India's Workforce Revolution

By **VIVEK WADHWA**
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American businesses are increasingly moving their research and development operations to India. Companies like General Electric and Cisco now have their second-largest research centers in Bangalore. Debates rage in the U.S. about whether this will lead to greater prosperity or threaten the country's global economic leadership. But it's more productive to ask how India is training a workforce capable of handling such complex work.

Quick learners: Trainees at Infosys in Mysore, India.

The global engineering and entrepreneurship project team at Duke University traveled to India several times between September 2006 and May 2008 to meet the executives of dozens of multinational and domestic Indian companies to review their R&D projects and operations. What we found was astonishing: Despite its low science and engineering graduation rates, India is rapidly becoming a global hub for R&D, with a momentum and scale similar to what it accomplished in information technology services.

But how? Adjusting for different definitions of which degrees count as "engineering" degrees, India graduated roughly 140,000 engineers in 2004, about the same as the U.S. Additionally, it graduated 17,000 at the masters level and 900 Ph.D.s -- a small fraction of the U.S. numbers and not even enough to meet the growing staff requirements of Indian universities. Nor is the quality of its graduates consistent. India's Institutes for Technology, for instance, are equivalent to the MITs of the world, but many other, smaller institutions aren't even licensed.

So if engineering education is so critical to global competitiveness, how is India succeeding? It's picking up on the best practices know-how it effectively imports from foreign companies outsourcing to India, and perfecting those techniques. This is hardly novel -- it's exactly the path Japan followed in the 1970s and '80s.

A new report by the Kauffman Foundation, which I co-authored, breaks the Indian innovations down into seven key areas:

- *Employee recruitment:* The companies we studied are innovative not only in how they recruit, but also in whom they recruit and where they look for talent. Most hire for general ability and aptitude, rather than specialized domain and technical skills. They rely on training and development to bridge skill gaps.

Technology companies like HCL and Wipro recruit from second- and third-tier colleges all across the country, and also in arts and science schools. India's largest call-center operator, Genpact, has recruiting storefronts in 22 cities, without even requiring a resume. It is also targeting retired bank clerks and housewives.

- *New-employee training:* Companies in India assume new recruits will have to be trained practically from scratch. So they invest substantial time, money and effort in the training function. Most large companies have built dedicated learning centers and some employ hundreds of training staff. The Infosys Global Education Centre at Mysore can train 13,500 people at a time. New recruits attend a 16-week boot camp which strengthens their technical, communications and management skills. For its science recruits, TCS provides seven months of training in computer programming, customer orientation and project management.

- *Continuing employee development:* Indian companies have to invest in making their employees more productive and rapidly moving them up the skill and management ladder. This increases billing rates and the productivity of employees, and lessens attrition because of the rapid career advancement that employees can achieve.

Employees are typically required to participate in a wide range of education programs, including not only technical and domain training but also soft skills and management skills encompassing training in quality processes; communication; and cultural, foreign-language and personal-effectiveness skills. Career advancement and salary increases are usually tied to the completion of such training.

- *Managerial training and development:* Shortages in managerial talent have made it necessary to foster talent from within. Managers are typically groomed through fast-track programs that provide management training and mentorship to high-performing employees. The average age of first-line managers in the Indian companies we studied is below 30. Preference is usually given to internal staff to fill management openings.

- *Performance management and appraisal:* All of the companies we studied have implemented sophisticated performance-management and appraisal systems to create greater transparency and fairness in evaluation and rewards. Managers are evaluated on a variety of nonfinancial measures, including employee satisfaction, attrition rates and mentoring.

- *Workforce retention:* Most companies have achieved dramatic reductions in employee turnover by carefully analyzing recruitment, performance and attrition data to identify patterns. This has led to constant refinements in recruitment, training and development, performance management and other human-resource practices. Corporate communications and employee engagement in the company and its programs are always a priority.

- *Education upgrades:* Indian companies appear to have an unusual level of interaction with the private colleges and universities that supply them with talent. This involves working with these institutions in developing customized degree programs; training the educators; creating new curricula and training programs; and negotiating deals to hire graduates in bulk -- without job interviews.

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The result of this workforce productivity is clear to see. In the aerospace industry, Indian companies are designing the interiors of luxury jets, in-flight entertainment systems, and collision-control and navigation systems for American and European corporations. In pharmaceuticals, Indian scientists are discovering drugs and performing clinical research for nearly all of the largest multinational drug companies. In the automotive industry, Indian engineers are helping to design bodies, dashboards, and power trains for Detroit vehicle manufacturers -- and soon may develop entirely outsourced passenger cars.

The Indian experience highlights what can be achieved by investing in upgrading workforce skills. That lesson has implications for policy makers in the U.S. who worry about how the economy will adapt to globalization. If workforce training can take the output of an education system as weak as India's and turn its graduates into world-class engineers and scientists, imagine what could be done with an American worker base that has received amongst the best education in the world.

Mr. Wadhwa is executive in residence for the Pratt School of Engineering at Duke University, and a Wertheim Fellow at Harvard Law School. This op-ed is adapted from a report, "How the Disciple Became the Guru," released today by the Ewing Marion Kauffman Foundation.