

Engineering Education

Introduction

With economic growth and the spread of technology, the demand for engineers has increased manifold. This has been matched by an increase in enrolments in engineering as well as rise in number of engineering institutes in India. However keeping in mind the growing opportunities for engineers, particularly in the field of information technology and business process outsourcing, there is scope for further expansion. A NASSCOM report foresees a shortage of 500,000 knowledge workers by 2010, 70 per cent of which would be in the BPO industry. At the same time, the quality of engineering institutes and engineering graduates needs to be improved. Apart from a few elite institutes, engineering education in India is often seen as outdated and irrelevant. Most graduates do not possess the requisite skills, and industries have been facing a consistent deficit of quality trained engineers. Also, most institutes, including premier institutes, fail to attract and retain quality faculty. These deficiencies in engineering education need to be tackled immediately to ensure that India does not miss out on significant opportunities.

Current Scenario

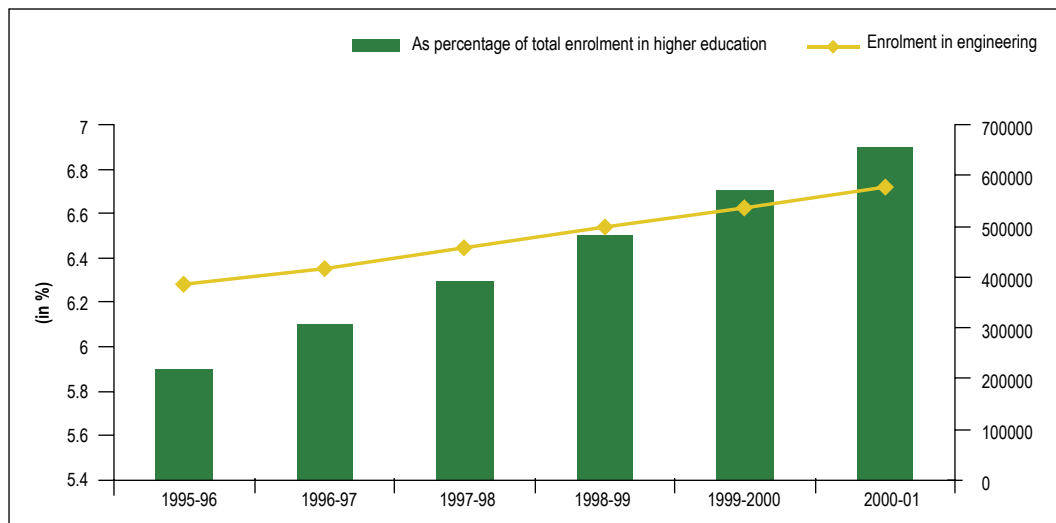
Enrolment: Enrolment in engineering education has seen a rapid increase in the last decade. The total enrolment in 2005-06 stood at 795120 – accounting for 7.21 per cent of the total enrolment in higher education.

Institutions: There has been a phenomenal growth in the number of engineering institutions at the graduate level, from 158 in 1980-81 to 1512 in 2006-07. A major reason for this explosive growth in the last decade has been the entry of private (aided as well as self financing) institutions. With the growth in demand, the average sanctioned intake per institution has also increased with time.

The investment from private sector has had a large role to play in the growth of institutions. However, the quality of these many of these private institutions is suspect. This has also been a major reason for the creation of a regional imbalance in the country.

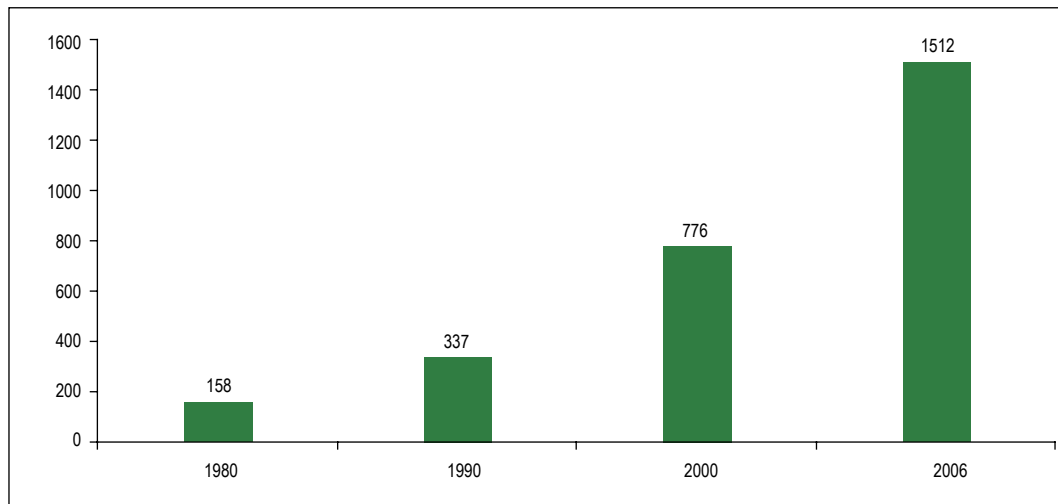
Regional imbalance: Although the number of engineering institutions is more than 1500 at present,

Figure 39: Time series trend in engineering enrolments



Source: University Development in India, 1995-96 to 2001-01, UGC

Figure 40: Growth in engineering institutions



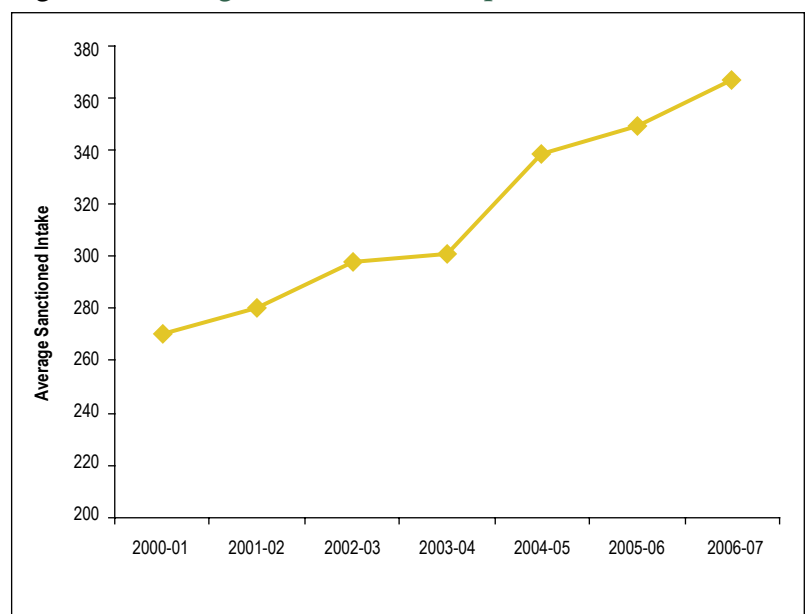
Source: UGC

data on the region-wise distribution of institutions and sanctioned intake of students indicates regional disparity. On one hand, where there are around 268 institutions in the southern region, there are only 9 institutions in the eastern region. At the extreme end of the spectrum, Nagaland, Andaman and Nicobar, Daman & Diu have no engineering institutions at all. Out of the seven Indian Institutes of Technology, three (Delhi, Kanpur and Roorkee) are located in the North, two in the East (Kharagpur and Guwahati) and two in the South (Chennai and Mumbai).

Faculty: The rapid growth of engineering institutions and the inadequate supply of teachers together have created a shortage of faculty across engineering disciplines and institutions. India has a faculty strength of around 67,000 in engineering. According to the AICTE Review Committee Report 2003, the increase in the sanctioned number of student intake has led to an escalation of faculty requirements of about 95,924. This indicates a shortfall of over 26,000 engineering doctorates and 30,000 engineering postgraduates for meeting the teaching requirements.

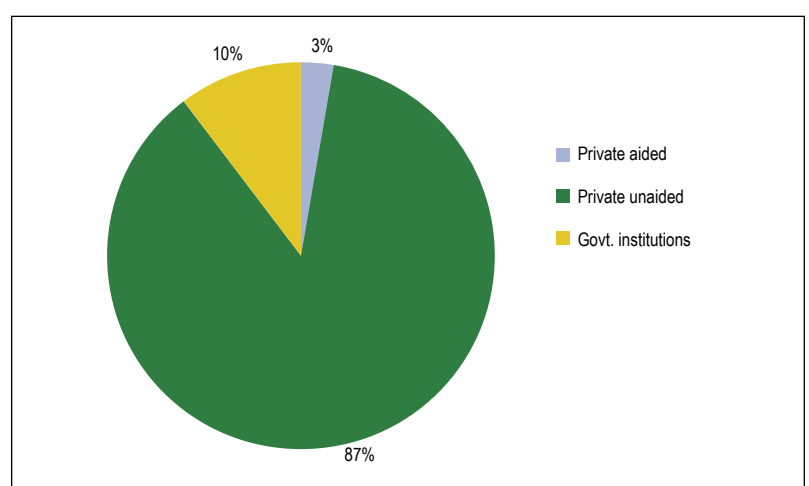
Quality: Engineering education in India has a pyramidal structure, with a few elite institutions at the peak and a large proportion of institutions at the bottom of this pyramid. Flexible institutions, world

Figure 41: Average sanctioned intake per institution



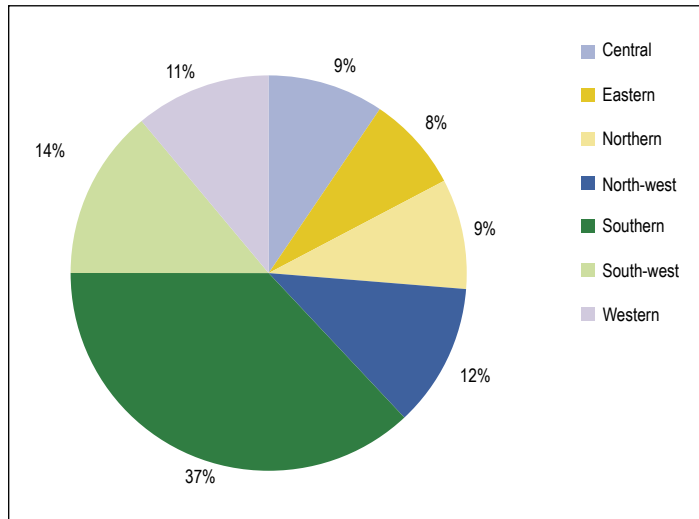
Source: AICTE

Figure 42: Share of institutions by intake (2006-07)



Source: AICTE

Figure 43: Region-wise distribution of engineering institutions in 2006-07



Source: AICTE

class infrastructure, relevant curriculum, good faculty and industry linkages are crucial inputs needed to enhance quality of engineering education in India. Current engineering graduates are often found to be ill-equipped to meet the skill demands of the industry – a survey by the McKinsey Global Institute showed that multinationals found only 25 per cent of Indian engineers employable.

Research: Postgraduate education in engineering and technology had a late start in our country. At the time of India's independence only 6 institutions offered postgraduate programs in engineering and technology to just about 70 students. In 2003, 1552 postgraduate engineering programs were recognised in engineering, offered by 321 institutions with a total sanctioned intake of over 26,000. In 2004-05, only 968 doctorate degrees were awarded in engineering, the majority of which came either from the Indian Institutes of Technology or the Indian Institute of Science, Bangalore.