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NEWS ANALYSIS

By Pete Engardio

Engineering: Is the U.S. Really Falling?

Numbers cited to prove that graduation rates in India and China dwarf those in the U.S. may be flawed. But the fear is all too real

Is America losing its competitive edge in engineering? Top Silicon Valley executives, U.S. think-tanks, industry associations, and university deans have all pointed out dropping enrollment in American science and tech programs and warn of a brewing problem. And in a November survey of 4,000 U.S. engineers, 64% said outsourcing makes them worry about the profession's future, while less than 10% feel sure America will maintain its leadership in technology.

Such gloom is reinforced by a raft of oft-cited statistics: the U.S. graduates only 70,000 engineers a year, and enrollment in engineering schools is declining fast. India, meanwhile, turns out 350,000 engineers annually, while Chinese universities produce 600,000, by some estimates. Indeed, with Asian techies earning anywhere from a quarter to a tenth of what their Western counterparts do, doomsayers might ask why any intelligent young American would pursue engineering.

FUZZY DEFINITIONS. But how accurate are such numbers? And how does the theory of American decline square with the reality that graduates of good U.S. engineering schools seem to have little problem finding jobs? Vivek Wadhwa, a founder of several tech startups and an occasional contributor to BusinessWeek Online who's now an executive in residence at Duke University says he got so disturbed by the anxieties of bright engineering students that he helped supervise a study released in December to get to the bottom of such questions.

The conclusion: Because of fuzzy definitions of "engineering graduate," estimates of Indian and Chinese numbers can be wildly exaggerated, while America's are understated.

Just look at the numbers using consistent criteria. If one counts people who study computer science and information technology as engineers -- as India does -- then the U.S. grants 134,000 four-year engineering degrees annually. Indeed, the U.S. is producing far more engineers per capita than either of Asia's emerging superpowers. Indian schools grants only 122,000 four-year engineering degrees (and almost as many three-year degrees), while China generates 351,000.

"SPREADING PROPAGANDA." But China's statistics may still be inflated because the definition of an engineer can vary widely from province to province. In some cases, auto mechanics are included. "The numbers seem to include anybody who has studied anything technical," Wadhwa says.

The bottom line is that America's engineering crisis is a myth, Wadhwa argues. Both sides in the globalization debate are "spreading propaganda," he contends. India and China are using inflated engineering numbers because they want to draw more foreign investment, while fearmongers in the U.S. use dubious data either to support their case for protectionism, to lobby for greater government spending on higher education and research, or to justify their offshore investments.

The study, though, is already coming under fire. Wadhwa says he's getting notes from researchers who challenge its soothing conclusions, and some U.S. engineers say it doesn't match the grim reality they're witnessing in downsized American R&D labs. And other studies point to different signs of ebbing American dominance in science and technology: The U.S. share of scientific papers is declining. Federal funding for research is falling. And even though American

engineering schools may be producing more grads than some data might indicate, many of their students come from overseas.

"ARE YOU KIDDING?" The debate raises an intriguing question: Does hype about the rise of India and China unnecessarily demoralize American engineers and scare U.S. students away from technical careers? Most surveys of U.S. corporate executives, after all, conclude that America is already facing a shortage of engineers in everything from software and chemicals to life sciences, and these shortfalls will worsen in coming years. Even the November survey of 4,000 engineers, by public relations firm McClenahan Bruer Communications and CMP publishing group, found that 56% said their own companies currently have a shortage of engineers.

The survey confirms that the psychological impact of U.S. offshoring may be just as big as the reality. In focus groups, engineers overwhelmingly said they believe their work is important to society. "But when we asked whether they think society appreciates what they do, they looked at us with blank faces and said, 'Are you kidding?'" says Kerry McClenahan, who runs the PR company behind the survey.

Another problem is that many of the U.S. engineers who are getting displaced lack the more demanding skills required by American tech companies today. Because routine tasks can be done more cheaply offshore, many executives say, they need U.S. engineers who can rapidly move on to next-generation technologies, work well with customers, and manage R&D teams.

COUNTERARGUMENTS COMING. Wadhwa describes it as a gap between "transactional" engineers and "dynamic" ones. The former are good at fundamentals but have a hard time applying their knowledge to broader problems. Dynamic engineers are more capable of abstract thinking, work well in teams, and can lead innovation. India and China have dynamic engineers, too, but U.S. companies still need many of them on staff at home. "What I'm seeing is that transactional engineers in the U.S. are being replaced by dynamic engineers offshore."

The contention that only engineers with routine skills are put at risk by offshoring will surely provoke counterarguments. But at very least, the Duke study has helped take the debate over declining U.S. competitiveness up a notch.

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