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CHAPTER 13

HIGHER EDUCATION REFORMS IN INDIA

SHYAM SUNDER

1. INTRODUCTION

> Our university system is, in many parts, in a state of disrepair.... In almost half the districts in the country, higher education enrollments are abysmally low, almost two-third of our universities and 90% of our colleges are rated as below average on quality parameters.... I am concerned that in many states university appointments, including that of vice-chancellors, have been politicised and have become subject to caste and communal considerations; there are complaints of favouritism and corruption.
>
> *Manmohan Singh, Prime Minister of India* (2007)

India exhibits a great deal of confidence in its technological capabilities and higher education. While the self-confidence of a society is key to building a better future, misplaced confidence often leads to ruin. It is important to distinguish among the various levels of knowledge. For example, owning, driving, repairing, making, and designing a car and inventing a new mode of transportation require successively higher orders of knowledge. A layman may ignore these distinctions, whereas the education system and policymakers cannot. Use of the same aircraft by Air India and Delta Airlines or of the same computers and operating systems for their work by the employees of Infosys and Microsoft does not make the knowledge base of the Indian workforce comparable to that found in the developed countries or many

of the developing ones. Beyond the shared operating or "driving" level of knowledge, their differences become painfully obvious. India has not yet designed and manufactured a commercially successful car or locomotive, much less an airliner, computer, or operating system, or introduced a new medical treatment. One has to look long and hard for Indian inventions.[1]

The number of higher-education institutions and their enrollments continue to grow faster than the population. At the end of 2010, India had 544 university-level institutions, including 130 deemed universities,[2] and 31,324 colleges where 14.625 million students are taught by 699,000 teachers.[3]

While the level and growth of these numbers are impressive, the quality of this education remains uncertain. Measures of quality are difficult to come by. India is supposed to do well in technical education. Yet according to a World Bank–Federation of Indian Chambers of Commerce and Industry (FICCI) survey, 64% of employers are "somewhat," "not very," or "not at all" satisfied with the quality of engineering graduates' skills (Ghosh 2009; Blom and Saeki 2011), presumably because of the low quality of their education. Infosys found less than 2% of its 1.3 million job applicants acceptable in 2006 (Surowiecki 2007). National Association of Software and Services Companies (NASSCOM) and McKinsey (2005) reported that only 25% of the engineering education graduates are employable by a multinational company. Agarwal (2006) reached a similar conclusion.

The challenge of quality in Indian higher education has many roots. Perhaps the basic problem (and the most difficult to resolve) is that it fails to attract a sufficiently large number of talented young to the life of teaching and scholarship. Starved of talent, many colleges and universities become either rule-bound bureaucracies or profit-bound commercial enterprises. As education—at all levels—is, at least in part, a public good, a commercial model alone does not serve society well. Since learning, scholarship, and good teaching do not lend themselves well to bureaucratic control and measurements of performance, attempts to run universities by rules of civil service, in the absence of viable alternative models of organization and administration, curtail the ability of these institutions to deliver quality education.

India's reputation for the high quality of its educated workforce is built on the few hundred thousand graduates of its elite institutions who have excelled in India and abroad. A significant part of this reputation arises from the screening function of the clean, competitive processes used to select a small number of the brightest candidates. Out of the annual cohort of some 26 million children born in India, the thin top layer of about 0.1% which enters such elite institutions is no longer sufficient for India's growing economy. To sustain its growth, India has to find a way of imparting quality higher education each year to an additional few million of its children, at a minimum. This second tier of students is bright enough, but unlike the top tier, it will not do well without a real education. This education, in turn, requires real resources, real teachers, and real colleges. Colleges run for profit have not achieved this goal in any part of the world, and are unlikely to do so in India.

Since education helps develop the minds of the young, the key input to quality education is the availability of high-quality intellects to teach—instruct, expose,

explore, innovate, and inspire—the students. To achieve this end, colleges must attract thoughtful, creative, and fearless minds from each year's cohort to careers in education. Once an abundance of talent in teaching and scholarship has been established, a culture of innovation may be built that will serve as a basis for a vibrant economy, society, and polity.

Innovation and creativity have served as the engine of economic growth and vitality throughout world history. In India, the willingness to experiment with (and adapt) new varieties of wheat and rice (developed elsewhere) launched the Green Revolution in the 1960s; the willingness to learn and adapt computer technologies, also developed elsewhere, has energized India's service sector. Four decades later, the gains of the Green Revolution are on the verge of being exhausted through population growth and the overuse of chemical fertilizers (Anand 2010). Research at the agricultural universities, instead of developing better seeds and agricultural technologies, has stagnated. Software services grew by absorbing a small pool of underemployed engineers at low wages. Having benefited immensely from India's existing educational capacity, industry has contributed little to the creation of additional higher-education capacity or to the improvement of its quality. The result is a rapid rise in industry wages that narrows its competitive margins in India and a gradual migration of the industry into other countries of Asia and eastern Europe in search of lower-wage pools of well-educated workers.

Like most other countries, India imports much of its technology. However, global competition will render this strategy unsustainable before long. In response to this risk, many countries around the world are adjusting their educational systems to groom a large number of their talented young with high-quality education, and promoting research to attract the "brain" industries. Research is original work—discoveries, inventions, writing, or design that is new and better than anything done before. The brain industries may move to these countries if they do not find a local source of labor of sufficient quality and in sufficient quantity to fill their needs. Unless India tackles the problem of attracting enough talent into higher-education careers, the same global competition that has served the Indian economy so well could prove to be its undoing.[4]

The challenges of quality in Indian higher education include (1) an inability to attract a sufficiently large number of its talented youth to lives of teaching and scholarship; (2) the separation of education from research; (3) inadequate financing; (4) a belief in the adequacy of investor-run colleges and universities, as well as the financial and political power of the investors; (5) a short-term, profit-based orientation toward education held by a large part of the business community; (6) excessive rent-seeking by well-organized groups and the dominance of the university-as-employer perspective; and (7) administrative weaknesses and wasteful expenditures. These issues are addressed in the following section.

Fortunately, these and other problems of Indian higher education have received the attention and analysis of individuals at the highest levels of government and civil service and by the best minds in academia. Prime Minister Manmohan Singh (2007) remarked on the poor state of Indian higher education in his address at the

University of Bombay. In June 2009, the Yash Pal Committee, appointed by the Minister for Human Resource Development, submitted its recommendations for the improvement of Indian higher education. In May 2010, the government of India submitted the Foreign Universities Bill for the consideration of the Parliament. Many other proposals to improve higher education have been made by a variety of organizations and individuals. Section 3 discusses some of these proposals, followed by concluding remarks in the final section.

2. Challenges of Higher Education

2.1. Attracting more talent to teaching and scholarship

That Indian academia is not attractive to talented youth is readily apparent. A visitor to Indian campuses, on requesting student audiences to raise their hands if they plan to pursue a career in teaching and scholarship, finds only one or two positive responses in auditoriums filled with a few hundred undergraduate and graduate students. These few lonely raised hands attract curious and surprised looks, and derisive giggles fill the room. As the pity and ridicule of friends and colleagues sink in, the brave souls drop their raised hands to the lap, as they bow to the oppressive climate of social contempt for an academic career path. The experience of vice-chancellors, directors, deans, and department heads further reveals the persistent difficulty of filling academic positions with inspiring teachers and innovative scholars. Solicitations to fill academic vacancies receive plenty of applications, but few candidates come from the top half of their undergraduate class. More often, academic jobs are the last resort for those with no other options.[5]

Although hard data on the quality of talent entering the teaching profession are hard to come by, there is plenty of anecdotal evidence. A conversation with a student on a visit to a well-known national university revealed that the compensation expected by members of his master's class was less than the average compensation of his erstwhile classmates who took a job outside academia after receiving their bachelor's degree. Only those who wish to teach, he sheepishly explained, enroll in the master's program. Apparently, the better students get picked for other jobs first. Teacher compensation often compares unfavorably with the compensation their students get in their first jobs upon graduation. While compensation is not the only reward of learning and scholarship, it is important. Until the Sixth Pay Commission Report led the University Grants Commission to raise government academic pay by 70% in 2008, teachers barely had a toehold on the lower-middle-class rung of the social ladder.[6] India's middle-class ethos offers no reward of high social status to complement the individual teacher's satisfaction in his or her career. Matrimonial

advertisements—that ultimate indicator of social status in India—often include searches for engineers, MBAs, and (U.S.) green-card holders, but hardly ever solicit members of the teaching profession. Mass-media portrayals of teachers depict them as mean-spirited, bumbling fools—see, for example, the 2009 Hindi Film *Three Idiots* and its presentation of the head of an elite engineering college. No wonder, then, the Hindi adjective *baychara* (pitiable fellow) is aptly used for teachers.

The low social regard for teachers at all levels may also be a consequence of the widespread belief in India that teachers in government schools, especially at primary and secondary levels, use their political muscle to shirk work. Weiner (1990, 59) quotes Ela Bhatt, respected social reformer and the founder of SEWA, the largest trade union in India: "[T]eachers do not care. . . . It is not because teachers are badly paid. . . . Education is well paid now and the teachers are organized but they do not teach. If we don't respect them it is because we see them doing other business than teaching."

The Pharmacy Council of India expresses its concern that graduates of M.Pharm programs are hired to teach not only bachelors but also masters and doctoral students immediately upon graduation. On its website, it states:

> The Pharmacy Council of India has noted with concern that several Universities/ institutions are offering PG [post graduate?] programmes in Pharmacy (M.Pharm) without having necessary infrastructure and qualified faculty. The pass outs from such universities/institutions are appointed as teaching faculty in pharmacy institutions to teach D.Pharm/B.Pharm/M.Pharm/Pharm.D. students. (http://www.pci.nic.in/press/appoinment%20of%20qualified%20teaching%20faculty.doc [accessed May 13, 2010])

Similar stories are told about engineering schools hiring their own jobless bachelor's degree holders to teach the following year's classes. Even in the elite universities, not all who teach a class are necessarily qualified to be admitted as a member of it.

It is an inconvenient truth that India lags in innovation, is falling further behind, and is in a state of largely unrecognized crisis. Like carbon monoxide, this slow creep, unannounced and unnoticed, is yet potentially lethal to India's economic progress. Research, scholarship, creativity, and inspirational teaching occupy only the narrow top of the educational pyramid. The education of educators is the seed-stock of knowledge. Just as a wise farmer saves his best grain to be used as seed for planting the next crop, even if it means bearing hunger pangs in a bad harvest year, so too a wise society sends its best brains to think, create, and teach the next generation. India does not.

How many higher-education teachers does India need? A simple "back of the envelope" calculation shows the need for approximately 740,000 teachers for higher education at the current low level of enrollments.[8] If the system were already in a steady state—assuming 35 years as the average length of a teaching career—the demand would come to about 21,000 new teachers each year. In 2007, a total of 20,131 Ph.D. degrees were granted in India[9], of which a mere 6,918 were in science and engineering (see table 13.1 and figure 13.1, which also include comparative figures for China and the United States).

Table 13.1 Ph.D. degrees awarded by discipline in India, China, and the United States

Year ending ==>	2002			2003			2004			2005			2006			2007			2008		
Field of Study	India	China	USA	India	China	USA	India	China	USA	India	China	USA	India	China	USA	India	China	USA	India	China	USA
Arts	4,524	1,222	5,050	6,144	1,580	5,020	7,473	1,770	5,012	7,532	1,855	4,950	7,605	5,125		8,257	4,890			4,722	
Science	3,955	5,257*	19,527	4,976	6,653*	20,001	5,612	7,927*	20,496	5,549	9,484*	21,557	5,625	22,672		5,839	24,056			24,632	
Commerce/ Management	728	765	1,113	954	1,095	1,036	1,096	1,431	1,254	1,010	1,660	1,170	1,115	1,310		1,402	1,505			1,437	
Education	420	197	6,503	527	276	6,643	613	274	6,633	491	319	6,224	599	7,183		659	6,429			6,578	
Engineering	734	4,968	5,081	833	6,242	5,281	882	7,797	5,777	968	9,126	6,427	1,058	1,905		1,079	7,745			7,862	
Medicine	219	*	1,655	246	*	1,633	317	*	1,719	456	*	1,784	438			454	2,134			2,094	
Agriculture	838	748		1,012	742		1,026	899		888	1,102		1,119			1,125					
Veterinary Medicine	110	*		136	*		116	*		132	*		180			185					
Law	110	615		146	683		144	906		179	1,038		182			175					
Others	336	1,034		444	1,354		574	1,589		693	1,818		809			956					
Total	11,974	14,706	40,024	15,328	18,625	40,024	17,853	22,593	40,757	17,898	26,392	42,112	18,730	36,247	38,195	20,131	41,464	48,112	43,759	48,802	

*Life sciences included in science.

Sources: Annual Reports of the University Grants Commission (India); Ministry of Education (China); National Science Foundation/Division of Science Resources Statistics Survey of Earned Doctorates. (USA).

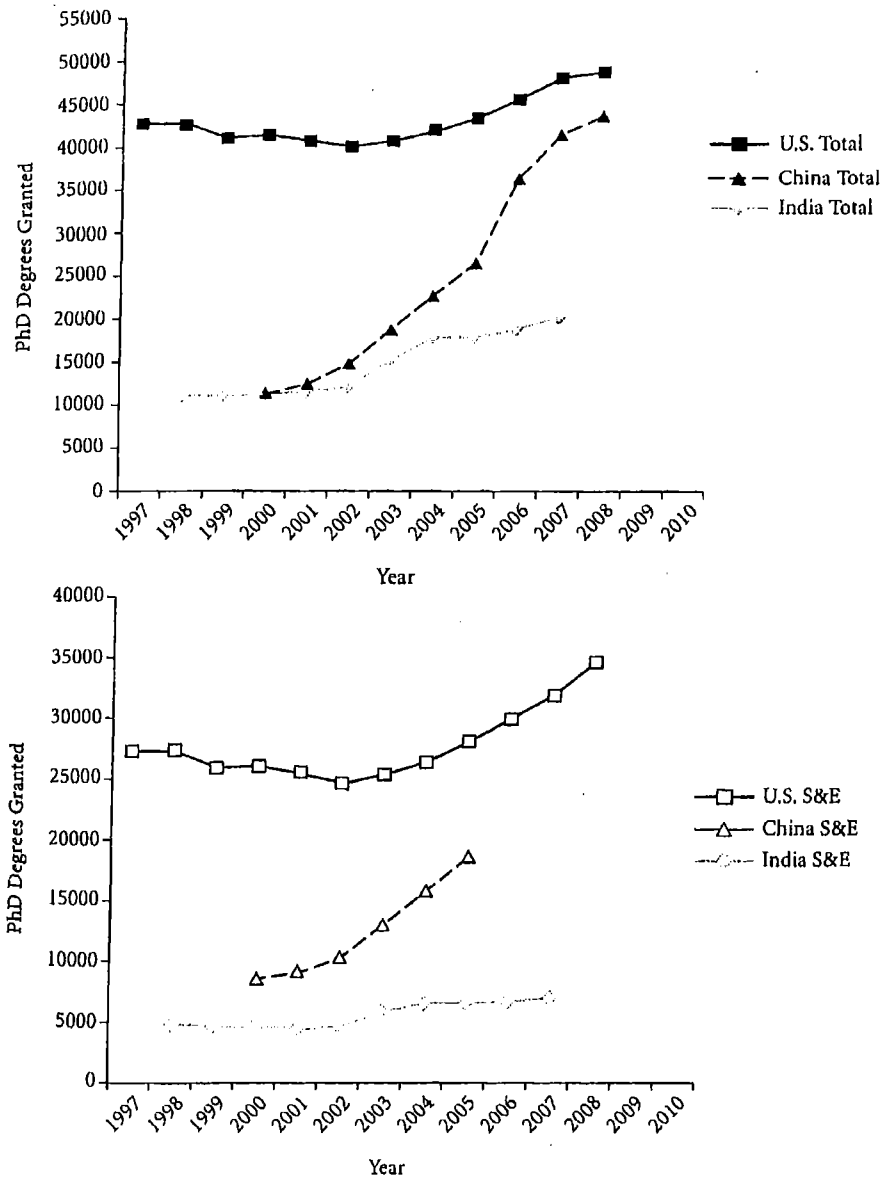

Figure 13.1 Ph.D. degrees granted in China, India, and the United States (in total and in science and engineering).

Sources: Ministry of Education, China; University Grants Commission, India; U.S. National Science Foundation.

There are good reasons not to be sanguine about the current state of India's higher education faculty. Srivastava (2009) quotes an estimate by the All India Council of Technical Education of a shortfall of 231,000 teachers in 2008. On the whole, the quality of talent entering the faculty and Ph.D. programs is unacceptable.[10] In most disciplines, talented students from the top half of the undergraduate or master's class do not go on to doctoral-level studies or pursue scholarly careers. Overall, the dissertations approved for Ph.D. degrees, and the research published by the supervising faculty in Indian universities does not compare with

international standards of quality. Relatively few doctoral theses from India earn scholarly reputations for their authors or publication in prestigious research journals. India's population is 90% that of China and 400% that of the United States. Nonetheless, even ignoring the quality differentials, the Ph.D. output of Indian universities is comparatively small (55% of China's and 40% of the United States). Finally, given today's higher enrollments and anticipated rates of growth, the current and projected demand for new teachers is at least twice as high as the estimate given above under the steady-state assumption.

Of course, not all those who earn Ph.D.'s go to work in academia. Brilliant minds are capable of contributing to the vitality of the economy through original work in industry, government, and other parts of society. In India, this is especially true in such disciplines as chemistry, where industry demand and higher salaries have helped raise and sustain the quality of Ph.D. programs. This only reinforces the need for quality educators, without whom these talented nonacademics would not have access to the training necessary to excel in their fields.

According to UNESCO statistics, of all regions of the world India has the lowest enrollment ratio and the fewest teachers in higher education per capita. While the enrollment ratio is growing, India has made scant progress toward closing the teacher gap (table 13.2). The *2000 UNESCO World Education Report* discloses that, at the time, India had about 434 teachers in higher education per million population, as compared to 3,612 in North America and 3,205 in East Asia. It lagged far behind the Arab countries (with 730) and Latin America (with 1,608). The Annual Report of the Ministry of Human Resource Development reported in December 2010 that, in 2008, India had 699,000 college and university teachers.

Table 13.2 Enrollment and teachers in higher education in India and Regions of the World

	Gross enrollment Ratio (relevant age)		Growth factor	Teachers per million population		Growth factor
	1995	2000		1995	2000	
North America	61.7	80.7	1.31	2,980	3,612	1.21
Asia/Oceania	28.8	42.1	1.46	2,162	3,205	1.48
Europe	32.3	50.7	1.57	2,042	2,393	1.17
Arab	11.5	14.9	1.30	653	730	1.12
Latin/Caribbean	15.7	19.4	1.24	1,422	1,608	1.13
India	**6**	**7.2***	**1.20**	**436**	**434**	**0.996**
World Total	12.5	17.4	139	964	1,084	112.5

*15.0 in September 30, 2009 (AICTE 2011).

Source: UNESCO, World Education Report, 1995 and 2000. http://www.unesco.org/education/information/wer/PDFeng/wholewer.pdf.

This translates to 578 teachers per million population, which is the lowest ratio recorded for any major region in the world. Compare this ratio to China's: according to the website of the Chinese Ministry of Education, the higher-education teacher/population ratio there had tripled, from 401 in 1999 to 1,199 in 2008.[11] While India reports a sharp rise in the number of teachers in higher education during the past decade, it is unclear how much of this increase consists of teachers who have not, in fact, received the education and knowledge necessary to offer quality teaching.

The All India Council of Technical Education (AICTE) reported that, in academic year 2006/07 faculty-development programs affected a total of about 1,350 individuals nationwide (AICTE Annual Report, section 2.5). The council received 25 proposals for nationally coordinated projects to promote research, and awarded Rs. 50,000 each to ten of these proposals. The council also approved grants totaling Rs. 160 million for 195 proposals for "modernization and removal of obsolescence" and Rs. 18 million for 211 research-promotion proposals.[12] By 2009-2010, the scale of faculty development programs remains essentially unchanged (AICTE 2010). For example, AICTE reports a total of 38 national doctoral fellowships across all disciplines. Considering the size of the education system overseen by AICTE—1.2 billion people and more than 100,000 college teachers—it is difficult not to be disappointed by its lack of attention to faculty development.

India's rapid economic growth of the past two decades followed investments made in education during the previous 50 years. Today, most of the system is focused on undergraduate education. Few of India's top students are attracted to scholarly careers. With its inability to attract even the top 1% of each year's class into Ph.D. programs, India's higher-education enterprise is declining in both the quality of instruction and scholarship. Instead, India is reaping the fruit of the educational trees planted long ago, but neglecting to plant enough new trees to meet the needs of the future. Unless it emulates the investments of the United States, Europe, and China by emphasizing research scholarship and doctoral education today, the quality of its higher education will continue to decline, with serious consequences for its economy. There is evidence that this decline has been continuing for some time. Even growth areas, such as technology, could lose steam as Indian firms move their operations to other countries where they can find a greater number of the well-educated employees they need.

2.2. Separation and fragmentation of education and research

Indian universities and research organizations have been resistant to change and innovation, partially because the system's components are organized as independent bunkers, each guarded against encroachment by the civil and academic bureaucracies residing therein. Two major dimensions of this isolation—instruction and research—and its harmful consequences are worth considering.

After gaining its independence, India set up freestanding research laboratories independent of universities, following the practice in many other countries, including France, the Soviet Union, and the United Kingdom. In India, this structural choice has neither promoted research and innovation nor helped maintain, much less raise, the quality of higher education.[13] In the early years, laboratories attracted talented scientists and engineers to conduct research. They were well financed by government and had little contact with education, industry, or the market (business being a dirty word in the socialist vocabulary dominant in the political class). With only a few exceptions, isolated from the talent and dynamism of youth and the inconvenient discipline of the market, most laboratories gradually fell into bureaucratic routine, promoting largely by seniority, hiring to spend the budget, and producing little notable research. Today, India hardly appears on the world research map in any discipline. The civil services that run these organizations control much of the government budget for promoting innovation, but have little to show for it.[14]

In addition, since the government budget for innovation was corralled to meet the payroll of these "research" organizations, little funding is left for use by the universities. Further, by isolating research from the education of the young, universities have been reduced to providing classrooms for instruction and issuing diplomas. Starved for talented faculty and funding to support innovation, universities have not had the opportunity to develop their research cultures. Even talented students are given little exposure to research, forgoing any accidental discovery of their affinity for innovation.[15] Ph.D. programs have difficulty attracting talent, because few faculty members can do or supervise research. The poor quality of candidates entering the Ph.D. programs, and the meager compensation graduates can anticipate, further lowers the social regard in which academics are held. This vicious cycle of negative reinforcements continues.

Another consequence is that the independent research institutes have been given narrowly defined, specialized disciplinary charters and staffs. These smokestack structures have isolated them from the exciting dynamic interfaces among disciplines, where most innovation occurs. In India, each research institute is bound by its own charter, and its organization does not facilitate or encourage the kinds of casual interaction with ideas from outside the discipline that may occur in broader university settings. An institute to conduct research on candles is no more likely to have discovered electricity than an institute set up to conduct research on horse carts could have invented automobiles. Yet India continues to spend its money and talent on organizations that are narrowly focused on yesterday's inventions.

Delhi and its surroundings are littered with signboards for the National Institute of XYZ, created to provide sinecures for retiring civil servants and politicians with hefty funding from the federal exchequer; new examples of such "institutes" appear regularly. The May 2010 announcement of the creation of a National Defense University at an initial cost of Rs. 3 billion on a 200-acre campus in the convenient vicinity of Delhi makes one wonder (1) what it is about national defense that calls for a special educational or research institution; (2) why it needs

200 acres, when top universities around the world do fine with a small fraction of that land; (3) who will reside in this university; (4) what they will do; and (5) how the taxpayers will know that they are worth the money spent on them. Is it possible that research on national defense may be done better on a university campus where historians, engineers, psychologists, and game theorists engage their intellects on important questions of defense? It will be interesting to watch what value this new institute may provide the taxpayers in return for the paychecks of its employees.

Like research, higher education also has suffered from narrow specialization. Frustrated with the lumbering pace, complex processes, and Kautilyan politics of universities, governments have found it expeditious to achieve their immediate goals by creating freestanding, single-purpose institutes as greenfield projects. They furnish a building, a staff, a faculty in half a dozen specialties, and the funding to run them, and they grant diplomas to a few hundred students in the desired discipline. This institute model efficiently achieves short-term—largely vocational training—goals but defeats the larger goal: building a firm foundation for broad-based education to prepare the young for responsible citizenship and professions, and to innovate. That larger goal requires an understanding of a range of disciplines, an understanding absent in such special-purpose institutes. A healthy tree requires hundreds of nutrients present in the soil; planting and watering a seed in a heap of urea quickly yields a tall plant that wilts and dies before bearing fruit.

Control, regulation, and financing of professional instruction have been entrusted to 15 separate councils created by various federal statutes. These include technical, medical, dental, pharmaceutical, nursing, legal, homeopathic, architectural, and rehabilitation education. Under the 1987 Act 52 of Parliament to create the AICTE, "technical education" was defined as "programmes of education, research and training in engineering, technology, architecture, town planning, management, pharmacy and applied arts and crafts." In addition, Parliament has also created councils on architecture and pharmacy separate from the AICTE. As a result, there are the Council of Architecture (under the Architects Act, 1972) and the Pharmacy Council of India (under the Pharmacy Act, 1948), both of which are independent statutory bodies, as well as the All India Board of Architecture and the All India Board of Pharmaceutical Education, which are among ten such boards inside the AICTE. Health and medicine appear to be covered by five independent councils (the Medical Council of India, the Dental Council of India, the Indian Nursing Council, the Central Council of Homeopathy, the Central Council for Indian Medicine, and the Rehabilitation Council), each operating under an act of Parliament.[16] The Indian Council for Agricultural Research (ICAR) is responsible for both research and education in more than 30 agricultural universities.

These separate fiefdoms tenaciously defend their turf without regard to the necessary and changing interactions of the substantive disciplines and professions they seek to control. Since they have been assigned to separate ministries, this bureaucratic resistance to change is especially fierce. It comes not only from the councils and institutions they regulate, but also from the civil servants and ministers who

control them. The broad-based resistance to the Yash Pal Committee Report and its proposal to create an integrated National Commission on Higher Education and Research is a good example of this phenomenon (Dhar 2010).

France has recently decided to move research into its universities. Munnich, the scientific adviser to the French president, writes:

> But this centralized monolithic structure, inherited from the past, has its limitations. Sarkozy has decided that the French scientific system will instead pursue the model that has been so successful in other highly developed nations, with powerful research universities at its centre. One of his first actions after being elected in 2007 was to pass a law giving the universities autonomy from centralized state control. They can now manage their own land and buildings, entirely handle their own budgets and have some flexibility to set researchers' salaries as they see fit, instead of being tied to rigid national salary scales—this gives them more openness and freedom to retain, or to attract, the best researchers. ... But universities have become the main operators, in charge of organizing their own research strategies. That has been accompanied by a marked shift away from the dominance of recurrent research funding, where the agencies funded labs on a rolling basis, to one where individual labs compete nationally for funding on the basis of grant proposals for projects. (cited in Butler 2010)

2.3. Inadequate financing

Statistics from UNESCO and the University Grants Commission show that India's public expenditure on all levels of education, as a percentage of both government spending (12.73% in 2005/06) and gross domestic product (3.46% in 2005/06), is not out of line with expenditures in developed countries. For example, in 2005 the comparable figures for the United States were 13.7% and 5.3%. For Japan, they were 9.2% and 3.5%. A large fraction of India's budget that might have gone to universities is already assigned to low-productivity government laboratories run, not by criteria of science and innovation, but by rules of civil service. What is left for education is directed to the existing government-run or -aided colleges, universities, and special-purpose institutes designated for specific disciplines. Given the heavy demands of economic development on India's budget, it is unlikely that these percentages can be raised significantly in the near future. How, then, can the expansion of higher education in India be funded?

India has decided that financing for expanding enrollments and improving the quality of higher education will come from students and their families, in the form of tuition and other fees.[17] While government-aided colleges, built and managed by charitable societies, have a long and distinguished history in Indian higher education, the government cannot afford to support virtually free education at more such institutions with massive subsidies.[18] Consequently, a large number of colleges and deemed universities have been opened in the past decade to be run either as not-for-profit or commercial operations by investors seeking a decent rate

of return on their investments. This "solution" to the challenge of financing higher education has several problems.

The United States provides an example of a high-quality, diverse, deep system of higher education that is accessible to most segments of the population. It is also a system in which the private sector plays a major role at all levels. However, the private sector's role takes the form of philanthropy and management. While there is much diversity across colleges and universities, student fees generally account for less than half the operating and capital budgets, with the rest coming from donations, research grants, royalties and licensing, and auxiliary services (see figure 13.2). In contrast, even genuinely not-for-profit colleges in India derive close to 100% of their revenues from student fees, because the revenue from other sources is small.[19] In colleges run for profit—whether overtly or covertly—the revenue from students must be sufficient not only to pay for all expenses but also to earn a return on investment. With little incentive to spend on innovation, research, and doctoral education, this financial structure is a serious obstacle to raising the quality of education provided by the institutions which account for most of the growth in enrollments.

Ironically, one of India's advanced theoretical-research groups in computer science is run by a U.S. corporation, Microsoft Research India. Ravindran Kannan, the principal researcher of its Algorithms Research Group (http://research.microsoft.com/en-us/groups/arg/default.aspx) and a world authority in the field, who returned to India after years of work in U.S. universities, said:

> I also wanted to try to establish a good research atmosphere in India. There are some places which do have a very good research atmosphere, but it's very small in India. It would be nice to have more research carried out everywhere—in India, in particular, because there's a lot of talent. (Knies 2010)

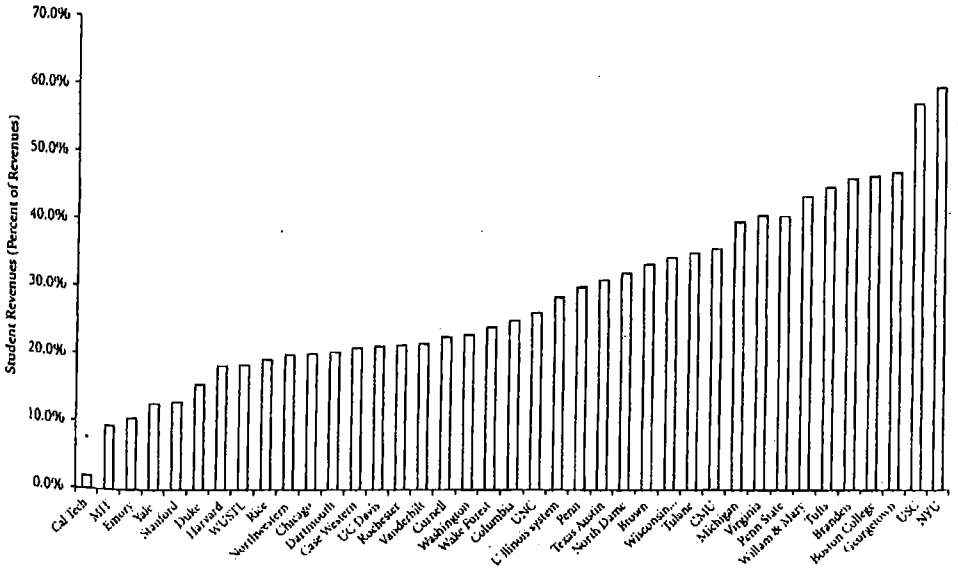

Figure 13.2 Revenue from students at 39 U.S. universities. Data gathered from the annual reports of universities.

2.4. Investor-run colleges and universities

Investor financing of higher education relieves the exchequer of budgetary pressure. However, it also raises new challenges of its own. Investor-financed colleges are feasible, at most, for vocational education or low-quality professional education that borders on the vocational. Thousands of colleges of engineering, computer applications, and business management have sprouted all over India, each promising students good jobs in exchange for cash. Many of these "colleges" are little more than shops that grant degrees in computer science without computers and in mechanical engineering without machines. Business management, fortunately, calls for little more than a room, some chairs, a chalkboard, and a person standing in front of the class in the role of the teacher. Visitors to Indian cities can easily spot signboards for many such "universities," based in distant states, offering classes in a few rooms of a residential flat (see figure 13.3). Given the fast growth and prevalence of this form of higher education, it is not surprising that the recent World Bank–FICCI survey, mentioned earlier, found that almost two out of three persons holding engineering degrees in India are not employable in that capacity.

Beyond business management, medicine, and engineering, a healthy system of higher education must also include studies in the humanities, arts, social and natural sciences, and many other disciplines. The chocolate of revenue-generating

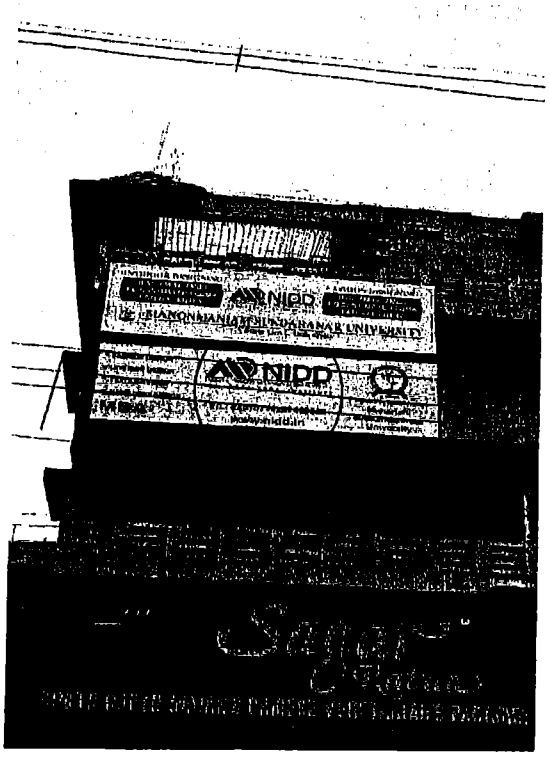

Figure 13.3 Two universities in Delhi.

Sources: Preeti Vihar, Vikas Marg, Delhi, July 20, 2010; Sachin Aggarwal.

disciplines must be balanced by daal-chapati-vegetables of liberal education in a healthy society. Vast numbers of students must study in these fields, and there is little chance that fees collected from students of mathematics and botany, for example, can ever suffice to pay the cost of their instruction, much less the cost of innovation and scholarship in these fields. Even government-run or -aided colleges offer little curricular or scholarly innovation and writing beyond textbooks. In investor-run schools, the lack of financial returns on such activities renders them even more scarce. If India succeeds in preparing its young for informed and enlightened citizenship through a system dominated by investor-run commercial schools, such an achievement would be unique in the world. Even enthusiastic advocates of investor-run higher education—education without the benefit of a large, ongoing infusion of philanthropic funding—have yet to make that case or illustrate its feasibility through successful examples. (See further discussion in the section on financing.)

2.5. Attitude of the business community

Many in the Indian business community appear to believe that entrepreneurial investors can do well for themselves financially, as well as do good for society, by opening and operating for-profit colleges of higher education. Raghunathan (2008) reports on the profitability of Educomp in selling to the education sector, and Gupta favors the for-profit model of higher education as superior:

> We've still got time to make amends. It starts with dismantling yet another shibboleth: That education should be run only by not-for-profit trusts. Now, here's my contention: Why not allow some of India's leading corporations, be it the Tatas, Birlas, or even Wipro, to set up for-profit institutions? Many of them are genuinely interested and they'd be a good deal better than the assortment of unscrupulous politicians and dubious entrepreneurs who have used these entry barriers to dish out poor quality education and fleece students. Under the existing model, no corporation can set aside large amounts on education without running into corporate governance issues. (Gupta 2010)

The criticism of government-run universities has substance. The Tatas (TIFR, IISc, and TISS), Birlas (BITS and Ranchi), Wipro (Azim Premji Foundation), and hundreds of other business houses have donated (not invested for financial returns) their money and precious managerial and governance skills to create high-quality universities and research institutes over the past century, and they continue to do so.[20] Contrary to Gupta's argument, it remains to be shown that high-quality higher (not vocational) education can be provided by corporations on a for-profit basis. Yet the investor-run colleges have already acquired a role and sufficient power to become an obstacle to the organic development of high quality education in India, as envisaged by the Yash Pal Committee proposals. Control or ownership of such institutions by men and women who occupy policymaking positions at high political levels does not make the task any easier.

2.6. Rent-seeking and universities as employment agencies

A well-functioning system of higher education is a place for learning and personal growth, a place to help individuals attain their potential. In India, the focus on learning yields, perhaps understandably, to acquiring the degrees required for employment in government and the private sector. What is less understandable is that universities and colleges are seen, especially in government, primarily as opportunities for the employment of academic and nonacademic staff. Actual value added, in the form of learning by students and innovation through research and interaction with various segments of society, takes a back seat to getting a diploma and securing employment. The dominance of this university-as-employer perspective is reflected in the single short paragraph used by the University Grants Commission (UGC) on its website to introduce the prestigious Indian Council for Agricultural Research:

> ICAR has established various research centres in order to meet the agricultural research and education needs of the country. It is actively pursuing human resource development in the field of agricultural sciences by setting up numerous agricultural universities spanning the entire country. It provides funding to nearly 30 (Thirty) State Agricultural Universities, one Central University and several Deemed Universities. These universities employ about 26,000 scientists for teaching, research and extension education; of these, over 6,000 scientists are employed in the ICAR supported coordinated projects.

From UGC's perspective, employment seems to be more deserving of mention than ICAR's vaunted research achievements, such as its facilitation of the Green Revolution, or its current research programs.

A visit to the National Council of Rural Institutes (NCRI) website (http://www.ncri.in/ accessed October 30, 2011) reveals many invocations of Mahatma Gandhi's name and offers an exhortation about rural education, along with a few posed photographs and copious praise of its officials. But it provides little information about what the council and its institutes have actually accomplished for the rural people . Perhaps it is not unreasonable to conjecture that the NCRI, like many other councils, may have been created to placate some political, administrative, or personal constituency; its accomplishments, the importance of its mission, and the justification of its budget seem not to have been reviewed since its founding. From the college-as-employment-agency perspective, it does not make sense to close down any agency once it has been opened, has a building and a budget, and supports some livelihoods. Sunset provisions—which terminate a program at a specified date unless it is explicitly reauthorized by fresh legislation—seem not to be an Indian practice.

Given the extreme diversity of income and accessibility to various levels of education across India and its various social strata, it is only appropriate that the government devote special attention to reducing these disparities. Gender and caste attract a large part of the limited administrative resources. The government faces the delicate task of balancing its attention between the well-organized, rent-

seeking groups on one hand, and of expanding the capacity and quality of education for all, on the other.

While this access issue has been largely handled through admission quotas, an alternative is to create well-financed secondary schools for disadvantaged children in order to give them a reasonable chance to compete for admission to universities on an equal basis. (Ways of dealing with their ability to pay for higher education are discussed in the section on financing, below.) This mechanism would also improve students' access to employment as faculty in higher education, albeit with a delay of a decade or more. Instead of patiently "growing" such longer-term solutions, however, the political system seems to prefer to waste decades wrangling over supposedly "instantaneous" solutions, such as legally mandated quotas. Such fights may pay political dividends by appealing to specific voter constituencies, but they undermine the norms of meritocracy in higher education, which are already weak in India. This is a high price to pay, because it could reduce even further the appeal of academia and scholarship for talent in India.

The Department of Higher Education in the Ministry of Human Resource Development seems to have been burdened with a potpourri of responsibilities that might have originated as historical contingencies or been pushed by specific influential constituencies at various times over the past six decades (see Appendix A for the list of 42 items). While it is not possible from this list to assess the administrative resources consumed by each item, their importance for building Indian higher education appears to be uneven. It would not be surprising if the 20–80 rule (80% of the time spent on things that account for only 20% of importance) applies to this list of responsibilities. The home page of the website of the Department of Secondary and Higher Education (http://www.education.nic.in/higedu.htm [accessed May 15, 2010]) discloses that the department has taken the initiative in facilitating only one new academic program: Guidelines for Setting up Departments of Vedic Astrology in Universities under the Purview of University Grants Commission (http://www.education.nic.in/circulars/astrologycurriculum.htm).[21] Perhaps it is time for some housecleaning, for rationalization of administrative tasks and responsibilities, so that the department can concentrate its administrative attention on the bigger, more general, and more important challenges of higher education for which there are no organized rent seekers.

2.7. Administrative perspective and wasteful expenditures

2.7.1. *Physical versus human resources*

Indian planning and governance is dominated by the concept of physical resources—property and goods—as the wealth of society. Human resources—the creative ability of people to think and do—is given less weight. Plans for the expansion of higher education through new colleges, institutes, and universities are specified in terms of acres of land, square meters of buildings, employment generated, number

of degree programs, and the number of students to be admitted and granted degrees.[22] The critical feature of education—developing the talent necessary to think, innovate, inspire, and teach—is more difficult to judge, is not emphasized, and remains in short supply.

Since India has raised its educational expenditures faster than other developing countries, such spending, as a percentage of annual GDP, is now at a level comparable with that achieved elsewhere in the world. The gross enrollment ratio in higher education (percent of 18- to 23-year olds) rose to 15.0% in 2009 (Ministry of HRD 2011, Table 8, HE-18). Nonetheless, India's enrollments, (UNESCO 2005, Figure 2.2, 58), teachers per capita, and teachers per student (see Table 13.2) lag behind all regions of the world. Agencies that control various parts of India's higher-education system pay scant attention to the quality of intellectual and human resources for education. Instead, the focus remains on measurable tangible resource inputs. For example, it is the function of the Pharmacy Council of India to "prescribe

i. the nature and period of study of practical training to be undertaken before admission to an examination;
ii. the equipment and facilities to be provided for students undergoing approved courses of study;
iii. the subject of examination and the standards therein to be attained; and
iv. any other conditions of admission to examinations."

Apparently, prescribing the quality and quantity of human resources needed for pharmacy education is not important enough to be included in this short list of the council's functions.

2.7.2. *Every ministry is in education*

The Ministry of Health and Family Welfare controls the Pharmacy Council of India. The other 15 education and research councils also fall under the jurisdiction of various ministries of the Indian government. With each ministry guarding its control of the branch of professional education assigned to it, comprehensive system reform is all but impossible. The recommendations of the 2009 Yash Pal Committee Report for such reform face collective opposition from more than a dozen ministries protecting their respective prerogatives. Reforms are unlikely to succeed without political initiative and support from the highest levels of government.

2.7.3. *Regulatory waste*

The governing rules and regulations issued and enforced by these councils are mind-boggling in their detail, but often irrelevant to quality education. The Dental Council of India, for example, invited applications for opening or expanding dental colleges. The applicants had to have at least five acres of land with no less than a 30-year lease and have a built-up area of at least 600 square feet per student in the first year, increasing to at least 1,000 square feet per student by the third year.

The rules also required applicants to build living space for at least 50% of the students and staff, a bank guarantee of Rs. 200,000 per student, an application fee of Rs. 300,000, and other such details. It barely mentions the faculty that might be needed to teach in the dental college.[23]

While some such regulations are necessary to control the entry of fly-by-night operators into the field, the five-acre land requirement for a dental college, independent of where it might be located, is puzzling. Why, for example, should it not be permissible for someone to impart quality dental education on a few floors of a high-rise building at Nariman Point, in Mumbai's high-density business district? Indeed, many well-known universities worldwide operate on high-rise campuses in major cities. In contrast, many Indian colleges are veritable Taj Mahals, built on sprawling campuses and occupying high-opportunity-cost land in major cities, with little regard for the cost and the consequences for educational capacity and accessibility for the talented students who get shut out. Exchange of high-value land for better facilities, equipment, high-caliber faculty, and expansion of student intake is not given serious consideration. Such wasteful spending of scarce resources has held back India's enrollments in spite of its head start over China. As a result, China has sprinted far ahead during the past two decades, quintupling enrollments within the ten-year period from 1997 to 2007.

2.7.4. *Political, civil service, and commercial control*

Most institutions of higher education in India fall under substantial control of political, civil service, and commercial interests. Political control takes the form of (1) chancellors, who tend to be governors of their respective states (who are mostly politicians or retired civil servants); (2) the appointment of vice-chancellors by federal or state governments through an opaque process in which caste and money are suspected of playing major roles; (3) control of funding and presence on the governing boards; and (4) close links with student groups and unions on campuses, which serve as training grounds for budding politicians. Civil servants who serve as ex officio members of the governing boards exercise outsized influence on decision making through their control of purse strings and appointments. Attention and resources devoted to the education and training of administrators in higher education remain minimal: "During 2009–10, no training programmes for academic administrators of universities & colleges and UGC officers had been conducted and hence no expenditure had been incurred." (UGC Annual Report 2009–10, 274).

2.7.5. *The Indian constitution and the political power of teachers*

The civil service ethos of most government and government-aided colleges is reflected in the low level of expectations from teachers. A median teacher is said to attend to less than half of his or her assigned classes. Given the prevalence of low expectations and performance, it can be argued that, following the Sixth Pay Commission, the salary raise of about 70%, without imposing an upward adjustment

in their performance obligations, overcompensates many teachers. Unfortunately, the civil service framework, in conjunction with intensive unionism among teachers, has left little room for specifying obligations for inspired teaching and brilliant scholarship in a meaningful way.

Following article 171(3c) of the Constitution of India, teachers of government-aided schools are the only class of employees paid from the exchequer who are permitted to serve as elected members of the Parliament, state legislatures, municipal councils, and councils of ministers. One-twelfth of the seats in the legislative councils are reserved for secondary or post-secondary teachers and, in the state of Uttar Pradesh, they have constituted more than a fifth of the council and more than a tenth of the assembly. In addition, scores of them have served as chief ministers and education ministers and in other ministerial posts. Principals and managers have little control over such teachers, with destructive consequences for morale and instruction in their schools. Many of those who are not yet in the legislature spend their energies campaigning to get elected and hold influential offices in most political parties. Teachers' unions in Uttar Pradesh and elsewhere in India have been opposed to virtually all educational reforms, including local controls on schools and performance evaluation of teachers, single-mindedly using their enormous political power to push for higher compensation and the freedom to not teach.[24]

Some members of the Constituent Assembly expressed doubts about the wisdom of affording teachers this special privilege. However, the metaphor of teachers as the "builders of the nation," in the immediate aftermath of the struggle for freedom in which teachers had played a major role, prevailed in the Assembly. A constitutional amendment may be necessary to overcome the unintended consequences of that noble sentiment and release Indian education from the grip of accumulated political power of the teachers. Such an amendment, however, may be virtually impossible to pass (see Kingdon and Muzammil 2003, 2008; PROBE Team 1999).

2.7.6. Enforcement of the Societies Act

The traditional charitable and managerial participation of civil society in institutions of higher education appears to be in the process of being overtaken by commercial interests, which see higher education as an industry with prospects of high private financial returns on their invested capital. Although most institutions are incorporated as not-for-profit organizations under the Societies Act, the failure of government to enforce their not-for-profit charters makes them private companies for all practical purposes. Well-intentioned government programs to allocate land for education in rapidly developing areas at concessional rates earn high returns in the form of real estate values and attract investment from commercial operators. In India, it is not unusual to see the windows of a single building covered by the signboards of several distant universities, all offering recognized diplomas. These diploma-for-money exchanges often claim to have the approval of the governments of the universities' home states (see Figure 13.3).[25]

2.7.7. *Resource use and productivity*

Given the high unfulfilled demand, low enrollment ratio, and scarcity of resources for higher education, the patterns of allocation of government resources to higher education is surprising. Indian cities are dotted with sprawling academic campuses, with well-separated, low-rise buildings on large tracts of expensive land with lush lawns, catering to a small number of students and housing a small academic staff and a bloated but idle support staff. Land and facilities deployment would suggest the existence of excess capacity in higher education. The provision of campus housing significantly raises the capital cost of building colleges, reduces labor mobility, conceals the real cost of staffing, and makes it all but impossible to weed out the incompetent. Relieving the principals, directors, and vice-chancellors from the diversion of being landlords or township mayors operating these staff colonies could allow them more time to meet the academic challenges of teaching and research and to more efficiently use scarce resources on Indian campuses.

The initial planning of a government-financed campus consists of provisions for land, academic and support buildings, staff quarters, and academic and support staffs. Support staff positions with permanent tenure are quickly filled from a large bank of available applicants. However, the scarcity of candidates for the academic staff keeps many such positions vacant and often forces compromises on hiring quality. The unfulfilled demand for higher-education opportunities brings plenty of student applications, and the administration scurries to find instructors to fill the class time. Independent of the initial plans and intentions, the shortage of high-quality academic personnel makes it all but impossible to attend to the research and innovation goals. Admitting more students to make more efficient use of the facilities is rarely feasible, for the same reason. Since the revenue associated with additional students is small or is counterbalanced by reduced grants from government, there is little incentive for the administration to admit more students or to employ their underused facilities to teach in multiple shifts.

Instead of building expensive, subsidized campus housing for faculty and staff, capital costs could be reduced by providing land or apartments whose ownership is restricted to current employees. Subsidized housing reduces mobility in the labor market. Even brilliant faculty members change over time. Any rental housing on campus should be offered at market rates and run on a commercial basis. Mobility across institutions and industry is as important for the health of scholarship as the movement of water is for health of a lake.

2.7.8. *Public good aspects of higher education*

All levels of education include elements of public good, where major consequences are not captured in the form of private costs and benefits to the participants. The public-good component tends to be smaller in higher education because significant benefits of being a physician, lawyer, dentist, or engineer can be captured by the students. Yet the public-good element remains, even in professional education.

For this reason, higher education continues to be subsidized, either by government or through private charity, in all parts of the world.

The public-good element is most prominent at the top of the educational pyramid, where exceptional young minds must be selected and prepared for careers in scholarship, research, and teaching. Ph.D. programs are a good example of this. Such education is extremely costly; preparation for research and other artistic and creative endeavors requires the intensive, individualized attention of accomplished scholars, writers, and artists. It cannot be delivered on a mass scale. Individuals who can supervise and guide the young are relatively few in number, and their time is scarce and expensive. Only students who have exceptional intellectual abilities are suitable for such programs. Attracting them, especially in the absence of high-paying jobs at the end of years of toil with original work, requires intensive efforts to find them and persuade them to consider such careers. Since virtually all such candidates must make significant pecuniary and personal sacrifices to enter doctoral programs, it is counterproductive to charge them tuition fees. Instead, they must be nurtured in the universities by stipends, research facilities, and other supportive mechanisms. At the end of their education, they usually go to work at other universities, never bringing any revenues back to the university that prepares them for their careers, although occasionally scholarly recognition may be reflected back to these institutions. Universities running seed farms to educate such students therefore produce a public good at high cost but with little direct benefit to themselves.

Privatization of higher education in India through investor-owned universities can only be expected to exacerbate the shortage of teachers and scholars in India. It would be difficult, if not impossible, to persuade investor-operators of private universities to spend substantial resources on preparing teachers and scholars through advanced postgraduate education at significant financial cost without associated compensating revenues. Even if they did so, they would likely try to keep the graduates for in-house teaching at the end of their education, as is common in many Asian countries. The scourge of inbreeding in graduate programs, at both the admissions and the faculty appointment level, weakens the control of the quality of such education that would otherwise be achieved through the assessment of talented candidates in the open labor market.

2.7.9. *Internal governance and evaluation of faculty*

Given the difficulty of objectively measuring educational accomplishment, universities depend on a shared sense of values among students, faculty, staff, administration, parents, government, donors, and the society as a whole. These values are too delicate to stand up to hard-ball confrontation and other tactics by which various constituencies seek their own rights with little shared understanding and obligation for their responsibilities. Absent shared expectations and values, no university can deliver quality education, no matter how talented the administration is. Degradation of education is the first consequence of conflict.

In India, most faculty appointments are made permanent shortly after the initial hire. The compensation follows predetermined pay scales, with little linkage to quality of scholarship or instruction. Fearing misuse of discretion, the system does not allow the department heads and deans to use their subjective judgment to selectively encourage their promising and high-performing academic staff.

Attempts to amend this situation take the form of bypassing discretion through bright-line rules for the assessment of research on the basis of publication and conference attendance, especially internationally. Visits to India and many Asian countries bring forth the following kinds of questions: Can you help me publish in international journals? My dean and the university demand that we publish in high-quality international publications. What criteria do your journals use to decide on publication of articles? My friend was told that they are not interested in articles using Chinese or Indian data. I have to get access to U.S. data and find a U.S. coauthor to work on it. Can you help me?

Such pleas for help from colleagues in Asian universities arise from the criteria used by universities for promotion and tenure. However, responding directly and positively to such requests is not necessarily an effective way to address the problem of innovation in higher education. Rules imposed by the education ministries make promotions contingent on international publications and conference presentations, in the hope of taking advantage of the internationally established systems of evaluation to assess the domestic faculty. That is to say, they do not regard their domestic evaluations to be sufficiently trustworthy. While such rules may address the short-term problem of selecting and assessing specific members of faculty, the indirect consequences of such rules are costly (see Sunder 2008a).

Such rules redirect scarce intellectual-research resources away from domestic problems that may need urgent attention. International journals have to cater to the substantive interests of their own readers, who may not be interested in even the critical problems of the society that supports the researcher. The pressure of such rules diverts the researcher's attention, requiring the selection of topics of interest to the editors of the targeted journals, even when the researcher has little competitive advantage in addressing such topics. The focus on international publications can result in severe misallocation of scholarly resources in fields where research questions are society-specific—not only in the humanities and social sciences but also in aspects of the natural sciences and professions.

Building an active and self-sustaining research culture requires developing a matrix of social norms of interaction, criticism, assessment, refereeing, and editing within a society. Pursuit of and dependence on international publications to fulfill the short-term goal of assessing the current faculty undermines this important longer-term goal. Thus, well-intended policies of educational administrators can end up doing more harm than good. Hunger was alleviated in India by developing the country's own agriculture to produce more, not by increasing imports of grain from abroad. The same argument applies to intellectual discourse and capital in society, albeit with greater force.

2.7.10. *Personnel policies*

With the importance assigned to degrees and administrative authority, the encouragement of creativity and originality of thought in young minds and respect for the power of ideas take a back seat. It is rare in India to see the name of a scholar in the public domain because of his or her scientific or artistic contributions. Rather, the few names that appear do so because of their administrative positions and authority. As P. Anandan of Microsoft Research India puts it, "India doesn't make heroes of its researchers." Indian educational and research structures find it difficult to recognize and encourage scholarly achievements except through administrative responsibility. In the catch-22 of Indian scholarship, scholars must become civil servants in order to have control over their work and organization, which leaves them little time for scholarly work.

Since civil servants often find it difficult independently to judge scholarship and art, it is reasonable for them to rely on the judgment of eminent people in the field. However, this well-intentioned involvement in administrative matters also consumes time that would otherwise be spent on creative or scientific work. In addition, India, like many other Asian countries, resorts to age and seniority as primary qualifications for granting decision-rights to evaluation of scholarship. This excessive respect for age puts meritorious young scholars and their heterodox ideas at a disadvantage.

3. Reform Proposals

Reforms for India's higher education will have to be found within India. Outside solutions are not acceptable to a proud society, and they attract immediate counterarguments as to why they would not work. Nor are they likely to work in India. There is evidence that the top policymakers in India recognize the urgency and importance of reforming the higher education system in India. The Yash Pal Committee Report and legislation to open India to universities from abroad are indicative of a change in the thinking of the policymakers. Yet formidable obstacles remain. Investor-run colleges and universities have the power of money and politics behind them, and it will not be easy to divest them of the profitable franchises already granted.

Wealthy individuals and their philanthropic trusts have built schools, parks, and hospitals for the public as a matter of public service. They seem to be in the process of being replaced by businessmen who think of education as an industry from which they can earn high financial returns. Turning the clock back to reestablish the attitudes that built thousands of charitable colleges in India will not be easy.[26] No model of higher education in the world has been successful without significant subsidies from an exchequer or philanthropy. It remains to be shown that India is an exception.

Figure 13.2 shows the fraction of revenues from student fees at 39 well-known universities in the United States to be significantly less than 100%.[27] Since Indian students who attend U.S. universities tend to pay full tuition, many are not aware that even these large sums do not cover the cost of running such institutions. Opening the door for foreign goods and manufacturers in recent decades has helped to change the thinking of business in India and to improve management, quality, and prices for the benefit of customers. Similarly, opening the doors of Indian higher education to foreign universities may help raise the awareness of the subsidies needed for quality education. Prestigious foreign universities will not lower their standards if they enter India; nor will they subsidize their Indian operations from abroad. When they do not rush through the open door, Indian government and business may develop a better understanding of the economics of delivering quality education on a sustainable financial basis.

Perhaps it is reasonable to assume that only reputable universities will be allowed entry into India. Even if their Indian operations break even financially, they will have to charge full cost—which means high prices—to deliver quality education and protect their reputation. Srivastava (2009) quotes an estimate of US$12 billion added to the Australian economy by foreign students, a large fraction of them from India. Since high prices are beyond the means of all but the high-income families, these universities will come under pressure to make their education more accessible. It is difficult to see what could be the source of subsidies to support wider access, except private philanthropy from wealthy Indians (see Tilak 2010). If this happens, foreign universities will have led the way toward reinvigorating an earlier era's approach to the financing of higher education.

Past collaborations with foreign universities that helped build some prestigious Indian universities have been primarily technical, involving deputations of teachers and students traveling in one direction or both. However, the organization of higher education calls for a much broader range of transfers of knowledge of university processes, organization, and management. Over the past decade, for example, Yale University has helped train the senior educational administrators (e.g., vice-chancellors and ministers) from China in all aspects of running a university, including faculty recruitment and development, curriculum, admissions, fund-raising, facilities and library management, research, intellectual property, financial management, and community relations. The impact of this knowledge transfer is already apparent in China. Perhaps India, too, could arrange to benefit from such transfers from well-regarded universities abroad.[28]

3.1. Yash Pal Committee report

The Committee to Advise on Renovation and Rejuvenation of Higher Education (the Yash Pal Committee) submitted its report to the Union Minister of Human Resource Development on June 23, 2009. Given the widespread concerns about the current state and trends in India's higher education system, the report was timely.

Written by a panel of eminent educationists, the report identifies some major weaknesses of the current system: disciplinary fragmentation and isolation; separation of instruction from exploration; proliferation of single-discipline institutes; erosion of autonomy and the democratic spirit of freedom of thought; unattractiveness of careers in education to talented youth; excessive commercialization; uneven accessibility; poor financing, governance, and management; and excessive and inappropriate regulation of colleges and universities. Political pressures and control from outside find internal resonance in the interested parties within these institutions, often generating resource- and attention-consuming litigation and conflicts irrelevant to their educational mission.

The report proposes a bold structural move in the creation of a new constitutional body, the National Commission for Higher Education and Research (NCHER), to take over the responsibilities of the Universities Grants Commission, the All India Council for Technical Education, and all educational aspects of 13 professional regulatory bodies, including the Bar Council of India. The commission will be directly responsible to the Parliament, along the lines of the National Election Commission, to protect it from political interference.

The commission, as the highest regulatory body in higher education in India, will seek to redefine the field through (1) developing a vision of higher education, as reflected in the framework for curricula, university benchmarks, international comparisons, and educational policies, including costs and pricing; (2) advising the union and state governments; (3) creating norms, processes, and structures for entry, accreditation, and exit of institutions and programs; (4) developing sources and mechanisms for funding; (5) promoting effective and transparent governance; (6) creating a national database on higher education; (7) promoting an environment to attract talented youth to education and research; (8) creating processes for enriching the environment for learning and exploration through closer interaction among students and teachers; (9) finding ways of gradually freeing universities from the administrative burdens of affiliated colleges; and (10) reporting annually to the Parliament on the state of higher education.

This three-paragraph summary does not do justice to NCHER's motivating vision of the future of India's higher education. Every system, no matter how inefficient and dysfunctional, has plenty of beneficiaries. Threatened by proposals for reform, they stand ready with their inside knowledge to rip the reform proposals apart, one line, paragraph, and chapter at a time. They will demand, "Where is the evidence for this? Prove it first." But as Samuel Johnson said, nothing will ever be attempted if all possible objections must first be removed. On Indian higher education, the choice for the government of India is to act or to spend its five-year term dealing with the objections.

The Yash Pal Committee's report could have put greater emphasis on the severe shortage of talent in higher education and research and on the possible consequences for quality and innovation of the for-profit "investment" model of higher education. It hardly mentions the responsibility of wealthy individuals and business corporations to support higher education and does not adequately promote the benefits of regulatory competition in the vast Indian system.

Many of the weaknesses of Indian higher education can be linked to the dearth of quality talent in the field. A significant number of the best minds of each year's graduates must be attracted to instruction and research for the committee's recommendations to have any chance of success. This can be done in two steps. The first is to introduce undergraduate research opportunities, programs offering promising students the privilege of working as research interns for outstanding scholars at their colleges, thus exposing the students to the excitement of a life of creative scholarship during their impressionable years. Second, upon graduation, the president of India could send a congratulatory letter to the top 1% of each year's class, letting them know that, as exceptional people, they are invited to pursue postgraduate studies with a government fellowship in any field, at any university (in India or abroad) that admits them at any time during the five years following graduation. If even a small proportion of talented graduates were to enter Ph.D. programs with presidential fellowships, India could significantly increase the flow of talent into education within a decade or so.

In addition to educating some five million new graduates, Indian colleges and universities must also educate about 40,000 new instructors each year. If the undergraduate classroom is the wheat farm, the graduate program is its seed farm. Whether one eats or starves tomorrow will depend on the quality of grain saved as the seed. At present, Indian universities grant some 20,000 Ph.D. degrees annually across all fields. In the judgment of many educators, these degrees are of mixed quality. Graduate programs, like seed farms, are extremely expensive to run, and they yield too little revenue to motivate profit-making colleges. The fact that profit-making companies in India do not invest in educating educators exacerbates the problem. To deal with it, to create and sustain a good system of higher education, the commission will have to have a "seed farm" division of its own.

While declining in relative importance, government employment is still significant in India. Strict, written definitions of the qualifications for government jobs, including the requirement of training in specific subjects, sustain the compartmentalization of education in universities. These formal requirements are often irrelevant to job performance. The committee's recommendation on lowering the walls that separate the academic disciplines could be accompanied by permitting greater flexibility regarding educational requirements for government jobs and by allowing a greater role for judgment in the recruitment of government personnel.

The report further recognizes the diversity of skills needed for the management of various university operations, and so calls for care in the education, training, and selection of administrators. Managing academic programs, faculty recruitment and promotion, admissions, curriculum, and budgeting—as well as the financial, facilities, personnel, government, community, governance, and fund-raising operations of universities—requires a wide range of skills. NCHER would do well to help universities build such management capabilities and to encourage appropriate succession planning. Improving the management of universities will help increase the chance of success in reaching the goal of university autonomy.

One can only hope that the state governments are not daunted by the report's call for real, substantive autonomy for centers of higher learning. In effect, "autonomy"

means leaving educational matters to educational administrators and faculty, and halting interference by the ruling party or ideology of the day in everything from the selection of vice-chancellors and faculty to matters of curricula and syllabi. Some parts of the report that deal with university autonomy seem to be reactions to the over-centralization of the educational bureaucracy as it exists under the current system. But the other extreme—unchecked faculty autonomy—can also become dysfunctional. Successful universities fine-tune the balance between faculty autonomy and responsible controls.

Even as they push the frontiers of knowledge, universities must adapt their curricula in a timely fashion in order to remain relevant. This is especially true in the natural and applied sciences and the professional disciplines. While faculty must take a leadership role in conceiving new curricula, feedback from students and labor markets is also indispensable.[29] Upon their arrival in the United States, graduates of India's top universities are often surprised to find that the subject they majored in had been dropped from U.S. curricula years earlier, through just this process of continual adaptation to the changing frontiers of knowledge.[30] While the provision of funding is important, equally important is a mechanism for making decisions on introducing, expanding, redesigning, and closing down programs of study, and for transferring emphasis and funds across programs and faculties. Endowing a university faculty with excessive autonomy can block such adjustments, fossilize curricula, and curtail the university's ability to adjust to changing times, new disciplines, the state of knowledge, and social needs. Isolating the university from political, business, and bureaucratic interference is important, but so is a mechanism that will enable it to function as a living institution, responsive to its environment.

A great many institutions of secondary and higher education in India were created by charitable trusts and are run well by those trusts. However, these same charitable trusts have also provided a veil for colleges run by operators who see them as little more than a profit-making business. The commission will have to make sure that not-for-profit trusts remain true to their legal charter and do not leak funds to their controllers. Alumni of these institutions could be given a voice in helping the commission evaluate the operations of colleges run by the trusts.

Finally, the commission's proposed new structure should have appropriate features to protect it from the conditions that have contributed to the failed structures it will replace. Establishing monopoly regulatory power over higher education for a vast and diverse country presents a prima facie risk of getting mired, once again, in inefficient procedures and rules. The report itself recognizes that a one-size-fits-all approach to the regulation of higher education should not be attempted. The government of India could adopt a model of regulatory competition by creating, not one, but two or perhaps three such commissions, each acting independently, with jurisdiction overlapping the entire country. The absence of monopoly regulatory power will induce these commissions to compete and innovate by trying different models and ideas, by allowing experimentation, comparisons, imitation, and rejection. Such an approach may help create a complex and diverse matrix of

institutions of higher education in India, one that can support the ambitions of a large and fast-developing country.[31]

The report of the Yash Pal Committee on higher education has been under active consideration of the Central Advisory Board of Education (Apoorvanand 2009) with a fair chance that its major recommendations may be implemented. The Yash Pal Committee makes a bold appeal for the revival of the state universities and asks the planners to bridge the huge gap that exists between them and the centrally created universities.

3.2. Centers of excellence

Quality of higher education in India is a major concern.[32] The government of India plans to create centers of excellence to lead the way to the rejuvenation of higher education and to serve as a model for other institutions. What is needed to create excellence in these institutions? How will their operating and performance norms percolate through the rest of the system?

3.2.1. *Knowledge: commodity or process?*

In the context of creating centers of excellence in higher education, knowledge is often conceptualized as a commodity to be produced, transferred, shared, and sold. This perspective shortchanges understanding, discovery, and innovation as creative processes in society. The university, as a part of this larger social process, needs active support from government and society to thrive and create. Since the creation of the Knowledge Commission of India, patents and designs, which are so important in engineering and medicine, have received much attention. This emphasis, however, should not replace the role of the university in a mode of human thinking that continually reconceptualizes our world through the arts, humanities, and sciences. Aryabhatta changed our geocentric world to a heliocentric one in the fifth century, just as the Internet has redefined library, meeting, and mail in the twentieth. The world determines how we think; and our thinking shapes the world around us. Knowledge cannot be produced, imported, stored, distributed, or consumed like rice, except in the "fields" and "bags" of the engaged human mind. The university is a special receptacle that contains and sustains the fragile ecosystem of knowledge. It requires decades of tender, loving care to come into being and is easily destroyed.

3.2.2. *Education or screening?*

Reforms continue to emphasize the quality of education provided by the Indian Institutes of Technology (IITs), the Indian Institutes of Management (IIMs), and like institutions, although many of the accomplishments of their graduates may arise from the selectivity that occurs when only a few thousand seats in such institutions are available annually for a cohort of some 26 million children. Only a small fraction of their graduates have produced outstanding scholarly achievements, unless

they have gone on to work at universities abroad. Given the opportunity cost of the resources spent on them, the scholarship of IITs and IIMs lags behind that of their sister institutions elsewhere. The nationalistic pride associated with the achievements of their graduates could also be used to help remedy their weakness in scholarship.

3.2.3. *Identifying and attracting talent*

Most students know little about an academic career or a life of scholarship. When teachers they respect take the time to tell them about it, they respond positively. A survey of undergraduate and master's students at three IIT campuses, available at the website of Pankaj Jalote of IIT Kanpur,[33] shows why these top students in India are reluctant to consider joining a Ph.D. program in an Indian university and what factors might change their minds (see tables 13.3 and 13.4). The figure for IIT Kanpur

Table 13.3 IIT Delhi, Kanpur, and Bombay students' perspectives on pursuing Ph.D. in India

Question 1: What is the main reason you would not join a Ph.D. program in India? (percent of students who agree with the reason given)

Reason	IITD	IITK	IITB
Ph.D. takes too much time	47.0	10.7	24.2
Doing a good Ph.D. in India is not possible as research work in India is poor	38.0	5.3	14.1
Indian Ph.D. has low market value	35.0	24.0	12.1
Faculty who taught me don't inspire me to take up higher studies	26.0	24.0	10.1
Do not want to spend another few years as a student	25.0	2.7	0.0
Have just not thought about Ph.D. and career options with it	21.0	54.7	36.4
I do not want to be an academician (and that is what Ph.D.'s do)	20.0	22.7	33.3
Faculty and their research is not known	18.0	6.7	5.1
Job options after Ph.D. are few	18.0	41.3	37.4
Attraction of settling abroad	16.0	6.7	3.0
Range of research areas available in India are limited compared with foreign universities	14.0	38.7	31.3
I expect to get a good job, so why should I do a Ph.D.?	14.0	30.7	34.3
There are too many courses which one has to do before starting research work	4.0	10.7	17.2
Would not be able to get admission in IITs/IISc or other top places	3.0	12.0	19.2
Ph.D. is too difficult	1.0	9.3	22.2

Source: http://www.cse.iitd.ernet.in/~jalote/misc/phd_surveyIITK-D-B.pdf (accessed July 18, 2010).

Table 13.4 IIT Delhi, Kanpur, and Bombay students' perspectives on encouraging pursuit of Ph.D. in India

Question 2: If these were available, would you seriously consider pursuing a Ph.D. in an Indian institution? (percent of students who responded affirmatively to the option)

Option	IITD	IITK	IITB
If the job opportunities after Ph.D. increase and provide a compensation of more than 100,000 Rs. per month	56.0	32.0	40.4
Part-time program option of doing Ph.D. while in job	36.0	2.7	7.1
If the Ph.D. program involves collaboration with R&D groups in companies in India, including internship stints for Ph.D. scholars	36.0	17.3	22.2
If the Ph.D. degree is a joint degree between an Indian institution and a foreign university (with at least one year being spent at the foreign university)	36.0	44.0	32.3
If the stipend of Ph.D. scholars is increased to about 20K Rs. per month	28.0	34.7	33.3
If the Ph.D. program involves spending (on scholarship) at least one-year in a research group at an overseas university	28.0	44.0	37.4
If the duration of Ph.D. program is reduced so it can be completed in four years	28.0	21.3	14.1
More information on programs and opportunities	25.0	42.7	49.5
If the course work in Ph.D. program is reduced and the focus is mostly on research	19.0	20.0	23.2
Removal of compulsory GATE exam for admission	8.0	38.7	40.4

Source: http://www.cse.iitd.ernet.in/~jalote/misc/phd_surveyIITK-D-B.pdf (accessed July 18, 2010).

students thinking of joining a Ph.D. program (24%) exceeds those for students at the Delhi (14%) and Bombay (17%) campuses. Perhaps Professor Jalote (2005) and his colleagues can supplement their writings on the subject[34] with selections from discussions with students that have influenced those students' decisions.

Microsoft Research runs an active program to identify and support outstanding students and attract them to Ph.D. programs in Indian universities. It also provides travel grants for international conferences, offers faculty-research awards, and runs internship programs for visiting researchers and undergraduate and graduate students, including one program only for women. If more Indian corporations and their industry organizations were to recognize the importance and value of the Microsoft Research initiative, follow its example, and start carrying their share of this public service, the effort could be scaled up sufficiently to tackle the problem of attracting and supporting talent.[35]

3.2.4. *Audit and accountability*

The new centers of excellence should not be free of audit; nobody should have authority to spend public money without accountability. Rather, the audit system should be reformed to make it less procedural and more substantive. Being no angels, scholars are just as susceptible to greed, avarice, and megalomania as anyone else. The absence of an audit requirement can easily become the pathway to financial scandals that could discredit the finest of institutions. The problem to be addressed here is not the audit itself, but devising the kind of audit that can assess the effectiveness of universities in achieving their instruction and scholarly goals.

3.2.5. *Building expectations for good governance*

The broad recognition of the difficulties arising from running universities in accord with civil service procedures has generated proposals to give "complete" autonomy to the new centers of excellence. Institutions that depend on government or charity for financial sustenance cannot, by definition, be completely autonomous, and no organization can or should receive resources without being accountable for their use. Instead, it is better to think of autonomy in terms of a governance structure, in which each participating individual's best interest lies in doing what the other participants expect him or her to do under various conditions (Sunder 2008b). The autonomy of renowned scholarly institutions in the United States and the United Kingdom is possible in this sense because they have developed values and commitments among students, faculty, staff, administration, government, donors, and society that mesh in a reasonably harmonious fashion. By acting in their own self-interest (broadly defined), these parties to a university also fulfill the expectations of others. Autonomy in this sense is not granted; rather, it is grown through decades of hard work by all participants for their shared good. Absent such shared commitments and the expectations that must accompany them, the up-front grant of autonomy runs a high risk of abuse, to be followed by quick retribution. India, having allowed the expectations of its universities to be degraded in pursuit of narrow interests over the decades since independence, now faces the difficult chicken-and-egg problem of rebuilding trust and mutual expectations among the constituents of higher education.

3.2.6. *Financing*

Higher education is costly—even more so when the total cost of attracting and educating talented people to teach is factored into the budgets. There is little chance under current policies that government and philanthropic sources can suffice to significantly expand enrollment from the current level to the 30 to 40 million needed to achieve an enrollment ratio of 50%. Policy reforms could help expand both government and philanthropic resources.

Expansion of capacity in government and government-aided institutions could be financed by allowing them to charge their students higher fees. These fees have

been kept low on the grounds that higher fees would deny access for the poorer sections of society.[36] Keeping student fees low for all, however, is an inefficient way of ensuring access, because most beneficiaries of the low fees are students whose well-to-do families can afford to pay more.[37] The policy of keeping the fees low across the board prevents the expansion of capacity and is thus a major obstacle to access to higher education.

Attempts to lower fees selectively, on the basis of a financial-means test, have run into administrative difficulties. There is also the potential for corruption in the execution of such a policy.[38] One alternative is to set the default higher-education fees of individual students at a multiple of the fees their secondary school charged from full-fare-paying students. Since secondary school fees are easy to observe and difficult to conceal or manipulate, this method would reduce the potential for misrepresentation and corruption, would collect more revenues from those who can afford to pay, and would also encourage well-to-do families to support government secondary schools by enrolling their children there. Institutions could establish their own multipliers, depending on the quality and cost of education they provide, and thus protect the real value of their fees from inflation.

On the philanthropic side of financing, the system of making the heads of universities responsible for raising funds from donors, alumni, sponsors, and others has several beneficial consequences. It makes the universities and their administrators accountable and responsive to their various supporting constituencies throughout society. It induces them to keep abreast of the achievements of their organization, so they can persuade others about the productive use of any support. The responsibility for raising funds also provides a non-bureaucratic context for internal academic, administrative, and financial decisions of the university. University administrators are pressed to think of innovative and efficient ways of raising and deploying resources. Vice-chancellors' efforts to convince outside constituencies of the importance and value of supporting universities helps raise awareness, beyond the philanthropic interests that have traditionally promoted higher education, that this goal is critical for society as a whole. Fundraising should therefore be among the key duties of the vice-chancellors, chancellors, directors, and the Boards of Governors. These officials, in turn, should be supported by a development organization to help accomplish the goal.[39]

In countries where private funding plays an important role in supporting quality higher education, the deductibility of charitable contributions to educational institutions from income and estate taxes and similar tax incentives have encouraged donor contributions and the building of public institutions of all kinds. In the presence of a significant (say, 50%) estate tax, wealthy individuals in the later part of their lives find it attractive to contribute a part of their wealth to causes and institutions they care about, instead of paying it in the form of the estate tax to a government over whose spending they have no control. Even if the estate tax does not actually collect much revenue, it induces wealthy individuals to increase their charitable spending in ways that appeal to their individual tastes and desires. The mechanism for collecting the estate tax, along with the

denial of tax deductions, can be used by government as an additional safeguard against the misuse of charitable organizations for personal purposes. India already permits charitable deductions for purposes of income tax. The addition of a significant estate tax, combined with provisions for charitable deductions, could go a long way toward addressing the problem of financing various levels of education.

For philanthropy to play an important role, continuing contributions should be a criterion for membership of governing boards. These boards should also include elected representatives of university alumni, because they have a lifelong stake in the university and can be expected to serve as a significant source of philanthropic support. Governing boards should have term limits of about ten years in order to promote a healthy rotation of personnel. Exceptions could be allowed for members making significant continuing contributions.

In the absence of good governance and transparent financial management and reporting, donors cannot be confident that charitable contributions to educational institutions will be used according to their wishes. Lack of trust discourages contributions; those who would otherwise wish to contribute are forced to set up their own trusts, foundations, and institutions, even if they have no ability or interest in managing them. Contrast this with the experience of U.S. businessman Warren Buffet. Convinced that they would be well utilized, he handed billions of dollars in contributions over to the Bill and Melinda Gates Foundation. Similarly, by instituting better governance and transparency of charitable trusts in India, the philanthropic share of the educational financing pie there could be significantly enlarged.

3.2.7. Organic growth

Centers of excellence grow only organically, over a period of time, starting from small seed-groups of scholars. Their culture must be allowed to evolve. When organizations grow rapidly, they risk destroying their culture. If the size, buildings, budget, and staff of these organizations is specified ex ante, the administrative positions tend to be filled up promptly, while the search for scholars, who are not readily available, drags on. Overstaffed organizations easily fall into a bureaucratic routine within a few years of their founding. Organic growth from a small size over time may help overcome this problem. Unfortunately, there is no known method of rapidly building quality educational capacity, any more than one can induce a healthy mango tree to bear fruit in only a year or two.

3.2.8. Evolving self-regulatory structures

Given the recognized dysfunction in the existing regulatory regime for higher education, it has been proposed that the new centers of excellence be kept outside its purview. While exclusion is worth considering, it is also important for the new

centers to help create collective mechanisms that might promote limited coordination and exchange of their best practices without unduly constraining innovation. To the extent that better coordination and self-regulatory mechanisms are developed, they could serve over time as models for the rest of the Indian educational system.

3.2.9. *Retirement age*

In recognition of India's extreme shortage of scholars, it has been proposed that age limitations on teachers be removed. In U.S. universities, tenured faculty no longer have a fixed retirement age; they can continue their employment as long as they can perform their duties. However, their duties include significant scholarship and other service functions in addition to instruction. Beyond a certain age, most faculty members find these duties onerous. This provides an incentive to choose retirement. Should they remove the retirement age altogether, without the assurance that senior scholars will perform their full range of duties, India's new centers of excellence could assume considerable risk. Perhaps a better option would be to set a default-retirement-age limit of 70, subject to waiver in exceptional cases. Faculty could also be offered the option of postretirement teaching or administrative assignments, as is currently the practice in India, Japan, and many other countries.

3.2.10. *Faculty support*

Setting grants for faculty support (e.g., for books) as a percentage of an individual's pay fails to recognize that the support needs of faculty members differ from discipline to discipline. Perhaps it would be better to make a lump-sum amount available in a research and teaching (RAT) account, which could begin as a percentage of pay and then be subject to individual negotiations, up or down. Such an account would fund travel, equipment, computers, subscriptions, and the like. The amounts charged to RAT accounts could be reviewed for propriety and purpose, with broad discretion granted to faculty to use the funding for the larger purposes of education and scholarship. These accounts have functioned well in many U.S. universities, as long as the faculty and administration agree on norms of appropriate behavior. Absence of shared norms can give rise to brawls in which faculty members are accused by the administration of charging personal expenses to their RAT accounts.

3.2.11. *International students and faculty*

When good job opportunities in other parts of the economy reduced the number of native-born students willing to pursue a Ph.D., the United States opened its doors to talent from abroad. Asia had plenty of young talent willing to work hard to earn doctorates in the best of U.S. universities and then become members of their faculties. Given the unwillingness of many Indians to pursue doctorates, India, too, might consider opening the doors of its graduate programs to students from

abroad to narrow the gap in academia between demand and supply of talent. The current thinking in India understandably focuses on the Indian diaspora as the potential source of talent. However, this pool of potential candidates is small relative to the large needs of India's higher education, and only a small fraction of them are likely to return to India in the near future.[40] Attracting non-Indians, including talent from neighboring countries and from Southeast Asia as a whole, may be a promising way to staff the centers.

3.2.12. Summer institutes

In Europe as well as Asia, many universities have succeeded in building their own research faculties by organizing summer research institutes which a few world authorities on a given subject are invited to lecture to and work with the local faculty and doctoral students. Funded by the government, these summer institutes could attract some 40 to 50 local scholars, exposing them to frontline research and ideas.[41] Participation in the institutes also would help to build links among scholars, among scholars that could continue well beyond the duration of the event. Since only the travel costs of visiting scholars must be subsidized, summer institutes provide an effective and economical approach to building research awareness, aspirations, capabilities, and networks.

3.2.13. Redefinition of Ph.D. programs

While there are many high-quality Ph.D. programs in India preparing good scholars, a large number of Ph.D. degrees are also granted for work of much lower creative, scientific, or scholarly merit. The proliferation of low-quality programs hurts the reputation of Indian scholars, research, and Ph.D. programs, and is a barrier to attracting new talent into research careers. Higher-education reform must address this difficult challenge.

4. Concluding Remarks

The Indian economy and higher education must be viewed not merely in relation to its own past, but also relative to its neighborhood and the world. Comparison with universities in other parts of the world, including other Asian universities which were easily outranked by their Indian counterparts a few decades ago, is not favorable to India. The 2010 survey by the London Times Higher Education Supplement (see table 13.5) shows no Indian universities in the top 100 (although there are 16 from Asia) and only two in the top 200 (whereas Asia as a whole has 32). These two are the Bombay and Delhi IITs, and their research output is barely noticeable (see

Table 13.5 World university rankings

	Population (millions)	Top 20	Top 50	Top 100	Top 200
China	1,330	0	1	2	6
Hong Kong	7	0	3	3	5
India	**1,173**	**0**	**0**	**0**	**2***
Japan	127	0	3	6	11
Other Asia	1,270	0	2	5	8
Asia subtotal	**3,907**	**0**	**9**	**16**	**32**
Australia	22	1	6	8	9
Canada	34	1	3	4	11
New Zealand	4	0	0	1	3
UK	61	5	8	18	29
USA	310	13	18	32	54
Total in this table**	**4,338**	**20**	**44**	**79**	**138**

Note: Each column subsumes the previous column; i.e., a university in the top 20 is also in the top 50, 100, and 200.

*IIT Bombay and IIT Delhi.

**The totals in the bottom row are lower than the top row because many universities located outside the listed countries are not included in the table.

Sources: Population: CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/index.html accessed May 25, 2010); university rankings: *Times Higher Education—QS*, http://www.timeshighereducation.co.uk/ (accessed May 26, 2010).

table 13.6). The 2005 survey by Shanghai Jiao Tong University's Institute of Higher Education lists only three Indian universities among the top 500 in the world, compared with 18 from China and 8 from Korea (see table 13.7). Here are four sobering expert assessments:

> Several Asian countries have undertaken ambitious plans for improving higher education, and some are making impressive progress. China, South Korea, Singapore, and several others have invested heavily in higher education, with the top universities improving significantly. Other countries—notably India, Indonesia, Vietnam, and most of the poorer Asian countries—have a very long way to go. (Altbach 2010, 5)
>
> Japan is still strong (7%).... Singapore emphasizes quality (0.7%).... India boosts output (3.4% but 44% below world average in research impact).... China's remarkable rise (10% from 5% seven years ago and 0.4% in 1980) ... [is] rapidly becoming a world power in research. (Pendlebury 2010, 6–7)
>
> Most of all, building universities capable of world-class research means attracting scholars of the highest quality. In the sciences, this requires first-class facilities, adequate funding, and competitive salaries and benefits. China is making substantial investments on all three fronts. Shanghai's top universities—Fudan,

Table 13.6 Selected list of top 200 universities of the world

2009 Rank	2008 Rank	Name	Country	Peer-review score (40%)	Recruiter review (10%)	Int'l faculty score (5%)	Int'l student score (5%)	Faculty student score (20%)	Citations faculty score (20%)	Overall score
1	1	Harvard University	US	100	100	98	100	85	78	100.0
2	3	Cambridge University	UK	100	100	100	89	98	96	99.6
3	2	Yale University	US	100	99	100	94	85	77	99.1
17	16	Australian National University	Australia	100	91	75	74	99	92	90.5
18	20	McGill University	Canada	100	97	92	61	67	95	90.4
22	19	Tokyo University	Japan	100	97	98	70	28	42	88.9
24	26	University of Hong Kong	Hong Kong	96	89	87	56	100	95	87.5
30	30	National University of Singapore	Singapore	100	96	40	75	100	100	84.3
49	56	Tsinghua University	China	98	83	95	34	45	34	78.9
52	50	Peking University	China	100	93	89	35	24	30	78.4
163	174	Indian Institute of Technology Bombay	India	76	79	43	45	16	13	58.6
181	154	Indian Institute of Technology Delhi	India	68	81	46	48	15	13	56.4

Source: *Times Higher Education*, http://www.timeshighereducation.co.uk/ (accessed May 26, 2010).

Table 13.7 Selected list of countries and the number of their universities appearing in top-ranked listings, worldwide

Rank	Country	Top 20	Top 100	Top 200	Top 300	Top 400	Top 500
1	USA	17	53	90	119	140	168
2	UK	2	11	19	30	36	40
3	Japan	1	5	9	13	24	34
4	Germany	–	5	16	23	33	40
5	Canada	–	4	8	17	19	23
6	France	–	4	8	13	19	21
7	Sweden	–	4	5	9	11	11
8	Switzerland	–	3	6	6	7	8
9	Netherlands	–	2	7	9	11	12
10	Australia	–	2	6	9	11	14
12	Israel	–	1	4	4	6	7
17	Russia	–	1	1	1	2	2
19	China	–	–	2	6	15	18
21	South Korea	–	–	1	2	5	8
23	Singapore	–	–	1	1	2	2
25	New Zealand	–	–	–	1	2	5
33	India	–	–	–	–	1*	3**

*Indian Institute of Science, Bangalore.

**IISc and Indian Institute of Technology, Kharagpur, and University of Calcutta.

Source: Academic Ranking of World Universities 2005, Institute of Higher Education, Shanghai Jiao Tong University (SJTU 2005), http://ed.sjtu.edu.cn/ranking.htm.

> Shanghai Jiao Tong, and Tongji—have each developed whole new campuses within the past few years. They have outstanding research facilities and are located close to industrial partners. Funding for research in China has grown in parallel with the expansion of university enrolment, and Chinese universities now compete much more effectively for faculty talent worldwide. In the 1990s, only ten percent of those Chinese who received Ph.D.'s in the sciences and engineering in the United States returned home. That number is now rising, and increasingly, China has been able to repatriate midcareer scholars from tenured positions in the United States and the United Kingdom; they are attracted by the greatly improved working conditions and by the opportunity to participate in China's rise. India, too, is beginning to have more success in drawing on its diaspora, but it has yet to make the kind of investments that China has made in improving facilities, stepping up research funding, and increasing compensation for top professors. (Levin 2010)

> But India's impressive economic performance has made the problem seem less urgent than it actually is, and allowed the government to defer difficult choices. ... Ultimately, the Indian government has to pull off a very tough trick, making serious changes at a time when things seem to be going very well. It needs, in other words, a clear sense of everything that can still go wrong. The paradox of the Indian economy today is that the more certain its glowing future seems to be, the less likely that future becomes. (Surowiecki 2007)

Saving the best grain as seed to plant the next crop applies not only to agriculture but also to education, except that one needs to think in terms of generational rather than annual crop cycles. India cannot aspire to a future as an advanced society without cultivating large numbers of original thinkers to inspire new generations of students, new ideas, original scientific research, the development of technology, and the production of fine arts and literature. India cannot fulfill its dreams without attracting its best to teaching and scholarship. The distance India has to travel becomes obvious when one looks for Indian inventions in the surroundings. The current mad rush for engineering and M.B.A. diplomas will not address this problem. The garden of higher education in India has been neglected for half a century, beset by a drought of talent and money. Whom would students like to be taught by—people as smart as they are or not quite? A friend's letter is not atypical in its content: "My sister and her husband have not been paid a salary for the last year, because the head of the accreditation body wanted Rs. 40 million in bribes and, when refused, withheld accreditation. The school has been fighting this in the Supreme Court." It is difficult to know the facts or to judge who is right and wrong in such cases. However, it does lead one to wonder: If the energies of India's educational regulators, entrepreneurs, and the highest court of the land are devoted to resolving such weighty matters, how much of their attention remains available for building quality higher education.

In education, it is not enough to keep abreast of knowledge created elsewhere. A world-class education system must also be an active contributor to the pool of knowledge across all disciplines. To reach this status, India needs to rethink the future of innovation and original research within the Indian economy—inside as well as outside academia. To become a brain power of the first rank, India will have to move beyond adopting and adapting the inventions created abroad and become a major creator of innovations in its own right.

The average compensation of fresh graduates compares favorably with the compensation received by their teachers and is often several times greater. The government doesn't have the money, and the business community thinks that a for-profit model is sufficient to deliver the kind of education that will prepare the young to help them compete in the world. But the fact remains: No Indian university stands among the top 100, 200, or even 300 in the world, and no one, anywhere in the world, has yet found a way to deliver quality education without large subsidies from either government or charity.

The dominant conception of higher education in India is one of brick-and-mortar facilities, not an ecosystem of interacting intellects. The current Indian

government is beginning to pay attention to this long-neglected challenge, but many obstacles remain. Changing mind-sets—of society, of the ministries of government maneuvering for control over various pieces of the educational pie, of the government-paid teachers exercising political power as members of the legislature—will require a serious rethinking of the future of India's economy if the current trends in higher education continue. Conversations with the department heads, deans, vice-chancellors, and senior civil servants, even with some politicians, about the current status of higher education and scholarly innovation in India are peppered with words such as "crisis," "grim," "vicious cycle," "broken," and "need for outside intervention." These concerns are often buried under the excitement generated by the recent high rate of economic growth. But outside solutions will not work.

During the famines of the 1960s, PL-480 grain shipments from the United States could not and did not solve the grim problem of insufficient food supply. It had to be addressed by the Green Revolution, made possible by a political, financial, technological, and administrative leadership that was admirable and visionary, and that set aside considerations of national pride. The computer age in India got an early start, then faltered due to a lack of funding and leadership in the sixties, and was revived by the Internet, Y2K, globalization, and government indifference in the 1990s. The liberalization of the Indian economy in 1991 was effected by external financial constraints and made possible by the leadership of the prime minister, P. V. N. Rao, and the then finance minister, M. Singh. India has time and again shown that its political, academic, business, and administrative leadership has the visionary capability to create capacity for innovation at the apex of India's system of education, scholarship, research and development, and the arts. There is no future in continuing to rely on shipments of recycled knowledge from abroad. India will have to find the internal strength to deal with this crisis, as it has dealt with others in the past.

APPENDIX A

Subjects Allocated to the Department of Higher Education, Ministry of Human Resource Development, Government of India (http://www.education.nic.in/abou-tus-abr.asp [accessed May 11, 2010])

The following subjects are allocated to the Department of Higher Education, as per the Second Schedule to the Government of India (Allocation of Business) Rules, 1961:

1. University education; central universities; rural higher education, foreign aid programme relating to higher education, technical education planning.
2. Institutions of higher learning (other than universities).
3. Books [other than the books with which the Ministry of Information and Broadcasting is concerned] and book promotion (excluding stationery, paper and newsprint industries, with which the Ministry of Commerce and Industry is concerned) with respect to the items in the list.
4. Audio visual education with reference to the items in the list.
5. Production of university level textbooks in regional languages.
6. The Copyright Act, 1957 (14 of 1957) and International Conventions on Copyrights.
7. Educational research.
8. Publications, information and statistics.
9. Development and propagation of Hindi, including multilingual dictionaries.
10. Grant of financial assistance for the teaching and promotion of Hindi.
11. Propagation and development of Sanskrit.
12. Rehabilitation and other problems relating to displaced teachers and students.
13. Central Advisory Board of Education.
14. UNESCO and Indian National Commission for Cooperation with UNESCO.
15. Matters relating to all scholarships, including those offered by foreign countries and foreign agencies, in subjects dealt with by this Department but excluding scholarships to students belonging to scheduled castes and scheduled tribes, denotified, nomadic and seminomadic tribes and general scholarships schemes and scholarships to foreign students and different schemes.
16. Education and welfare of Indian students overseas; education departments of Indian missions overseas; financial assistance to education institutions and Indian students' associations abroad.
17. Educational exchange programmes, exchange of teachers, professors, educationists, technologists, etc.; programme of exchange of scholars between India and foreign countries.

18. Grant of permission to teachers of universities, colleges and institutions of higher learning to accept assignments abroad.
19. Admission of foreign students in Indian institutions.
20. Charities and charitable institutions, charities and religious endowments pertaining to subjects dealt within this Department.
21. Ad hoc scientific research, other than research in higher mathematics, nuclear science and atomic energy, in universities and educational institutions.
22. Vigyan Mandirs.
23. General policy regarding partial financial assistance to scientists going abroad for studies in fields other than mathematics, nuclear science, and atomic energy.
24. Expansion, development and coordination of technical education.
25. School of Planning and Architecture.
26. Regional Schools of Printing.
27. Grants-in-aid to State Government institutions, non-Government institutions, professional bodies and technical institutions of Union Territories for technical education; grants-in-aid for postgraduate studies in basic sciences; grants-in-aid for development of higher scientific and technological education and research in educational institutions; grants-in-aid for fundamental research in science and technology; grants to individuals for fundamental research.
28. All Indian Council for Technical Education, including conduct of its National Diploma and National Certificate Examinations.
29. Practical training facilities for students of engineering and technological institutions.
30. Recognition of professional technical qualification for purposes of recruitment to posts under Government of India.
31. National Research Professorships and Fellowships.
32. Holding of foreign examination in the fields of professional and technical education in India.
33. University Grants Commission.
34. National Book Trust.
35. Administrative Staff College of India, Hyderabad.
36. Indian School of Mines and Applied Geology, Dhanbad.
37. Indian Institutes of Technology at Kharagpur, Mumbai, Kanpur, Chennai, Delhi, Guwahati, and Roorkee.
38. Indian Institute of Science, Bangalore.
39. The Tata Institute of Social Sciences, Mumbai.
40. International Students Houses in India and abroad.
41. Schemes for grant of financial assistance to voluntary organisations for promotion of modern Indian languages.
42. Regulation of engineering professional services.

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Notes

1 Book publication, sales, distribution across subject matter, and reading habits of the literate in India suggest limited interest in higher levels of knowledge outside required textbooks.

2 A deemed university enjoys an autonomous status granted by the Department of Higher Education in the Union Ministry of Human Resource Development on the recommendation of the University Grants Commission. Educational institutions given this status can set their own course work, syllabi, admissions criteria, fees, and the like. Widespread abuse of this autonomy led the ministry in January 2010 to withdraw the deemed university status from 44 out of 130 such institutions; they were reverted to their earlier status as colleges affiliated with other universities. At the time of writing, the matter remains before the Supreme Court.

3 Ministry of Human Resource Development, Annual Report 2010–11, p. 86, Table 6.1. http://www.education.nic.in/AR/AR2010-11/AR2010-11.pdf (accessed October 30, 2011). According to *Statistics of Higher & Technical Education 2009–10* http://www.education.nic.in/AR/AR2010-11/AR2010-11.pdf (accessed October 30, 2011), the higher education enrollment had been about 30% greater at 20.741 million (Table 7) of which 3.445 million (Table 6) was in open universities an year earlier.

4 Levin (2010) has argued that India has some two or three decades before its advantage of low-cost labor runs out and innovation becomes a necessity. However, like entrepreneurship, innovation must be embedded in the culture. It has not been easy to graft it onto mature systems even under severe economic pressures. As India builds a large part of its system from the ground up, it would be unwise if it did not build innovation as an organic part of its higher education. By increasing efficiency of the manufacturing and service sectors, innovation will also help sustain India's low-wage advantage longer.

5 Admission to U.S. Ph.D. programs is challenging because they attract some of the best students from undergraduate programs in the United States and abroad. Even harder to get into is a two-year program called Teach for America, which attracts graduates of elite Ivy League universities in large numbers to teach in government schools in poor areas (Winerip 2010).

6 See http://www.aicte-india.org/downloads/reg-paydegree220110.pdf for the new AICTE pay scales (accessed on October 30, 2011).

7 In Indian usage, postgraduate education refers to masters and doctoral degree programs; this is called graduate education in United States.

8 Assuming the population = 1,200,000,000; birthrate 2.2%; higher education enrollment ratio = 20%; years in college = 3; instruction hours = 20 per week per student; weeks of instruction = 35 per year; instructor class hours = 500 per year; average class size = 30; and instructor career length = 35 years. A more refined calculation would require many adjustments in growth rate, dropouts, and similar circumstances.

9 According the University Grants Commission's Annual Report for year 2009–10, the total number of Ph.D. degrees granted in Indian universities was only 10,781, of which 4,893 (5,320 including agriculture) were in science and technology (UGC 2011, Appendix XI, 322).

10 In spite of ample anecdotal evidence, the data on the quality of Ph.D. candidates and programs are scarce. Compared to those in the United States and China, a disproportionately large number of Ph.D.'s in India are granted in the field of the arts. Similar concerns about quality are heard about China (*Economist* 2010), but it is difficult to make objective comparisons.

11 Cf. http://www.moe.gov.cn/edoas/website18/89/info1261469797229789.htm (accessed July 23, 2010).

12 On October 30, 2011, US$1 = Indian Rs. 48.77.

13 See Sheshadri and Iyer (2006) for an overview of research programs and establishments in India: Department of Science and Technology (13 laboratories), Department of Atomic Energy (12 laboratories), Science and Engineering Research Council, Intensification of Research in High Priority Areas (6 major facilities), Fund for Improvement of S&T Infrastructure in Higher Education Institutions, Council of Scientific and Industrial Research (32 laboratories), and Department of Biotechnology. Aside from the number and the amounts of research grants, it is difficult to find public information about these endeavors.

14 In its 2004–2005 Annual Report, the Department of Science and Technology listed important achievements of the 32 CSIR laboratories, of which development of a "hand operated daal mill of 40–50 kg/hr. capacity" was the eighth entry.

15 Unlike U.S. universities, where the most distinguished researchers regularly teach undergraduate students, few such professors teach undergraduates in Indian institutions. We occasionally learn about the potential achievements of Indian students in news stories from, for example, the *Hindu* (2010) and the BBC (2010).

16 After the arrest of the president of the Medical Council of India on charges of corruption and the dissolution of its General Council in May 2010, a comprehensive reorganization to create a National Council of Human Resources in Health and a National Accreditation Regulatory Authority was taken under consideration by Parliament. See Rao (2010) on the ills of medical education, and Zachariah et al. (2010) for arguments as to why education for a specific profession (here, medicine) should be kept out of the scope of the proposed National Council for Higher Education and Research on grounds of being "special."

17 Kapur and Mehta (2007, 2) argue that the de facto privatization of higher education in India at a massive scale is the result of a breakdown of the state system.

18 It is difficult to justify massive subsidies for the lucky few who get in at the cost of shutting out millions of others due to insufficient capacity. Students at some of the best-known government universities in India paid little more than the price of a cup

of coffee (e.g., Rs. 200, or US$4, at the prestigious Presidency College in Calcutta until 2000 and 850 Rs. at the All India Institute of Medical Sciences in 2009, compared with the *Times of India* estimate of the Rs. 17 million cost of teaching each doctor) for their annual tuition fee, having spent massive sums on private coaching classes to get admitted. Large allocation of resources to private "cram schools," whose sole purpose is to facilitate competitive entry into almost tuition-free institutions of higher education starved for funds, is a distortion with tragic consequences for India.

19 For example, Dayanand Sagar College of Engineering reported that all but 1.5% of its 243-million-rupee revenue in 2007/08 came from student fees. Expenditures were 89% of the revenues, http://www.dayanandasagar.edu/minimumdisclosure-09.pdf (accessed July 16, 2010). This statement does not seem to include capital expenditures, and there is no mention of charitable contributions received.

20 A systematic study of the finances of such organizations does not seem to exist. Chennai Mathematical Institute and Harish-Chandra Research Institute (originally created by the B. S. Mehta Trust) are two among many other examples. CMI plans to grow into a well-rounded university, and HRI is increasing its engagement with universities. Also see *Frontline* (2010) for examples of educational institutions in Bengaluru.

21 A millennium or so after the Vedas, Kautilya mentioned regard for the other world and fondness for auspicious days and constellations, along with anger, lust, inaction, and fear, as character flaws of men in *Arthaśāstra* (9.4.25): "The objective slips away from the foolish person who continually consults the stars before deciding what to do" (9.4.26). One only wishes that those who rule the land of Kautilya's birth in modern times, run its system of education, and claim the mantle of its history and learning could think as rationally and clearly as Kautilya did.

22 For example, the website of Dayanand Sagar College of Engineering, http://www.dayanandasagar.edu/minimumdisclosure-09.pdf (accessed July 16, 2010). complies with the Minimum Disclosure Norms for Colleges of Higher Education in nine pages of detail, listing 16 programs of education; their regulatory and accreditation status; undergraduate and postgraduate enrolment; student performance; in-state, out-state, and foreign status; physical facilities; and even the income and expenditure account for the year ended March 31, 2008. Profiles of the individual members of the teaching staff of the college, their education, and their research and grant information are also provided.

23 http://www.dciindia.org/publicnotice_page/notice.html (accessed May 13, 2010).

24 India's primary and secondary school teachers are among the highest paid in the developing countries, both in terms of purchasing power parity and relative to GDP per capita. In 2002/03, their starting, 15-year, and top-of-the-scale salaries were 397%, 651%, and 615% of per capita GDP in elementary education, and 586%, 778%, and 927% in upper secondary education. (Sources: UNESCO/UIS WEI, www.uis.unesco.org/publications/wei2007; OECD countries: OECD, 2007, www.oecd.org/edu/eag2007). Correspondingly, India has the highest student-teacher ratios of all WEI countries at the primary and lower secondary levels, 40.2 and 37.2 students per teacher, respectively. Teachers at these levels also have one of the highest annual workloads among WEI countries (UNESCO-UIS/OECD, "Education Trends in Perspective: Analysis of the World Education Indicators, 2005," 121).

25 Three institutions in this Delhi apartment on Vikas Marg are Maharishi Markandeshwar University, with its main campus in Mullana in Haryana; Manonmaniam Sundaranar University, with its main campus in Tirunelveli (Tamilnadu); and the National Institute of Design and Development, affiliated with the latter.

26 On March 14, 2010, the *Times of India* reported the good news about the proposed creation of Azim Premji University in Bengaluru. Dileep Ranjekar, the director of Azim Premji Foundation, was quoted as saying, "The purpose of the university is to augment and increase talent for the Indian education system and conduct research in relevant fields."

27 Although systematic data remain to be collected, see note 19 for one example from an Indian university.

28 The first India-Yale Higher Education Leadership Program was held in Fall 2011.

29 The Pharmacy Council also points to some institutions offering other unapproved degrees. Its website leaves the impression that these unapproved M.S. programs are not illegal and students enroll in them at their own risk. (Notice Posted by the Pharmacy Council of India, http://www.aicte-india.org/ [accessed May 13, 2010]). Perhaps it is not unreasonable for the Pharmacy Council to allow new programs to evolve from the bottom up, through experimentation outside its regulatory regime based on student and employer preferences. If these programs find enough demand, presumably the regulations will be modified over time to recognize them. The higher-education regulatory system must continually make these difficult decisions on balancing the imperfections of top-down design with the bottom-up evolution of the system through adaptation over time.

30 For example, electrical power generation, transmission, and electrical motors, which constituted the heart of electrical engineering curricula in the 1970s in India, had already been replaced by electronic circuits and devices in U.S. universities.

31 The U.S. State of California, for example, runs three parallel systems of higher education to cover its diverse needs. Ten campuses of the University of California, 23 campuses of California State University, and 109 campuses of the California Community Colleges are open to the top 12.5%, 33.3%, and 100%, respectively, of the state's high school graduates.

32 According to National Assessment and Accreditation Council, of the 14,000 colleges in 2006, 245 were rated to be of high, 1785 of medium, and 668 of low quality. The remaining 11,302 unrated colleges were presumed to be of low quality (See Jha 2006 and Worldbank 2006, Table 24). These quality assessments were based on student/teacher ratios and physical facilities, not the quality of instruction or research. Though 64% of the low quality colleges reported to have a computer center, there was only 1.5 computer per college on average.

33 http://www.cse.iitd.ernet.in/~jalote/misc/phd_surveyIITK-D-B.pdf (accessed July 18, 2010).

34 http://www.cse.iitk.ac.in/users/jalote/article_on_IT.html (accessed July 18, 2010).

35 Bangalore also has research centers of Boeing, Rolls Royce, BAE, Honeywell, Pratt and Whitney, Cisco, IBM, INTEL, Nokia, Citrix, and Nortel. However, research centers at Reliance, Tatas, Essar, Birlas, Bharti Airtel, L&T, or other major Indian businesses seem to be conspicuously absent in Bangalore and elsewhere. New inventions of the former group, some of them developed in India, regularly appear in the world markets; inventions of the latter group are less visible, even in India.

36 The tuition fee at the Indian Institute of Technology, Kharagpur, is said to have been set at a level comparable to the fee charged by the Massachusetts Institute of Technology in the early 1950s, adjusted for Indian income and purchasing power. Over the six decades since, fees at MIT have exceeded the changes in income and inflation, rising from less than US$1,000 in the early 1950s to about US$40,000 in 2010 in nominal terms. Since U.S. prices have risen by a factor of about 8 over these

years, MIT tuition fees have risen by a factor of about 5, after adjustment for inflation. See Economist Debates (2008) for arguments on all sides of the debate as to who should pay the cost of higher education.

37 Alison Wolf writes in Economist Debates (2008): "Universities have expanded rapidly everywhere, but the beneficiaries have been overwhelmingly middle-class. It is not poor clever children who have been flooding into higher education, but the children of the affluent, whether clever or not. Yet bizarrely, in much of the world, governments seem determined that to those who have, it shall be given. How else to explain the enormous proportions of public education spending that are directed into higher education?"

38 A proposal to charge means-tested fees was under consideration in the United Kingdom in mid-2010 (Shepard and Vasagar 2010).

39 In both public and private institutions of higher learning in the U.S., fund-raising is a major, if not the primary, function of the president. Large development organizations are assisted by volunteer networks consisting mostly of alumni. See Rhodes (1997).

40 Korean, Singaporean, and Chinese scholars started returning to their home countries from U.S. and European universities in significant numbers only after the compensation gap narrowed significantly. Besides, as Levin (2010) writes, "it remains to be seen whether the Indian government can tolerate the disproportionately high salaries that would be necessary to attract leading scholars from around the world."

41 For example, see the Max Planck Institute of Economics at Jena, Germany, Research School on Adapting Behavior in a Fundamentally Uncertain World, July 25–August 20, 2010. The website includes information on previous years' summer institutes, http://www.imprs.econ.mpg.de/summerschool/.

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