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Skills Gap Hurts Technology Boom in India

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TIRUCHENGODE, India — As its technology companies soar to the outsourcing skies, India is bumping up against an improbable challenge. In a country once regarded as a bottomless well of low-cost, ready-to-work, English-speaking engineers, a shortage looms.

India still produces plenty of engineers, nearly 400,000 a year at last count. But their competence has become the issue.

A study commissioned by a trade group, the National Association of Software and Service Companies, or Nasscom, found only one in four engineering graduates to be employable. The rest were deficient in the required technical skills, fluency in English or ability to work in a team or deliver basic oral presentations.

The skills gap reflects the narrow availability of high-quality college education in India and the galloping pace of the country's service-driven economy, which is growing faster than nearly all but China's. The software and service companies provide technology services to foreign companies, many of them based in the United States. Software exports alone expanded by 33 percent in the last year.

The university systems of few countries would be able to keep up with such demand, and India is certainly having trouble. The best and most selective universities generate too few graduates, and new private colleges are producing graduates of uneven quality.

Many fear that the labor pinch may signal bottlenecks in other parts of the economy. It is already being felt in the information technology sector.

With the number of technology jobs expected to nearly double to 1.7 million in the next four years, companies are scrambling to find fresh engineering talent and to upgrade the schools that produce it.

Some companies are training faculty members themselves, offering courses tailored to industry needs and improving college labs and libraries. They are rushing to get first choice of would-be engineers long before they have completed their course work. And they are fanning out to small, remote colleges that almost no one had heard of before. The country's most successful technology concerns can no longer afford to hire only from the most prestigious Indian universities. Nor can they expect recent graduates to be ready to hit the shop floor. Most companies require in-house training of anywhere from two to six months.

Demand is beginning to be felt on the bottom line. Entry-level salaries in the software industry have risen by an average of 10 to 15 percent in recent years. And Nasscom, which helps companies wanting to outsource find workers, forecasts a shortage of 500,000 professional employees in the technology sector by 2010.

The labor crunch is starting to pop up across the service economy. ICICI, the country's largest financial services company, announced plans to hire up to 40,000 workers in the next three years.

The Retailers Association of India said in July that its fast-expanding industry would need nearly 115,000 workers in the next six months. Reuters reported in October that Google was having trouble finding Indian workers proficient in the languages and design technologies used in the latest generation of Web sites.

This year, India's largest software company, Tata Consultancy Services, plans to add 30,000 people to its current work force of 72,000. So it was that on a recent afternoon a four-man team from the company roamed the halls of a college founded by a local textile magnate in this small south Indian outpost.

The team came to Tiruchengode with the goals of selecting its next generation of software programmers and assessing how, in the short term, the company could help the college churn out more of what it needed. "These are the guys who are going to write my Windows 2010," as one of the recruiters put it.

"We can't afford to let talent go" was the verdict of A. K. Pattabiraman, a member of the team.

They grilled professors and administrators: How many faculty members have doctorates? Why did so many students have incompletes by the time they entered their fourth and final year? What software programs do they use for the class in mechatronics — a combination of mechanics, information technology and electronics?

They tested the students' ability to reason and speak, tossing out debate topics, like democracy versus dictatorship, and science quiz questions, like what happens to an iron rod put in a beaker of nitric acid.

They sampled the offerings at the college library and the English language lab.

The exercise was part of an elaborate process by the company to assess whether this campus, the K. S. Rangasamy College of Technical Education, can be added to the pool of colleges from which to recruit.

In the past, Tata Consultancy Services needed only to turn to the top engineering schools in the country: the nine campuses of the Indian Institutes of Technology and a few others gaining admission can be more difficult than getting into the Ivy League. Today the list includes 209 institutions, many of them, like this one, brand-new private colleges that have emerged to meet the need. Mr. Rangasamy, the college's founder, is himself the product of the Indian economic expansion. His factories produce tablecloths and bedsheets for Kmart and Marriott.

Mr. Rangasamy himself has no more than a fourth-grade education and speaks not a word of English. But the cluster of colleges he has built educate nearly 12,000 students. Of those, nearly 3,600 study software engineering, and most of them, college officials say, are the first in their families to attend college.

The imprimatur of Tata Consultancy would clearly be a prize for the college, and the campus was festooned with flowers and banners welcoming the company team. To be certified as part of the company's pool would mean that its students would have a chance of getting a job even before graduation, and other perks for the college — faculty training, course materials, research opportunities for teachers and students.

The number of technical schools in India, including engineering colleges, has more than tripled in the last 10 years, according to the All India Council of Technical Education. Most are privately run.

A new kind of institution has emerged to offer intensive English language training and instruction in technical skills required for the workplace for those between college and career. They are called finishing schools, and Nasscom is rolling out its own by early next year.

In the end, the Rangasamy college did not fit the company's bill. The team found deficiencies in the way basic subjects were taught and deemed the students to be average.

Higher education is still available only to a tiny slice of India's young. No more than 10 percent of Indians ages 18 to 25 are enrolled in college, according to official figures. Nearly 40 percent of Indians over the age of 15 are illiterate.

The industry is lobbying hard to allow private investment in Indian higher education. Right now the government allows only nonprofit ventures, and often they are of varying quality or are the brainchildren of politically connected entrepreneurs.

The Commerce Ministry has recently floated the idea of private foreign investment in higher education. Indians account for among the largest groups of foreign students in the United States, and India increasingly sends students to other countries, like Australia and Canada.

Nandan M. Nilekani, the chief executive of Infosys, one of India's biggest providers of technology and back-office services to Western companies, calls the situation a crossroads for his country.

With more than half of its population under 25, he said, India could educate its young and open job opportunities for them, or be left with a large, potentially restive pool of unskilled, unemployable youth. "It is a golden opportunity," he said, "which can be frittered away if we don't do the right thing."

India's young engineers are earning salaries unimaginable in their parents' day.

They have been preparing intensely as well. Many have been writing code since they were teenagers, or slogging through stiffly competitive exams to get into reputable engineering schools.

Naini Gomes, 22, landed a job with Infosys at the end of her third year in college. That was not unusual on her campus, an engineering college with a strong reputation in Bangalore. "Everybody was sitting with at least two jobs," Ms. Gomes said.

The sense of opportunity, in fact, can inject an unnerving self-confidence in Indians of Ms. Gomes's generation.

"The way the I.T. sector is booming, this is the place to be," said Chinmay Nanavati, a fresh 22-year-old recruit. "At this point I'm happy with the way things are going. They're going my way."