



Viewpoint November 7, 2006, 2:14PM EST

The Real Problem with Outsourcing

**We may have been worrying about the wrong issues:
America doesn't need a flood of new engineers, it needs
to keep research at home**

by [Vivek Wadhwa](#)

An increasing number of engineering jobs are being moved overseas by U.S. companies, yet it's not clear if the offshoring trend will erode our competitiveness or provide long-term benefit. Still, political and business leaders are raising the alarm about a shortage of engineers, and saying we need to compete with India and China in graduation rates. They criticize American educators and prescribe teaching more math and science to children to get them up to speed.

Education should always be improved, and math and science are really important, but education and graduation rates aren't the issues to worry about right now. A new Duke University engineering study conducted by my students concludes that there's no real shortage of engineers, and that American workers' education levels isn't what's leading to offshoring. We've got a lot to worry about, but it helps to understand the real issues.

In a previous column, I wrote about earlier research at Duke which showed that some of the most-cited statistics on engineering graduates were inaccurate (see BusinessWeek.com, 12/13/05, "[About that Engineering Gap...](#)"). The research demonstrated that often-cited statistics claiming the U.S. is producing only 70,000 engineers a year, vs. 350,000 from India and 600,000 from China, aren't valid. Despite our relatively small population, we're actually graduating a comparable number of engineers to India, and the Chinese numbers include degrees we don't classify as engineering—such as mechanics and industrial technicians.

Questions and Answers

Our research raised many questions. To answer some, we asked 78 senior executives of American corporations a series of detailed questions about their experiences in offshoring engineering jobs. We also spent several weeks in India and China meeting corporate executives, academics, and government officials. We released the results at a recent

National Academy of Engineering offshoring workshop ([click here to read the report](#)). Here are some of our conclusions:

1. There is no shortage of engineers. Technology executives like Intel's ([INTC](#)) Craig Barrett and Microsoft's ([MSFT](#)) Bill Gates routinely say their companies have problems hiring domestically, and therefore need to look offshore. To better understand these claims, we asked corporations how long it took them to fill engineering job openings, whether or not they offered signing bonuses, and the percentage of accepted job offers.

Eighty percent of the respondents to our questionnaire reported that their U.S. engineering jobs were filled within four months, and that offer-acceptance rates have stayed constant or increased over the past three to five years. Eighty-eight percent didn't offer signing bonuses or offered them to less than 20% of potential employees. Intel and Microsoft may have difficulty in hiring engineers with specific skills at competitive salary levels, but our data don't indicate a general shortage of engineers.

2. Engineering degrees aren't the issue. The execs we interviewed said their top offshoring location for entry-level engineering jobs is India. Our earlier research reported graduation numbers supplied by the Chinese government which were higher than those of the U.S. and India combined. We expected to hear that corporations had difficulty hiring in India but not in China. Surprisingly, 75% said that India had an adequate to large supply of well-qualified entry-level engineers.

Duke researcher Ben Rissing says this high number may be explained by the response to another question we asked about the requirements for the engineering degree itself. The majority of respondents said they didn't mandate that job candidates possess a four-year engineering degree. Forty percent hired engineers with just two- to three-year degrees or diplomas, and an additional 17% said they would hire similar applicants if they had additional training or experience.

It seems the debate about U.S. education and engineering degrees may be missing the point. Our research shows it doesn't matter how many engineers we graduate; if companies are prepared to go offshore, they're willing to recruit and train raw talent.

3. American workers have many advantages. Our research showed that U.S. workers have advantages in their communications skills, understanding of the market, education/training, creativity, and willingness to challenge the status quo. They are as productive or more productive and deliver work of equal or higher quality than foreign workers. We also learned that the work being sent abroad is rarely more technical than that done in the U.S. And there are security risks, cultural barriers, infrastructure problems, and training issues offshore that can reduce its attractiveness.

4. More jobs will go offshore. Despite the negatives that come with offshoring, the majority of companies expect the trend to continue and plan to send an even wider variety of jobs offshore. Only 5% of the companies we interviewed said their overseas operations would stabilize or contract.

Corporations told us that the greatest advantage in offshoring is saving money on salaries, followed by savings on overhead, the ability to create 24/7 development cycles, access to new markets, and finally, proximity to customers. They're simply doing what gives them an economic and competitive advantage.

In other words, offshoring is a reality. The problem is that when jobs go, so does research. And this is ultimately what could threaten U.S. competitiveness.

American Advantages

The telecom industry highlights this issue, and points to the need to develop a plan to encourage businesses to keep operations and critical research in the U.S. At a recent National Academy of Engineering conference, University of Texas Professor Ted Rappaport presented an analysis of research and development investments by telecoms over the past few years. His research shows that all but five of the 57 major research initiatives announced were located outside the U.S. Rappaport believes that as a result, U.S. students have lost interest in entering graduate school to pursue research in the telecom field. He worries that America is at risk of losing its ability to "invent" the next Internet or cell-phone technology.

While we worry about our education system and graduation rates, we're overlooking the real problem—that globalization is rapidly leading to critical research and development functions moving offshore. Charles Vest, former president of MIT, and president-elect of the National Academy of Engineering, said the U.S. is the most innovative nation on the planet—it has the best universities, is still the king of the hill in science and research, has a strong free-market economy, and enjoys democracy and freedom. He sees many opportunities and risks. But the biggest risk is complacency. I agree: We could lose our competitive edge unless we figure out how to keep research in the U.S.

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