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DOES GLOBALIZATION OF THE SCIENTIFIC/ENGINEERING
WORKFORCE THREATEN U.S. ECONOMIC LEADERSHIP?

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Does Globalization of the Scientific/Engineering Workforce Threaten U.S. Economic Leadership?

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ABSTRACT

This paper develops four propositions that show that changes in the global job market for science and engineering (S&E) workers are eroding US dominance in S&E, which diminishes comparative advantage in high tech production and creates problems for American industry and workers:

(1) The U.S. share of the world's science and engineering graduates is declining rapidly as European and Asian universities, particularly from China, have increased S&E degrees while US degree production has stagnated.

2) The job market has worsened for young workers in S&E fields relative to many other high-level occupations, which discourages US students from going on in S&E, but which still has sufficient rewards to attract large immigrant flows, particularly from developing countries.

3) Populous low income countries such as China and India can compete with the US in high tech by having many S&E specialists although those workers are a small proportion of their work forces. This threatens to undo the "North-South" pattern of trade in which advanced countries dominate high tech while developing countries specialize in less skilled manufacturing.

4) Diminished comparative advantage in high-tech will create a long period of adjustment for US workers, of which the off-shoring of IT jobs to India, growth of high-tech production in China, and multinational R&D facilities in developing countries, are harbingers.

To ease the adjustment to a less dominant position in science and engineering, the US will have to develop new labor market and R&D policies that build on existing strengths and develop new ways of benefitting from scientific and technological advances in other countries.

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Proposition 1: The US's share of the world's S&E work force is declining rapidly.

employment

growth

trade-offs in supplies

York Times

The New

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The Economist

Proposition 2: Despite perennial concerns over shortages of scientific and engineering specialists, the job market in most S&E specialties is too weak to attract increasing numbers of US students.

job market for bachelor's and master's graduates

-

Women and minorities

Reconciling the data and the shortage claims

Proposition 3: Technological Edge and Global Competition When Numbers Count

human resource leapfrogging

could

Real concerns or paranoia: the title question

Proposition 4: Adjustment Problems and Policies for a New Era

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Degrees

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Engineers

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Statistical Abstract, 1953

EXHIBIT 1:

1975	1989	2001	2003^a	2010^a
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Science and Engineering Indicators 2004

EXHIBIT 2:

1990

2000

2004

EXHIBIT 3

1990	2000	% Change
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EXHIBIT 4:

Discipline	1987	1999	% ^a
	Postdocs / Tenured		

Engineers

Enhancing the Postdoctoral Experience for Scientists and

EXHIBIT 5

Share of NIH Grants

1980

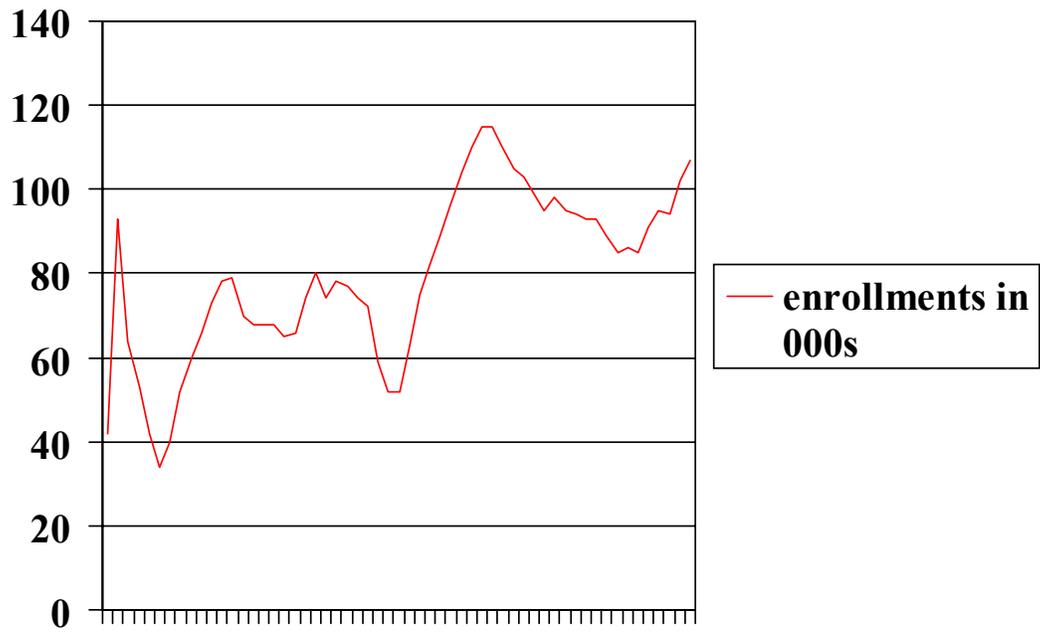
2001

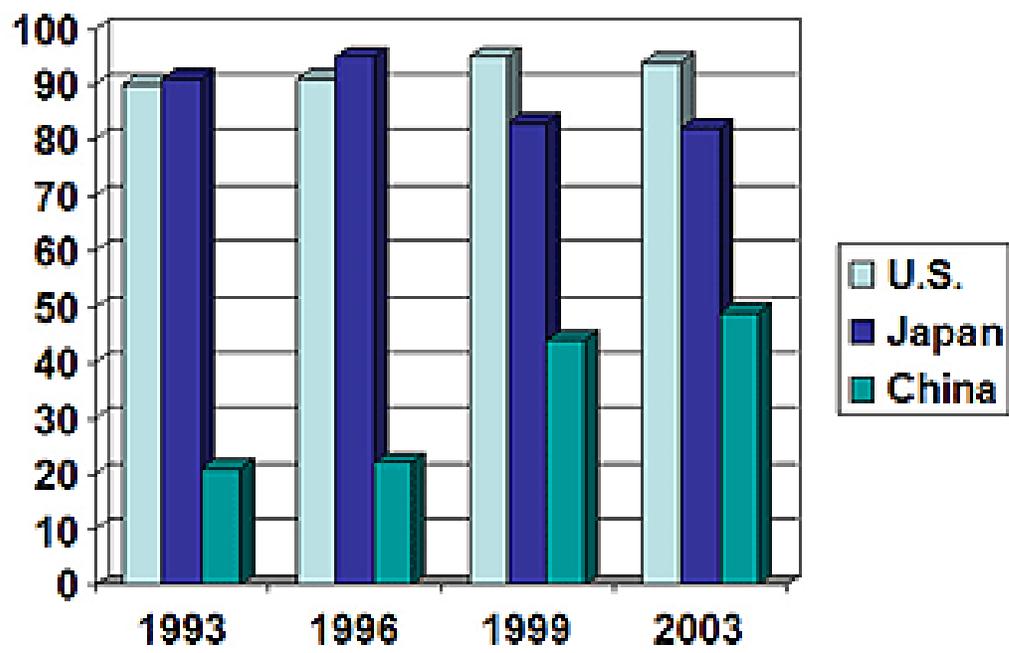
Relative Odds of Getting NIH, by age (ratio of shares of NIH grants to shares of PhDs)

Science

Characteristics of Doctoral Scientists and Engineers in the United States

EXHIBIT 6:





International Journal of Technology Management
