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POLICY BRIEF

The National Investment in Information Technology R&D

The strength of U.S. information technologies industries stems from **a complex and extraordinarily fruitful long-term partnership among government, universities, and industry** in research and development that has evolved over the last 50 years.

The burgeoning use of information technologies throughout society is changing the way Americans live, work, and play. As the demand for more and better information technologies has grown, **IT industries have become a critical part of the U.S. economy, accounting for more than $500 billion a year**. Businesses that produce computers, semiconductors, software, and communications equipment have been responsible for one-third of the overall growth in U.S. production since 1992, creating millions of new high-paying jobs. Moreover, as prices in this sector have declined more rapidly than most, IT industries have been keeping inflation a full percentage point lower than it otherwise would be.

The R&D efforts needed to uphold the U.S. position in information technologies and their capacity to improve the lives of all Americans are *beyond the scope* of any single institution, industry, or government agency. Strategic federal investments drive innovation, stimulate revolutionary advances, and are especially crucial for:

- ***accelerating the exploitation of information technologies for the good of society***
- ***improving the accessibility, robustness, reliability, and security of information infrastructure***
- ***making governmental information-based services more responsiveness to citizens' needs***
- ***providing networking and computational resources for government and university scientists***

Over the past half-century, federal investments in computing, information, and communications R&D have *yielded spectacular returns*, transforming many aspects of society and leveraging new products and services, even whole new industries, for the benefit of Americans as individuals, workers, citizens, and consumers.

Yet a congressionally chartered blue-ribbon panel has concluded that **the Nation is underinvesting in long-term, fundamental research** in these areas. Critical problems are going unsolved and the rate of flow of new ideas is dangerously low. The President's Information Technologies Advisory Committee (PITAC) recommends in its *Interim Report* that the **federal investment in information technologies R&D be increased by $1 billion over the next five years** and that a strategic initiative in long-term research be created.

The PITAC report identifies key thrusts in fundamental computing and communications research most likely to lead to the *breakthroughs and new capabilities* needed to meet the challenges of the 21st century. Expanding the federal investment in these areas will **enable the U.S. to begin capitalizing on the extraordinary potential of new and revolutionary information technologies**, merely a hint of which can be given here:

> Global communications networks as reliable as modern telephone systems… Trustworthy software for critical public information systems and infrastructure, like the air traffic control system and electric power grids… Robust systems for responding to natural disasters and other national emergencies… Telemedicine and computer-aided surgery… Customized on-line education programs that respond to individual learning styles… Real-time language translation over digital networks… Electronic commerce linked to businesses' marketing and inventory strategies and consumers' private financial management… Instantaneous access to news, information, and digital libraries… Smart medical and other personal devices with communications capabilities… Real-time conferencing and collaboratory capabilities for telecommuters… Accurate computer simulations of physical properties for designers and builders… Sophisticated climate and ecosystems models for policy decision-makers… Virtual laboratories and remote-access instrumentation for scientists and engineers… *and other products, services, and public goods unimagined today*…

More On The Federal Role In Information Technology R&D

"As we approach the 21st century, the opportunities for innovation in IT are larger than they have ever been—and more important. We have an essential national interest in ensuring a continued flow of good new ideas in IT. After careful review of the Federal programs, however, this Committee has concluded that Federal support for research in information technology is dangerously inadequate."

– The President's Information Technology Advisory Committee

"In just the past four years, information technology has been responsible for more than a third of our economic expansion. Without government-funded research, computers, the Internet, communications satellites wouldn't have gotten started…. It all started with research, and we must do more. In the budget I submit to Congress for the year 2000, I will call for significant increases in computing and communications research."

– President Bill Clinton

"The U.S. Government has played a critical role in the evolution and application of advanced computer networking technology and deserves credit for stimulating wide-ranging exploration and experimentation over the course of several decades."

– Vinton G. Cerf, Senior Vice President, Data Services Division, MCI Telecommunications Corp.

"Today's microprocessors are roughly 10,000 times faster than their ancestors. And microprocessor-based computer systems now cost only one-fortieth as much as their ancestors, adjusting for inflation. The result: an overall cost-performance improvement of roughly 1 million in only 25 years! This extraordinary advance is why computing plays such a large role in today's world. Had the research at universities and industrial laboratories not occurred—had the complex interplay among government, industry and academia not been so successful—a comparable advance would still be years away."

– William N. Joy, Co-Founder and Vice President for Research, Sun Microsystems, Inc.

"Indeed, for nearly 50 years, federal investment has helped to train the people and stimulate the ideas that have made today's computers and many of their applications possible. Federal support early in the life cycle of many ideas has advanced them from novelties to convincing demonstrations that attract private investment to products and services that ultimately add to the quality of U.S. life."

– Computer Sciences and Telecommunications Board, National Research Council

Sources On Information Technology R&D Policy

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