

Rising Against the Gathering Storm



Energizing and Employing America
for a Brighter Economic Future

Importance

85% of measured growth in the US income per capita is due to technological change

“A balanced research portfolio in all fields of science and engineering research is critical to US prosperity.”

Charge to the Committee

- “What are the top 10 actions, in priority order, that federal policymakers could take to enhance the science and technology enterprise so that the US can successfully compete, prosper, and be secure in the global community of the 21st century?”

Return to the Past

- Hasn't this happened many times before in US history?
 - The Endless Frontier – “without scientific progress... we cannot insure our health, prosperity, and security.”

Trends in Federal Research

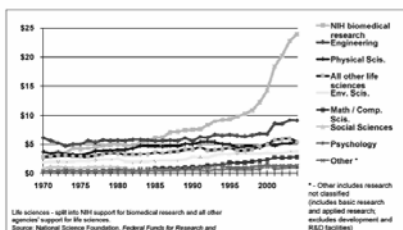


FIGURE 3-13 Trends in Federal Research by Discipline, FY 1970 -2004
SOURCE: AAAS based on NSF, Federal Funds for Research and Development FY 2002, 2003, 2004. FY 2003 and 2004 data are preliminary. Constant-dollar conversions based on OMB's GDP deflator.

Recommendations

- 10,000 Teachers, 10 Million Minds
- Sowing Seeds for Future Research
- Keeping Best and Brightest in the US
- Incentives for Innovation

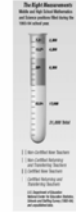
K-12 Science and Mathematics Education

- Annually recruit 10,000 new teachers
- Attract more college students to the teaching profession

K-12 Education

- 68% of US 8th and 93% of students in grades 5-9 taught by uncertified teachers
- US 15-year-olds ranked 24th out of 40 countries in an International Student Assessment of mathematical skills

FIGURE K12-5: In 1993-1994, Over 20% of Mathematics and Science Teaching Positions Were Filled by Non-Certified Teachers.



National Center for Education Statistics, School and Staffing Survey (1993-1994). Washington, DC: United States Department of Education.

Higher Education

- In the US science and technology workforce in 2000, 38% of PhDs were foreign born.
- There were almost twice as many US physics bachelor's degrees awarded as in 1956, the last graduating class before Sputnik than in 2004.



Percentage of 1st University Degrees in Sciences or Engineering

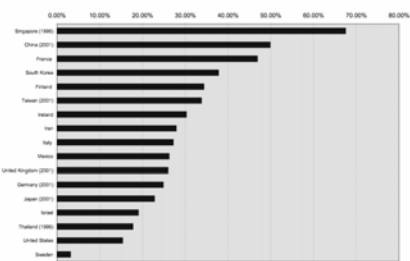


FIGURE 3-16a Percentage of 24-year-olds with first university degrees in the natural sciences or engineering, relative to all first university degree recipients in 2000 or most recent year available. SOURCE: Analysis conducted by the Association of American Universities, 2006. National Defense Education and Innovation Initiative based on data from Appendix Table 3-35 in National Science Board, 2004. Science and Engineering Indicators 2004 (NSB 04-01).

Teaching Incentives

- Goal: To strengthen teaching skills through training and education programs
- Government supplied grants to state and regional programs
- Teachers receive incentive payments for performance as well as student performance on AP tests

Student Incentives

- Goal: To increase the number of students obtaining a degree in science engineering or mathematics
- AP examination fee rebates
- \$100 mini-scholarships to passing science or math scores

Would this kind of system work?

- What are some of the pros and cons to these ideas?

Sowing Seeds through Science and Engineering Research

- Strengthen the nation's long-term basic research to fuel the economy, provide security, and enhance the quality of life.



Increase Federal Investment

- Over the next 7 years, increase investment in the long-term basic research by 10% each year
- Provide new research grants of \$500,000 each year, over five years, to 200 of the nation's most outstanding early-career researchers
 - NASA
 - National Science Foundation (NSF)
 - National Institutes of Health (NIH)
 - Department of Energy (DOE)

Best and Brightest In Science and Engineering Higher Education

- Make the US the most attractive setting in which to study and perform research
- US can develop and retain the best scientists, engineers, and students throughout the world.

Increased Numbers and Proportions

- Provide 25,000 new 4-year competitive undergraduate scholarships each year for US citizens attending US institutions in the sciences and engineering.
- Funding 5,000 new graduate fellowships each year for US citizens studying in the areas of national need.

US Doctorate production in Science and Engineering

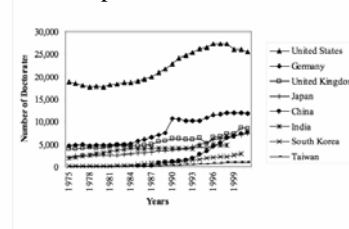


FIGURE 3-6 US doctorate production in science and engineering is decreasing; EU and Asian production is rising but is still well below US levels.
SOURCE: National Science Board. *Science and Engineering Indicators 2004* NSB 04-1. Arlington, VA: National Science Foundation, 2004, Table 3-30.

Internationally

- Improve visa processing for international students.
- Provide automatic visa extension to international students who receive doctorates

- Do we need so many more scientists and engineers?

Incentives for Innovation

- Ensure that the US is the premier place in the world to innovate
- Invest manufacturing and marketing
- create more jobs based on innovation

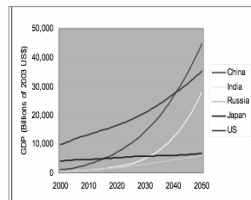


FIGURE 9-1 Growth of emerging markets.
SOURCE: Goldman Sachs, *Dreaming with the BRICs: The Path to 2050*. Gl
NY: Goldman Sachs, Oct. 2003.

Worried about Outsourcing of US jobs?

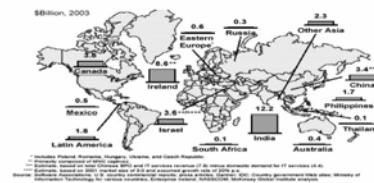


FIGURE 3-11 Offshored services market size (Business Process Outsourcing and Information Technology, Captive and Outsourced), for 2003, billion of dollars.
SOURCE: McKinsey and Company, *The Emerging Global Labor Market: Part II—The Supply of Offshore Talent in Services*. New York: McKinsey and Company, Jan. 2005.

US Economy

- In 2005, American investors put more new money in foreign stock funds than in domestic stock portfolios.
- China became leading technology exporter as of 2004.
- IBM recently sold its personal computer business to an entity in China

Implementation Actions

- Enhance intellectual-property protection for the 21st Century global economy
 - Patents and Trademarks
- Provide tax incentives for US-based innovation.
- Ensure ubiquitous broadband Internet access.

Congress Passes Massive Measure To Support Research, Education

- August 2, 2007 Congress authorized \$43 billion spending over 3 years for dozens of research and training programs
 - COMPETES (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science.)

Why did this bill get passed while past bills have fallen short?

- “We quit talking about the virtues of science in the abstract and started talking about its impact on jobs.”
- Huge amount of spending
 - What will Congress choose to support?
- Sustaining this coalition for 10 to 15 years

The Big Question:

Can all of this be achieved?
Is there a reasonable chance
for the US to maintain
leadership?