Higher Education in India: Growth with Challenges

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The British economist Joan Robinson once said,'. . . whatever you can rightly say about India, the opposite is also true.'[1] Nowhere is this more true than in higher education. Excellence at a few institutes co-exists with mediocrity at many others. The opportunity for social mobility grasped by millions of Indians who obtain a college degree contrasts vividly with the waste of millions who remain excluded from a system in which they cannot afford to participate. And the dynamism presented by the creation of new private institutions throws into relief the stagnant governance structures of Indian public universities.

Higher education has grown very rapidly in India over the last 30 years, with the proportion of those who attend tertiary institutions to the relevant age group rising from 6% in 1983 to around 20% by 2011.[2] This growth has been greatly compressed into only a few areas. First, most of the growth has occurred primarily in professional fields, especially engineering and management. Second, the growth has occurred in teaching rather than in research, with public research in India highly concentrated in autonomous research institutes instead of universities.[3] Third, most of the growth has been in private institutes rather than public ones. And fourth, because the most dramatic growth has been in professional education such as engineering and management, the humanities and social sciences have been neglected.

Such rapid growth, concentrated in private rather than public institutions and focused on only a few professional fields, has given rise to four crucial challenges. These are the need to ensure quality, to build graduate education and research universities, to provide equity of access, and to build excellent liberal arts universities. This chapter considers ways in which the growth of the higher education system has been compressed and the challenges that have followed, and provides suggestions for how these challenges can best be tackled.

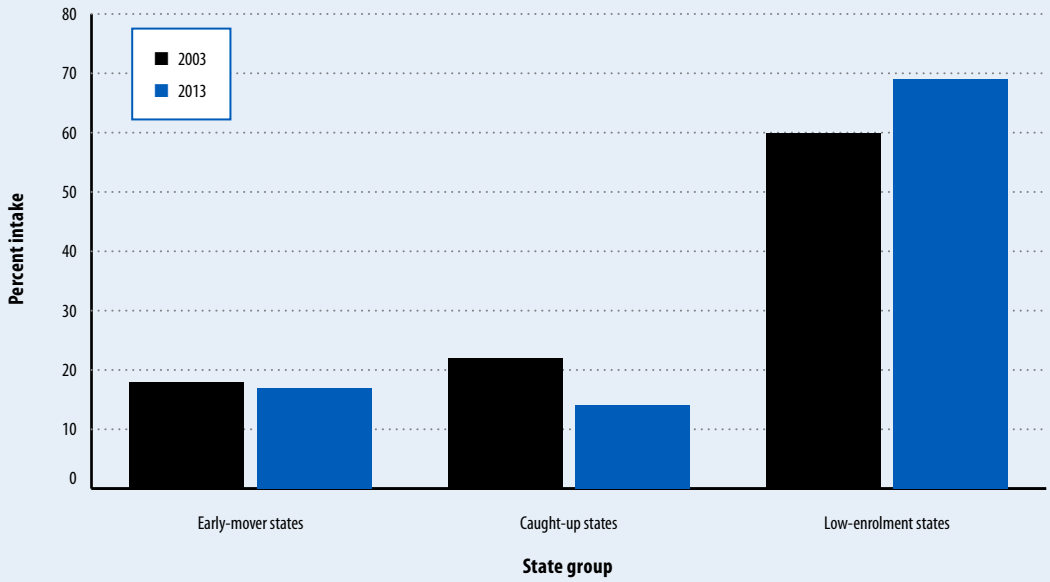
The problem of quality

Engineering, pharmaceuticals, business, and computer applications have been the recipients of most of the growth in higher education in India. Both the number of engineering colleges and their enrolment have grown at a rate of 20% a year for 30 years. At the height of this boom—from 1995 to 2010—India opened the doors to approximately one new engineering college and one new management institute each day. In 2012–13, India had around 3,500 engineering colleges and 2,500 management institutes.[4] In 2013, out of the nearly 1.5 million approved engineering seats, almost 1.2 million new students were admitted to various engineering programs across India (see Figure 1). This is a 30-fold increase over the 1983 annual enrolment of 40,000 engineers. This growth has contributed directly to India's abundance of engineers, but raising their quality is a pressing concern and represents the first challenge.

To keep the quality of an engineering education level with the quality it had 30 years ago (hardly an ambitious goal), the number of faculty would need to have increased 30-fold.[5] Because PhDs in science and engineering have only doubled and those holding a Master's degree in science and engineering have only tripled, the number of those who have achieved the credentials to teach at the tertiary level has not kept pace, so the number of faculty needed to ensure quality teaching falls very short. In fact, a severe faculty shortage affects almost every Indian institute.

Various attempts have been made to address the quality problem. Most of these have focused on regulation, which can dictate the physical infrastructure for institutes and the qualification requirements for faculty. More useful measures have taken the form of various schemes to entice Indians with PhDs who are working overseas to come back home (an example is the Ramalingaswani Re-entry Fellowship programme) and programmes to make a career in academics and research more attractive to recent graduates (such

Figure 1: Percent total undergraduate engineering student intake by state groups, 2003 and 2013



Source: Personal communication, Dr S. S. Mantha, Chairman, AICTE, 7 February 2014.

Note: 'Early-mover states' are those that expanded college enrolment early (these encompass 30% of the population); 'Caught-up states' are those that expanded college enrolment later, but have now caught up (these encompass 19% of the population); and 'low-enrolment states' are those where college enrolment is still disproportionately low (these encompass 51% of the population).

as the J.C. Bose National Fellowship programme).[6] Such programmes will have some impact, but it will be felt mainly at the top end of the institutional scale. Well over half the faculty at the great bulk of institutes in India are 'temporary' faculty who do not have to meet the requirements, and who have to date displayed little interest in graduate programmes or research. It seems that trying to regulate quality into institutes has largely failed. Instead, a combination of market and institutional mechanisms has much greater potential for providing an effective boost to quality in education.

For many years, when demand for professional course seats exceeded supply, tertiary institutions had little incentive to improve the quality of their faculty or their facilities. The supply of places at institutes of higher learning has now exceeded demand in India for the last five years in the southern states of the country,[7] and institutes are finally being forced to compete with each other to attract enough students. Simply relying on the market to weed out those institutes that cannot perform at an improved level and thus provide a higher-quality education, therefore, will address much of the problem. The state can also play a useful role in ensuring that this happens, however, first by ignoring the cry of incumbent colleges to limit the number of new seats and new institutes. Second, introducing a strong compulsory accreditation and assessment programme that publishes college quality indicators would go a long way towards harnessing this market solution. And third, one could emulate the state university system prevalent in the United States of America (USA) in the second half of the 20th century, where a few excellent (and relatively inexpensive) state universities provided an excellent 'quality control' pool for more expensive private universities that must either be better in some way than their public counterparts or admit less-qualified students.

What evidence is there that relying on the market to improve matters in higher education will work? As noted above, some improvement in the five states where supply exceeds demand is already in evidence. Moreover, consider the geographical concentration of India's higher education system. In 2003, the five southern states accounted for two-thirds of seats and less than one-third of the population.[8] This mismatch was entirely a supply-and-demand

Table 1: Undergraduate engineering student intake by states

State categories	Annual student intake (2003)	Percent of total	Annual student intake (2013)	Percent of total	Population (2011)	Percent of total
States that moved early in expanding college enrolment (Tamil Nadu, Andhra Pradesh, Maharashtra, Karnataka, Kerela)	248,700	69	695,871	60	363,603,498	30
States that moved later but have caught up (Madhya Pradesh, Gujarat, Orissa, Haryana, Punjab)	50,294	14	260,215	22	228,135,519	19
States where college enrolment is still disproportionately low (Uttar Pradesh, West Bengal, Rajasthan, Bihar, others)	62,302	17	210,381	18	618,830,556	51
Total	**361,296**	**100**	**11,66,467**	**100**	**1,210,569,573**	**100**

Source: Personal communication, Dr S. S. Mantha, Chairman, AICTE, 7 February 2014.

issue. The five southern states had been the first to permit private engineering colleges, and student demand followed. Recent work by Chandrashekhar and Sharma shows how, over the last 10 years, 5 million students migrated from states such as Bihar, Uttar Pradesh, West Bengal, and Rajasthan to prosperous states such as Karnataka, Maharashtra, and Delhi in search of an education.[9] That migration prompted other states to join in the private education boom to meet the demand of their own students. By 2013, many other states—such as Madhya Pradesh, Gujarat, and Punjab—had caught up, and their share of engineering students now reflects their share in the population (see Table 1).

The need to build graduate education and research universities[10]

The concentration by field has combined with a focus on teaching programmes. Graduate technical education has stagnated relative to undergraduate education. There are some signs of life now, with the better private engineering colleges starting Master's degree programmes and the Indian Institutes of Technology (IITs) growing their PhD programmes in a big way. But India will need 10 years of increased output to address the faculty shortages just at the top technical institutes, even before beginning to substantively address the shortages that are rife across the country's mainstream technical education system. Even at the very top, a recent article indicates that the 15 IITs have over 2,000 faculty vacancies—equivalent to more than one-third of its total faculty positions.[11]

Thus the second challenge is to raise the quantity and quality of graduate technical education, an issue linked to where public research is done. Although India was also an early investor in public scientific research, this investment went overwhelmingly into autonomous scientific research institutions. The result of doing scientific research in autonomous institutions has been that research has largely bypassed the university system.[12]

A few leading institutes, especially the IITs, are now focusing much more on research than they did in earlier years,[13] but most publicly funded research is still done in autonomous institutes. Although research in the higher education sector has grown (from 1% to 4% of national research and development, or R&D, funds) over the last 20 years, even its current level of 4% compares poorly with an international norm of 15% to 25% of national R&D spending. Instead India continues to locate over 90% of its public research spending within autonomous institutes. Every other major economy concentrates public research within the university system.

Doing public research within the university system is a long-established international principle.[14] High-quality graduate education requires research, and combining research and teaching will benefit both. World-class graduate education requires teachers who do research. And the benefits to be had by combining research and teaching do not flow only one way, to teaching. Research too benefits, which is particularly important for India's innovation system.

The successful experience of the Republic of Korea and Taiwan, Province of China, for example, indicates that the flow of innovation runs sequentially from industrial development to industrial in-house R&D and then to public scientific research. An industrial sector competing with the best firms in the world in increasingly sophisticated industrial sectors is a requirement for sustaining investment in in-house R&D, and strong in-house R&D is

a requirement for sustaining investment in public scientific research of value to industry. It is only since 1991 that Indian industry has increasingly had to compete with the world's leading firms. This competition in turn has driven greater investment in in-house R&D by specific Indian firms and industries such as pharmaceuticals. The more advanced technological sectors in Indian industry are only now capable of utilizing, and therefore sustaining, public investment in scientific research. By combining this research with teaching, the Indian economy will get the primary benefit of doing research: availability of trained researchers.

The issue of the isolation of Indian public research has simply received no public attention and is not on the reform agenda. Indeed, at a minimum India should grandfather the problem and allocate increases in public research spending to the higher education sector. Instead, the problem is perpetuated. In the government's 11th Plan (2007–2012),[15] 14 new autonomous public research institutes were initiated; in the current 12th Plan (2012–2017), doors are opening on another seven public research institutes.[16] Opening new autonomous research institutes outside of the higher education system remains the number one long-term problem with the Indian higher education system. It is foolish to remain oblivious to something where contrary international evidence is so overwhelming, so well founded, and so well known.

Providing equity of access

The rapid growth of the Indian education system has overwhelmingly taken place in the private sector, leading to concern about equity and access. Engineering enrolment rose from 15% in private institutes in 1960 to over 90% by 2006–07.[17] Growth in public-sector higher education over the last 30 years has been small, with some renewed investment only in the last eight years.[18]

Obtaining clear data on just what proportion of spending on higher education is put towards public education and what is put towards private education is not easy in India. The official numbers indicate that India spends around 0.5% of GDP on higher education.[19] My—very rough—estimate indicates that private spending on higher education is about 2% of GDP.[20] Why does this not show in the official data? Many private engineering and medical colleges charge before the admission what are called 'capitation fees'—they collect a certain amount as a cash donation (sometimes with no receipt) and put this in a trust that is formed to receive the money. The amount charged for the capitation fee varies considerably, based on course and institute desirability. A good private engineering institute in Maharashtra, for example, would charge an official fee set by the state of US$1,500 per year, but would add a capitation fee of US$15,000 as an immediate, one time 'donation' to the trust before admission is granted. The fees for attending a medical college would be even more extreme.

Overall, Indian higher education is increasingly private and increasingly expensive, in spite of the growing state regulations regarding what can be charged and who can be admitted. The fact that spending on private education is evident in surveys of consumer spending but not in official education data means that capitation fees, long made illegal, are alive and well.[21] The conclusion is clear: as Kapur and Mehta put it in the title of their 2004 paper, Indian education has gone from 'half-baked socialism to half-baked capitalism'.[22] So the fourth challenge is to provide equity of access for all Indians.

Only the very best performing poor (who get into some leading public institutions such as the IITs on merit) have access to high-quality education. They cannot afford the bulk of private education on offer, and they cannot access loans because the fees must be paid unofficially in cash. The result is that student loans cover less than 3% of students; this is in substantial contrast to the situation in the USA, the United Kingdom, and Australia, where more than 50% of students obtain student loans.[23] Reforms that free all institutes to charge the fees they wish would allow poor students to obtain loans for their education. The state could then guarantee all student loans, which could be made available through the banking system. These loans could be repaid in an equitable way. One of the most interesting approaches to student loan repayment is the Australian system, where education loans are repaid through a surcharge percent on income tax paid.[24] This has the merit of speeding up repayment for those earning more and reducing or eliminating it for those in low-paying occupations. Finally, there is no reason for the state to subsidize the tuition of professional courses at the IITs or Indian Institutes of Management (IIMs), where median earnings after graduation comfortably cover the cost of education. The money saved by not subsidizing professional education could be used to fund a loan or grant programme for poor students.

Building world-class, full-service research universities

A focus on professional fields has the corollary of neglect of the social sciences and humanities. India today

arguably does not have even a single world-class, full-service university.[25] The country requires several. The last 10 years have begun to see some private investment in liberal arts colleges and a few endowed universities. Much remains to be done, however, to build full-service universities that provide an excellent education in the humanities and social sciences. The abundance of political and intellectual freedom in India can help the liberal arts to thrive, and the country's education policy should make full use of this advantage.

The most elusive feature of a world-class institute is excellence. Excellence is hard to define—most university presidents who have it say it is 'in the water'. But in whatever way it is defined, excellence is sorely missing in Indian higher education. Only at the Indian Institute of Science (IISc) Bangalore, the country's IITs, and some IIMs can one find excellence in abundance. Creating a culture of excellence in an existing educational institution that is only mediocre is a much harder task than growing new fields in an institution that already has it. Because of this, India's best chance of creating a few world-class, full-service universities is to grow its IITs and its IISc into full-service universities, where graduate and undergraduate educations are combined and where science, engineering, and the liberal arts and humanities are all of equal merit. Establishing full-service universities from the IITs and IISCs should be the Indian government's project for the next 20 years.

Conclusions

The relatively small reform of the early 1980s of allowing private colleges in some states triggered a massive expansion of professional education, almost all privately provided. We should not underestimate just how impressive this expansion has been, but the quality problem India now faces is a direct consequence of its emphasis on quantity over quality. The solution is not to limit expansion but rather to improve quality. In typical Indian style, the state manages to simultaneously overplay and underplay its role. The state over-regulates private institutes, limiting what can be started, how many students can be admitted, what fees can be charged (although it has been unsuccessful in eliminating the persistent capitation fees), and the curriculum that is taught. At the same time, it underplays the assessment of institute quality, which it should publish; continues to spend money on public research in the wrong place (autonomous institutes); and grossly underinvests in the liberal arts and social sciences. Meanwhile, the public agenda is dominated by debate on extending caste-based reservations in public and private institutions, a move focused nine parts on electioneering and one part on educating.[26]

India has a tremendous opportunity, an opportunity provided by a unique combination of the huge availability of talent in student numbers with an education system that—with all its problems—has demonstrated its ability to respond effectively to market demand, a strong social propensity to invest in education at great personal cost, and an abundance of the political and intellectual freedom in which academic enquiry can thrive. To produce 1.5 million engineers a year, of whatever quality, is no mean achievement. India must now move on four fronts: first, it must build true research universities by moving public research funding from autonomous institutes to the university system. That will grow graduate programmes, which will simultaneously provide faculty for the education sector and trained researchers for industry. Second, it must use the market more and more to improve quality in the largely private professional education system, with the state ensuring public assessment so parents and students decide which institutes are of adequate quality to survive. Third, it must ensure equity of access on merit by permitting institutes to set their own fees and recover costs in a transparent manner, for which state guaranteed loans are easily available. The state will need to step in to provide adequate support for non-professional fields, but there is no reason to subsidize education in an IIT or IIM or to regulate what an engineering college can charge. And finally, it must focus higher education investment on building a few world-class, full-service universities that will produce the country's intellectuals of the future. India must not squander this opportunity.

Notes

1 Sen, 2005.

2 Minglebox.com, 2013; World Bank Data, available at http://data.worldbank.org/indicator/SE.TER.ENRR.

3 Examples of autonomous labs across the country are the 39 labs within the Council for Scientific and Industrial Research (CSIR) labs.

4 Personal communication from Dr S.S. Mantha, Chairman, All India Council for Technical Education (AICTE), 7 February 2014.

5 Although subjective and difficult to quantify, a 'poor quality' engineering education means that students who receive such an engineering degree have low employability because of their poor skillset.

6 The Ramalingaswami Re-entry Fellowship programme was instituted by the Ministry of Science & Technology's Department of Biotechnology in 2006. See http://dbtindia.nic.in/docs/Ramalingaswamiadvertisement%2013-14.pdf for details. For information about the J. C. Bose Fellowships, see Government of India, Ministry of Science & Technology, 2005.

7 The southern states where places have exceeded demand are Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, and Kerala, which together accounted for two-thirds of all engineering seats until a decade ago.

8 Forbes, 2003.

9 Chandrashekhar and Sharma, 2014.

10 Much of the material in this section is taken from Forbes, 2013.

11 Srivastava, 2013.

12 Forbes, 2013, p. 261.

13 Ramya, 2013.

14 See in particular the work of Nathan Rosenberg and Richard Nelson, and especially Rosenberg and Nelson, 1994; Nelson, 1993; Pavitt, 1998; Mowrey, 1998; and OECD, 1998.

15 Government of India, Planning Commission, 2007.

16 Government of India, Planning Commission, 2013a.

17 Cheney et al. 2005, p. 17; Ernst & Young, 2011, p. 19.

18 The government has set up 8 new Indian Institutes of Technology, 7 new Indian Institutes of Management, and 74 new state universities in the last eight years (Government of India, Ministry of Human Resource Development, 2011a, b; UCG, 2012).

19 UGC, 2008.

20 My estimate combines the work of Agarwal (2006) with University Grants Commission data for public spending (University Grants Commission, 2008) and some investigating with National Sample Surveys (Government of India, Ministry of Statistics and Programme Implementation, no date) of consumer spending.

21 *The Times of India,* 2013.

22 Kapur and Mehta, 2004; see also Kapur and Mehta, 2007.

23 Agarwal, 2006.

24 In India, cess is collected by the government as a percent of all taxes (income tax, service tax, excise duty tax, etc.). This money is then used directly to subsidize the tuition fees of professional courses of government-sponsored academic institutions, some of which—such as the IITs and IIMs—have excellent reputations. Students who graduate from these high-status institutions generally get well-salaried jobs and ideally can repay the cost of their education. These students usually do not need the cess to cover their education cost, unlike students from lower-rank institutions, which are not funded through cess.

25 At a presentation on our higher education system that I made at the Planning Commission some years ago, I repeated this assertion. After much heated discussion a few held that we perhaps had one, in JNU (Jawaharlal Nehru University, in Delhi). For a country of our size to have arguably one world-class liberal arts institution surely proves the point!

26 Sharma, 2014.

References

Agarwal, P. 2006. 'Higher Education in India: The Need for Change'. *ICRIER Working Paper* No. 180, June. Delhi: Indian Council for Research on International Economic Relations.

AICTE (All India Council for Technical Education). No date. Unapproved Institutions. Available at http://www.aicte-india.org/.

Chandrashekhar, S. and A. Sharma. 2014. 'Internal Migration for Education and Employment among Youth in India'. WP-2014-004. Mumbai: Indira Gandhi Institute of Development Research. Available at http://www.igidr.ac.in/pdf/publication/WP-2014-004.pdf.

Cheney, G. R., with B. B. Ruzzi and K. Muralidharan. 2005. *India Education Report.* NCEE (National Center on Education and the Economy). Available at http://www.ncee.org/wp-content/uploads/2013/10/India-Education-Report.pdf.

Mowery, D. C. 1998. 'The Changing Structure of the US National Innovation System: Implications for International Conflict and Cooperation in R&D Policy'. *Research Policy* 27 (6): 639–54.

Ernst & Young. 2011. *Private Sector Participation in Indian Higher Education: FICCI Higher Education Summit 2011.* India: Ernst & Young. Available at http://www.ey.com/Publication/vwLUAssets/Private_sector_participation_in_Indian_higher_education/$FILE/Private_sector_participation_in_Indian_higher_education.pdf.

Government of India, Ministry of Human Resource Development. 2011a. 'Indian Institutes of Development'. Available at http://mhrd.gov.in/itt_higher_english.

———. 2011b. 'Indian Institutes of Management'. Available at http://mhrd.gov.in/iim_hindi.

Government of India, Ministry of Science & Technology. 2005. Press Release, August 5. Available at http://dst.gov.in/whats_new/press_releases05/two-prestigious.htm.

Government of India, Ministry of Statistics and Programme Implementation. No date. NSS Survey Reports. Available at http://mospi.nic.in/Mospi_New/site/inner.aspx?status=3&menu_id=31.

Government of India, Planning Commission. 2007. *Eleventh Five Year Plan (2007–2012).* Available at http://planningcommission.nic.in/plans/planrel/11thf.htm.

———. 2013a. 'Higher Education'. *Twelfth Five Year Plan (2012–2017),* Volume 3, 89–90. New Delhi: Sage Publications. Available at http://planningcommission.gov.in/plans/planrel/12thplan/welcome.html.

———. 2013b. 'Science and Technology'. *Twelfth Five Year Plan (2012–2017): Economic Sectors.* Volume 1, Chapter 8. Available at http://planningcommission.gov.in/plans/planrel/12thplan/welcome.html.

Forbes, N. 2003.'Higher Education & Scientific Research for Industry: Reflections on Priorities for India'. Paper prepared for conference on India's Economic Reforms – Centre for Research on Economic Development & Policy Reform, 5–7 June, Stanford University, Stanford California, USA.

———. 2013. 'India's Higher Education Opportunity'. In *Economic Reform in India: Challenges, Prospects, and Lessons,* eds. N. C. Hope, A. Kochar, R. Noll, and T. N. Srinivasan. New York: Cambridge University Press. 260–72.

Kapur, D., and P. B. Mehta. 2004. 'Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism.' *CID Working Paper* No. 108. Cambridge, MA: Center for International Development at Harvard University.

———. 2007. 'Mortgaging the Future? Indian Higher Education'. Brookings-NCAER India Policy Forum 2007–08, Volume 4: 101–57. Available at http://media.sas.upenn.edu/casi/docs/about/IPF_Final_dft.pdf.

Minglebox.com. 2013. 'Gross Enrollment Ratio in India Touches 2%'. *Minglebox, Education News,* 25 January. Available at http://www.minglebox.com/article/news/gross-enrollment-ratio-in-india-touches-20-percent.

Mowery, D. C. 1998. 'The Changing Structure of the US National Innovation System: Implications for International Conflict and Cooperation in R&D Policy'. *Research Policy* 27 (6): 639–54.

Nelson, R. R. 1993. 'Innovation Systems: A Comparative Analysis'. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship. Available at SSRN: http://ssrn.com/abstract=1496195.

NSF (National Science Foundation). 1993. *Human Resources for Science & Technology: The Asian Region.* Washington, DC: NSF.

OECD (Organisation for Economic Co-operation and Development). 1998. 'Introduction: New Rationale and Approaches in Technology and Innovation Policy'. Innovation in Science, Technology and Industry. OECD Directorate for Science, Technology and Industry. Available at http://www.oecd.org/sti/inno/introductionnewrationaleandapproachesintechnologyandinnovationpolicy.htm.

Ramya, M. 2013. 'Research Leads ITT-M to Global Recognition: Efforts to Cement its Position as a Global Research Destination Involve Tie-Ups with Top Varsities Worldwide, Course Innovations'. *The Times of India Chennai,* Times City, 11 February, p. 2.

Rosenberg, N. and R. R. Nelson. 1994. 'American Universities and Technical Advance in Industry'. *Research Policy* 23 (1994): 323–48.

Sen, A. 2005. 'Asia: Contrary India'. *The World in 2006: Predictions 2006.* The Economist Intelligence Unit, 18 November. Available at http://www.economist.com/node/5133493.

Sharma, N. 2014. 'To Reserve its Votes, Congress Plans Private Sector Quotas'. *The Economic Times,* 21 January. Available at http://articles.economictimes.indiatimes.com/2014-01-21/news/46411555_1_congress-president-sonia-gandhi-reservation-scheduled-castes.

Srivastava, V. 2013. 'IITs Continue to Grapple With Shortage of Staff'. *Hindustan Times,* 19 December.

The Times of India. 2013. 'Capitation Fee Demanded by Pvt Colleges Illegal: SC'. *The Times of India,* 9 September. Available at http://timesofindia.indiatimes.com/india/Capitation-fee-demanded-by-pvt-colleges-illegal-SC/articleshow/22428303.cms.

UCG (University Grants Commission). 2008. *Higher Education in India: Issues Related to Expansion, Inclusiveness, Quality and Finance.* New Delhi: University Grants Commission. Available at http://www.ugc.ac.in/oldpdf/pub/report/12.pdf.

———. 2012. List of State Universities which Are Included in the List of 2(f) of the UGC Act, 1956. Available at http://www.ugc.ac.in/oldpdf/stateuni2B.pdf.

Walsh, V. 1992. 1992. 'Technology and the Economy: The Key Relationships'. *Research Policy* 23 (4): 473–75. Paris: OECD.