

House Science Committee Hearing Summary
US COMPETITIVENESS: THE INNOVATION CHALLENGE
July 21, 2005

Top executives from IBM and Cisco Systems and Johns Hopkins University testified before the House Committee on Science on important relationships between Federal investments in science and engineering education and research and U.S. economic and technological competitiveness. 11 Science Committee members (6 Reps and 5 Dems) questioned witnesses at the session.

The hearing offered a preview of policy perspectives and recommendations likely to be offered by business and academic community representatives at the publicly funded Innovation Summit to be held in Washington in October.

Introduction and Background

While the US continues to lead the world in terms of innovation capacity - R&D spending, size of its scientific and engineering workforce, etc - there are disturbing signs that its lead over other countries may be slipping. Overall federal spending on research and development as a percentage of gross domestic product (GDP) has been declining since the 1960's and the focus for much of this spending has been shifting away from the physical sciences, math and engineering - the areas of R&D that have traditionally been most closely associated with innovation and economic growth.

At the same time, other nations - most notably China and India - have recognized the important links between innovation and economic growth and are pouring resources into their scientific and engineering enterprise, rapidly building their capacity to innovate and with it their ability to compete with the US and Europe in an increasingly technology driven global economy.

Advocates from nearly every industry sector are calling on Congress to respond to the growing competitiveness challenge by increasing public investments in science and engineering education and basic research and development.

Key Questions

- What role does innovation play in bolstering US economic and technological competitiveness?
- What principal innovation challenges does the US face in terms of competing in the global economy?
- What kinds of investments in research and development and in science and engineering education and training are needed to strengthen the nation's innovation system and its competitive position in the world?
- What should the Federal Government be doing to strengthen the nation's innovation system, particularly with regard to programs of support for research and technical workforce development?

Nicholas Donofrio - EVP for Innovation and Technology, IBM Corporation

A major factor in the accelerated growth of the American economy since 1995 has been increased productivity resulting from the application of information technology to the improvement of business processes. The pace of economic change in the US and elsewhere in the world is being driven by the convergence of three historic developments: the growth of the Internet as the planet's operational infrastructure; the adoption of open technical standards that facilitate the production, distribution and management of new and better products and services; and the widespread application of these technologies to the solution of ubiquitous business problems.

In an increasingly networked world, the choice for most companies and governments is between innovation or commoditization. Winners can be innovators - those with the capacity to invent, manage and leverage intellectual capital - or commodity players - who differentiate through low price, economies of scale and efficient distribution of someone else's intellectual capital.

To maintain its economic leadership and living standards, the US must raise innovation to a whole new level and make it the focal point and organizing principle for public and private policies that nurture the nation's technological talent, investment and infrastructure.

IBM Policy Recommendations

- Establish an innovation focal point in the Executive Office of the President
- Create new national innovation metrics to drive performance and assess results
- Expand scholarships, reform immigration to attract and retain best talent
- Improve career options and workers adaptability using portable learning benefits
- Devote more Federal R&D resources to physical, engineering and service sciences, emphasizing basic, novel, high-risk and exploratory ventures
- Focus federal economic development programs on regional innovation hotspots
- Establish a legal and regulatory environment that encourages voluntary and more complete disclosure of business innovations
- Improve US production capabilities in emerging technologies by establishing world class Centers for Production Excellence; strengthen DoD's historic role in advanced manufacturing research and use the Manufacturing Extension Program to help small and mid-sized firms to improve product design, manufacturing, supply chain and customer relations management capabilities
- Capitalize on new and emerging opportunities involving hydrogen fuel cells, nanotechnology, new materials, micro-machining, semi-conductors, broadband deployment, next generation wireless devices, digital medical records and networked computer modeling and simulations
- Encourage America's ability to solve problems across diverse communities by institutionalizing innovative approaches to learning, skill building and collaboration.

John Morgridge - Chairman of the Board, Cisco Systems, Inc.

Morgridge emphasized the need for business and government to work together to improve the nation's education system, physical infrastructure and its legal and regulatory environment in order to maintain its leadership in technological innovation and economic competitiveness.

Cisco supports policies that will help make America's K-16 educational system the best in the world by making the teaching of math, science and engineering a top priority at the national, state and local levels; improving educational standards and accountability; and making better use of instructional technology to enhance educational outcomes.

To strengthen the physical infrastructure needed for innovation and economic growth, Cisco supports universal broadband connectivity and a date certain (2009) for the end of analog television broadcasting so that additional wireless spectrum can be made available for important public safety and emerging commercial communications applications.

Improvements in patent law are needed to ensure that inventors continue to have appropriate incentives to invest in innovation as well as promote public access to new ideas. The Patent and Trademark Office needs additional resources and procedures to improve the quality of the patents it issues and help stem the rising tide of frivolous patent litigation. Rather than developing and mandating adherence to technical standards, the most effective role of government is to ensure adherence to existing laws and regulations and enforce appropriate penalties against transgressors.

William Brody - President, The Johns Hopkins University

America's longstanding pre-eminence in discovery and innovation is threatened by recent developments in the United States as well as by advances in other countries including China, India and Western Europe.

Europe currently produces twice as many scientists and engineers than the United States. Asia produces three times as many. Federal financial support for basic research in the physical sciences and engineering is declining. Science and technology articles published in Western Europe already exceed those published in the United States. And by 2010, it is expected that emerging economies in Asia will produce more patents and spend more on R&D than we do.

With declining leadership in innovation will come declining living standards. Some say such declines are already becoming apparent. The number of jobs requiring technical training is growing five times as fast as other occupations at the same time that the average age of American scientists and engineers is increasing; the numbers of new entrants into most SET fields is static or falling; and the public perception of these fields as exciting, important and financially rewarding is declining.

Enhanced financial incentives, including more generous scholarships and fellowships, are needed to replenish America's homegrown talent pool, especially in view of steady increases in tuition and other higher educational expenses. Immigration reforms are needed to attract and retain more of the best and the brightest students from other countries.

At the same time, the nation should be significantly increasing its financial support for basic research in information technology, mathematics and the physical sciences – and doing so without sacrificing important allocations for research in the biological, health and life sciences. For its part, the private sector must be encouraged to be more accepting of risks and to eschew the short-term, bottom-line thinking that has become the hallmark of far too many American corporations. Government agencies, including DoD and DARPA, should channel more of their available resources into cutting edge research on the frontiers of science and technology instead of into applications and development.

Representative Jerry Costello (D-IL-12)

In opening remarks on behalf of the minority, Representative Costello criticized the Administration for proposing to reduce Federal spending on non-defense related research in its FY 2006 Science and Technology Budget request.

Costello also highlighted testimony offered at a recent Congressional round-table discussion on high tech workforce issues, including the offshoring of science and engineering jobs. He pointed to the urgent need for more and better information on the kinds of knowledge and skills that US scientists and engineers need to differentiate themselves from their counterparts in lower-cost overseas locations.

Developing appropriate policies to improve US technological competitiveness – and help create more and better jobs in the United States – will require a free and open discussion involving representatives from academia, business, government and labor as well as bipartisan consideration by the Congress, Costello said.

Organizational Demographics

IBM - Founded in 1914, IBM is a \$96 billion a year provider of information technology applications and systems integration services that does business in 174 countries. US sales account for 38% of IBM's revenues; 13% come from Japan and 49% from the rest of the world. IBM currently employs 100,000 workers, down from 300,000 ten years ago.

Cisco Systems - Founded in 1984, Cisco is a leading supplier of networking equipment and network management services that currently employs 35,000 workers in 60 countries. 56% of Cisco's revenues are derived from sales to customers in the United States; 7% come from Japan; and 37% from other nations.

Johns Hopkins University - Founded in 1876, JHU is the largest university recipient of research funding from Federal agencies and for 25 years in row has been the nation's leading academic institution in terms of expenditures on scientific, engineering and medical research.

More Information

Additional background information on the July 21 House Science Committee hearing on US Competitiveness: The Innovation Challenge, including a committee press release, the hearings charter, introductory remarks by Representatives Chairman Sherwood Boelhart (R-NY-24) and Jerry Costello (D-IL-12), the formal testimony of the three invited witnesses and an archived transcript of the hearings is accessible on the House Science Committee website at <http://www.house.gov/science/hearings/full05/july%2021/index.htm>.