Science and Engineering Indicators 2006

Every two years the National Science Foundation's Division of Science Resources Statistics prepares the latest edition of *Science and Engineering Indicators* (SEI) for the National Science Board. This information is provided in tables, figures, and narrative text in a way that allows users to draw their own interpretations from it. This information falls into the eight categories which constitute the respective chapters of the report: Elementary and Secondary Education; Higher Education in Science and Engineering; Science and Engineering Labor Force; Research and Development: Funds and Technology Linkages; Academic Research and Development; Industry, Technology, and the Global Marketplace; Science and Technology: Public Attitudes and Understanding; and State Indicators. An Overview -- "a selective interpretive synthesis that brings together patterns and trends that unite data in several of the substantive chapters" -- precedes these eight chapters. "A policy-oriented 'companion piece,' authored by the National Science Board (NSB) and providing NSB analyses and recommendations, often accompanies SEI and draws on its data.

The Overview for the 2006 edition of SEI focuses on research, development, and manufactures in scientific and technological fields from the global point of view and the science and engineering workforce from the same perspective. (It is important to know that the social sciences are considered along with the natural sciences in the rubric of "S&E.") The initial brushstrokes on the global scene open with the first two "flatteners" in Thomas Friedman's *The World is Flat* -- "the demise of the Cold War" and "the Internet" -- move on to incorporate some additional flatteners and what Friedman calls the "Triple Convergence" brought about by a huge influx of scientific and technological workers from China and India. (Friedman's book is reviewed in this issue.) Yet, while the nations of the European Union and Japan are cited as losing ground in science and technology while China and other Asian nations are making gains, the United States is pictured as "maintaining its position." At the same time, the U.S. high-technology trade balance is shown as turning negative in the past several years "for the first time in recent memory." Related graphs curiously show a disproportionately low percentage of government R&D funding for Japan.

When it comes to scientific research, though, the U.S. does not fare quite so well. Between 1992 and 2002 the U.S. share of published research articles in the world's major peer-reviewed scientific and technical journals dropped from 38% to 30%. And between 1980 and 2000 the U.S. share of the international S&E labor force fell from 31% to 27%, while the shares of China and India doubled to 10% and 8%, respectively. At the same time, "In each of the past five decades, S&E jobs in the U.S. economy grew more rapidly than the overall civilian labor force," and "S&E employment through the 1990s rose at an annual average of 3.5%, more than three times as fast as the growth in overall civilian employment."

The U.S. was able to fill this increase in S&E jobs by "strong increases in the number of foreign-born individuals holding U.S. S&E jobs." "More than half of the engineers holding doctorates and 45% of doctorate holders in the physical sciences, computer sciences, and life sciences were foreign born." "Foreign students earned one-third of U.S. S&E doctorates and 55% of engineering doctorates, whereas doctorates earned by U.S. white males dropped

sharply." All of this happened in spite of "recent downturns in foreign enrollment," while "Asian locations that have been the source of two-thirds of foreign doctoral candidates in the United States are developing their own S&T infrastructures."

This leaves "prospects for the U.S. S&E workforce" to be "for slower growth, rising retirements, and increasing average age," and changing characteristics in the "college-age cohort" that show increasing percentages of demographic groups that have not traditionally sought S&E degrees does not hold out greater hope for the future.

S&E Indicators can be read or downladed at www.nsf.gov/statistics/seind06.