American Leadership in the Innovation Economy:

A Report on the Joint Economic Committee's National High-Technology Summit

July 1999

Joint Economic Committee Staff Report
Office of the Chairman, Connie Mack

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A REPORT ON THE JOINT ECONOMIC COMMITTEE'S NATIONAL HIGH-TECHNOLOGY SUMMIT

SECTION I: OVERVIEW

The successful American system of entrepreneurial risk and reward, dynamic capital markets, and limited government is nowhere more evident than in the high-technology sector. U.S. software, semiconductor, and biotechnology industries – to name a few – dominate world markets. The high-tech sector has been responsible for over one-third of real economic growth in recent years, and has helped propel the U.S. economic expansion into its eighth year.

With the crucial economic role of the high-tech sector in mind, the Joint Economic Committee (JEC), chaired by Senator Connie Mack (R-FL), held a three-day High-Technology Summit on June 14th, 15th and 16th to highlight, explore, and advance high-technology issues. During three days of hearings, the JEC heard from over thirty industry leaders and high-technology experts. This report provides a brief overview of the principal policy issues raised, and highlights various discussions by participants during the Summit.[1]

The high-tech sector has grown to represent over eight percent of the U.S. economy. Employment in this sector is growing at twice the rate of total U.S. employment growth, with particularly strong growth in high-tech service industries such as software. As Summit kick-off speaker Federal Reserve Chairman Alan Greenspan noted, the American economy, which "twenty years ago seemed to have seen its better days, is displaying a remarkable run of economic growth that appears to have its roots in ongoing advances in technology."

The Summit offered Committee members the chance to ask participants what Congress could do to ensure the continued success and growth in our high-technology industries. Participants repeatedly stressed that a primary factor leading to the success of high-tech in this country has been the relatively "light hand of government."

The benefits of this "light hand" approach is dramatically illustrated by the exploding Internet economy, which was recently valued at over $300 billion by a University of Texas study.[2] It is no accident that the Internet is dominated by U.S. users and host computers – Americans have a very high propensity for entrepreneurship,[3] and millions are being empowered to learn, discover, and start new businesses online.

Nonetheless, business leaders at the Summit were not taking America's high-tech lead for granted. They stressed that federal policy must stay up-to-date with rapid changes in their industry and the increasingly globalized economy. For example, in areas such as export controls on encryption, industry leaders indicated that U.S. policies have not kept pace with the new realities of the global information economy. In education policy, Summit participants

[1] This report is not designed to be comprehensive in its coverage of high-technology policy issues. For example, this report does not discuss Internet taxation because a three-year Internet tax moratorium was passed in 1998 and a Congressional Commission has been appointed to study the issue.
[2] *The Internet Economy Indicators*, Center for Research in Electronic Commerce, University of Texas, 1999.
[3] A June 1999 study from the Kauffman Center for Entrepreneurial Research (*Global Entrepreneurship Monitor*) finds that Americans have a much higher rate of business start-ups than nine other countries studied.

generally agreed that our current system is not providing enough skilled workers to satisfy the growing demands of the high-tech sector.

This report examines some of the major policy issues raised at the Summit in the following sections: Section II looks at trends in research and development (R&D); Section III examines U.S. encryption policy; Section IV looks at supercomputer export controls; Section V looks at the K-12 education system in a high-tech world; Section VI discusses the high-tech worker shortage and foreign skilled workers; Section VII discusses the role of capital markets in high-tech sector financing; and Section VIII examines the status of Y2K liability legislation. The Appendix includes a list of Summit witnesses, and provides a summary of high-tech related legislation initiated during the 105th Congress.

SECTION II: FEDERAL SUPPORT FOR R&D

Background

Throughout this century - and as we head into the next century - economic growth in industrial countries has become increasingly dependent on advances in scientific knowledge. In fact, technological innovation has accounted for up to half of U.S. economic growth during the past five decades, according to the U.S. Office of Technology Policy. Research and development (R&D) is the primary source of technological innovation as it leads to creation of new products and improved production efficiency.

The realization that R&D plays a central role in modern economic growth has led governments in most industrial countries to provide various types of support for R&D. In the United States, federal support for R&D includes direct performance of research in government labs, financial support for university-based research, and the provision of incentives for private industrial research. Most funding for basic research – research that may not have an immediate economic payoff - comes from direct federal spending. Most funding for market-oriented research comes from private industry.

Data from the National Science Foundation shows that federally-funded R&D, measured as a percentage of GDP, has declined during the past two decades. Federal R&D fell from 1.07 percent of GDP in 1980 to 0.78 percent in 1998. The federal share of total U.S. R&D fell from 47 percent to 30 percent during this period. Maintaining a strong federal R&D role is considered to be very important because the federal government funds the bulk (57 percent) of basic research in the United States. Federal R&D funding totaled $67 billion in 1998.

The relative decline in federally-funded R&D in the past two decades can be contrasted with strong growth in industry-funded R&D. Industrial R&D as a percentage of U.S. GDP has risen 70 percent since the late 1970s. By 1998, industry-funded R&D reached $144 billion, representing 1.7 percent of GDP - up from 1.0 percent or less throughout the 1970s. High profits, heightened global competition, low interest rates, and other factors have fueled particularly strong industrial R&D spending in recent years.

Sustaining and increasing U.S. R&D requires maintaining a strong federal commitment to basic research, and pursuing policies to maximize private sector R&D. Private research can be encouraged with strong patent protections to secure intellectual property rights, minimization of taxes on capital to encourage investment, and regulatory policies that don't stifle innovation and change.

Additionally, the federal R&D tax credit is a widely supported incentive in the federal tax code designed to increase private sector research. The credit lowers the tax burden on research and increases industry's investment in innovation. Since its introduction on a temporary basis in 1981, the credit has been renewed nine times. The R&D credit is currently

due to expire at the end of June, and there is bipartisan support in Congress to renew it this session and make it permanent.

The payoff to high R&D spending, and technology investment in general, is increased productivity and a higher standard of living for all Americans. Federal Reserve Chairman Alan Greenspan and other economists have linked recent gains in U.S. productivity growth to advances in U.S. technology industries. Many U.S. industries that are very technology and R&D-intensive, such as semiconductors and biotechnology, dominate world markets for their products. For example, the U.S. biotechnology industry, which spends 50 percent of its annual revenues on R&D, is over five times larger than the entire European biotech industry.

Discussion

Summit participants focused on two areas of policy to boost the nation's R&D expenditures. First, they stressed the important role that the federal government plays in performing basic research. Second, they encouraged Congress to re-enact and make permanent the R&D tax credit in order to maximize private industry R&D. These policies are generally viewed as being complementary. For example, the role of the federal government in the initial development of the Internet was noted by a number of Summit participants. Since the initial federal and university development though, private sector entrepreneurship has caused the Internet to explode in size and scope.

Dr. Eric Schmidt of Novell, Inc. captured these two policy priorities in his comments at the Summit:

> It is thanks to Federal funding for research in the post-war years that we have the Internet. One of the best investments Congress can make is to assure strong support for Federal research and systematic incentives for commercial R&D. Today, we are short-changing both of these. Except for small increases in the past three years, overall Federal support for research has been flat or declining for a decade. Moreover, Washington has treated the R&D tax credit as a temporary political fix rather than as a sustained incentive for innovation. We must make substantial, consistent increases in Federal funding for basic science, engineering and technology research.

Roberta Katz of TechNet also stressed the importance of the R&D tax credit:

> Although the credit has been effective, its history of repeated, limited extensions has prevented it from achieving its full incentive effect. An R&D credit that requires constant renewals, that suffers from gaps in coverage and retroactive enactment serves not as a bridge to the 21st Century, but as a drawbridge that impedes the progress of innovation. The uncertainty of a credit which must be renewed annually and which has the potential to expire makes it impossible for firms to factor the credit into their valuation of long-term research investments. Numerous studies support the credit's effectiveness in encouraging corporate research expenditures above and beyond previous levels. The result has been new and innovative technologies, medicines, products and services that benefit all Americans.

One of the studies cited by Summit witnesses in demonstrating the efficacy of the R&D credit is a 1998 Coopers and Lybrand study that examined the effects of a permanent credit renewal. The study concluded that the federal budget may actually gain revenue over the long-term from a permanent R&D tax credit by increasing tax payments enough over the long-term to more than offset the immediate revenue loss to the federal budget.

As is the case for other issues facing the high-tech industry, the increasing globalization of the U.S. economy has important implications for R&D policy. Industrial R&D spending is becoming increasingly globalized as large multinational corporations tap pools of scientific talent across many operating locations around the world.

Judy Carter of Softworks, Inc. addressed this issue at the Summit:

> Moreover, we can no longer assume that American companies will automatically choose to site their R&D functions in the United States. Foreign governments are competing aggressively for U.S. research investments by offering substantial tax and other financial incentives. Even without these tax incentives, the cost of performing R&D in many foreign jurisdictions is lower than the cost to perform equivalent R&D in the U.S. An OECD survey of sixteen member countries found that thirteen offer R&D tax incentives. Of the sixteen OECD nations surveyed, twelve provide a R&D tax credit or allow a deduction for more than 100 percent of R&D expenses. Six OECD nations provide accelerated depreciation for R&D capital. According to the OECD survey, the U.S. R&D tax credit as a percentage of industry-funded R&D was third lowest among nine countries analyzed.

However, an advantage of globalization is that it creates opportunities for U.S. companies to maximize their investment in R&D. Put simply, the value of an innovation created by a firm's R&D increases in proportion to the size of the market in which it can be used. Higher sales ensure a larger potential payoff to new product breakthroughs, and thus encourages companies to take extra risks and pursue greater investment in promising ideas. Of course, American firms are not unique because competitors in Europe or Japan can also gain the size advantage of selling in world markets. As a result, globalization is creating an imperative for U.S. policymakers to provide for the best possible climate for R&D and technological investment in order to maintain the United States' leadership position.

An additional policy concern raised during the Summit by the pharmaceutical industry is the threat that price controls would impede that industry's ability to earn a return on their R&D investment.

Gordon Binder of Amgen described the industry's concerns:

> In this session, there will be a number of proposals directly or indirectly to impose price controls on pharmaceuticals. Innovation is expensive, risky and therefore fragile. Price controls - even the threat of price controls - discourages it, badly. I have here a chart of total pharmaceutical company R&D spending in the U.S. during each year of the last decade. You can see that, in that time, the climb was steady - with one exception. In 1994 it almost stopped. What happened in 1994? The President put forward his health care program and it included price controls. This is a simple fact: all policies to advance the biotechnology and the

> development of pharmaceuticals and encourage industry growth into the next century will be far less successful if Congress imposes any form of price controls on pharmaceuticals.

This example illustrates that a wide range of federal policies affect the private sector's ability to fund large R&D programs. The challenge for policymakers is to ensure that the United States continues to be the most favorable location for R&D for today's and tomorrow's knowledge industries. This means making sure that federal tax policies, regulatory policies, and other factors create the best possible business climate for R&D. For example, the on-again, off-again R&D tax credit has not been as favorable to U.S. R&D investment as a permanent credit would be. But with improved policies, America's pre-eminence in industrial research and high-technology should continue far into the next century.

In conclusion, the importance of pursuing the best possible federal high-technology policies is crucial because high-tech affects every part of the U.S. economy. Robert Holleyman II of the Business Software Alliance expressed this point at the Summit:

> America's technology industry has not only substantially boosted economic growth in our country, but more importantly, it has fundamentally transformed the economy itself by making American businesses more efficient, productive, and competitive than ever before.

SECTION III: ENCRYPTION

Background

Encryption is a method of encoding data and communications to safeguard the privacy of electronic information. As electronic commerce such as banking, stock trading, and shopping grows, encryption is becoming an increasingly important method to ensure privacy for Internet transactions.

Encryption involves using a mathematical algorithm to convert plain text into an encoded representation. There are differing strengths of encryption, as approximated by the number of bits in the algorithm, ranging from 40-bit to 128-bit, with 128-bit being the most secure. Generally, a "key" is needed to decrypt or unscramble a coded message. But up to 56-bit encryption has been cracked using "brute force," or computer-generated keys trying every code possibility.[4]

Currently, there are no statutory restrictions on the sale or use of encryption software within the United States. Encryption strength is not restricted, nor is there a requirement that a "spare key" be registered or held with law enforcement agencies. However, law enforcement agencies have proposed that encryption software for domestic use (and foreign export) be made with "key recovery" features, so that third parties, such as law enforcement agencies, would have access to a "spare key" in order to crack encrypted messages if required.

In contrast to current domestic use policy, there are restrictions on the export of encryption technology from the United States.[5] Generally, up to 56-bit encryption may be exported without restriction after a review. Stronger encryption may be exported under a number of exceptions. The primary exception is that export restrictions are lifted on encryption software if key recovery is included so as to allow U.S. authorities to read private electronic messages. The export rules have also been loosened for certain industries, including financial institutions and medical organizations, and foreign subsidiaries of U.S. corporations in approved countries.

The Clinton Administration has relaxed some controls on encryption exports, but opposes complete relaxation because of concern that advanced encryption in foreign hands would hinder U.S. law enforcement and intelligence efforts. The Administration's policy has generally been to allow stronger encryption, but only as long as it includes key recovery with law enforcement access if illegal activity is suspected.

While national security concerns are of course highly important, there are a number of shortcomings to the current encryption export policy. Most strikingly, the strongest encryption (128 bit) is already available from foreign software vendors. Americans or foreigners can currently download this strong encryption product for use from the Internet. A new study produced by Cyberspace Policy Institute at George Washington University examined foreign

[4] See *Encryption Technology: Congressional Issues*, Congressional Research Service, 1999.
[5] See *Encryption Export Controls*, Congressional Research Service, 1999.

encryption availability.[6] The study identified 805 products incorporating cryptography that were developed in 35 countries outside the United States. At least 167 of these foreign products utilize strong encryption. The report also found that the quality of the foreign product is comparable to that of U.S. products.

U.S. export restrictions may put U.S. software makers at a competitive disadvantage to foreign firms which already supply strong encryption. This is an important problem because it may erode the U.S. lead in encryption technology and related software products. It is not just a narrow range of security software that the U.S. policy affects. Encryption is increasingly being integrated into large-selling mainstream products such as World Wide Web browsers. The Congressional Research Service cites one study that estimates losses to the U.S. economy in the tens of billions of dollars if current export policy is not liberalized.[7] Adding to this weakness in U.S. policy is that several other industrial nations are moving in the opposite direction and loosening their encryption controls.

Another problem with encryption restrictions in general is that strong encryption is becoming crucial for the growth in electronic commerce because privacy is a big concern of both consumers and businesses on the Internet. Recent hacking of government Web sites, and the continuing problems with Internet viruses, drive home the huge vulnerability of electronic networks to criminals. Encryption is a way to thwart criminal activity on the Internet. Strong 128-bit encryption is currently unbreakable, and thus provides the best security to the millions of citizens and businesses going on the Internet for business, banking, transmitting legal documents or tax returns, and many other vulnerable activities.

The problem with a "key recovery" approach to encryption policy, particularly if restrictions are expanded domestically, are the civil liberties issues raised. Empowering the federal government with the means to read the nation's e-mail would, as Majority Leader Lott has noted, "invade our privacy" in a new and powerful way. Most Americans are excited by the way that the Internet has empowered individuals with new opportunities, but many would be disturbed if it also empowered the government to chip away at the right to privacy in the digital age.

Discussion

During the Summit, business leaders addressed numerous problems with current U.S. policies regarding export restrictions on encryption. Jim Barksdale of the Barksdale Group emphasized the importance of encryption to securing our right to privacy. He noted that, “A world without encryption for the Internet would be like a world without envelopes for letters. Every communication would be like a postcard.” Barksdale stressed that issues like encryption must be considered in the context of the growing integration of the world economy. He noted, “the fact that the Internet is truly a global medium has meant that this and many other issues can no longer be looked at through just the prism of the U.S. government.”

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[6] *Growing Development of Foreign Encryption Products in the Face of U.S. Export Restrictions*, Cyberspace Policy Institute, George Washington University School of Engineering and Applied Science, June 1999.
[7] *Encryption Technology: Congressional Issues*, Congressional Research Service, 1999.

The new reality of the global marketplace was also stressed by William Larson of Network Associates. He stated that, "in our surveys of the market, we have found over 750 international products that compete directly with U.S. security products. This number is growing because U.S. companies are being forced to cede the market to these competitors."

Mr. Larson provided some examples of the global competitive realities:

> Here are some real life examples of how U.S. companies like Network Associates are losing sales of these key products to foreign competitors due to U.S. export controls. Network Associates had secured a deal with Chrysler Corporation for desktop encryption products prior to the acquisition of Chrysler by Daimler Benz. U.S. laws allow more liberal exports to foreign offices of U.S.-owned companies, but not to foreign-owned companies. Daimler- Chrysler is now looking to German company Utimaco, which can supply encryption to all its offices, and its suppliers worldwide. This is a seven-figure deal that could be lost."
>
> Network Associates is in competition with Checkpoint - an Israeli software company - for a contract worth about half a million dollars with the Orient Overseas Container Line Ltd. (Hong Kong). However, the customer is looking for a strong encryption VPN, which we cannot provide due to export regulations. For these and other international customers, choosing a security solution is somewhat like installing plumbing in a building under construction: once customers select foreign security systems and build networks around them, there will be no opportunity for U.S. companies to regain that market leadership.

The importance of the encryption and computer security market was also stressed by Mr. Larson. He noted that:

> In 1999, the non-U.S. market for security software is projected to be over $1 billion. This growth in a relatively new market sector emphasizes the fact that security is an essential element to the continued development of the information infrastructure and to the growth of e-commerce, and potential customers worldwide are recognizing this. Without robust security systems, consumers and businesses will not develop the trust necessary for the transition from traditional commercial activities to electronic commerce and online communication. Our customers, including financial institutions, manufacturers, governments and other organizations have recognized this reality, and are now procuring the technology necessary to ensure that their networks are secure.

The Summit also heard from IBM's Louis Gerstner, Jr. regarding the importance of U.S. encryption policy:

> We have to push for a sensible encryption policy in this country -- one that recognizes the commercial demand for secure information systems and transactions, and also recognizes the legitimate needs of law enforcement and national security.

SECTION IV: SUPERCOMPUTER EXPORT CONTROLS

Background

For a number of decades, the United States has placed restrictions on the export of very high performance computers, generally referred to as supercomputers. Restrictions on supercomputer exports are designed to protect U.S. national security, and to limit the capacity of some foreign powers to develop advanced military capabilities.

However, rapid developments in the computer industry have made continued control of supercomputers much more difficult, and may limit the ability of U.S. manufacturers to retain the lead in this key high-tech industry. In particular, three major changes are occurring in the supercomputer industry: i) the raw speed of off-the-shelf microprocessors continues to increase; ii) the application of cluster, parallel processing, and scalability technologies have made the control of supercomputers difficult to enforce; and, iii) the computer industry has become globalized, making it less possible for the United States to control the components needed to manufacture supercomputers.

Computer speed is measured in two basic ways: MHz and MTOPS. MHz, or megahertz, is a standard measure of microprocessor chip speed familiar to users of PCs. In contrast, supercomputers are rated for export control purposes in MTOPS (millions of theoretical operations per second). A computer's MTOPS rating is dependent upon chip speed, computer design, and the number of chips in the computer system.

During the 1980s and 1990s, controls on supercomputers have occasionally been eased due to rapid advances in microprocessor technology and the increased availability of computers from foreign sources. In 1996, a four-tier system of destination countries was established to regulate supercomputer exports as shown in the following table:

Tier	Countries	Controls
I	28 countries including Western Europe, Japan, Canada, Mexico, Australia, and New Zealand	• No license requirements but to keep records of export.
II	106 countries including many in Asia, Africa, Latin America, and Central and Eastern Europe.	• License requirements for computers above 10,000 MTOPS. • No license but to keep records of those machines below 10,000 MTOPS.
III	50 countries including China, Russia, and Israel.	• Export licenses required for computers between 2000 and 7000 MTOPS to military end-users. No license requirement for sales to civilian end users for units of the same speed.***** • Licenses are required for all sales of units above 7000 MTOPS.
IV	Cuba, Iran, Libya, Iraq, North Korea, Sudan, and Syria.	• Exports prohibited.

* In 1997, Congress modified the rules so that exporters are required to notify the Department of Commerce of exports to Tier III countries for computers between 2000 and 7000 MTOPS. Federal agencies in the export control system then have ten days in which to object to a sale without a license.

Although these thresholds were established just three years ago, the rapid advance of computer technology is quickly causing them to be very restrictive. This is not hard to understand considering that "Moore's Law" suggests that the computing power of microprocessors doubles every 18 months. The export control threshold of 2,000 MTOPS will soon be reached by standard PCs.[8] (In comparison, consider that the fastest computers being made today are rated at over 1.5 million MTOPS). As a result, the number of regulated exports (computers above 2,000 MTOPS) is expected to grow from about 2 million in 1997, to nearly 4 million by 2000.[9]

Perhaps even more relevant to the application of supercomputer export controls is the growing sophistication of *cluster*, *parallel processing*, and *scalability* technologies. These technologies allow individual computer chips, which by themselves may not fall under export restrictions, to be grouped together to create a very powerful supercomputer.

Clustering describes the application of interconnect devices which allow for many computers to perform specific tasks in groups. P*arallel processing* allows multiple chips of even average speed to form a very powerful computer. In fact, many of the world's faster computers today use commercially available chips.[10] In addition, the open architectures of many computers today have contributed to enhanced *scalability*, where machines are designed to be easily upgraded to faster CPUs, or even additional motherboards. All of these technologies are making it increasingly difficult for government agencies to restrict the flow of machines that are capable of processing at supercomputer levels.

Discussion

Each of these technological advances in computing makes it easier to develop supercomputers from components that, at the time of initial sale, are below the thresholds of current export controls. For example, in August Intel plans to release its new Pentium III Xeon chip, which will run at 1,283 MTOPS.[11] In a dual-processor machine (one that could be purchased off the shelf at a chain retail outlet) this chip-set would rate at 2,566 MTOPS and be considered a supercomputer and subject to export controls. In congressional testimony last year, Under Secretary for Export Administration, William Reinsch, stated:

> The result (of *scalability*) is that it is possible to buy a number of systems that perform well below 2000 or even 1000 MTOPS, and thus do not require a license for export, and then upgrade these machines to 5000 or 6000 MTOPS or more.[12]

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[8] "Computer Executives Press for Easing of Export Controls," *Washington Post*, June 13, 1999.
[9] *High-Performance Computer Systems Summary*, Prepared for The Computer Coalition for Responsible Exports., Gartner Group Inc., 1998.
[10] *High-Performance Computer Systems Summary*, Prepared for The Computer Coalition for Responsible Exports., Gartner Group Inc., 1998.
[11] "Computer Executives Press for Easing of Export Controls," *Washington Post*, June 13, 1999.
[12] Reinsch, William A. (Under Secretary for Export Administration, U.S. Department of Commerce). Testimony before the Senate Government Affairs Committee Subcommittee on International Security, Proliferation, and Federal Services, September 17, 1998.

Another major problem encountered by attempts to limit the availability of supercomputers is that computer manufacturing is becoming globalized. Five of the top 25 supercomputer makers, 14 of the top 25 workstation makers, 10 of the top 25 makers of mid-range mainframe and upper-range servers, and 15 of the top 25 PC makers were foreign-owned in 1997.[13] As a result, worldwide control of machines that fall under current U.S. export regulations is not really possible anymore. For example, there are 11 foreign competitors that can manufacture machines that link eight Pentium III chips together to run at 10,264 MTOPS.[14]

While important national security concerns underlie U.S. export restrictions on supercomputers, they potentially may have the reverse effect if they jeopardize the ability of U.S. computer manufacturers to stay in the lead in supercomputer technologies. Under Secretary Reinsch has also addressed this point:

> Its fundamental premises are that, like it or not, rapid technological progress has rendered control of high performance computers increasingly difficult, and that it is more important to our national security to have a healthy computer industry supplying state of the art products to our military and intelligence services than it is to attempt to control the uncontrollable and jeopardize our companies' future in the process.[15]

Testifying at the High-Tech Summit, Scott McNealy of CEO of Sun Microsystems outlined his position for the relaxation of export controls on supercomputers:

> Export control policies for computers must keep pace with rapid technological advances. Failure to update controls this year will force both the U.S. government and industry to devote considerable resources to policing the export of tens of thousands of systems that are available from foreign competitors. The result – U.S. companies will lose sales with no gain in security. This will eventually limit the ability of these companies to shape the future of the Internet era. This will also limit the ability of these companies to supply our armed forces with the cutting edge technologies they need to maintain the advantage on the battlefield.

[13] Gartner Report, a final report prepared for The Computer Coalition for Responsible Exports: High-Performance Computer Systems Summary. Gartner Group Inc., 1998.
[14] "Computer Executives Press for Easing of Export Controls," *Washington Post*, June 13, 1999.
[15] Reinsch, William A. (Under Secretary for Export Administration, U.S. Department of Commerce). Testimony before the Senate Government Affairs Committee Subcommittee on International Security, Proliferation, and Federal Services, September 17, 1998.

SECTION V: EDUCATION IN A HIGH-TECH ECONOMY

Background

Computers are rapidly penetrating the nation's schools. The computers-to-students ratio in K-12 schools has fallen from less than 1-per-100 in the early 1980s to about 1-per-8 students in the late 1990s. Student Internet access has dramatically improved as well. In 1998, 89 percent of public school students were able to access the Internet, compared to just 35 percent in 1994.[16]

While student access to new technology is constantly improving, surveys show that students may not be spending much time utilizing it. Elementary school students average only 1.7 hours of computer time per week. Middle school and high school students average just 2 hours per week of computer time.[17] One problem may be that teachers aren't prepared for the technology advances in the schools: a 1998 survey reported that only 20 percent of full-time public school teachers rated themselves as "very well prepared" to incorporate new technology into their curriculum.

But will student access to new technology translate into higher student performance? Computers are an important tool for education, but computers alone won't ensure that student knowledge increases. While computers and other technologies are beneficial new "inputs" to education, we will have to examine measures of education "output" to see whether they result in higher student performance.

Education reformers are not, of course, leaving hopes for school improvement solely in the hands of new technology. One major reform effort is the school choice movement, which calls for increasing competition between schools and empowerment of parents to have more choice in their children's education. The innovative and dynamic high-tech sector provides a sharp contrast to the poorly-performing public school sector of the economy. The widely differing results in the two sectors highlight the dramatic impact that competitive markets, choice, and low barriers to entry could make on the nation's schools.

Discussion

An important theme during the Summit was the role that technology will play in education. A common sentiment among many of those testifying was that technology, while necessarily important, should be viewed as another input to creating better schools. Ultimately, it is not the number of classrooms that are "Internet-wired" that is the most important statistic. Rather, it is the quality of the output in the form of SAT scores and skilled students with good

[16] *Information Technology and Elementary and Secondary Education: Current Status and Federal Support*, Congressional Research Service, 1999.
[17] *Information Technology and Elementary and Secondary Education: Current Status and Federal Support*, Congressional Research Service, 1999.

reasoning abilities that should be the goal of new technologies in the schools. Testifying at the Summit, U.S. Secretary of Education Richard Riley expressed this point:

> I firmly believe that we need to build a broader and stronger workforce that knows how to capitalize on the potential of technology…Information technologies do not operate in a vacuum. The mere existence of a high powered computer or a telecommunications network, for instance, does little for a society that lacks the knowledge or skills to use it.

High-tech leaders testifying at the Summit echoed Riley's statements. Ariel Kleckner of RedGorilla, John Keane of Keane, Inc., Michael Durham of the SABRE Group, and Roberta Katz of TechNet all expressed concerns about the insufficient numbers of talented workers with the appropriate skills to contribute to the growth of the U.S. technology sector.

Ms. Kleckner of RedGorilla explained that her experience trying to hire skilled employees has been particularly difficult as she is still laying the foundations for her company. According to Kleckner:

> At present, there are more technical jobs in Silicon Valley than…technically trained people to fill them. This has been the greatest concern of mine as president of a young company, and a substantial amount of my time has been devoted to finding and recruiting the fifteen highly trained engineers, programmers, graphic designers and systems architects that comprise RedGorilla's workforce.

Ms. Kleckner also highlighted the importance of basic science and mathematical learning necessary to work in a technology-based society. John Keane of Keane, Inc. reiterated the statements of Ms. Kleckner by calling for programs to promote science and math interest at an early age. He also emphasized that the rapidly changing environment associated with information technology requires talented workers who can continually learn and adjust to new situations.

Michael Durham of SABRE expressed the view that many parties share the responsibility to train workers for the growth industries of tomorrow:

> The government, educational institutions and industry must commit significant resources to attract more U.S. workers and students into careers in the high tech sector…Sabre spends approximately $9 million each year in technical training and we are prepared to do more.

Mr. Durham advocated more business spending on internal and external training programs to encourage U.S. citizens to pursue careers in high technology, and thought that the proposed idea of a high-tech training tax credit had merit.

Roberta Katz of TechNet called for improving K-12 education by establishing high educational standards, deregulating public education, and setting high performance standards for schools. Ms. Katz emphasized that "schools should be forced to compete, and parents should be able to choose the best public school for their children." Bill Gates of Microsoft echoed Ms. Katz's concerns and said:

> When you look at the phenomenal economic growth produced by technology, and the huge increase in demand for highly-skilled knowledge workers, it is clear that our ability to continue benefiting from technology will largely depend on how well we educate the next generation to take advantage of this new era.

IBM's Louis Gerstner, Jr. also stressed the overwhelming importance of improving our public school system:

> Unless we arrest the wasting decline of our public schools -- and do it now -- America is destined to be an also-ran in the emerging digital economy.

Members of Congress attending the hearings also expressed concern about the quality of U.S. education. Senator Robert Bennett (R-UT) noted that one role of the government in education should be creating standards to ensure the quality of the U.S. education system.

Congressman Mark Sanford (R-SC) noted that access to technology doesn't necessarily teach reasoning:

> Is the educational impact of the internet and all this technology overstated? In other words, knowledge is not reasoning and it seems to me that a lot of kids these days may be able to flip on the computer and they may be able to surf the web and see all kinds of different pieces of knowledge and yet not be able to reason, and I think the basics of math and English offer the ability to learn how to learn, which is a more important thing than frankly, turning on the computer.

Many high-tech business leaders are taking an active role in improving the quality of K-12 education. Alfred Berkeley of NASDAQ talked of the strides currently being taken to make sure that information technology is used to improve and analyze the quality of U.S. education. NASDAQ, with the help of Eastman Kodak and Lockheed Martin, has invested in improving U.S. education standards by developing an Internet-based student self-testing site. Their proposed Internet site will contain a Self Assessment Testing Program that will allow students to test themselves and compare their abilities with other students in the United States and abroad. Mr. Berkeley emphasized that this website will "empower the student, and the parent, and the teacher to know exactly how effective they are being in what they are learning."

SECTION VI: FUELING HIGH-TECH WITH FOREIGN WORKERS

Background

Fast growth in many high-technology industries, and industries that use high-tech equipment, is creating a huge demand for skilled workers with scientific, engineering, and computer experience. These industries are responsible for an increasingly larger share of the U.S. economy, and by 2006 almost half of the private workforce will be employed either by industries that produce information technology (IT) equipment or services, or by industries that are heavy users of IT.[18]

While the availability of numerous high-paying jobs in leading-edge industries is good news, the demand for workers with the education and training to fill those jobs is outpacing the supply of skilled workers. A study by Virginia Polytechnic Institute found that nearly 350,000 information technology positions are going unfilled because of a lack of qualified candidates.[19]

Further growth in the U.S. high technology sector relies on expansion in the availability of skilled workers. With an increasingly globalized economy, the threat is that technology industries may be forced to expand operations abroad, instead of in the United States, if enough qualified workers cannot be found. Exacerbating the problem is that U.S. universities are not graduating enough U.S. citizens with degrees in computer science, engineering, and other disciplines key to the high-tech sector. The Department of Labor reports that the number of bachelor's degrees awarded in computer science and engineering actually declined during the past decade.

As a result of technology worker shortfalls, high-tech companies have needed to fuel their growth by hiring highly-skilled foreign nationals under the H1-B work visa category. H1-B workers are skilled in specialty occupations such as computer science and engineering, and they often have advanced degrees. Current law limits the number of H1-B workers through an annual cap. Last year, the cap of 65,000 was reached four months before the fiscal year ended. In response, Congress increased the cap for the next three fiscal years, but dropped it down again to 65,000 in fiscal 2002. Despite a higher cap this fiscal year, the worker limit was already reached in June.

How important are foreign-born workers in fueling America's high-tech industry? A new study by the Public Policy Institute of California found that a remarkable 24 percent of Silicon Valley high technology firms founded since 1980 are run by Chinese and Indian immigrants. Between 1995 and 1998, 29 percent of high-tech firms in Silicon Valley were run by immigrants from these two countries.[20] Immigrant-owned companies often have an immediate advantage in the global marketplace because they frequently have direct ties to U.S. export markets.

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[18] *The Emerging Digital Economy II*, Department of Commerce, June 1999.
[19] Testimony by Michael Durham, CEO, Sabre Inc., before the Joint Economic Committee, June 15, 1999.
[20] The study, authored by Anna Lee Saxenian, is forthcoming by the Public Policy Institute of California. As reported in the *Wall Street Journal*, June 25, 1999.

Many of these businesses were founded by immigrants who originally came to the United States as science and engineering students. In fact, the largest sources for H1-B workers are Indian and Chinese, the same groups of foreign nationals who are starting so many high-tech businesses in Silicon Valley.[21] Foreign nationals make up a large and increasing percentage of graduate students in U.S. universities with engineering and other technical degrees. Upon graduation, many of these students take this knowledge back to their respective countries and are employed by foreign companies, perhaps in competition with U.S. firms. By retaining these talented foreigners in the U.S., our economy would instead keep the competitive advantage.

Discussion

A priority expressed by many high-tech leaders at the Summit was a continuation and expansion of the H1-B worker program. The shortfall of high-skilled workers was described by Sabre's Michael Durham:

> The supply and demand curves in the high tech labor market not only do not intersect, they are not even trending toward each other. Last year…nearly 350,000 IT positions within the U.S. remained vacant, and all indications are that the number is rising.

Part of the solution according to Mr. Durham is recruitment of foreign nationals. He stated:

> We recruit from 30 U.S. universities and grant interviews to virtually all U.S. citizens who apply. However, MIT reports that 49 percent of its graduate students in operations research and industrial engineering and 52 percent of its graduate students in mathematics are foreign nationals. The U.S. opens its technical universities to these foreign citizens, who…are now returning to foreign countries and bringing their exceptional talent to new careers with foreign companies, where they will compete in the high technology sector against U.S. companies because we have reached the immigration cap.

John Keane of Keane Inc. described the issue as follows:

> (Public) policy should also facilitate the reaching outside of our national borders to bring in educated and skilled personnel. America has always been the land of opportunity - and overseas skills can contribute significantly to the continued development of our industry.

Certainly, the H1-B worker program is merely one part of a solution to the high-tech worker shortage. Government, business, and educational institutions must work in concert to help increase the supply of domestic high technology workers over the long term. But improving K-12 education, particularly in science and mathematics, is the key to a long-term solution to the skilled-worker shortage.

[21] "A Push For More Special Work Visas," *Washington Post*, June 25, 1999.

SECTION VII: FINANCING THE HIGH-TECH INDUSTRY

Background

Open and dynamic capital markets have played an essential role in the recent success of the U.S. high-technology sector. Advanced capital markets have combined with America's risk-taking and entrepreneurial culture to create dominant U.S. firms in biotechnology, Internet businesses, and firms in many other high-tech industries. These industries have fueled about one-third of real U.S. economic growth in recent years.

Rapid changes in the high-technology sector illustrate the "process of creative destruction" which is central to a healthy and growing economy. Creative destruction means that old industries are replaced with new higher-yielding industries. A growing economy must have mechanisms to move capital and labor resources into new business ventures in new fields. Dynamic U.S. capital markets meet this need and have helped launch thousands of new high-tech businesses by helping fuel them with fresh capital.

Growing venture capital markets, "angel" financing, share offerings, and other financing techniques have made the U.S. economy a uniquely powerful generator of new high-tech business start-ups. New firms require capital to start. Often, the initial financing comes from inside investors – the entrepreneur, friends and family members. New firms also seek capital from "angels" who fund startups. They are typically more mature investors experienced in specific high-technology industries who understand the needs and challenges of new companies. In addition to providing capital, angels frequently sit on a new firm's board of directors and provide valuable insight and advice. In return for their investment of capital and wisdom, angels receive an ownership stake in the new company.

In addition, efficient U.S. equity markets have allowed many cash-poor high-tech start-ups to utilize equity positions and stock options to attract the highly-skilled talent needed to grow any high-tech start-up.

Discussion

The exploding Internet economy is allowing thousands of young entrepreneurs to start new businesses, as described by a number of witnesses at the Summit. Twenty-three year old Gene Hoffman of Emusic.com, described his firm's beginnings:

> Emusic, formerly known as the GoodNoise Corporation, was founded in Silicon Valley in January 1998 by Bob Kohn and myself in the living room of my house. Through funding of our own, from friends and family and through some angel investors we quickly got underway to build the market leading company for downloading music over the Internet. We became a public company in May 1998.

Many of these new entrepreneurs are women. A recent study by researchers at Babson College noted the important role of women in creating new businesses. "Globally, increased participation of women may be the fastest way to increase overall entrepreneurial activity."[22] Ariel Kleckner of RedGorilla.com illustrated this trend at the Summit. She described her business start-up:

> RedGorilla is an Internet start-up company that I founded with three colleagues earlier this year. We are headquartered in Silicon Valley, San Francisco to be exact, and we provide fee and low-cost web-based services that help small businesses and independent consultants track their financials. We are looking forward to a successful launch of our new product on September 1, 1999.

After initial funding from family, friends, or angel investors, a start-up may then turn to venture capital firms for additional funding. For an Internet firm, this infusion may be roughly six to nine months after its beginning. The amount of venture capital invested is typically greater than the investment from Angels. The sources of venture capital may be institutional investors such as pensions, endowments, corporations or high net worth individuals. These investors have a shorter time horizon – perhaps one year – than Angels, who typically work with firms for the long-term. Additionally, venture capital investors usually do not take an active role in managing and running startups.[23]

Successful firms may eventually access public markets through initial public offerings (IPOs). In general, only established and successful, though young, firms seek capital from IPOs, and they do so because they need substantial amounts of capital in order to try to accelerate their expansion.

Recent legislation has increased the access to capital for start-up firms. In 1997, Congress cut the top capital gains tax rate from 28% to 20%. In 1998, Congress decreased the holding period required for an investment to receive this lower capital gains tax rate from 18 months to 12 months. These actions allowed investors to take risks on less certain companies and fund new ventures because of higher after-tax rate of returns. The positive effect of these changes was noted at the Summit by Judy Carter of Softworks and other panelists.

The low-inflation policy of the Federal Reserve has also reduced risks for investors, and lowered effective capital gains tax rates by decreasing the amount of inflationary gains subject to the tax. These factors have had the combined effect of increasing the rewards and reducing the risks to investors, thus increasing the amount of capital available to firms. Also, firms in this country have found an easier access to funds recently because of the lack of investment opportunities abroad, since many other major economies are in recession.

Because many startup companies do not have a great deal of cash, they must compensate employees and members of the board of directors with stock options. Stock options have been central to the success of many young high-tech start-ups. However, a

[22] *The Wall Street Journal*, June 24, 1999, P. A1.
[23] Buss, Terry F. (1999), P. 7.

number of Summit witnesses were concerned about accounting rule changes that will impede their ability to use this powerful financial tool. The Financial Accounting Standards Board (FASB) is considering changes that would make options more expensive for firms and require companies to deduct the value of the options from company profits. These changes would significantly disadvantage startups that struggle to attract and keep talented, young workers and experienced board members. Ariel Kleckner of RedGorilla.com made the following observations on this point:

> Stock options are a key factor in the ability of young technology companies like RedGorilla to employ a talented workforce when salary dollars are scarce – they are our currency. In fact, enabling employee ownership through stock options has long been a cornerstone for emerging growth companies in industries like biotech, Internet and software. It has given workers a stake in the success of their firms and fueled America's entrepreneurial culture.
>
> Stock options are also a critical means by which emerging technology companies and venture capital firms secure competent people to serve on their Boards of Directors. It is essential that young companies like RedGorilla attract experienced and qualified directors, who can provide entrepreneurs like myself with the business guidance that is crucial for a firm's survival. For my company, attracting such directors would be impossible if we could not rely on stock options for compensation. Smaller firms often cannot pay directors' fees in cash. And providing stock compensation has the obvious benefit of giving directors the greatest incentive to see the company through to success.

Similarly, potential changes in accounting rules for business combinations could hurt dynamic, growing industries where mergers and acquisitions are both common and beneficial to technological advancement. Roberta Katz of TechNet noted:

> The ability of high-tech companies to grow and acquire new technologies through mergers and acquisitions and to compensate their employees through stock options are important factors driving the US economic expansion – economic growth that is the envy of the world. Before the adoption of new rules that may have a significant effect on economic growth in the technology industry and economy, we should be certain that the impacts of these rules are fully understood and that there are perceived problems with existing accounting standards that justify such changes.

SECTION VIII. Y2K LIABILITY

Background

Because of the way that computers and software had been designed in the past, the turn of the century brings with it a new set of complications. Before, many computers kept track of the date by a two-digit figure (like 79 for 1979). This simplification may be a big problem as we enter a new decade wherein 00 will not be discernable as either the year 1900 or 2000. The consequence may be that many applications, hardware devices, and other systems with computers chips may cease to function properly at the turn of the century, January 1st, 2000. This problem, commonly known as Y2K, has been the focus of concerted fix-up efforts by computer users, corporations, government agencies, and the international community for the past half decade. What is not certain is the extent of the potential costs when Y2K begins to take effect.

One issue that is of significant importance for the stability of financial markets is the free flow of complete information regarding potential Y2K vulnerabilities. But fear of legal liability is a disincentive for firms to fully disclose their Y2K preparedness. On this point, Senator Robert Bennett (R-UT) has noted:

> As we speak, the very fear of litigation is preventing organizations from sharing Y2K compliance information, leading to a 'circle-the-wagons' mentality among many in the business community, and heightening the potential for rumor and public panic to fill the void.[24]

In 1998, these motivations aided in the passage of the Year 2000 Information and Readiness Disclosure Act (P.L. 105-174). This bill was aimed at encouraging companies to fully disclose the assessments of their respective Y2K problems by making disclosures under the Act immune from use in civil proceedings (unless fraud or bad faith was demonstrated).

Litigation has become an important threat to the efficient transition of our economy into the next millennium. As of June 1999, 62 class action or individual lawsuits have been filed (mainly against software vendors for failing to make their products Y2K compliant and improperly charging for upgrades).[25] Senator Bennett noted:

> The biggest Y2K headache of all could be the legal fees and lawsuits that cripple America's employers and working people long after the Y2K bug has been chased from computer hardware and software.[26]

A recent study estimated that insurers could pay $15 to $35 billion for claims and legal costs related to Y2K problems.[27] Certainly, there is a great deal of fear that such litigation could

[24] Bennett, Robert F. Statement on Y2K Litigation Reform. Special Committee on the Y2K Technology Problem Web site, May 13, 1999.
[25] *CRS Year 2000 Computer Problem Briefing Book: Legal Issues*, Congressional Research Service, June 1999.
[26] Bennett, Robert F. Statement on Y2K Litigation Reform. Special Committee on the Y2K Technology Problem Web site, May 13, 1999.
[27] "Insurers' Y2K Payout is Expected to Total More than $15 Billion," *Wall Street Journal*, June 21, 1999.

draw high-tech industry resources into the legal arena for a number of years to defend against law-suits.

Discussion

In a statement at the High-Tech Summit, Senator Pete Domenici (R-NM) commented on legislation related to Y2K:

> There are numerous issues on the Congressional Agenda that affect the high-tech community. Both the Y2K Liability Reform bill and the Securities Litigation Reform bill . . . go a long way toward eliminating the "litigation tax" on some in the most prolific job creating sector – high tech.

Numerous bills have been introduced in the 106th Congress to limit monetary damages against private companies and government agencies that have made good faith efforts to achieve Y2K compliance. In June, the Senate passed H.R. 775. This measure would:

- Establish a 90-day waiting period for filing a Y2K complaint to encourage parties to correct and mitigate Y2K-related problems;
- Encourage alternative dispute resolution;
- Establish proportional liability;
- Preserve contract rights;
- Impose punitive damage caps for small businesses and exempt governmental entities from punitive damages.[28]

The bill is not designed to prevent individuals who have been harmed from their right to seek compensation, nor does it preclude legitimate lawsuits from being pursued, instead it encourages people to fix their Y2K problems instead of merely litigating them.[29] With large public and private resources being channeled into the preparation of the Y2K problem, a great deal of work is being done in every sector of the economy to minimize the time and costs involved in getting back to regular and predictable business after the turn of the century.

Prepared by JEC staff members: Chris Edwards (Sections I, II, and overall editing), Steve Schultz (Section III), Chuck Skipton (Sections IV and VIII), Angie Ritzert (Section V), Josephine Robinson (Section VI), and Lawrence Whitman (Section VII). Please contact Chris Edwards (224-0367) with any questions or comments.

[28] Press release from the Special Committee on the Y2K Technology Problem, "Senate Passes Dodd Bill on Y2K Litigation Reform," June 15, 1999.
[29] Press release from the Special Committee on the Y2K Technology Problem, "Senate Passes Dodd Bill on Y2K Litigation Reform," June 15, 1999.

APPENDIX 1. HIGH-TECH SUMMIT WITNESSES

Day One – June 14 - Highlight

Alan Greenspan; Chairman, Board of Governors of the Federal Reserve System
Louis V. Gerstner, Jr; Chairman of the Board and CEO, IBM Corporation
Roberta Katz; President and CEO, Technology Network
Craig R. Barrett; President and CEO, Intel Corporation
Edward J. Nicoll; President and COO, Datek Online Holdings Corporation
Judy G. Carter; President and CEO, SOFTWORKS, Inc.
Jim Barksdale; President, Barksdale Group
Sara Horowitz; Executive Director, Working Today

Day Two – June 15 - Explore

William H. Gates; Chairman and CEO, Microsoft Corporation
Richard Riley; U.S. Secretary of Education
Robert Holleyman; President and CEO, Business Software Alliance (BSA)
William Larson; President, CEO and Chairman of the Board, Network Associates
Dr. Eric Schmidt; Chairman of the Board and CEO, Novell, Inc.
Jeff Papows; President and CEO, Lotus Development Corporation
Jeremy Jaech; CEO, Visio Corporation
Dr. Charles Vest; President, Massachusetts Institute of Technology
Ariel Kleckner; Founder, President and COO, RedGorilla.com
John F. Keane; President, CEO and Chairman of the Board, Keane, Inc.
Michael J. Durham; President and CEO, The Sabre Group, Inc.
Gene Hoffman; Founder, President and CEO, EMusic.com

Day Three – June 16 - Advance

Scott McNealy; Chairman, President and CEO, Sun Microsystems
Marc Andreessen; Chief Technology Adviser, America Online, Inc.
Alfred R. Berkeley, III; President, NASDAQ Stock Market
John W. Sidgmore; Vice Chairman, MCI WorldCom; Chairman, UUNET
Morton Bahr; President, Communications Workers of America
Gordon Binder; CEO, Amgen, Inc.
Frank Carlucci; Chairman of the Board of Directors, Nortel Networks
James C. Morgan; Chairman and CEO, Applied Materials, Inc.
Esther Dyson; Chairman, EDventure Holdings, Inc.
Mark Benerofe; Executive Vice President and Chief Marketing Officer, Priceline.com
Dr. Lester Thurow; Lemelson Professor of Management and Economics, M.I.T.

APPENDIX 2.
HIGH-TECH ACCOMPLISHMENTS OF THE 105TH CONGRESS

Internet Tax Freedom Act

- Creates a national policy limiting state and local government interference of interstate commerce by establishing a three year moratorium on state and local taxes on Internet access services, online services, and communications.
- Establishes a public-private Advisory Commission on Electronic Commerce to study taxation of electronic commerce.
- Preserves the rights of states and local governments on future electronic commerce.

American Competitiveness Act

- Amends the Immigration and Nationality Act to assist the U.S. in remaining competitive by increasing the access of United States firms and institutions of higher education to skilled workers.
- Expands educational and training opportunities for American students and workers by authorizing $50 million annually in matching educational grants for mathematics, computer, and engineering degrees for disadvantaged, low-income students.
- Increases for 5 years the number of temporary work H1-B visas the United States grants each year for high technology workers.

Government Paperwork Elimination Act

- Enhances electronic commerce by promoting the reliability and integrity of commercial transactions through establishing authentication standards for electronic communications.
- Mandates that the federal government put its forms online and allows citizens to download them, sign them by use of digital signatures, and file them with the appropriate agency. Allows businesses to electronically store these forms.
- Enables citizens to avoid much of the current paperwork deluge and allows companies to save millions in storage and other costs. Most importantly, Congress is putting in the hands of American innovative private sector the power to improve and spread the technology the U.S. needs to secure state and national commerce.

Next Generation Internet Research Act of 1998

- Advances the current state of the Internet and university research capabilities, and assists federal agencies to achieve their missions.
- Creates a multi-agency program concentrated upon the research and development of a coordinated set of technologies that seeks to create a network infrastructure to support speed, robustness, and flexibility beyond what is available in the current implementation of the Internet.
- Develops a new high-speed testbed to deliver systems that are 100 times or more faster than what is currently available to Internet users.

Digital Signature and Electronic Authentication Law

- Authorizes a financial institution to use electronic authentication in business transactions if it has entered into an agreement to do so with a counterparty, or has established a banking, financial or transactional system using electronic authentication.
- Empowers the appropriate Federal or State bank supervisor to preclude the use of electronic authentication if it determines that such use is inconsistent with or threatens the safety and soundness of the institution.
- Prohibits a State government, agency, or instrumentality from acting as a digital certification authority or imposing fees with respect to electronic authentication services.

Tax Payer Relief Act of 1997

- Reduces the top capital gains rate from 28 to 20 percent for assets held at least 18 months.
- Allows individuals a 50 percent exclusion for the sale of certain small business stock acquired at original issue and held for at least 5 years.
- Allows individuals to roll over tax-free gains from the sale or exchange of qualified small business stock held for more than 6 months if the taxpayer uses the proceeds to purchase other qualified small business stock.

Securities Litigation Uniform Standards Act of 1998

- Enacts national standards for securities class action lawsuits involving nationally traded securities.
- Preserves the appropriate enforcement powers of State securities regulators.
- Encourages the adoption of State laws providing for reciprocal enforcement of subpoenas issued by another State securities commission.

Prepared by Senator Bill Frist's office.