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Study: China Leaps Forward In Advanced Tech Education

BY SHEILA RILEY

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As policymakers grow increasingly alarmed over the threat outsourced research and development poses to U.S. engineering competitiveness, a new study shows China leading in graduate degree-level engineers capable of advanced research and development.

In a recent Duke University study, researchers said China is overtaking the U.S. and India in advanced engineering and technology graduates.

India produced only about 1,000 engineering Ph.D.s in 2005, not even enough to staff its own universities. The U.S. graduated 7,333, while China came in first place at 9,427.

Even taking into account population differences — China has four times as many people as the U.S., while has India three times as many — the numbers are significant.

"The outsourcing of engineering jobs will continue and gain momentum, and what will go next is research and design," said Vivek Wadhwa, an executive in residence at Duke and the study's lead author.

The report, "Where the Engineers Are," appeared in the National Academy of Science Issues Magazine in March.

The study also concluded that, contrary to popular belief, the U.S. does not face a shortage of engineers.

Previous Duke research contradicted the prevailing thought that India and China graduate many times more baccalaureate-level qualified engineers than the U.S.

Still, the latest findings are renewing worries that the U.S. is falling behind.

More than 60 percent of U.S. engineering doctorates were awarded to foreign nationals, according to data from the American Society for Engineering Education.

The U.S. is producing the same number of Ph.D.s for its citizens as it did in the 1970s — about 3,000 a year, says Michael Gibbons, ASEE Director of Data Research.

According to the report, the engineering doctorate rates for India and the U.S. showed little change from 1995 to 2005.

But China made a huge jump, increasing from under 2,000 Ph.D.s in 1995 to over 9,400 over the same period.

The study's authors say the U.S. needs to adjust its focus to address the looming shift in the international tech hierarchy.

"We worry about the wrong things," Wadhwa said. Those wrong things include outsourcing of lower-level tech jobs such as computer code development, which can be done anywhere.

It's the migration overseas of critical R&D, the kind that requires advanced degrees, that should be a cause for concern, Wadhwa says.

"The next wave of outsourcing is what we have to worry about," Wadhwa said.

Student perceptions of what makes a good career are part of the problem, Wadhwa says. Rather than studying to be scientists and engineers, young students are opting for seemingly more lucrative careers such as investment bankers.

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The field of engineering suffers from misconceptions, says Richard Heckel, founder of Engineering Trends, an e-commerce consulting firm.

Murky job data often leads high school seniors to conclude that engineering jobs won't be in demand by the time they're ready to work. Offshoring and lagging salaries contribute to the problem, according to Heckel.

Better media coverage would help, he says.

"The media actually play a significant role in all this," Heckel said. "Engineering achievements are not getting much press."

Duke's report, part of an ongoing look at globalization and engineering, holds good and bad news for the U.S. economy, says Robert Litan, research and policy vice-president at the Kansas City, Mo.-based Kauffman Foundation, which works to advance entrepreneurship.

"The good news is that there's a lot of hype in the India and China engineering numbers," Litan said. "The bad news is that if you look at the masters' and Ph.D.s in China and India, they are rapidly increasing."

Engineering competitiveness is intertwined with immigration issues.

The Duke study focused on highly skilled immigrants or immigrants who want to be highly skilled, Litan notes.

Those immigrants come to the U.S. mainly on temporary visas. That needs to change, he says.

"The best way to keep the research from going offshore is to bring the smart people here," Litan said.

He adds that research shifting overseas isn't all bad.

Though many would prefer research and development to take place on U.S. soil, he says, everyone benefits from R&D successes, wherever it occurs.

"The world is not a zero-sum game," Litan said.