technology and science," and its mission "is to create an ambience in which new ideas, research and scholarship flourish and from which the leaders and innovators of tomorrow emerge" (IIT Bombay 2009d, 2). The institute's curriculum reflects its hope that its graduates will be the leaders of tomorrow. In addition to offering professional courses, IIT Bombay strongly emphasizes acquiring a thorough grounding in the basic sciences of physics, chemistry, and mathematics and an exposure to subjects like philosophy and social sciences. The emphasis on basic sciences is expected to address, at least to some extent, the fear of rapid obsolescence of technology. The emphasis on the humanities and social sciences is intended to help students engage more positively with the society in which they live. Apart from providing facilities for higher education, training, and research in various fields of engineering and technology, the institute has been contributing to India's advancement of science and technology in the country and its industrial development and economic growth.

Today, IIT Bombay is recognized as one of the few centers of academic excellence in the country; UNESCO has declared it the first knowledge heritage site (IIT Bombay 2008, 1). IIT Bombay alumni have achieved success in different fields and various capacities—as world-class engineers, managers and technocrats, consultants and advisers, faculty and researchers, and entrepreneurs—both within the country and abroad. Notwithstanding the different methodologies adopted for institutional ranking, IIT Bombay is rated one of the best technical institutes in the world: it ranked 36th in the Times Higher Education–QS World University Rankings for Engineering and IT Universities and 174th among 200 top higher educational institutions in the world in 2008, missing a slot in the

top 100 because of low scoring on two indicators—international faculty members and international students (Mukul 2009, 13).

It is no wonder that, during the past five years, IIT Bombay has emerged as the most-favored destination for students among all IITs: 52, 46, 50, 54, and 69 of the top-ranked IIT–Joint Entrance Examination test takers (the elite among the engineering aspirants in the country) have opted for this institute in the years 2005, 2006, 2007, 2008, and 2009, respectively. Overall, 178 (35.6 percent) of the top 500 candidates, the single-largest group, opted for IIT Bombay in 2009 (Chhapla 2009a). The institute's location in the country's financial and entertainment capital, its reputation for academic rigor and quality of campus life, and its record placement figures have all contributed to its growing attraction.

Academic Organization

Under the aegis of the IIT Council, IIT Bombay is governed by a Board of Governors with a chairperson nominated by the Visitor. The board consists of the director; four experts in the field of education, science, or engineering nominated by the council; two professors nominated by the senate; and one technologist or industrialist of repute each nominated by the governments of the states of Goa, Gujarat, Karnataka, and Maharashtra. The registrar is the secretary to the board. Since 2000, the board is assisted by an advisory committee consisting of eminent experts in the fields relevant to the institute and its distinguished alumni. The second review committee found this mechanism to positively contribute to the institute and hence recommended it for other IITs, as well (Government of India 2004, 42).

On all academic matters, the senate is supreme: it has the authority and responsibility to maintain standards of education, instruction, and examination for the various programs of study and for all other academic matters generally. All professors of IIT Bombay are members of the senate, and the director is its chairperson. The director is assisted by a deputy director. There is an orderly division of labor between the academic and allied functions: there are seven functional deans, each with a well-defined authority and sphere of responsibility. The registrar is responsible for the overall administration of the institute, and she or he is assisted by five administrative officers (and support staff members) who are assigned specific areas of administration. The Academic Office, under the dean of academic programs, facilitates and coordinates academic work, especially the teaching and evaluation of students. It is also the repository of grades and academic records of all students, and it provides administrative support to the senate.

The Academic Office closely interacts with the office of the Dean of Student Affairs, which looks after the nonacademic problems of students and coordinates their various cocurricular activities.

IIT Bombay offers a wide variety of programs and courses of study in engineering (its main competency), design, pure sciences, management, humanities, and social sciences organized under 14 discipline-specific departments, 10 multidisciplinary centers, and three schools of excellence. Given the autonomy that the institute enjoys, these programs and courses are flexible so that they can respond to the challenge of change. The institute emphasizes teaching and learning basics, and the pedagogy and evaluation are geared to it. Annually, more than 1,000 students pass through the institute with different degrees.

A special feature of IIT Bombay's academic organization is the Continuing Education Programme. The courses offered under this banner include short- and long-term courses on topics of interest to the industry and research; in-house courses run exclusively for a specific company or organization (either at its site or at the institute); long-term certificate courses on selected topics; and postgraduate-level evening courses for professionals. Selected courses are offered to a large number of participants across the country through video broadcast of lectures supported by course handbooks. The use of Web and satellite transmission for virtual classroom transaction is an innovation that spreads advanced technological knowledge to people who cannot otherwise access it.

Making concessions for individual idiosyncrasies, for which professors are well known, the institute has been fortunate to obtain able leadership. Unlike at state universities where the vice-chancellor's position is now a political appointment and is based on extra-academic considerations, the directors of IIT Bombay have been professors of stature and achievement. By and large, there is no interference from the government or politicians. However, the institute must reckon with Shiv Sena, a Hindu right-wing nativistic political party that controls the unions of the support staff.

Student Enrollment

As noted earlier, over the years, IIT Bombay has attracted the best among the candidates successful at the IIT–Joint Entrance Examination for its undergraduate programs. Similarly, the postgraduate programs attract the best among the candidates passing the Graduate Aptitude Test in Engineering, the Joint Admission, and other admissions procedures. However, because a master of technology and a PhD are not priorities for bachelor of technology graduates, the caliber of students at this level is

not high, and the standard of education is accordingly pegged down. The annual intake of students has steadily increased: from 1,135 in 1998–99 to 1,754 in 2008–09 (that is, an increase of 54.54 percent). The increase in intake for the undergraduate program (including a dual-degree program and the preparatory course) is most striking: from 319 in 1998–99 to 652 in 2008–09 (that is, an increase of 107.07 percent). The enrollment in various programs is as follows: bachelor of technology, dual degree, and preparatory, 652; master of science and master of science and PhD, 162; master of philosophy, 12; master of design 49; master of management, 86; master of technology, 596; and PhD, 197.[3]

In 2007–08, there were 5,507 students, of which 2,313 (42 percent) were undergraduates and 3,194 (58 percent) postgraduates. It is envisaged that in 2014–15, this number will be 8,250 (that is, an increase of 49.81 percent): 2,750 (33.33 percent) undergraduates and 5,500 (66.67 percent) postgraduates. Enrollment increase at the first degree level in 2008–09 is explained in part by the implementation of the first phase of reservation (9 percent) of the quota of seats for other underprivileged classes (27 percent); the remaining two phases 9 percent each) will be implemented in 2009–10 and 2010–11.

The Faculty

"Recruiting and retaining high quality for the Institute has always been a challenge. The situation has become acute with the new reservation policy of the Government of India for admission of students at all levels," observes former director Professor Ashok Misra (IIT Bombay 2008, 12). In 2007–08, there were 433 full-time and 31 adjunct faculty members. The professorate at the institute is top-heavy: about 50 percent are professors and 25 percent each are associate professors and assistant professors. There is a faculty shortage of about 10 percent. The average age of professors, associate professors, and assistant professors is 51, 42, and 36, respectively (Government of India 2004, 51). The age profile of the faculty tends to be younger in IIT Bombay as compared to other IITs.

The breakdown of faculty members by discipline is engineering (61 percent); science (26 percent); and humanities, social sciences, and management (13 percent). About 44 percent of the faculty members have at least one degree from the IIT system (see Government of India 2004, 5). Almost all faculty members have a PhD degree; it is noteworthy that 158 (36.49 percent) of them obtained their PhD degree from universities abroad and 74 (17.09 percent) from IIT Bombay itself. The rate

of degrees earned from the institute by institute faculty, which is not detrimental by itself, would be higher if one considers that many other faculty members may have at least one degree from the institute.

Unlike at universities, IIT Bombay (as do other IITs) follows the practice of posting rolling advertisements on its website. Applications are solicited throughout the year, and the selection procedure is initiated when the institute has a critical mass of applications for consideration or if there is an urgent need for appointment in a given department, center, or school. Even so, the institute's procedures are more rigidly defined as compared to the system prevalent even in the Indian Institute of Science.

Research and Development

Unlike faculty members at most engineering colleges whose primary activity is teaching and evaluation, faculty members at IIT Bombay undertake research and consultancy projects sponsored by government organizations and private industrial establishments.[4] They have undertaken such projects for the government's Department of Science and Technology, Department of Electronics, Department of Space, Aeronautical Development Agency, Department of Atomic Energy, and Oil and Natural Gas Commission. Some research projects are funded by international agencies. There are also collaborative and consultancy projects with many industries, including some from abroad. On average, in any given year faculty members are engaged in about 400–500 sponsored projects.

Sponsored research projects demand innovativeness, active teamwork, and the creation of state-of-the-art research facilities. These projects enhance interaction between the institute and industry, something at which Indian higher education has been notoriously weak. Sponsored research and consultancy also are a source of additional revenue. IIT Bombay has drawn up clear norms for revenue sharing from the commercialization of its own intellectual property.

The Industrial Research and Consultancy Centre at IIT Bombay coordinates sponsored research and consultancy projects, providing necessary liaison with industry and other sponsors of research. Under the auspices of this center, the academic departments, centers, and schools have set up experimental facilities for aerodynamics, biotechnology, low temperature physics, microelectronics, microprocessor applications, remote sensing, robotics, telematics, and other areas. Painstakingly built over the decades, these state-of-the-art laboratories and facilities are an immense source of pride for the institute. The Computer Aided Design Centre caters to design activity in chemical engineering and metallurgical engineering. In

addition to this main computer center, many other research groups at IIT Bombay have computing facilities that are accessed by the faculty for special computational work. The Central Library,[5] central workshop, and the printing press complement the necessary infrastructure for quality research work.

To attract candidates with research potential, the institute offers research fellowships (for graduate and postgraduate degree holders with or without experience) and summer internships (for prefinal-year graduate and postgraduate students). Awardees work on research projects and could be considered for admission into postgraduate or doctoral programs subject to fulfilling the institute's admission requirements. Faculty members and students are provided with liberal financial assistance to participate in international conferences. IIT Bombay has instituted several awards for outstanding faculty achievements in research and development.

From Education to Entrepreneurship

It is the institutional mission of IIT Bombay to encourage and promote entrepreneurship. In 1999, the institute adopted the concept of business incubation. It now hosts the Society for Innovation and Entrepreneurship, which provides "an environment to translate knowledge and innovation into creation of successful entrepreneurs" (IIT Bombay 2009a, 1). In April 2009, to showcase the institute's research and innovations, its Industrial Research and Consultancy Centre held an event called TechConnect (IIT Bombay 2009b). A large number of products from the institute's research laboratories and Society for Innovation and Entrepreneurship were put on display. It is noteworthy that IIT Bombay now holds more than 80 patents in varied streams of engineering (IIT Bombay 2009b) and it has filed 53 more parent applications (IIT Bombay 2009d, 10–11).

Alumni

The alumni of IIT Bombay are its precious assets. Their website (http://www.iitbombay.org) was one of the earliest alumni sites for an Indian educational institution. They have two official organizations: IIT Bombay Heritage Fund and IIT Bombay Alumni Association. The IIT Bombay Heritage Fund is registered as a public charitable organization under Section 501(c)(3) of the U.S. Internal Revenue Code, and its mission is to fund and promote education and research among students, faculty, and alumni of IIT Bombay. It has raised more than US$20 million and helped fund the new schools on campus—Kanwal Rekhi School of Information Technology and the Shailesh J. Mehta School of Management.[6] The IIT

Bombay Alumni Association is registered under Section 25 of the Indian Companies Act (1956), and its mission is to strengthen the connections between alumni, assist them in different ways, and nourish their ties to the alma mater. The association has played a key role in building the alumni network and supporting the local chapters all over the world. The IIT Bombay Heritage Fund and Alumni Association together maintain the alumni directory and website so that alumni can stay in touch with one another and with their alma mater.

International Relations

IIT Bombay's relations with institutions and organizations abroad have grown over the decades. To coordinate and oversee international programs, the institute now has an International Relations Office and a dean for international relations. This office also works with the Ministry of Human Resource Development and Ministry of External Affairs on all matters pertaining to IIT Bombay's memoranda of understanding with overseas institutions and organizations.

The institute is a member of LAOTSE (Links to Asia by Organizing Traineeship and Student Exchange), an international network of universities in Europe and Asia, under which it exchanges students and senior scholars with universities in other countries. Among the institute's recent international collaborative initiatives are the joint PhD program with Monash University (Australia) and research in nanoscience and technology with the University of Cambridge (United Kingdom). Given its elaborate and tough admission procedures, the institute has been unable to attract foreign students.

Finance and Resource Mobilization

IIT Bombay operates one of the largest budgets for educational institutions in the country: its balance sheet for 2007–08 shows a sum of more than Rs 5,743 million. Its income was about Rs 1,544 million, of which about Rs 1,074 million (69.56 percent) came from the government. In absolute terms, the increase in funding during the past two decades appears to be steep, but one also must consider the decline in the rupee value during the period. More than 48 percent of its income, or more than 69 percent of receipts from the government, is spent on pay and allowance and retirement benefits for faculty and staff members. Much of the institute's development expenditure is paid for by monies generated from sponsored research projects and consultancy receipts. In 2007–08, Rs 731 million was generated from research projects (10 percent increase from

the previous year); 180 new projects brought as much as Rs 440 million. Similarly, Rs 167 million was generated from consultancy (20 percent increase from the previous year). Alumni and corporate donations and endowments were previously addressed.

Overall, IIT Bombay is less dependent on the government than are the universities, whose dependence on governmental support is as high as 85–90 percent. Nevertheless, to succeed in its quest for becoming a world-class institution, the institute must overcome its dependence on governmental support. This requirement appears to be particularly important if one considers the increasing governmental (and political) interference in the IIT system, something that was unheard of in the first few decades of its development. On this count, IIT Bombay has a long way to go.

Conclusion: Whither the IIT System?

Over the past five decades, the IIT system has established a brand, and its alumni have been its proud brand ambassadors. Beginning with the autonomous model that was evolved to foster excellence in technology, education policy makers marked a break with the moribund state university system. This autonomy has been well used by IITs to respond to the challenges of change and to approximate the best in technology education in the world. The IIT system is highly competitive, and only the best candidates are selected. Even with the government's sustained campaign for implementing the protective discrimination policy and expanding its scope in the name of social justice, the IIT system has upheld quality and meritocracy still prevails.

Quality teaching has been the IIT system's forte: although emphasis is placed on basic sciences, IIT courses cover cutting-edge fields in technology and engineering. The system has been choosy in recruiting faculty members, and the faculty-student ratio in the original five institutes is considered a luxury by Indian standards. IIT Bombay's continuing education program has contributed to the improvement of the quality of engineering education in the country. Although an adjunct to teaching, the system has developed enormous capacity for research and development, especially in applied technology. The state-of-the-art facilities—laboratories, libraries, and computational centers—at the original five institutes are the best in the country. The concept of business incubation adopted by IIT Bombay to promote entrepreneurship among the students has yielded positive results.

Comparative assessment of diverse institutions, in terms of either quantitative indicators or qualitative markers, is difficult and often invidious. Much depends on who is comparing which institutions and for what purpose. Comparing IITs with engineering colleges and universities in India (see table 6.1) would surely reveal IITs to be islands of excellence, far beyond the reach or imagination of the universities. This situation is remarkable, if one considers the odds at which excellence in education must be pursued in India, where there is tremendous pressure for

Table 6.1 IITs and State Universities: A Study in Contrasts

IITs	*State universities*
IITs are established by an act of Parliament; president of India is the Visitor of all IITs.	Universities are established by an act of a state legislature; governor of the state is the chancellor of the universities within the state.
IIT Council is an overarching policy-making body for all IITs—"the IIT system."	Some states have a common legislative framework for their universities; there is no overarching policy-making body.
Academic ambit is covered by the All India Council for Technical Education.	Academic ambit is covered by the University Grants Commission.
As the academic and executive head, the director (an academic appointee) is not the chairperson of the managing body—the Governing Board.	As the academic and executive head, the vice-chancellor (primarily a political appointee) is the chairperson of the managing body—the Syndicate or Executive Council.
IITs are financially dependent on the central government, but generate funds through projects, consultancy, and alumni support.	Universities are humiliatingly dependent on state government funding and hardly generate any funding of their own.
IITs enjoy greater functional autonomy.	Universities have very little functional autonomy; the state's directives override.
The government does not interfere in an institute's decision-making process.	Government interference occurs in a university's decision-making process.
Politicians do not interfere.	Political interference occurs in both policy matters and day-to-day affairs.
IITs are limited in number; there is planned and regulated expansion (at least in the first five decades).	Universities are large in number; expansion is unplanned.
Faculty recruitment and student admission are all-India in scope; outlook is cosmopolitan.	Faculty recruitment and student admission are largely restricted to state or even region within it; outlook is parochial.
Focus is on technology and its application with a strong foundation in basic sciences.	There are many focuses, especially on the practice of engineering in engineering colleges.

(continued next page)

Table 6.1 *(continued)*

IITs	*State universities*
Although teaching is the forte, research is encouraged; faculty members do considerable research.	Teaching, to the exclusion of research, is the norm.
Flexible structure and process exist: IITs respond to changing situations and implement changes without delay.	Rigid structure and process exist: universities are unable to respond to changes when required.
Faculty have functional autonomy in teaching and evaluation.	Faculty members teach and evaluate approved courses on a standard format.
Common all-India entrance test is needed for admission: IIT-Joint Entrance Examination is required.	Admissions are based on previous academic credentials: no entrance test is required.
Meritocracy prevails, even with the government's protective discrimination policy.	Mediocrity rules.
Favorable faculty-student ratio exists.	Large classes and unfavorable faculty-student ratio exist.
English is the exclusive medium of instruction and evaluation.	Vernacular is the main medium of instruction; even where English is the medium of instruction, students have the option to write the examination in the vernacular.
Student activism is kept under control; no political patronage of student groups occurs; academic calendar is followed.	Student activism is unchecked; active political participation occurs in student politics; academic calendar is periodically derailed by agitations.
Continuous process evaluation is carried out by the teacher; credit-based grading is used.	Year- and semester-end product evaluation takes place; external evaluation is used.
Student evaluation of courses and teachers is an established norm.	Student evaluation of courses and teachers hardly exists.
Credentials are recognized worldwide.	Credentials are not respected even within the country.
Proud alumni are a well-organized asset and are a resource for mobilization and as brand ambassadors.	The idea of an alumni organization does not exist.

Source: Author.
Note: The comparisons are based on general observations.

massification, mediocrity, and general debasement of academic standards. Any talk of excellence will be dubbed as elitist and as against the principles of social justice. However, if one compares IITs with high-ranking, world-class universities—including the Massachusetts Institute of Technology, the model on which IITs were based—IITs have a long way to go. Approximating that model calls for a huge investment of resources,

unwavering dedication, and consistent hard work. At the same time, the strain toward decline is worrisome. Perhaps the extra effort made by the IIT system may only help it stay where it is.

The IIT system faces both external and internal challenges. "A university needs to have three basic freedoms: freedom to decide what to teach, whom to teach, and who will teach. It is the corrosion of these freedoms that we are witnessing today," bemoaned former IIT directors, Indiresan and Nigam, in the early 1990s (1993, 359). The corrosion to which they referred involved the reservation of seats for the scheduled castes and scheduled tribes candidates and the attendant political interference that it brought into the functioning of IITs. This problem has been exacerbated with the extension of the reservation strategy to other underprivileged classes in 2008, even as the experience of reservation of seats for scheduled castes and scheduled tribes highlighted its negative effect on both IITs and the students accepted under the reservation quota. The government sought to address the critics by increasing the number of seats, which only added pressure on the system.

It is here that the functional autonomy of IITs is seriously compromised. Their continued dependence on governmental funds is an open invitation for greater political interference. Recent governmental decisions—concerning the creation of a lecturer's position in IITs, the relaxation of PhD qualification for this position, the starting of new IITs without adequate preparation, the pay packages for the faculty, and other options—suggest that the government has begun treating IITs as regional universities if not as its own departments. The increasing proclivity of politicians to interfere in the IIT system seems to be related to the decline in their pride about the system.

IITs face significant challenges internally, as well. These include the difficulties faced in recruitment of faculty members, the inability to determine suitable pay packages and allied benefits, and the lack of a performance-based reward system. More important, IITs have not adequately addressed the need for revisiting the system's objectives. They have succeeded in producing the best engineering and technology graduates in large numbers, but they need to move beyond this mission; research and extension cannot be mere appendages in education. In international comparisons, IITs fall short in research output, publications, and citation indexes. Fine-tuning their teaching and research programs to the developmental needs of a predominantly rural economy is another gray area, especially because IITs receive huge public funding.

Furthermore, in spite of existing for more than five decades, the IIT system has not fostered interinstitutional interaction. Synergy among IITs could improve the quality of their teaching and research programs. As of now, such interaction is extremely limited; interinstitutional mobility of faculty is uncommon. If one considers the sudden expansion of the system, the importance of such synergy and faculty mobility can hardly be exaggerated.

The stringency of IIT entrance procedures is criticized for diverting educational efforts from higher secondary schools to coaching classes. Coaching classes are expensive; not all students can afford to invest money, energy, and time on coaching. Furthermore, coaching classes favor the better-off sections of society. Often, candidates who fail the IIT–Joint Entrance Examination face depression and other psychological problems, as do their families. But, IITs can ill afford to dilute their standards; the IIT system cannot be blamed for the deficiencies of secondary school education. Dubbing meritocracy—the lynchpin of the IIT system—as elitism is an invitation to mediocrity.

The challenges, both external and internal, faced by the IIT system reduce optimism about the ability of existing IITs to realize their dream of world-class status or the ability of new IITs to replicate the achievements of the original five. One fears that the fledgling IITs will hardly take off, and even if they do, it will be several decades before they reach a modicum of what the original five achieved during the quarter century of their existence.

Notes

1. The 2005 profile of the successful candidates, which has changed only marginally over time, is as follows: 72 percent come from cities, 40 percent are 18 years old, 40 percent pass the examination in the second attempt, 32 percent score more than 90 percent in their class-10 examination, 53 percent come from CBSE (Central Board of Secondary Examination)-affiliated schools, 45 percent have fathers in public or government service, and 60 percent have parents who are both graduates. Interestingly, 45 percent of these candidates took the examination in just five cities: Delhi, Hyderabad, Jaipur, Kota, and Kanpur (Gulhati 2007, 34–35).
2. In March 2010, US$1 = Rs 46.24.
3. The statistical information cited in this section is from the Annual Reports of IIT Bombay and particularly the Director's Report in the Annual Report for 2007–08 (IIT Bombay 2008).

4. The Second Review Committee (Government of India 2004, 7) records the important role that IIT Bombay has played in the development of (a) technologies for India's Light Combat Aircraft, Tejas; (b) aeroservoelasticity analysis software (not commercially available anywhere in the world); and (c) computational fluid dynamics packages.
5. The Central Library at IIT Bombay has a net collection of 408,805 volumes and an institutional repository; it serves a membership of 7,753. It procures more than 1,100 periodicals, 12,000 full-text electronics journals, and 12 databases. It is the first university library in the country to support online submission of theses and dissertations; on the institute's Intranet, the library now has a full-text database of 4,467 items submitted since 1999–2000.
6. Alumni donations (from India and abroad) to IIT Bombay in 2007–08 amounted to Rs 55 million. The institute received corporate donations of Rs 70.7 million. At a conference held in New York to mark the golden jubilee of IIT Bombay, its alumni in the United States committed to donate US$7 million (see IIT Bombay 2009c). Some of the donations are for specific purposes, such as establishment of chairs. The Class of 1982 donated Rs 1.03 million to set up the New Faculty Joining Bonus fund. With the funds made available by Raj Mashurwala (a 1972 graduate), the Suman Mashurwala Advanced Microengineering Lab was inaugurated in April 2007 (IIT Bombay 2008, 11–12). India's first Nanomanufacturing Lab, inaugurated in November 2007, is a gift from the IIT Bombay Heritage Fund.

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