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from the October 12, 2005 edition

From abroad, challenges to US role as top innovator

Ramped-up R&D in China and India blunts economic edge of US.

By [Mark Trumbull](#) | Staff writer of The Christian Science Monitor

For decades, America was the preeminent destination for the world's innovators. Scientists of all kinds left their homelands to learn the ropes at top-flight US universities - and often stayed put to earn high salaries. Many countries struggled to stop this brain drain to the US.

But today, the giant sucking sound may be flowing in the other direction. Just this year, 325,000 Chinese earned engineering degrees. The US, by contrast, gave out just 60,000 - fewer than it did a decade ago. And international enrollment at US campuses has been falling.

These numbers symbolize an emerging risk that developing nations like India and China, fueled by high education and lower labor costs, could leapfrog US leadership in innovation.

But amid new calls to address a scientist "shortage," the need is not so much to match China and others numerically as to do something that may be even harder: to stay way ahead in the quality of research and the jobs it spawns.

"The jobs that exist are all going to go away," says Gerard Alphonse, who heads the US branch of the Institute of

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
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Electrical and Electronics Engineers.
"What we need to do is create the new jobs that will not go away for the next 15 or 20 years."

Of course, not every American job is threatened. But innovation-intensive fields do face global competition, and success in those fields is widely seen as vital to a healthy economy with rising living standards.

If concern about a science gap sounds like a lament as old as the Russian Sputnik satellite, the backdrop today is quite different from the 1950s or even the 1980s, when Japan's economic rise caused American angst.

The reason lies in two factors: the growing number of nations with advanced skills, and a corresponding rise in the willingness of global corporations to locate research and production where profit opportunities are greatest.

"Companies are taking the latest tools and technologies to that foreign talent," says Ron Hira, an expert on outsourcing at the Rochester Institute of Technology.

The trick for nations like the US is to cultivate the kinds of research and related jobs that can't be easily done elsewhere.

Given the global strategies of today's corporations, some economists say there's no guarantee that the free marketplace will produce that result.

In a recent paper, Harvard University's Richard Freeman tackled the question, "Does globalization of the scientific/engineering workforce threaten US economic leadership?"


He outlines several trends that suggest the answer is yes.

- By 1999, China ranked behind only the US, Japan, and Germany in publications on four emerging technologies. By 2004, China was third and closing in on Japan in one of those fields, nano- technology.
- Companies are increasingly locating R&D facilities in China and India.
- The US share of the world's science and engineering graduates is declining rapidly.

On one level, this is simply a predictable reversal from an era of US hegemony as an economic superpower. In 1970, for example, American universities issued half the world's science and engineering

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doctorates. Now Europe alone outpaces the US in those doctorates, and China could be on pace to do so by 2010.

To be sure, the US remains the acknowledged world leader in technological innovation.

And in traditional economic theory, one nation's gain doesn't need to be another's loss. Economies can grow side by side, each specializing in the fields where they hold an advantage.

But the US and other industrialized nations face a new threat, Dr. Freeman says. If populous developing nations capitalize on their combination of technical advancement and lower costs, they could "do what the North-South trade models have assumed the South could not do: compete effectively in R&D intensive, high-tech industries."

Already, some signs appear troubling. Pay for electrical and electronics engineers fell in 2003 for the first time since surveys began in 1971. In that same year, their jobless rate hit 6.2 percent, well above the national average.

Few experts see easy solutions.

Some emphasize the "do-no-harm" approach, warning against government meddling in the private sector. Spur research along with the rest of the economy, they argue, by keeping a lid on taxes, healthcare costs, and litigation.

Others call for targeted policies to ensure America doesn't get left behind. Among the most common recommendations: Promote spending on research, recruit and retain talent from at home and abroad, and guard against provisions such as tax laws that help employers move jobs overseas.

The most basic need, some say, is for America to keep pioneering fields so cutting-edge that other nations, for the most part, can't do them.

"It could be interdisciplinary things, or it could be higher-level things," says Dr. Alphonse.

To do that, some say federally funded university research is crucial. That's because corporations tend to focus on applied science rather than basic science that lays the groundwork for new industries.

Federal spending on research in the physical sciences, when measured as a share of the national economy, has been falling for four decades, notes Don Giddens, dean of engineering at Georgia Institute of Technology, in Atlanta.

"There are some choices that we're making right now," he says, "that

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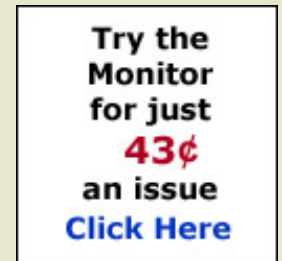
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