

Digital Economy 2003



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I am pleased to release *Digital Economy 2003 (DE2003)*, the Commerce Department's fifth annual report on the performance of American industries that produce information technology (IT) goods and services, and the effects of IT on U.S. economic strength. This report furthers the Department's mission of providing economic measurement and analysis that supports improved decision-making by policy makers, business people, and the public at large.

America's businesses and workers have a special need today for sound economic information and analysis. With the President's economic policies expanding the public's opportunities for investment, entrepreneurship, and job creation, we need good information to make well-informed business decisions and better economic choices. Moreover, good decisions and a growing economy are particularly important now, when our national security is so closely linked to our continuing economic security and strength.

With the recession well behind us and the recovery gaining strength, we can begin to stand back and assess—more accurately than in the past—IT's role in promoting high performance in the Nation's most dynamic businesses and industries, and rapid and sustained non-inflationary growth in the overall economy. *DE2003* shows that IT-producing industries are once again at the forefront of national economic growth and that, on average, industries and firms that have invested most heavily in IT equipment achieve faster productivity growth than those that do not. In addition, IT seems to be enabling technological advances in other areas—biotechnology, for example—that promise continuing benefits in the years ahead.

DE2003 also shows that along with extraordinary benefits, IT presents an array of new challenges. These include especially the technical and legal challenges of creating conditions for the secure and effective use of IT to expand commerce, enhance business processes, and improve the quality and accessibility of government services. The first step in meeting these challenges, of course, is fully to understand them. *DE2003* is an important step on the way to creating such understanding.

A handwritten signature in black ink, appearing to read "Donald L. Evans". The signature is fluid and cursive, with a large initial "D" and "E".

Donald L. Evans

Executive Summary

After two years of retrenchment, IT-producing industries now show signs of resuming the dynamic role they played during 1996–2000.

- Evidence through the third quarter suggests that in 2003 IT-producing industries, which supply about 8 percent of GDP, will contribute about 0.8 percentage points of the estimated 2.9 percent rate of real U.S. economic growth.
- Performance varies by sector. IT service industries, which grew, though at a reduced rate, during 2001–2002, continued to grow at a moderate pace during 2003. Computer and semiconductor manufacturers are rebounding from major losses suffered in 2001–2002, but communications equipment makers show continued weakness.
- IT output is increasingly concentrated in IT services suggesting that future growth in the IT sector may be more modest and less volatile than in the past.

Use of IT continues to be a source of strength in the U.S. economy.

- Investment in and use of IT have played a major role in the recent strong labor productivity growth. From 1989 to 2001, IT-intensive industries experienced average annual labor productivity growth of over 3 percent—much faster than the 1.6 percent pace of the overall non-farm economy.
- Firm- and plant-level research by the Census Bureau’s Center for Economic Studies shows that a range of related factors affect IT’s role in productivity growth. In addition, the roughly 50 percent of U.S. manufacturing establishments that have computer networks also have higher productivity than manufacturing establishments without networks, even after controlling for many of the plant’s economic characteristics in the current and prior periods.
- The use of IT in life sciences R&D exemplifies the dynamic role IT can play in creating new economic opportunities. In bioinformatics (a new field created by the intersection of life sciences R&D with IT-enabled data processing capabilities), IT has expanded R&D horizons by enabling life scientists to acquire, manage, and analyze much larger amounts of and more complicated biological data. This has increased demands on IT producers for more advanced computers and software.

IT employment, which fell sharply during 2001–2002, has been slow to recover.

- Since 2000, the number of workers in IT-producing industries has declined by 11.2 percent (to 4.8 million workers) compared with a decline of less than 2 percent in all private industries. Workers in IT occupations (employed by all industries) totaled 5.9 million in 2002, 8 percent less than in 2000.
- Initially, IT job losses were concentrated in IT manufacturing industries and low-skilled IT occupations. However, the recent job losses have been widespread across almost all IT-goods and services producing industries, and across all IT skill levels.
- In 2002, the average annual wage for workers in IT-producing industries was \$67,440, down 1.3 percent from the average of \$68,330 for 2001. In contrast, the average annual wage for all private workers increased 1 percent to \$36,520. One explanation for this 85 percent wage premium in IT-producing industries is that most IT jobs tend to be high skilled.

U.S. IT producers remain the most competitive in the world.

- In 2002 (the most recent year for which data are available), estimated sales by U.S. IT companies and their overseas affiliates topped \$1 trillion, even as the United States experienced a record foreign trade deficit in IT. The United States remains the world's largest exporter of IT goods and services.
- The side-by-side occurrence of world-class U.S. IT-producing companies and the Nation's chronic deficit in IT goods trade appears to be largely a result of the globalization of production and distribution of IT goods and services—especially the tendency of U.S. IT companies to supply foreign and American markets from off-shore production centers, and the increasing incidence of intra-firm IT trade.

Ongoing challenges to U.S. IT producing companies cannot obscure the immense and still growing importance of IT in economic and other dimensions of social life.

- The digital revolution has altered our relationship with information itself. We now expect that any information we need will be easily and almost instantaneously accessible. IT has enabled new channels for interaction—both for individuals and businesses. Many transactions are now conducted online (e-commerce) and firms are improving business processes through increased use of IT (e-business).
- These remarkable developments also create new challenges—especially challenges to the security of individual identity—that have created a need for new security tools.

Digital Economy 2003

Economics And Statistics Administration

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Preface

Kathleen B. Cooper, Under Secretary for Economic Affairs

Digital Economy 2003 (DE2003) is the Department's fifth annual report on conditions in U.S. information technology (IT) industries and the effects of IT on national economic performance. Each of these reports has addressed questions that economists have sometimes found difficult to answer. Early nineteenth-century economists earned a reputation as practitioners of the "dismal science" by underestimating the ability of technological innovation to drive faster than expected economic growth. This year, the basic analytic challenge has been complicated by an atypical recovery. Productivity growth has been remarkably strong, output growth has gathered impressive momentum, and prices remain low. But employment has lagged. DE2003 examines IT's role in these unusual developments.

Important developments that we anticipated (or hoped for) in our 2002 report have come to pass. Renewed IT investment and strong if selective growth in IT-producing industries have helped the sector reassert its role as an engine of economic growth. In addition, strong productivity growth during and after the 2001 recession has answered the challenge posed four years ago by Robert Solow when he suggested that IT's enduring effects on productivity would be clear only when the economy had weathered its first IT-era recession.

DE2003 shows that: (i) recovery in IT-producing industries and increased use of IT throughout the economy are once again helping to drive very rapid productivity and output growth; (ii) employment growth in IT industries and IT occupations has yet to recover; (iii) highly competitive U.S. IT-producing industries are globally integrated; and (iv) even as we begin to take its presence for granted, IT continues to alter our lives, expanding our choices, and presenting us with new opportunities and challenges. In short, our continuing study shows that the digital era is living up to many of our expectations and hopes. But there is much more to understand about IT's role in our growing and changing economy.

