

SOFTWARE AND INFORMATION  
**DRIVING THE GLOBAL  
KNOWLEDGE ECONOMY**



SOFTWARE AND INFORMATION INDUSTRY ASSOCIATION



## ABOUT THE STUDY

This study was prepared by Content First, LLC, in conjunction with the Software & Information Industry Association (SIIA). The purpose of this report is to collect and disseminate objective data about the economic contribution of the software and information industries to the U.S. and world economies.

## ABOUT SIIA

The Software & Information Industry Association is the principal trade association for the software and digital content industry. SIIA provides global services in government relations, business development, corporate education and intellectual property protection to the leading companies that are setting the pace for the digital age. [www.sii.net](http://www.sii.net)

## ABOUT CONTENT FIRST

Content First, LLC, is a full-service public policy research firm in Washington, D.C., that utilizes a unique process of melding solid research and analysis with presentation and communication to bring advocacy data, industry statistics and policy research to life for trade associations, businesses, law firms, consulting firms and the public affairs community.

Michaela D. Platzer, president of Content First, LLC, brings more than 20 years of public policy research experience to her firm acquired as vice president, research and policy analysis for the American Electronics Association; manager, European affairs, for the U.S. Chamber of Commerce; and international economist for the Embassy of the Republic of South Korea. She has authored numerous publications, including recent economic and policy reports for the American Society of Association Executives, the National Venture Capital Association, the Transatlantic Business Dialogue, the Representative of German Industry and Trade, the Organization for International Investment, the U.S. Chamber of Commerce and the Korea-U.S. Business Council. She has a master's degree from The Johns Hopkins School of Advanced International Studies and a bachelor's degree from the University of California at Davis

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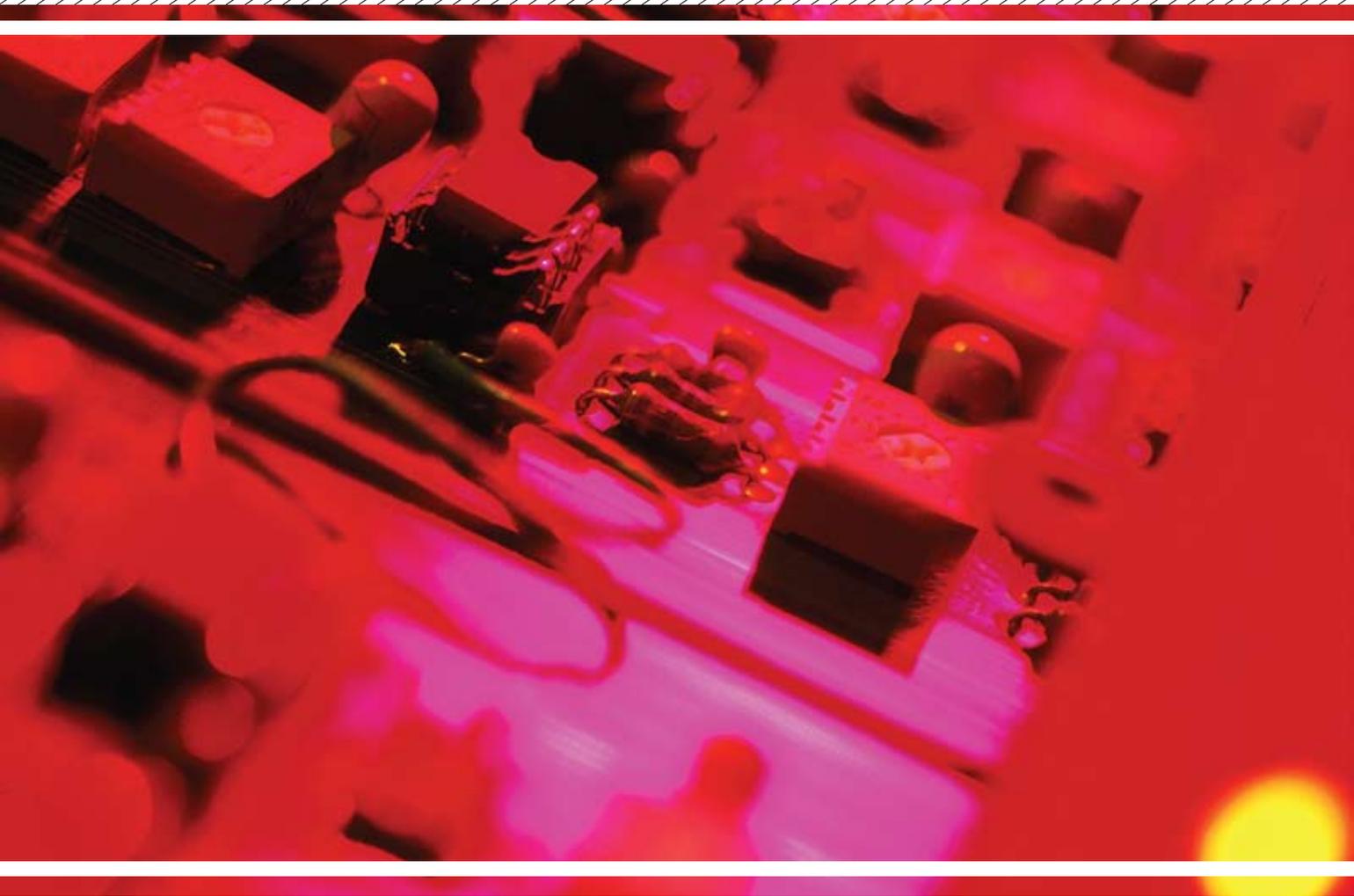
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**INTRODUCTION**



Since the 1990s, the rise of the Internet and proliferation of information technology (IT) have combined to create a global networked infrastructure. This infrastructure has, in turn, accelerated the development of a new global “knowledge economy,” where business models are more often driven by expertise and intellectual capabilities and based on networking, connecting and collaborating. In the global knowledge economy, national economies are, in many ways, inseparable from the larger global economy, and the United States is more dependent on the rest of the world than ever before.

The software and information industries are key drivers of the new global knowledge economy. As such, they are among the fastest-growing and most important industries of the U.S. and world economies. These industries publish and distribute information,<sup>1</sup> provide software applications<sup>2</sup> and related Web-based services and create the needed infrastructure and tools to further today’s software and information-based economy.<sup>3</sup> Well-known firms such as Adobe, Bloomberg, Google, Oracle, Salesforce.com, Sun Microsystems, the McGraw-Hill Companies and Thomson, along with thousands of lesser-known companies, create transformative products and services at the leading edge of innovation.

Increasingly, software and information products are converging. Just a decade ago, the software industry distributed its products encoded on disks, while the information industry published content predominantly in printed

form or through proprietary telecommunications networks. The evolution and growth of technology over the last decade, driven by the emergence and ubiquity of the Internet, has led to a substantial convergence of software and information products and services. The Internet-based global network is driving a confluence of information and software, breeding new-look offerings and companies that combine the value proposition of each. Today, it is rare to find a software application without robust information content or to access digital information content that is not delivered or powered by software.

The Software & Information Industry Association (SIIA) produced this report to measure the substantial economic impact of the software and information industries on the U.S. and global economies. This report provides much-needed data to help inform policymakers and thought-leaders seeking to understand and develop policy and regulatory frameworks promoting strong growth, innovation and continued U.S. global leadership in the increasingly competitive global knowledge economy.

# EXECUTIVE SUMMARY



This report is based on the best available data from public sources, including U.S. government statistics, as well as market research reports and other information in the public domain to provide the most accurate measurement of the substantial impact of the software and information industries on the U.S. and world economies. Specifically, this report uses data and empirical analysis to demonstrate how the software and information industries contribute greatly to U.S. economic growth and job production, represent a disproportionate share of U.S. global trade and influence and transform the business models and user experiences across all sectors of the economy. Finally, the report assesses the opportunities for continuation and expansion of these trends and concludes that a positive public policy climate – one containing supportive regulatory, legal and trade frameworks – is critical.

## Transforming the U.S. and Global Economies

The software and information industries are playing the leading role in the digital revolution that is transforming all sectors of our society and of the U.S. and global economies. From financial services to healthcare and from education to entertainment, software and information technologies are improving efficiency and productivity, while providing increased customization and choice. These technologies are improving processes and value chains for businesses and other enterprises, resulting in more efficient and effective management. Individuals are empowered, gaining increased access, building community and advancing mobility.

Notable, as examples, are the impact of software and information products and services in the financial services, education and healthcare sectors. Technologies have made it easier for consumers to access financial information and services, for markets to trade stocks and commodities and for service providers to deliver superior offerings and create new distribution channels. The need to improve quality and improve cost efficiency in healthcare is driving the use of advanced information technology, including the management of digitized medical records. Educational institutions are using software and information technologies to provide more timely, flexible, engaging and personalized learning, while learners of all ages are enrolling in virtual schools so their education is no longer constrained by schedules or geography.

All sectors of our society and economy are experiencing unprecedented innovation and productivity through the use of software and information. In the United States, IT was responsible for two-thirds of total factor growth in productivity between 1995 and 2002 and virtually all of the growth in labor productivity.<sup>4</sup> Software and information products and services are at the heart of this growth. The ongoing digital revolution will continue to spur innovation and growth, providing significant new market opportunities for not only the software and information producers but also for their enterprise and individual customers.

## Driving U.S. Job Creation and Economic Growth

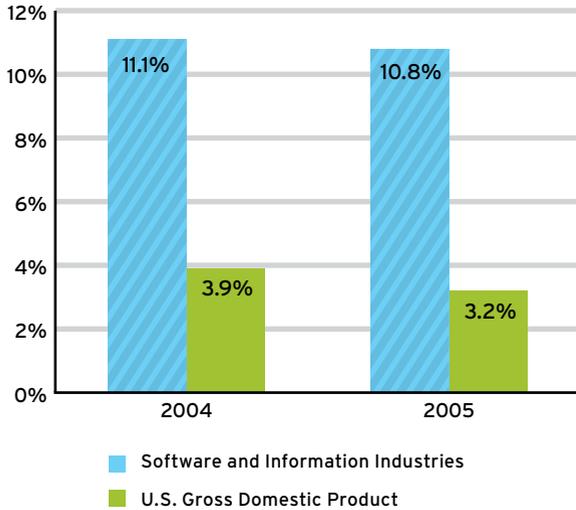
America's software and information industries are dynamic and evolving, with an economic impact far greater than their relative share of the overall U.S. economy. The software and information industries generate millions of high-wage jobs, with revenue and job growth far exceeding that of the U.S. economy as a whole.

**Software and Information Industries are Growing Faster than Other Leading Industries and the Overall U.S. Economy.** The rate of growth in the software and information industries has significantly outpaced that of the U.S. economy as a whole, thus helping to sustain the expansion of the overall economy.

The nation's software and information industries grew more than three times faster than the overall U.S. economy in 2005, with growth of 10.8 percent compared with 3.2 percent for U.S. Gross Domestic Product. And in 2004, these industries grew 11.1 percent compared with 3.9 percent for GDP.

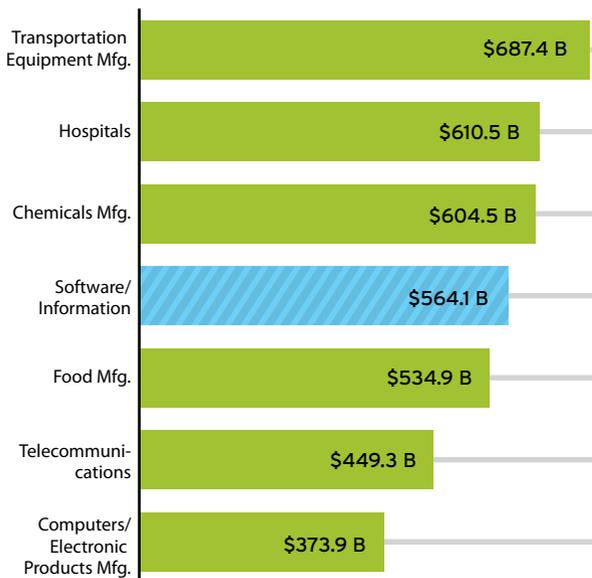
Revenues generated by the nation's software and information industries reached \$564 billion by 2005, up by more than 10 percent since the beginning of this decade. When comparing the software and information industries with other major U.S. industries by revenue, the data reveal that software and information rank among the leading industries in the country.

Growth in the Software and Information Industries vs. Growth in U.S. Gross Domestic Product, 2004–2005



Source: U.S. Bureau of Economic Analysis

Software and Information Industries Compared with Other Leading Industries by Revenue, 2005



Source: U.S. Census Bureau

**Software and Information Industries Generate Millions of Jobs for Americans, with Growth Outpacing Many Leading Sectors.**

The U.S. software and information industries employed more than 2.7 million Americans in 2006. Net employment by these industries grew by 17 percent between 1997 and 2006, adding more than 400,000 jobs.

The software and information sectors are among the nation's fastest-growing industries when measured by job growth in comparison to other industries. The industries' job gains were outpaced – and then only narrowly – by only a few other industries in the U.S. economy. The strong gains in employment by the software and information industries also contrast sharply with the decline in jobs in many of the nation's major industries, including transportation equipment manufacturing (-13%), computer and electronic product manufacturing (-27%), telecommunications (-8%) and chemical manufacturing (-13%) sectors, which all saw their employment base drop between 1997 and 2006.

The Bureau of Labor Statistics predicts there will be more than two million job openings in software and information occupations between 2006 and 2016.<sup>5</sup> For example, the demand for computer software engineers, just one of the key occupations in these industries, will increase by 450,000, with the total number of jobs in this occupation reaching nearly 1.2 million by 2016.

**Software and Information Industries Create High-Wage U.S. Jobs.**

Employees working in the nation's software and information industries are well-compensated. They earn among the highest wages in the country. The annual average wage paid in the software and information industries was \$75,400 in 2006, 78 percent higher than the 2006 annual average wage for all private-sector workers, which was \$42,400. Wages in the software and information industries were higher than wages in other major industries such as telecommunications (\$67,400) and manufacturing (\$51,400).

Nationwide, the statistics also reveal that since 1997, the annual average wage in the software and information industries surged by 18 percent. By comparison, average private sector wages increased by 10 percent, adjusted for inflation.

**Competing Successfully Around the World**

Extending well beyond the U.S. market, American firms comprising the software and information industries are world leaders in economic growth, experiencing strong

sales and revenue growth selling products and services in markets around the world.

Today, many American software and information companies earn a substantial percentage of their total revenue outside the United States, in some cases more than half. American companies, both large and small, are helping to meet the insatiable global demand for new software and information products and services. The global demand is widespread, from the sophisticated European marketplace to the newer and rapidly growing Chinese and Indian markets.

**Direct Sales Through U.S. Affiliates Abroad is Largest Component of Trade Generated by the U.S. Software and Information Industries.** Rather than exporting from the United States, many U.S. software and information firms sell their services directly in foreign markets through their affiliates abroad. In fact, such direct sales represent a substantial share of international trade in software and information. A local presence is often advantageous because an overseas subsidiary is better positioned than the parent company located in the United States to design and distribute software and information services tailored to local market conditions and requirements.

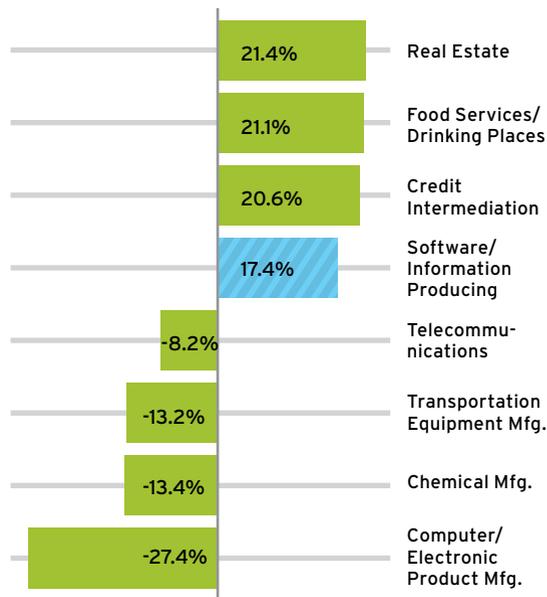
In 2004, total overseas sales (all U.S. industries) through affiliates was \$483 billion. The U.S. software and information industries represented 13 percent of this total, establishing these industries as important drivers of continued U.S. economic growth.

**U.S. Cross-Border Exports of Computer Software and Information Services Growing Steadily.** The American software and information industries also export their products and services directly from the United States. Cross-border exports represent a smaller, but important, part of overseas trade generated by the U.S. software and information industries. These direct export sales reached almost \$19 billion in 2006, representing a jump of more than 30 percent from the \$14.3 billion in 2000.

**Global Business Trends and ICT Growth Promise Steady International Growth**

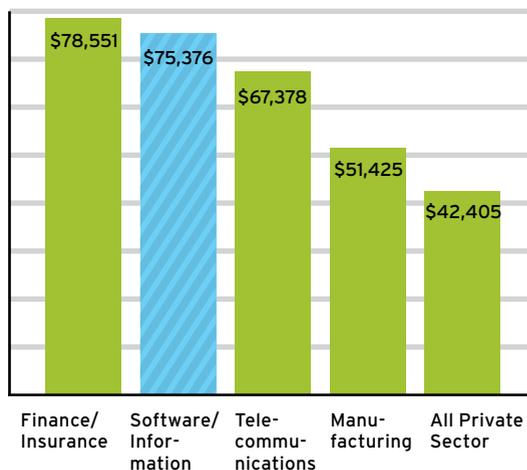
The global market for Information & Communication Technology (ICT) is very substantial and growing strongly. Although ICT refers to the broader measure of “information technology” that covers such things as computers, software, telecommunications and systems design, it includes a measurement of global spending for software and computer services, and as a whole,

Software and Information Employment Growth Compared to Other Industries, 1997-2006



Source: U.S. Bureau of Labor Statistics

Software and Information Sectors by Annual Average Wage, 2006



Source: U.S. Bureau of Labor Statistics

the ICT market creates an infrastructure that propels the digital information market.

- Global ICT spending reached nearly \$3 trillion in 2005 and is expected to grow to approximately \$4 trillion in 2008.
- Fully one-third of all ICT spending is for computer software and computer services. The United States is a global leader in computer software and computer services expenditures, and the large, rapidly growing economies of Brazil, Russia, India and China are increasingly important markets for software and information.

## Promoting Continued Innovation and Growth

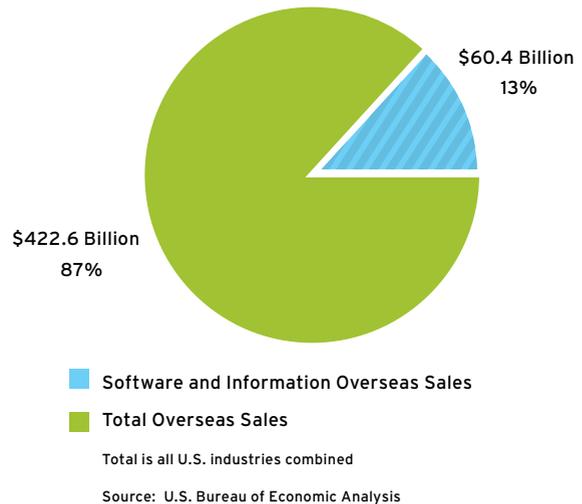
As the economic data illustrate, the software and information industries are critical to growth of the United States economy. While the innovation in these sectors is helping the United States continue as a global economic leader, there is little room for complacency. Sustaining – and growing – the significant economic and job impact delivered by the software and information industries will require a supportive public policy environment. Maintaining this environment is dependent on the following critical factors:

### Education, Training and a High-Skilled Workforce.

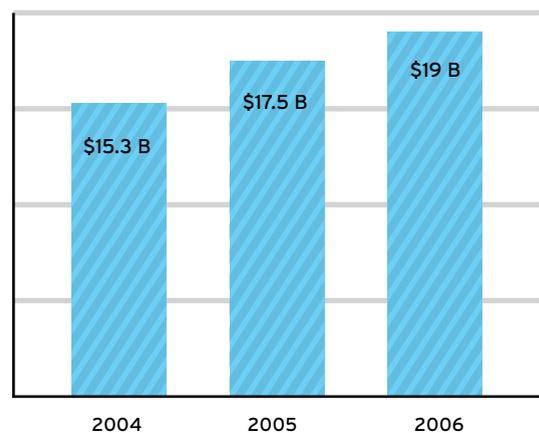
Human capital is the fuel to innovation. Over the next decades, the nation's software and information industries will need a highly educated and skilled workforce. To remain competitive, the United States must both invest in science, technology, engineering and math education, as well as reform immigration policies to attract and retain highly skilled workers from around the world.

**A Regulatory Model Recognizing New and Evolving Business Models.** The national and global regulatory environments have been unable to keep pace with the rapid transformation in the production, marketing and distribution of software and information. Governments have been challenged to address the vital issues of privacy, security and taxation. Going forward, regulations must continue to be based on the least-restrictive approach, refrain from choosing one business model to the exclusion of others and, wherever possible, rely on meaningful self-regulatory compliance efforts that build confidence in the marketplace.

U.S. Software and Information Overseas Sales Through Affiliates, 2004



Cross-Border Exports of U.S. Computer Software and Information Services, 2004 to 2006

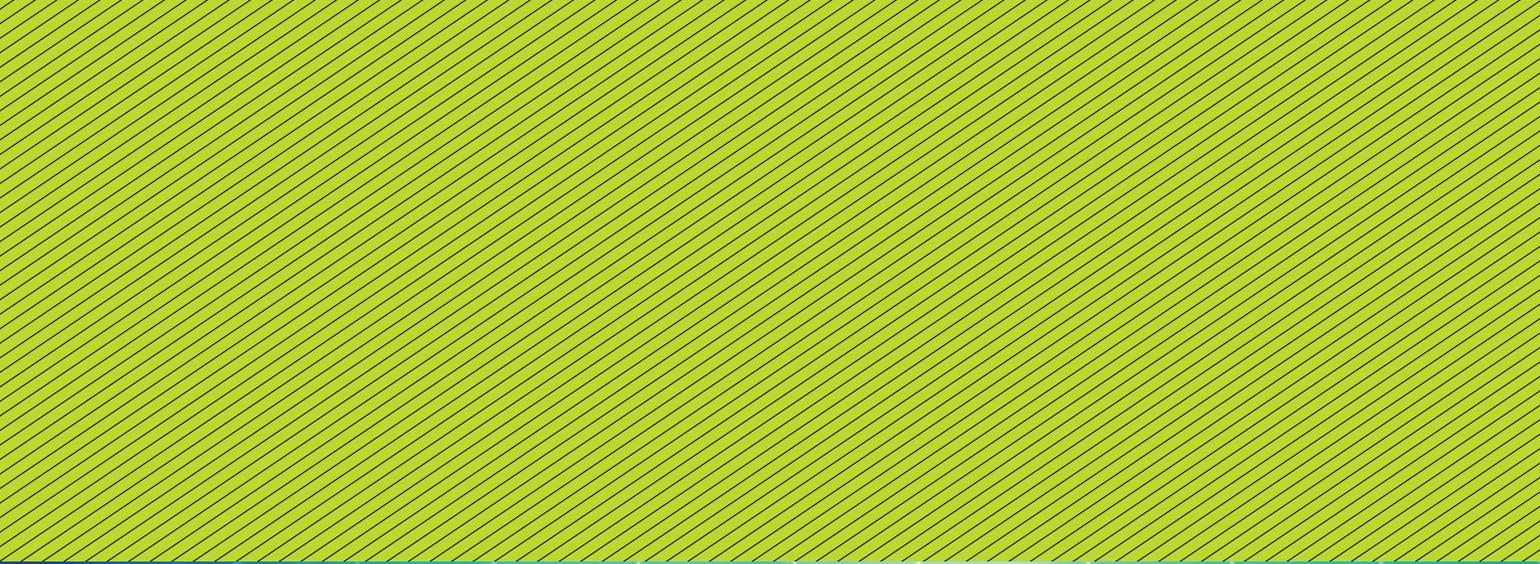


Source: U.S. Bureau of Economic Analysis

**Dissolving Barriers to Cross Border-Trade.** The ability to distribute software and information products electronically, rather than through traditional physical media, challenges the traditional approaches to trade facilitation. The United States, through meaningful trade policy, as well as multilateral, bilateral and regional trade initiatives, must ensure continued, full-market access for U.S. software and information products, without bias to whether they are delivered, distributed, used or transported in physical or electronic form.

**Strong Intellectual Property Protection.** The U.S. software and information industries depend on a meaningful international framework to protect the industries' intellectual property, including copyrights, trademarks and patents. There is a critical need for an enforcement regime that deters infringement, piracy and counterfeiting, while encouraging local investment and employment.

**Continued Advances in Computer Access and Broadband Penetration.** Broadband penetration is critical to the delivery of and access to increasingly sophisticated digital information products and software applications, either through high-speed Internet connections or wireless networks. The U.S. must continue to maintain strong broadband penetration and unrestricted access to rich Internet content.



# SOFTWARE AND INFORMATION INDUSTRIES: AT A GLANCE

## High-Quality Job Growth

- Generate millions of jobs, employing more than 2.7 million Americans in 2006. Jobs in the software and information industries have grown by 17 percent between 1997 and 2006, adding more than 400,000 jobs over the period.
- Pay an annual average wage 78 percent higher than the annual average wage for all U.S. private sector workers, \$75,400 vs. \$42,400. Over the last decade, wage growth was 18 percent for software and information industries compared with a 10 percent average growth across all industries.
- Produce significant job growth in key software and information occupations. For example, jobs for computer software engineers alone will increase by almost 450,000, with the total number of jobs in this occupation expected to reach nearly 1.2 million by 2016.

## U.S. Economic Growth

- Experience recent growth nearly three times that of the overall U.S. economy. In 2005, industry growth was up by nearly 11 percent compared with 3.2 percent for the economy as a whole.
- Generate substantial revenue that ranks among the leading U.S. industries. Software and information generated \$564 billion in revenue in 2005, an increase of 7 percent from 2004.

## Global Competitiveness

- Lead other industries in sales through overseas affiliates, with more than \$60 billion in sales representing 13 percent of the \$483 billion total (all U.S. industries) overseas sales through affiliates in 2004.
- Produced direct export sales of almost \$19 billion in 2006, representing an increase of more than 30 percent from 2000, as companies shift to reliance on foreign markets for ever-larger portions of their total revenue.

These statistics are based on objective U.S. government measures. They reflect the last year available for each indicator at the time this publication was prepared.

# PART I

## TRANSFORMING THE U.S. AND GLOBAL ECONOMIES

Over the last decade, the software and information industries have proven to be strong drivers of U.S. economic growth and job creation. To understand why these industries have flourished and why the prospects for continued growth remain strong one must appreciate the leading role software and information products and services play in the digital revolution that is transforming the U.S. and global economies.

Today's economy is knowledge-dependent, with software and information products and services largely driving innovation and productivity. Computing power, memory and access have become increasingly affordable, fast and networked. Combined with the global network provided by the Internet, advances in software and digital information products and services have launched a new era of Web-based computing that has fueled real productivity growth and increased innovation.

According to a recent report by the Information Technology and Innovation Foundation, the widespread dissemination of IT and telecommunications hardware, software and services has increased worker productivity three to five times more than non-information technology capital (e.g., buildings and machines).<sup>6</sup> In the United States, IT was responsible for two-thirds of total factor growth in productivity between 1995 and 2002 and virtually all of the growth in labor productivity.<sup>7</sup>

From accounting and inventory management to personnel and production schedules, businesses and other enterprises have increased their efficiency and effectiveness through digitization. Customers, both individuals and enterprises, have been empowered to innovate and produce at accelerated rates made

possible by software- and digital-information-powered technologies.

Software boosts productivity by enabling organizations to automate certain functions, freeing up time to create value in other tasks. Software also allows organizations to fundamentally re-engineer processes and help firms use capital and resources more efficiently.<sup>8</sup> As a result, electronic commerce has lowered barriers to entry, reduced sales and distribution costs, improved customer service and ultimately increased competition to better meet market demands.

The digitization of information is improving access to that data, while also enabling value-added aggregation, synthesis and customization. Databases, periodicals, newswires, market research, financial data and reference materials have all migrated to the Internet, where information can be fluidly recombined, personalized and delivered anywhere and at anytime. Software-powered mobile devices are liberating individuals by providing real-time access to communications and information from the field, accelerating most tasks to improve productivity. As illustrated by the examples in this section, software and information are driving the digital revolution across virtually all sectors of the economy.

### Enabling Financial Services in Real Time

Perhaps no sector of the "old" economy has been more directly affected by IT than the financial-services sector. Technology has made it easier for consumers to access financial information and services, for markets to trade stocks and commodities, and for service providers to deliver superior offerings and

create new distribution channels. The software and information industries have powered this transformation.

The average citizen is now empowered through instant access to specialized information that once was available only to bankers, brokers and financial-services professionals. Individuals can execute trades and perform other financial functions that once required an intermediary. The financial-services industry could not provide the level of service it does today without the support of the software and information sectors, which facilitate the rapid and reliable flow of accurate information that is current to the moment.

From stock exchanges to brokers to investors, every component of the banking and financial-services sector has come to rely upon real-time access to every trade and every timely news item affecting financial decisions. It is inconceivable for professionals in the financial services sector to wait for printed news, telephone calls or even mail to provide information.

In short, software and information have become essential to financial services. That is why the banking sector continues to invest in the digital future, spending more than \$240 billion in 2007 alone on information technology (including hardware, software, information technology services, Internet services and telecommunications).<sup>9</sup>

## Transforming Healthcare

The U.S. healthcare sector has been slower to fully embrace new IT, investing just 2 percent of its revenue in IT, while other information-intensive industries, such as the financial-services sector, invest closer to 10 percent.<sup>12</sup> Increasingly, however, healthcare is undergoing a digital conversion.

Several trends are driving the healthcare industry to embrace information systems, including:

- The need to digitize information
- The restructuring of the healthcare industry to be more efficient
- The need to improve quality and reduce preventable errors
- The continuing advances in information technology<sup>13</sup>

Increasingly, the healthcare industry is investing in information technologies to enable the transition to electronic medical records. According to Plunkett Research, healthcare records technologies are the second fastest area for information technology

## NASDAQ: Developing the Electronic Stock Market

The National Association of Securities Dealers Automated Quotations, more commonly known as the NASDAQ Stock Market, is a floorless stock exchange, with some 3,200 listed companies. It trades approximately two billion shares daily and handles more initial public offerings (IPOs) than any other U.S. exchange.<sup>10</sup> Unlike other stock exchanges, NASDAQ's electronic screen-based equity securities market isn't a physical place; it is a virtual market.

Since its inception, the NASDAQ Stock Market has been at the forefront of innovation, using technology to bring millions of investors together with the world's leading companies across all business sectors from technology, retail and communications, to financial services, transportation, media and biotechnology. NASDAQ achieved so much so quickly because it was constantly evolving to meet the changing needs of its investors and of public companies.

When it began trading in 1971, NASDAQ was the world's first electronic stock market. At the beginning it was merely a computer bulletin board system and did not connect buyers and sellers. Most trading was actually done via the telephone. This changed when, during the October 1987 stock market crash, it became evident that brokers often did not answer their phones. To solve this problem, NASDAQ established the Small Order Execution System (SOES), which provides an electronic method for dealers to enter their trades.<sup>11</sup>

Over the years, NASDAQ's trade and volume reporting and automated trading systems have revolutionized the global exchange sector. The year 2004 was a landmark for NASDAQ, as it surpassed the New York Stock Exchange in annual share volume. Today, NASDAQ is the most efficient stock exchange in the world.

## Thomson Healthcare: Improving Medical Performance

Software and information companies support the nation's healthcare industry by providing the information systems it needs to access health information, electronic medical records and other medical data to improve medical performance. Thomson Healthcare is one example of a company that recognizes how essential information and knowledge management tools are in helping organizations across the healthcare industry improve clinical and business performance. Its products include comprehensive healthcare databases, analytics, professional services and research services – all of them designed to help professionals make better decisions faster. Organizations across the healthcare industry rely on Thomson Healthcare to diagnose and treat patients wherever they may be and to improve clinical, financial and operational performance.

For example, the American Heart Association/American Stroke Association and Thomson Healthcare have jointly developed a new process allowing hospitals to participate more efficiently in the American Heart Association's initiative, Get With The Guidelines (GWTG), an acute care, hospital-based program that helps to manage risk factors in patients. Thomson Healthcare's Core Measures software allows hospitals to transfer patient data for acute myocardial infarction and heart failure directly into the GWTG Patient Management Tool™. This eliminates the need for duplicative entry of data and helps hospitals close the gap between recommended treatment and actual treatment of patients with coronary heart disease, stroke and heart failure.

growth after the U.S. government.<sup>14</sup> Additionally, Radio Frequency Identification (RFID), a technology enabling wireless computerized tracking of inventory, is beginning to make hospital inventories more manageable.

Indeed, the application of software and information to the healthcare industry has the potential to produce enormous cost savings and significant improvements in healthcare itself. Most importantly, better computer systems can help prevent medical errors and save lives. The Institute of Medicine estimates that preventable medical errors, from unplanned drug interactions for instance, kill between 44,000 and 98,000 people each year.<sup>15</sup> Digitization, led by software and information products and services, can help prevent fatal errors commonly caused by faulty systems or even by illegible handwriting. The push toward digitization of the healthcare industry creates significant opportunities for software and information companies.

## Advancing Personalized Education

To meet the needs of today's knowledge-based, global economy, educational and training institutions are using software and information technologies to provide more timely, flexible, engaging and personalized learning. From elementary school to the corporate boardroom, students of all ages are increasingly learning in a 21st century "virtual classroom." For some, virtual schooling enables anytime, anywhere, anyplace learning so education is no longer constrained by schedules or geography. For others, the physical classroom is augmented by software and digital content that empowers and engages students and instructors alike.

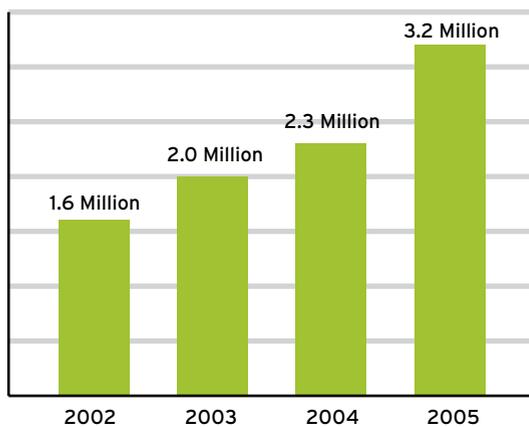
Software and information stimulate and advance personalized learning in many different ways. Through computer-based assessment, interactive and adaptive courseware and virtual tutors (both artificial and human), instruction can respond in real time to each student's specific learning needs and style. Simulation software, compelling digital content, virtual learning and other multimedia bring the curriculum alive for students for whom the chalkboard and textbook are no longer sufficiently engaging. Through virtual learning communities, software and Web-based resources empower students and teachers to explore, share and test ideas and to create new knowledge.

And, just as businesses have harnessed the power of technology, schools and colleges are discovering the benefits of software and information technologies to manage complex educational enterprises more efficiently.

The data below testify to the continuing transformation of education through software and information technologies:

- 80 percent of curriculum directors in the nation's 2,500 largest school districts believe textbooks will gradually be replaced by a new generation of electronic instructional materials.<sup>17</sup>
- An estimated 700,000 K-12 students were enrolled in distance learning in 2005-2006. These data indicate that online learning in K-12 schools has increased more than tenfold in six years.<sup>18</sup>
- In postsecondary education, nearly 3.2 million students were taking at least one online course during the fall 2005 term, a substantial increase over the 2.3 million reported the previous year.<sup>19</sup>
- For the 2004-2005 academic year, public colleges and universities projected an average budget in-

**Growth in Online Learning in U.S. Higher Education by Number of Students, 2002-2005**



Source: The Sloan Consortium

## Oracle: Streamlining Hospital Purchasing to Save Lives

Healthcare is moving toward a day when the industry will be able to access information and health-related applications freely and securely using nothing more than a Web browser. Companies such as Oracle are at the forefront of the move to provide the healthcare industry with the information-based software solutions it needs to access health information, electronic health records and other medical data.

Software can save lives by tracking medical supplies. After all, it is critical for healthcare providers to have the right medical supplies on hand – at the right place and at the right time. This can literally mean the difference between life and death.

Prior to adopting Oracle's PeopleSoft Enterprise applications, the medical staff at Health First, the largest not-for-profit healthcare system on Central Florida's eastern seaboard, often found that the supplies needed for a surgical procedure were not on the supply cart and that the supplies on the cart were not what they needed. The problem was that medical staff would grab what they needed from the supply cart and go. That practice has been changed by using PeopleSoft. Health First's financial and supply chain systems administrator says: "Now, they just scan their badge on a cordless handheld scanner, enter the patient's name on the touch screen, scan the item, and go." The entire process takes 10 seconds per item, ensures more accurate chargeback and gives Health First better visibility into its overall medical spending.

## Blackboard: Creating the Digital University

If you're a college educator, administrator or student these days, there is a good chance you've encountered the products of Blackboard, which has been helping to transform higher education since the company's founding in 1997.

With revenues in 2006 of \$183.1 million, Blackboard has become one of the major providers of software applications to U.S. postsecondary institutions, which make up 62 percent of its revenue base. By the end of 1998, it had 26 licensed clients for one software application; by December 2006, the company had 3,400 clients using more than 4,700 licenses of multiple software applications.

Through the company's software applications, postsecondary institutions are integrating technology into the modern learning experience. Professors can now assign digital materials to students, manage course communications, create and score online assignments and tests and report grades, while students can now collaborate and communicate on team projects or assignments more easily than before.

In addition to higher education institutions, Blackboard also serves primary and secondary schools, corporations, governments and textbook publishers. The company's customer base is primarily in the United States, but its acquisition of WebCT in 2006 has expanded the company's international presence. In 2006, international revenues represented 19 percent of Blackboard's total revenue. The Blackboard Learning System, which is used for online learning in postsecondary institutions, is now offered in multiple languages, including English, German, Japanese, Arabic and Chinese.

## McGraw-Hill: Changing the Way We Learn

Formed in 1909 from the merger of two companies, McGraw-Hill has long been known for its excellence in educational publishing. As it looks forward, the company, which has expanded to cover education, financial services, and information and media, is looking to be both more digital and international. The company's evolution is a reflection of the way in which digital information is changing the educational landscape.

In response to growing demand for lifelong learning, McGraw-Hill's higher education and professional publishing businesses are integrating technology into their offerings. In 2006, the company introduced 40 new online courses and plans on adding more to respond to the needs of higher education institutions. McGraw-Hill Education is expanding delivery of its products through iPods, PDAs and other mobile devices.

For elementary school-age children, the company is developing technology-driven programs to facilitate individual learning, particularly by those children with below grade-level proficiency.

crease of 30 percent for academic software and 2 percent for administrative software over the previous year. For private colleges and universities, academic software budgets increased 43 percent, and administrative software budgets increased 34 percent from the previous year.<sup>20</sup>

- More than 36 percent of the leading organizations in workforce training use technology to deliver their services. At least 60 percent of technology-based learning was online in 2005, and almost 90 percent of online learning was self-paced.<sup>21</sup>

## Improving Business Process Across All Sectors

Beyond financial services, healthcare services and education, software and information are changing the way business is conducted in companies, large and small, across all industries. Processing payroll, accounting or tax preparation by hand is no longer conceivable. Effective management requires that all processes be completed as efficiently as possible - and that means using a process that combines information and software, either in-house or over the Internet, to get the job done quickly and correctly. New Web-based applications provide firms of any size access to capabilities that were once the province of only the largest firms.

## Salesforce.com: Improving Service with Customer Relations Management via the Web

The history of Salesforce.com demonstrates the opportunities the Internet and broadband penetration have created and the transformative effect of software solutions for business. Ubiquitous broadband networks and high-speed wireless networks for the first time have given rise to meaningful alternatives to bulky and costly personal computers. In their place are a proliferating collection of smart connected devices that are tied together by a vast array of Internet-based information services based in centralized data centers.

For example, the industry is now rushing to software-as-a-service (SaaS) models with firms such as Salesforce.com, a San Francisco-based company that sells business applications delivered via Web browsers. The global SaaS market is expected to grow to \$19.3 billion by 2011, tripling in size from \$6.3 billion in 2006, according to Gartner, a market research firm.<sup>22</sup>

Earlier customer relationship management (CRM) software was delivered through the client/server model, which often put it beyond the reach of small and mid-sized companies, because it was difficult to deploy and use and carried a high total cost of ownership. The spread of the Internet and decline in the price of computer technology and telecommunications paved the way for new customer relationship management solutions, which Salesforce.com has successfully promoted.

Salesforce.com offers enterprise applications via the Internet and has recently introduced Force.com, the world's first on-demand platform, which enables customers, developers and partners to build powerful new on-demand applications that extend beyond CRM to deliver the benefits of multi-tenancy across the enterprise. The company has been recognized as a global market and technology leader for its SaaS applications, with a customer base that has grown to approximately one million subscribers. Salesforce.com currently offers applications in 14 languages for clients around the world.

## PART II

# DRIVING U.S. JOB CREATION AND ECONOMIC GROWTH

The software and information industries are major drivers of U.S. job creation and economic growth. By nearly all measurements, these industries have an economic impact far greater than their share of the entire American economy.

Dynamic companies such as Adobe, Blackboard, Google, Intuit, the McGraw-Hill Companies, Oracle, Salesforce.com, Symantec and Thomson are among the countless software and information businesses reshaping the American economy with their innovative products and services, while creating well-paying jobs across the country and playing a central role in the U.S. economy's current health and future prosperity.

This section of the report examines the direct economic impact of the software and information industries on the American economy. U.S. government databases have been mined to provide a snapshot of these important sectors of the U.S. economy. Data are presented on the industries' jobs, wages, revenue and contribution to gross domestic product (GDP) growth.

### Generating Millions of High-Wage Jobs for Americans

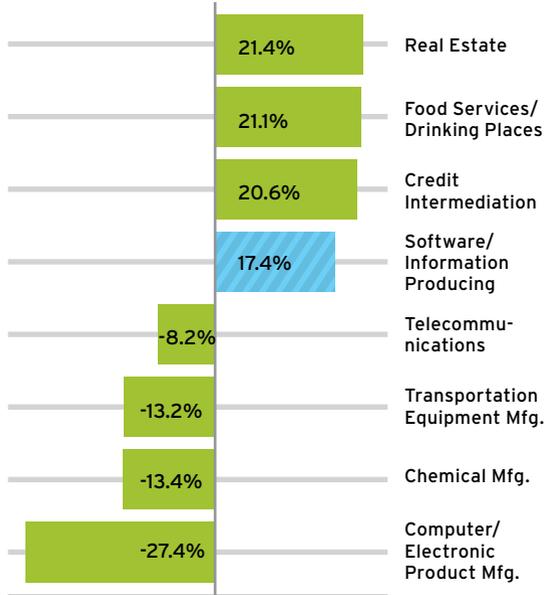
The U.S. software and information industries employed more than 2.7 million Americans in 2006, compared with the 2.3 million Americans working in the software and information industries in 1997. This addition of more than 400,000 high-wage jobs, a 17 percent net increase in the industries' employment base, is nearly double the 10 percent increase in total U.S. private sector employment since 1997. This highly

skilled workforce develops, designs, manufactures, operates, repairs, services and maintains the software and information products and related infrastructure that support everything from e-commerce to network-related activities.

**Software and Information Industries' Job Growth Outpaces Many Sectors.** The software and information sectors of the U.S. economy were among the nation's fastest growing industries when measured by job growth. The industries' job gains were outpaced, and then only narrowly, by only a few other industries in the U.S. economy, such as the food services industry, the banking sector and the real estate industry, each of which increased its employment base by approximately 21 percent between 1997 and 2006. The strong gains in employment in the software and information industries contrast sharply with the decline in jobs in the nation's transportation equipment manufacturing sector (-13%), computer and electronic product manufacturing industry (-27%), telecommunications (-8%) and chemical manufacturing (-13%), which all saw their employment base drop between 1997 and 2006.

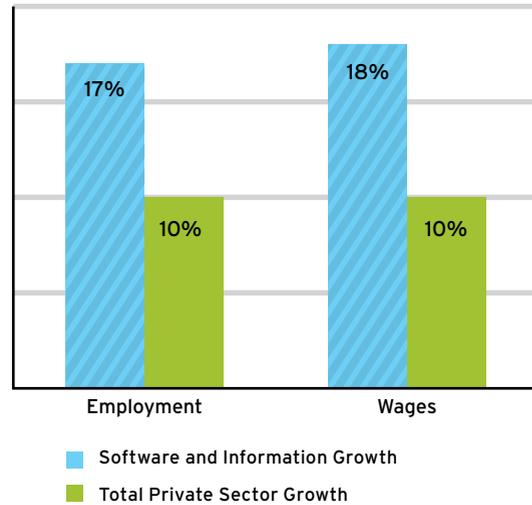
**Employment in the Software and Information Industries by Sector.** The software and information industries are dynamic, diverse and ubiquitous. They provide a large variety of the nation's most cutting-edge products and services. The software and information industries employment statistics below were culled directly from the U.S. Bureau of Labor

Software and Information Employment Growth Compared to Other Industries, 1997-2006



Source: U.S. Bureau of Labor Statistics

Employment and Wage Growth for Software and Information Exceeds Total Private Sector Growth, 1997-2006



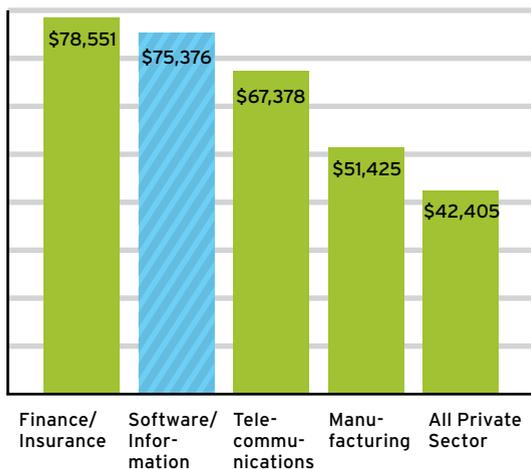
Source: U.S. Bureau of Labor Statistics

Recent One-year Growth of Select Software and Information Companies, 2005-2006

COMPANY	2005 REVENUE (IN MILLIONS)	2006 REVENUE (IN MILLIONS)	2005 EMPLOYEES	2006 EMPLOYEES
Adobe	\$1,966	\$2,575	5,734	6,082
Autodesk	\$1,523	\$1,840	4,813	5,169
Blackboard	\$136	\$183	549	765
Bloomberg	\$4,100	\$4,700	8,200	9,500
CA Inc.	\$3,560	\$3,796	15,300	16,000
EMC	\$9,664	\$11,155	26,500	31,100
Google	\$6,139	\$10,605	5,680	10,674
Intuit	\$2,038	\$2,342	7,000	7,500
Macrovision	\$203	\$248	692	784
McGraw-Hill	\$6,004	\$6,255	19,600	20,214
Microsoft	\$39,788	\$44,282	79,000	71,000
Oracle	\$11,799	\$14,380	49,872	56,133
Reed Elsevier Group	\$8,802	\$10,018	36,300	36,800
Salesforce.com	\$310	\$497	1,304	2,070
Symantec	\$2,583	\$4,143	6,500	16,000
The Thomson Corporation	\$8,703	\$6,641	40,500	32,375

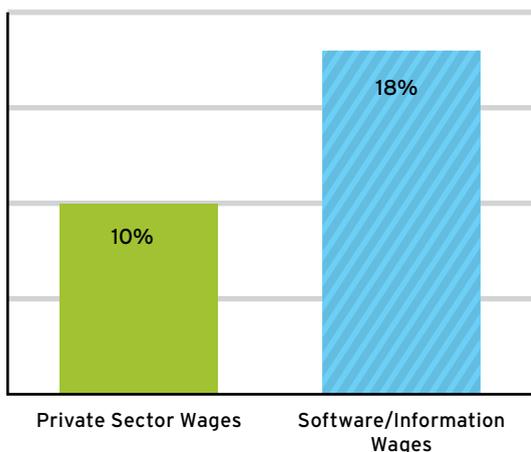
Sources: Securities and Exchange Commission and Hoover's

Software and Information Sectors by Annual Average Wage, 2006



Source: U.S. Bureau of Labor Statistics

Software and Information Wages Growth Outpaces Average Private Sector Wage, 1997-2006\*



\* adjusted for inflation  
Source: U.S. Bureau of Labor Statistics

Statistics, and the industry classifications are derived from the U.S. government's industry classification coding system, the North American Industry Classification System (NAICS).

A detailed list of the NAICS codes used to define the software and information industries in this report are listed on page 43.<sup>23</sup>

The largest industry sector, in terms of jobs, is the computer systems design and related services industry, employing almost 1.3 million Americans nationwide in 2006, an increase of nearly 40 percent since 1997. Among other services, this industry provides custom computer programming support to meet the unique needs of a particular customer. For example, these firms may be hired to code large programs or to install a software package on a user's system and customize it to the user's specific needs.

The publishing and Internet/information services sectors are also significant elements of the U.S. software and information industries and therefore pivotal to the nation's economic health. These industries provide the information we read in books, newspapers and magazines, as well as all the online content. The publishing sector covers everything from newspaper publishers, periodical publishers and book publishers to software publishers. Businesses providing Internet and information services include Internet services providers, Web search portal companies and firms operating in the data-processing and related services sector of the U.S. economy. These two large industry sectors employed nearly 900,000 and more than 470,000 U.S. workers in 2006, respectively.

Employees in the nation's software and information industries are well-compensated; they earn among the highest average wages in the country. The annual average wage paid in the software and information industries was \$75,400 in 2006, 78 percent higher than the \$42,400 annual average wage for all private-sector workers. Wages in the software and information industries were higher than wages in other major industries such as telecommunications (\$67,400) and manufacturing (\$51,400).

Since 1997, the annual average wage in the software and information industries has risen by 18 percent. By comparison, average private sector wages increased by 10 percent, adjusted for inflation.

Among the major sectors comprising the software and information industries, the 2006 annual average wage in the computer systems design and related services industry was \$84,200. The publishing industry paid its workforce an annual average wage of \$66,700,

and the Internet and information services industry posted an annual average wage of \$73,300 in 2006.

**High Wages Reflect Specific Skills and Expertise of Occupations in the Software and Information Industries.** Software and information services occupations generally command higher earnings than the national average because jobs in these occupations require skilled workers with extensive education and training.

The software- and information-related occupations include computer programmers and software engineers, as well as market research analysts, editors, writers, and media and communications workers. As the table on page 24 shows, software and information occupations demand levels of education and training beyond just a high school education. In fact, more than 35 percent of all the software- and information-related occupations require a bachelor's degree or higher, and the vast majority of the workers in these occupations have a college degree or postgraduate degree. Wages generally increase commensurate with education and training. For instance, the more than 250,000 computer and information systems managers have a bachelor's degree or higher and thus earned more than \$100,000 in 2006.

**Millions of Software and Information Job Openings Expected in the Years Ahead.** According to the most recent employment projections from the Bureau of Labor Statistics,<sup>24</sup> there will be more than two million job openings in the software and information occupations between 2006 and 2016. This number includes the projected total job openings over the next 10 years due to growth in the industry and to replacement of workers who leave their software and information occupations to transfer to other occupations, retire or stop working for other reasons. These job openings represent 4.5 percent of the total 50.7 million job openings expected in the United States between 2006 and 2016.

Within these two million software and information job openings, it is expected that almost 450,000 will be for computer software engineers, with the total number of jobs in this occupation reaching nearly 1.2 million by 2016. In the years ahead, there will also be great demand for computer systems analysts, some 280,000 jobs by 2016. Projections also show an increase of more than 190,000 jobs for network systems and data communications analysts, making this the fastest-growing occupation by numeric job growth between 2006 and 2016. Robust demand for efficient communication systems and new Internet and mobile technologies are among the factors driving the

**Employment and Wages in the Software & Information by Sector, 1997 and 2006**

SECTOR	1997 EMPLOYMENT	2006 EMPLOYMENT	1997 AVERAGE WAGES	2006 AVERAGE WAGES
Computer Systems Design and Related Services	919,539	1,275,185	\$74,200	\$84,169
Publishing Industries (except Internet)	940,170	899,121	\$57,035	\$66,652
Internet and Information Services	417,196	470,892	\$55,133	\$73,280
Other Information Services	65,456	104,632	\$63,951	\$52,610
Software and Information Industry Employment Total	2,342,361	2,749,830	\$63,628	\$75,376

Source: U.S. Bureau of Labor Statistics

### Education and Training Levels for Select Software and Information Occupations, 2006

OCCUPATION	2006 AVERAGE WAGES	AVERAGE EDUCATION AND TRAINING LEVEL	PERCENT COLLEGE OR HIGHER EDUCATION
Computer and Information Systems Managers	\$107,250	Bachelor's or Higher	70%
Computer Software Engineers, Systems Software	\$87,250	Bachelor's + Work Experience	83%
Computer Software Engineers, Applications	\$82,000	Bachelor's	83%
Financial Analysts	\$77,280	Bachelor's	85%
Computer Systems Analysts	\$72,230	Bachelor's	66%
Computer Programmers	\$69,500	Bachelor's	72%
Database Administrators	\$67,460	Bachelor's	72%

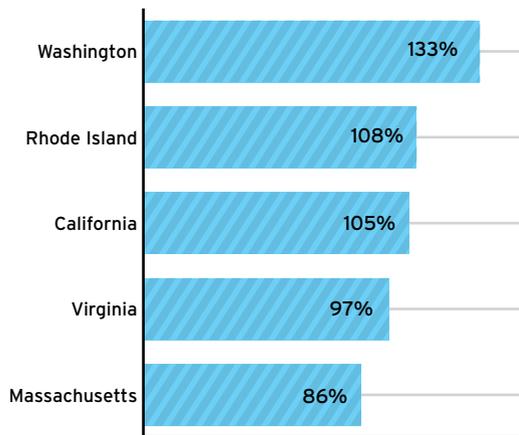
Source: U.S. Bureau of Labor Statistics

### Software and Information Occupational Projections, 2006-2016

OCCUPATION	2006 EMPLOYMENT	2016 EMPLOYMENT	JOB OPENINGS DUE TO GROWTH	NET REPLACEMENT NEEDS	TOTAL JOB OPENINGS
Computer Software Engineers	857,000	1,181,000	324,000	125,000	449,000
Computer Systems Analysts	504,000	650,000	146,000	134,000	280,000
Computer Support Specialists	552,000	624,000	71,000	171,000	242,000
Network Systems and Data Communications Analysts	262,000	402,000	140,000	53,000	193,000
Network and Computer Systems Administrators	309,000	393,000	83,000	71,000	154,000
Computer Programmers	435,000	417,000	-18,000	91,000	91,000
Database Administrators	119,000	154,000	34,000	13,000	47,000

Source: U.S. Bureau of Labor Statistics

### Software and Information Wages Compared with State Average Private Sector Wages, Top Five States, 2006



Source: U.S. Bureau of Labor Statistics

growth in these and other software and information occupations.

In contrast, the Bureau of Labor Statistics projects that the total number of jobs for computer programmers will fall from 435,000 in 2006 to 417,000 in 2016, or a decline of 18,000. There are several reasons for this trend, including the fact that workers in other occupations are acquiring programming skills, the work is globalized and that some basic programming functions are now automated.

### Creating High-Wage Jobs in Every State

The software and information industries provide employment opportunities nationwide (see the Appendix for a complete list of state rankings by employment). Consistent with general employment trends, more than 70 percent of these jobs were located in the largest 15 states (measured by total employment). These states, including California, New York, Texas, Virginia and Florida, accounted for almost two million of the 2.7 million jobs in the software and information industries.

Software and information industries pay high annual average wages all across the country (see Appendix for a complete list of state rankings by wages). The highest paid software and information workers nationwide in 2006 were in Washington, Massachusetts, California, Virginia and New York. Average wages in the software and information industries ranged from a low of \$34,200 to a high of almost \$100,000.

### Top 15 States by Software and Information Employment and Wages, Ranked by 2006 Employment

STATE	2006 EMPLOYMENT	2006 WAGES	STATE	2006 EMPLOYMENT	2006 WAGES
1. California	363,275	\$97,938	9. Massachusetts	106,078	\$97,975
2. New York	205,975	\$82,236	10. Georgia	95,616	\$72,467
3. Texas	179,855	\$74,806	11. Ohio	91,290	\$62,396
4. Virginia	163,692	\$85,938	12. Washington	88,638	\$99,205
5. Florida	131,424	\$62,209	13. Maryland	82,661	\$79,698
6. Illinois	115,626	\$75,630	14. Colorado	75,534	\$80,083
7. New Jersey	108,630	\$81,444	15. Michigan	73,132	\$65,689
8. Pennsylvania	106,408	\$65,292			

Source: U.S. Bureau of Labor Statistics

Often, these wages significantly exceeded private-sector wages. For instance, in Washington, Rhode Island and California, software and information industries' wages were more than twice the average private-sector wage in these states in 2006.

But even small states with a relatively small software and information employment base benefit because these jobs pay well. For example, in West Virginia, the software and information industries pay their workers 25 percent more than the average for private-sector workers in the state.

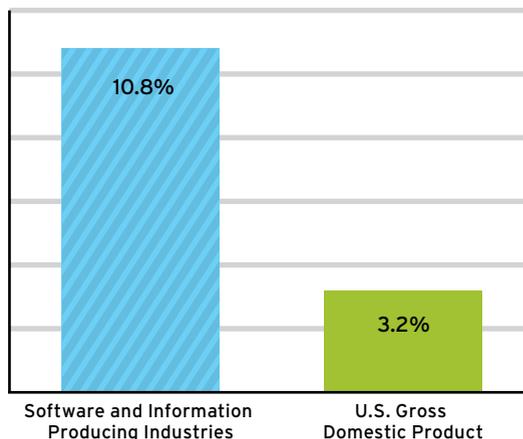
### Growing Faster than Overall U.S. Economy

Not only do the software and information industries produce millions of well-paying jobs, they also contribute significantly to the overall health of the American economy. Indeed, growth in these dynamic industries has significantly outpaced growth in the U.S. economy as a whole, thus helping to sustain the expansion of the overall American economy. The nation's software and information industries grew more than three times faster than the overall U.S. economy in 2005, based on the most recent available data. And in 2004, the nation's software and information industries grew more than twice as fast as the U.S. economy as a whole, 11.1 percent compared with 3.9 percent.<sup>25</sup>

### Software and Information Industries' Contributions to U.S. Economy Far Exceed their Relative Share.

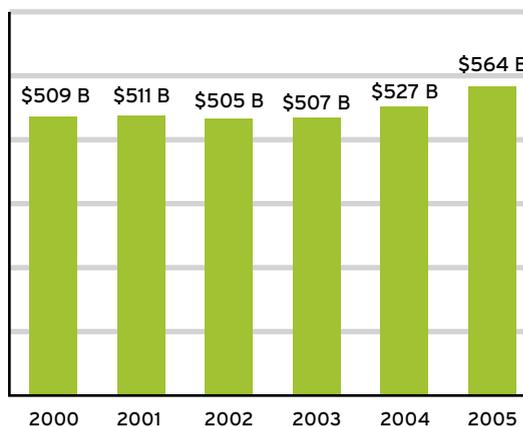
The contribution of the software and information industries to the U.S. economy is far greater than other industries as measured by their share of the U.S. economy. In 2005, the software and information industries represented 2.8 percent of the economy but grew at 11 percent. In contrast, while the U.S. real estate, rental and leasing industry (12.7 percent) and the manufacturing industry (12 percent) comprised a much greater share of the American economy, they grew at only 3.4 and 2.2 percent, respectively.

Growth in the Software and Information Industries vs. Growth in U.S. Gross Domestic Product, 2005



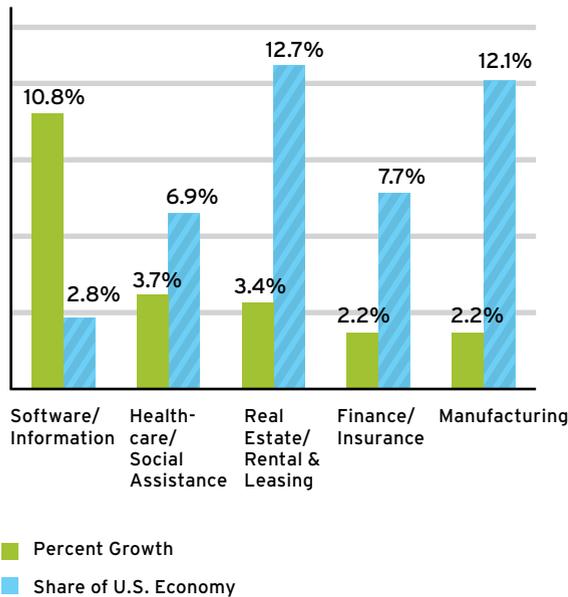
Source: U.S. Bureau of Economic Analysis

Software and Information Revenue, 2000-2005



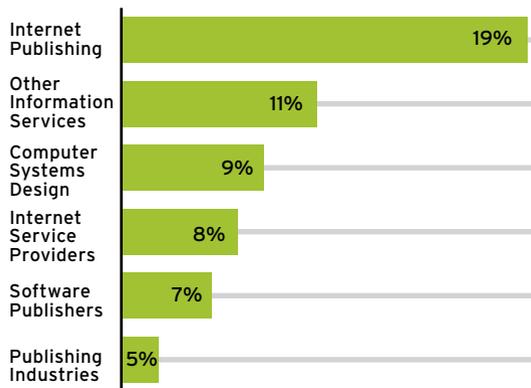
Source: U.S. Census Bureau

Software and Information Industries Compared with Select Industries by Growth and Share of U.S. Economy, 2005



Source: U.S. Bureau of Economic Analysis

Software and Information Sectors' Revenue Growth, 2004-2005



Source: U.S. Census Bureau

**Software and Information Revenues Grew to \$564 Billion.** The companies that comprise the software and information sectors generated \$564 billion in revenue in 2005, a 7 percent increase over 2004, according to the most recent available data from the U.S. government's Service Annual Survey.<sup>26</sup> Since the beginning of this decade, revenue by the software and information sectors has increased by more than 10 percent, from \$509 billion in 2000.

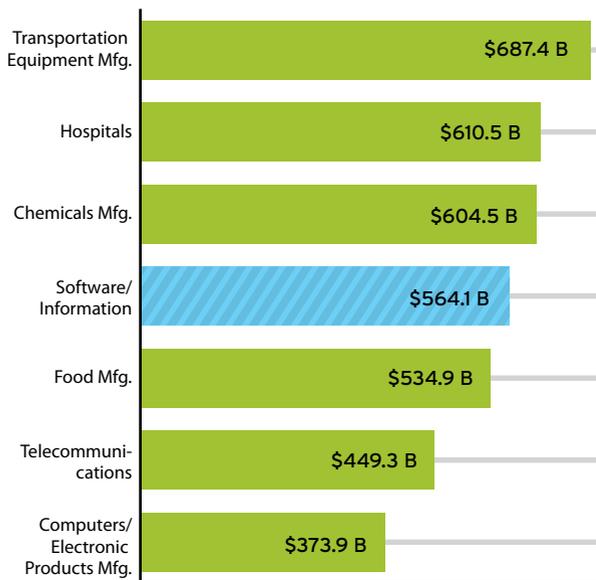
When comparing the software and information industries with other major industries within the U.S. economy, they rank among the leading industries by revenue, behind transportation equipment, hospitals and chemical manufacturing, but ahead of other large sectors such as food manufacturing, telecommunications, and computers and electronic products manufacturing.

The software and information industries are producing new technologies and services as firms continue to evolve offerings to meet new demands and trends in a broad array of sectors of the U.S. economy.

#### Internet Publishing and Broadcasting

The Internet publishing and broadcasting sector posted the largest revenue growth rate between 2004 and 2005, up by almost 19 percent. This sector, composed of Internet service providers, Web search portal companies and data processing services firms, has seen its revenues increase from an estimated \$6.9 billion in 2000 to \$10.3 billion in 2005. It is the backbone of today's information industry creating innovative products and services enabling businesses and individuals to quickly organize, deliver and access information in a timely, customized manner. The resulting added value to content and data empowers the user to manage information more efficiently and effectively than ever before possible.

### Software and Information Industries Compared with Other Leading Industries by Revenue, 2005



Source: U.S. Census Bureau

#### Computer Systems Design and Related Services

The computer systems design and related services industry is another rapidly growing industry sector, generating nearly \$190 billion in revenue in 2005, an annual increase of almost 9 percent. The strength of this sector is not surprising given the importance of computers, networks and related infrastructure as the means for delivering services and information in today's digital economy.

#### Software Publishing

The software publishing industry remains vibrant as it produces and distributes broadly available computer software, including design, documentation, installation and ongoing support services to software purchasers. Software publishers have seen their revenues increase by more than 17 percent since 2000, from \$102 billion to nearly \$120 billion.

#### Information Publishing

Much of the publishing industry has ventured online. Today, most newspapers and magazines have extensive Web sites updated around the clock as news breaks. Specialty journals are migrating online as well. Many of these "periodicals" were born online, never before existing in print form. And books are often reproduced electronically so these e-books can be read on handheld readers, computers or other devices.

### Online Revenue for the Publishing Industry, 2001-2005

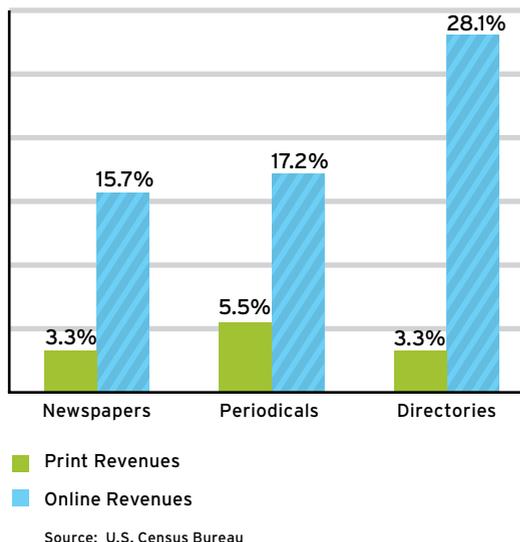
SECTOR	2001	2002	2003	2004	2005	2004-2005 GROWTH
Online Newspapers	\$401 M	\$583 M	\$718 M	\$1.8 B	\$2.1 B	16%
Online Periodicals	\$1.3 B	\$1.3 B	\$1.4 B	\$1.5 B	\$1.7 B	17%
Online Books	n/a	n/a	n/a	n/a	\$612 M	n/a
Online Directories, Databases and Other Collections of Information	\$496 M	\$596 M	\$760 M	\$3.1 B	\$4.0 B	28%
Total Online Publishing Industry	\$2.2 B	\$2.5 B	\$2.9 B	\$6.4 B	\$8.4 B	32%

Source: U.S. Census Bureau

Reflecting the rise of digital publishing, the most recent data from the U.S. government show a substantial increase in online revenues for periodicals, databases and other news and information collections. For example, revenue for online directories, databases and related information collections increased by 28 percent from \$3.1 billion in 2004 to almost \$4 billion in 2005. Newspaper publishers also saw a sharp online sales increase of 16 percent between 2004 and 2005 to a total of \$2.1 billion. Periodical publishers posted a 17 percent increase in their online revenue during the same time period, reaching \$1.7 billion in 2005. Online revenue for the publishing industry totaled \$8.4 billion in 2005, up by 32 percent between 2004 and 2005. Given the ongoing industry trends to continue increasing digital and online publishing, the current growth trend can be expected to continue in the years ahead.

Although online revenue for newspaper, periodical, book, directory and mailing list publishers still represents a small share of total revenue in these industry sectors, the growth trend significantly outpaces revenue growth from traditional sources. For example, revenue growth for traditional print newspapers was 3.3 percent between 2004 and 2005, while online newspaper revenues grew five times faster at almost 16 percent during the same time period. The same trend is evident for other segments of the publishing industry.

Online Revenue vs. Print Revenue,  
2004-2005 Growth



## PART III

# COMPETING SUCCESSFULLY AROUND THE WORLD

As the data in Part I and Part II of this report show, the U.S. software and information industries are powerful drivers of the U.S. economy. The industries' reach also extends well beyond the U.S. market, where U.S. firms are world leaders, experiencing strong sales and revenue growth in the global marketplace.

Today, leading American software and information companies such as Autodesk, Adobe, Oracle and Symantec derive more than half of their total revenue outside the United States.

Although current data make the measurement of this vibrant overseas market challenging (see text box on next page), the evidence suggests that the reported statistics should be viewed as *conservative estimates* of total trade in software and information services for the total overseas market. Methods and data for tracking international trade have lagged behind the fast-evolving software and information products and services that are sold in digital (often online), rather than physical, form.

Nonetheless, the disaggregated data, both on direct sales through U.S. affiliates abroad and on cross-border trade, indicate a strong and growing market for U.S. software and information products overseas:

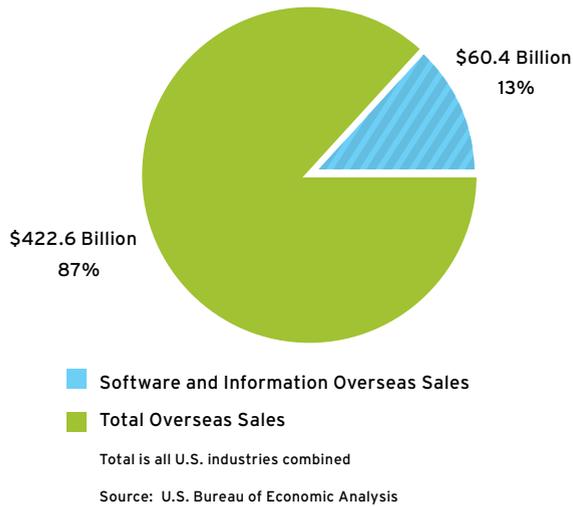
- Global sales generated by overseas affiliates of U.S. software publishers; newspaper, book and database publishers; and firms providing computer system design and related services total \$60 billion dollars.
- An additional \$19 billion is generated through cross-border exports of computer and information services, receipts for royalties and license fees for computer software and sales of prepackaged software goods.

On a global level, the data are often examined from an information and communication technology perspective. Driven by the advancing digitization of many industries and the strong worldwide market for information and communication technology (ICT), there are tremendous growth opportunities for U.S. software and information companies around the world. The global ICT market already totals nearly \$3 trillion and is expected to expand to almost \$4 trillion for 2008. Software and information are increasingly critical components of the ICT market. Both are essential building blocks of today's technology infrastructure, an infrastructure that is critical to continued innovation, productivity and growth in an ever-more digitized world.

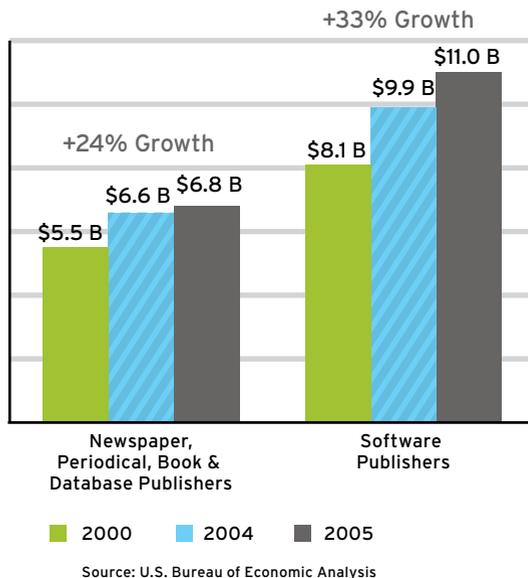
### Global Sales are Strong and Growing

American software and information companies are highly competitive in markets around the world. Large firms such as Adobe, Apple, Oracle and Google, along with thousands of small and medium-sized American companies, are helping to meet the insatiable global demand for new software and information products and services. These companies sell their products and services everywhere from the well-established and sophisticated European marketplace to the newer and rapidly growing Chinese and Indian markets.

### U.S. Software and Information Overseas Sales Through Affiliates, 2004



### Software Publishers and Newspaper, Periodical, Book & Database Publishers Sales Through Their Overseas Affiliates, 2000-2005



### Direct Sales through U.S. Affiliates Abroad is the Largest Component of the Industries' International Trade.

Many U.S. software and information firms sell their services directly in foreign markets through their affiliates abroad. In fact, such direct sales represent the largest share of international trade in software and information. A local presence is advantageous because an overseas subsidiary is often better positioned than the parent company located in the United States to design and distribute software and information services tailored to local market conditions and customer requirements.

Together, the U.S. software and information industries sold more than \$60 billion through their overseas affiliates in 2004, the latest year for which comprehensive data are available from the U.S. Bureau of Economic Analysis (BEA).<sup>27</sup> These overseas sales represented 13 percent of the \$483 billion in total U.S. overseas sales through affiliates in 2004, establishing these industries as important drivers of continued U.S. economic growth. Key industry segment leaders of the software and information industries experienced the following recent growth in sales through overseas affiliates:

- U.S. software publishing industry<sup>28</sup> sales through overseas affiliates totaled almost \$11 billion based on preliminary 2005 statistics, the latest year for which data are available for this industry. These sales rose by 33 percent from \$8 billion in 2000.
- The newspaper, periodical, book and database publishing industry segments<sup>29</sup> sold nearly \$7 billion through overseas affiliates in 2005, up by 24 percent from \$5.5 billion in 2000.
- The computer systems design and related services industry segment<sup>30</sup> overseas affiliates' sales reached an estimated \$44 billion in 2004, the last year for which data were released.<sup>31</sup>

**Direct Exports Continue to Grow.** The American software and information industries also *export* their products and services directly from the United States. Cross-border exports represent an important and strategic part of overseas trade generated by the industries. Direct exports are composed of cross-border sales of computer and information services, royalties and license fees for general-use computer software and sales of prepackaged, or boxed, software. These direct export sales reached almost \$19 billion in 2006, representing an increase of more than 30 percent from \$14.3 billion in 2000.

**Select Software and Information Companies by International Revenue as a Percent of Total Revenue, 2006**

COMPANY	INT'L REVENUE (IN MILLIONS)	INT'L REVENUE AS A PERCENT OF TOTAL REVENUE
Adobe	\$1,309	51%
Akamai Technologies	\$94	22%
Apple	\$7,829	41%
Autodesk	\$1,840	66%
Blackboard	\$35	19%
CA Inc.	\$1,812	46%
EMC	\$4,835	48%
Google	\$4,560	43%
Macrovision	\$111	45%
McGraw-Hill	\$1,530	25%
Microsoft	\$16,384	37%
Oracle	\$7,938	55%
Salesforce.com	\$110	22%
Symantec	\$2,097	51%

Sources: Securities and Exchange Commission and Hoover's

### Measuring the Global Market for U.S. Software and Information: The Statistical Challenge

Measuring the worldwide software and information market is challenging, especially when it comes to tracking international services trade flows. Why is it so difficult?

Today, software and information products and services most often are downloaded or accessed from the Internet or purchased through license agreements. These sales do not involve the movement of physical products across national borders using customs declaration forms, which is the traditional basis for U.S. government statistics.

In contrast, data on international sales of software and information services are collected predominately through surveys, or by researchers, rather than by customs officials. Data based on such surveys may not be entirely accurate or complete because respondents either did not have the time to fully complete the survey form or completed it incorrectly.

#### Estimates of the global market use different, non-comparable measures.

*Direct sales through U.S. affiliates abroad are tracked according to the type of industry*, using surveys on direct investment and services using the U.S. Bureau of Economic Analysis' (BEA) international surveys industry classification system. The statistics on direct sales by U.S. affiliates abroad covered in this report comprise three industries: newspaper, periodical, book and database publishers; software publishers; and computer systems design and related services.

In contrast, *export sales are tracked according to the type of service provided*. Export sales include: cross-border sales of computer and information services; overseas royalties and license fees for general use computer software; and cross-border sales of prepackaged or boxed software.

**Statistical sources do not capture the full scale of the global software and information market.** Some sales go unrecorded because of the difficulties described above of tracking trade in intangible products and services. Also, the total value of computer services for foreign consumers may be scattered across several categories of cross-border trade and sales by affiliates. In addition, some computer-related services may be embedded in goods that are exported to foreign markets. The reported statistics should, therefore, be viewed as *conservative estimates* of total trade in software and information services. Nonetheless, international organizations, government agencies and private sources' best estimates reflect a fast-growing global market for U.S. software and information products and services. The data reported here are based on such best estimates. ■

### Exports of Computer and Information Services

**Reach \$10 Billion.** Cross-border exports of U.S. computer and information services increased nearly 50 percent from \$6.8 billion in 2000. Computer and information services exports are composed of two parts. One component consists of computer and data processing services, ranging from custom software and programming services to integrated hardware and software systems. The second component consists of database and other information services, including firms providing business news and financial information services as well as those providing medical, legal and technical database services.

The \$10 billion in cross-border exports of computer and information services in 2006 was only slightly less than the exports of film and television tape rentals at \$11 billion, and it was far greater than exports of both management and consulting services and telecommunications services, at \$7.4 billion and \$6.3 billion, respectively, in 2006.

### International Royalties and Licenses Bring in Additional Revenue to U.S. Software Companies.

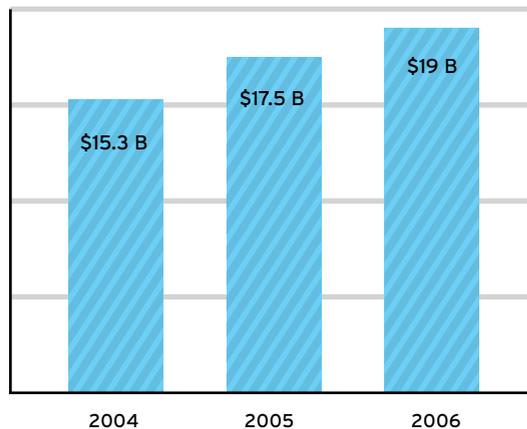
Another way in which software is sold overseas is through receipts for the rights to distribute or use software. These transactions include licensing fees for both reproducing copies of software for networked computer systems and for access to, or download of, electronically transmitted software from the Internet.

International software royalties and license fees grew 20 percent from 2000 to an estimated \$6.8 billion in 2006.<sup>32</sup> In addition, royalties and license fees paid to U.S. companies through their affiliates abroad totaled more than \$20 billion in 2006.

### U.S. Packaged Software Sales Overseas Total \$2 Billion.

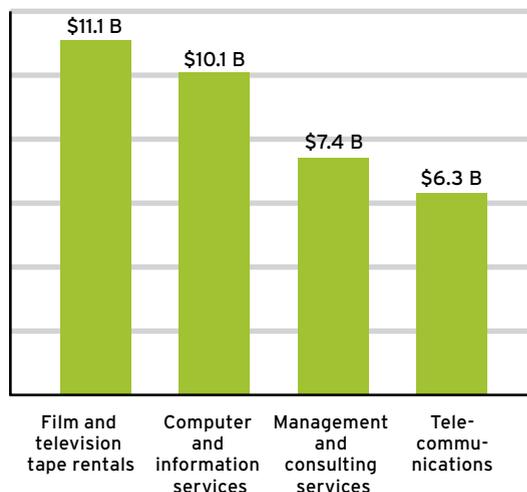
Although a significantly declining business model, some software is still packaged and physically shipped from the United States to customers abroad. U.S. packaged software export sales are classified for customs purposes as goods trade and totaled more than \$2 billion in 2006.<sup>33</sup> As one would expect, since software today is mostly downloaded directly from the Internet, cross-border exports of prepackaged software goods have fallen since 2000 from \$2.7 billion to \$2 billion in 2006, even as total industry exports have increased significantly.

Cross-Border Exports of U.S. Computer Software and Information Services, 2004 to 2006



Source: U.S. Bureau of Economic Analysis

Computer and Information Services Cross-Border Exports Compared with Exports of Other Major Services, 2006



Source: U.S. Bureau of Economic Analysis

## Promising Global Business Trends and ITC Growth

As the previous data illustrate, foreign markets represent major opportunities for U.S. software and information companies. The prospects for robust sales opportunities in the future are strong. As described in Part I, the drive to digitize across all industries and across society is increasing the demand for software and electronic information. Trends include further automation of business operations, transformation of the business/client relationship, mobility and offerings of products in digital form such as in the markets for business information and scientific knowledge.

In both developed and developing economies, spending on information and communication technology (ICT) generally and for computer software and computer services specifically is on the rise. While the data below go beyond the strict boundaries of the software and information industries, they provide ample and compelling evidence of an advancing digital revolution that is certain to open new markets and create fresh opportunities for U.S. software and information companies worldwide.

### Upward Trend in Digital/Mobile Revenues Worldwide.

Over the last five years, spending on digital content and digital and mobile forms of distribution has risen for a wide range of products. And, this trend is forecast to continue. According to PriceWaterhouseCoopers (PWC), worldwide digital and mobile revenues<sup>34</sup> are expected to increase from \$58 billion in 2006 to a projected \$153 billion in 2011.

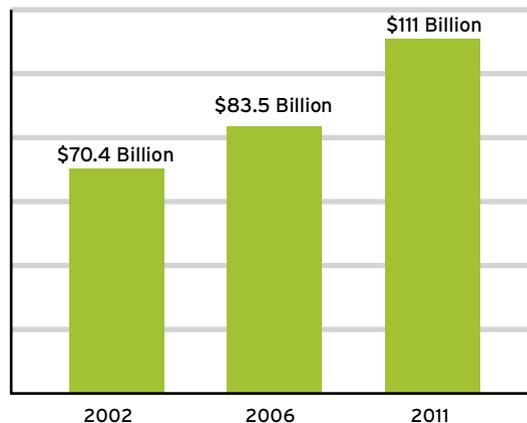
The steady migration toward digital distribution and digital formats is evident in the market projections for specific industries as well. Two examples of the trend toward digital content and distribution are the markets for business information and for scientific knowledge.

### Scientific and Technical Information Migrating Online.

As with business information, scientific and technical publishing is also undergoing major changes as a consequence of the digital transformation. Research practices and modes of disseminating scientific and technical information and knowledge are changing fundamentally as a consequence of the increasing use of digital content.

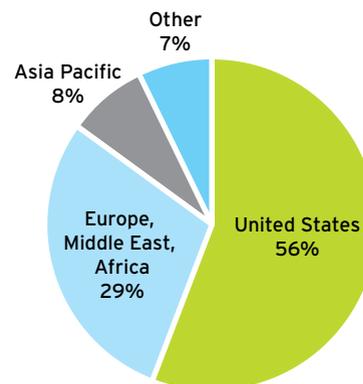
According to an OECD study of scientific publishing, many researchers are including digital-only data and other digital research products in their work, while digital forms of delivery and online access are multiplying. In 2003, some 75 percent of published scholarly journals were online. The core science,

Global Business Information Market Expands Worldwide, 2002 to 2011\*



\* 2011 data are projected  
Source: PriceWaterhouseCoopers

Global Business Information Market by Country, Share of 2006 Market



Source: PriceWaterhouseCoopers

technology and medicine publishing market in 2003 had already reached an estimated \$7 billion to \$11 billion. Given present trends in scientific publishing, an increasing portion of revenues can be expected to come from digital forms of distribution.<sup>35</sup>

**Global Business Trends Boosting Demand for Digital Business Information.** There is little consistent data on the distribution of business information<sup>36</sup> through electronic form – online, site licenses or on a pay-as-you-go basis – as opposed to distribution through print formats. According to PriceWaterhouseCoopers' review of the business information industry, companies and investors increasingly are looking for up-to-date financial, marketing and industry data that have been packaged with analytical tools. This value-added analytical information is more useful to subscribers and distinct from the ever-growing volume of raw information available online free of charge to consumers. Additional market opportunities for business information are being created by several other developments, including:

- The improved international economic environment in recent years
- Rapidly growing international investment, including an increased number of international mergers and acquisitions
- The migration of entertainment and news and media to online and digital/mobile formats and distribution channels, which is creating demand for new measurements for tracking developments in these industries
- The emergence of hedge funds and new international financial players

The effect of these changes will be new opportunities for producers of software and digital information. The business information market is projected to increase from \$84 billion in 2006 to \$111 billion in 2011, growing at an annual compound rate of 5.8 percent.

The United States in 2006 was the largest market for business information, totaling \$47 billion, or nearly 56 percent of the global market, followed by Europe, the Middle East and Africa, at \$24 billion combined, or nearly 29 percent of the global market. The business information market in Asia is significantly smaller, at only \$7 billion in 2006. All markets are expected to grow, with Asia projected to reach more than \$9 billion in 2011, and the United States and European markets climbing to \$62 billion and \$32 billion, respectively, in 2011.

### **Strong Global Market for Information and Communication Technology Creates Robust Business Opportunities for Software & Information.**

Estimates of the worldwide market for information and communication technology vary, but all agree that the global market for ICT is very substantial and growing strongly. Although ICT refers to the broader measure of “information technology” that covers such things as computers, software, telecommunications and systems design, it includes a measurement of global spending trends for software and computer services, and as a whole, the ICT market creates an infrastructure that propels the digital information market.

Global ICT spending reached nearly \$3 trillion in 2005. On a global basis, spending rose 5.6 percent a year, surging from \$2.3 trillion in 2000 to almost \$3 trillion in 2005, and it is expected to grow to almost \$4 trillion in 2008.

While the United States is the world's largest national market for ICT, with spending amounting to more than \$1 trillion in 2005, spending in other nations is growing exponentially. In fact, the United States' compound annual growth rate in ICT spending is significantly slower than many other leading ICT markets, up by only 3.2 percent annually over the 2000 to 2005 period. This is in sharp contrast to the expenditure growth rates in many of the other top 10 ICT markets.

For instance, China, the world's sixth-largest ICT market today, increased its information and communication technology expenditures by 22 percent per year between 2000 and 2005. Brazil's ICT expenditures rose by more than 13 percent a year, making it the world's ninth-largest ICT market. France recorded a 9 percent annual increase in ICT spending between 2000 and 2005, ranking fifth in ICT spending worldwide. All of these national markets increased their ICT spending from significantly lower levels than that of the United States.

Among the top 10 countries, Japan was the only nation with declining ICT expenditures in recent years, with spending falling from \$400 billion to \$342 billion between 2000 and 2005. However, the OECD notes in its most recent analysis that it expects ICT spending in Japan to increase in the years ahead.

**One-Third of All ICT Spending is for Computer Software and Computer Services.** Expenditures for software and computer services helped to drive the \$965 billion in worldwide ICT spending in 2005, with

**Top 10 Countries in Worldwide Information and Communication Technologies Spending,  
2000 and 2005 (in millions of current U.S. dollars)**

RANK	COUNTRY	2000	2005	COMPOUND ANNUAL GROWTH RATE 2000-2005
	WORLD	\$2,259,190	\$2,963,532	5.6%
1	United States	\$932,166	\$1,093,625	3.2%
2	Japan	\$400,971	\$342,174	-3.1%
3	Germany	\$115,090	\$169,830	8.1%
4	United Kingdom	\$116,790	\$161,581	6.7%
5	France	\$84,864	\$134,742	9.7%
6	China	\$44,359	\$117,632	21.5%
7	Italy	\$51,130	\$76,654	8.4%
8	Canada	\$44,382	\$65,699	8.2%
9	Brazil	\$33,410	\$62,065	13.2%
10	Korea	\$35,006	\$54,443	9.2%

Source: OECD, based on data developed by Global Insight as published by the World Information Technology and Services Alliance (WITSA)

**Top 10 Countries in Computer Software and Computer  
Services Spending, 2005 (in millions of U.S. dollars)**

RANK	COUNTRY	COMPUTER SOFTWARE + SERVICES TOTAL	TOTAL ICT SPENDING	COMPUTER SOFTWARE AND SERVICES AS A SHARE OF TOTAL ICT SPENDING
1	United States	\$412,559	\$1,093,625	38%
2	Japan	\$93,633	\$342,174	27%
3	United Kingdom	\$72,620	\$161,581	45%
4	Germany	\$66,097	\$169,831	39%
5	France	\$63,282	\$134,742	47%
6	Italy	\$28,931	\$76,654	38%
7	Canada	\$24,855	\$65,699	38%
8	China	\$17,946	\$117,632	15%
9	Netherlands	\$15,915	\$39,195	41%
10	Australia	\$15,869	\$45,676	35%

Source: Source: OECD, based on data developed by Global Insight as published by the World Information Technology and Services Alliance (WITSA)

spending in these areas comprising one-third of all ICT spending worldwide.

Not surprisingly, the United States was the global leader in computer software and computer services expenditures at more than \$400 billion in 2005, followed by Japan, the United Kingdom, Germany and France. In the United States, computer software and services accounted for nearly 40 percent of all ICT expenditures. Computer software and services spending also accounted for more than 40 percent of all ICT spending in France, the United Kingdom and the Netherlands in 2005.

The large and rapidly growing developing markets of Brazil, Russia, India, and China (widely known as the BRIC economies) are expected to become increasingly important markets for software and information. China's software and computer services spending rose by more than 55 percent a year to almost \$18 billion in 2005, up from just \$2 billion in 2000. In Brazil, computer software and computer services spending increased from \$6.5 billion in 2000 to more than \$15 billion in 2005. Spending on software and computer services was considerably lower in both India and Russia at \$7.1 billion and \$3.7 billion, respectively, in 2005, positioning India as 17th and Russia as 23rd on a worldwide basis by this metric.

These numbers underscore the tremendous potential of these rapidly growing markets. China already is the eighth most important global market for software and computer services. In the years ahead, China promises to be a substantial source of new customers for

software and computer services firms as its economy grows and industries modernize and as the disposable income of China's population increases along with its personal computer usage, Internet penetration and e-commerce activities. Similarly, Brazil (19 percent), India (37 percent) and Russia (24 percent) all increased their annual spending on software and computer services between 2000 and 2005.

All of these countries are poised to become important markets for U.S. software and information goods and services as their economies develop and demand for ICT expands.

**Global Spending for Computer Software and Services Projected to Rise as ICT Expenditures Surge Worldwide.** Sustained growth in ICT spending will create new business opportunities for U.S. software and information companies. On a worldwide basis, projections indicate that spending on information and communication technologies overall will jump to \$3.7 trillion by 2008, representing growth of some 65 percent since 2000.

Expenditures on computer software and computer services alone will continue to grow even more rapidly than ICT as a whole. Worldwide computer software spending is projected to more than double to \$400 billion by 2008, compared with less than \$200 billion in 2000. Similarly, computer services' spending worldwide is anticipated to nearly double from just over \$470 billion in 2000 to more than \$900 billion in 2008.

**Worldwide ICT Spending, 2000-2008, ranked by 2008 Projected Expenditures  
(in millions of current U.S. dollars)**

	2000	2005	2008	2000-2008 GROWTH
Communications	\$1,167,377	\$1,504,906	\$1,786,605	53%
<b>Computer Services</b>	<b>\$472,814</b>	<b>\$676,656</b>	<b>\$904,296</b>	<b>91%</b>
Computer Hardware	\$440,912	\$493,164	\$639,756	45%
<b>Computer Software</b>	<b>\$178,086</b>	<b>\$288,807</b>	<b>\$400,295</b>	<b>125%</b>
Total ICT Spending	\$2,259,190	\$2,963,532	\$3,730,952	65%

Source: OECD, based on data developed by Global Insight as published by the World Information Technology and Services Alliance (WITSA)

## PART IV

# PROMOTING CONTINUED INNOVATION AND GROWTH

The software and information industries are critical to growth for the U.S. economy. While innovation in these sectors is helping the U.S. continue as a global leader, there is little room for complacency. Sustaining the significant economic and job gains delivered by the software and information industries – and realizing new growth opportunities both in the United States and internationally – will depend on many facilitating factors.

Perhaps most important is the ability to maintain an environment in which new and innovative products and services can emerge through the evolution of the following domestic and international regulatory and legal frameworks and the reduction of trade-restrictive barriers:

### **Education, Training and a Highly Skilled Workforce.**

Human capital is critical to the innovation process. Access to skilled personnel is the fuel driving the software and information sectors' progress. Over the next decades, the nation's software and information industries will need many highly educated technical workers to develop and design new products and services, as well as effective leaders and creators of new businesses.

At a minimum, the U.S. education system at all levels must further act on the national consensus that our educational system needs to improve its science, technology, engineering and math education, including imparting problem-solving abilities, technology literacy and communication skills. These improvements are needed for the nation to keep pace with increased

workplace and societal demands, as well as educational advancements in other nations. Achieving this goal will require a long-term investment in and re-orientation of our higher education system that can meet the growing demand for producing world-class graduates in math, science and technology.

Our nation must recognize that it is competing for the best in skilled talent with other countries that want to be globally competitive. How the United States addresses the shortage of qualified personnel and restrictions on the immigration of highly skilled workers will have a profound impact on the American economy and U.S. competitiveness.

### **A Regulatory Model Recognizing New and Evolving Business Models.**

The Internet's advance is rapidly transforming the production, marketing and distribution of software and information, and the regulatory environment has been unable to keep pace with these rapid changes. Governments have been challenged to address the vital issues of privacy, security and taxation. Regulations must continue to be based on the least-restrictive approach, refrain from choosing one business model to the exclusion of others and, wherever possible, rely on meaningful self-regulatory compliance efforts that build confidence in the marketplace.

### **Dissolving Barriers to Cross-Border Trade.**

The ability to distribute software and information products electronically rather than through traditional physical media challenges the traditional approaches to

trade facilitation. What is unchanged, however, is the essential need for effective market access and a reduction in cross-border trade barriers.

The goal, through meaningful trade policy as well as multilateral, bilateral and regional trade initiatives, is to ensure continued, full-market access for U.S. software and information products, without bias to whether they are delivered, distributed, used or transported in physical or electronic form. Products delivered electronically must not lose market access and other protections currently enjoyed by products traded on physical carrier media. Similarly, electronically transmitted products should not be subject to additional barriers or burdens simply due to their medium of distribution. New, more-efficient online business models should not be disadvantaged in the marketplace by discriminatory differences in trade treatment.

As such, United States trade policy should:

- Affirm that electronically delivered products receive treatment no less favorable than their physical equivalents
- Avoid trade restrictions that would discourage or prohibit products delivered, used, distributed or transported electronically as an alternative to physical delivery of the product
- Ensure a comprehensive scope with no digital products or sectors excluded
- Establish legally binding, permanent, duty-free treatment for *all* electronically transmitted products

**Strong Intellectual Property Protection.** The U.S. software and information sectors depend on a meaningful international framework for the protection of our industry's intellectual property, including its copyrights, trademarks and patents.

According to the fourth annual Business Software Alliance (BSA) and IDC Global Software Piracy Study, 35 percent of the software installed in 2006 on personal computers (PCs) worldwide was obtained illegally, amounting to nearly \$40 billion in global losses due to software piracy.<sup>39</sup> Additionally, according to Outsell Inc.,<sup>40</sup> information is improperly forwarded at least 56 billion times per year, just by U.S. corporate workers alone.

In large markets, such as China, India, Brazil and Russia, enormous efforts are required to create a legal framework and meaningful enforcement regime that not only deters infringement, piracy and counterfeiting but that also encourages local investment and employment.

**Continued Advances in Computer Access and Broadband Penetration.** Broadband penetration is critical to the delivery of and access to increasingly sophisticated digital information products and software applications, either through high-speed Internet connections or wireless networks. While the United States has been an innovative path breaker in the digital age, U.S. leadership is slipping when it comes to broadband penetration. The U.S. ranked only 15th among the 30 OECD countries for broadband access per 100 inhabitants in December 2006, behind such countries as Denmark, Korea, Sweden, France and Japan.<sup>41</sup> The U.S. must continue to maintain strong broadband penetration and unrestricted access to rich Internet content.

### Conclusion

If these and other issues can be addressed, the future global digital landscape holds great promise for the software and information industries. As the global knowledge economy continues to develop, businesses, governments and individuals around the world will adopt new habits and generate new demands for software solutions and digital information content and services.

As the data and growth projections underscore, U.S. companies in the software and information industries are performing consistently well. These dynamic industries have made important contributions to U.S. GDP growth relative to their size and have added tens of thousands of high-wage jobs for American workers, while other industries are contracting.

The software and information industries have a bright future, because competition in the global knowledge economy requires accurate and timely information and because technological changes lead to new and better products and methods for distributing them.

## EMPLOYMENT AND WAGES BY STATE

States Ranked by Employment, 2006			
1. California	363,275	37. Rhode Island	10,947
2. New York	205,975	38. Maine	9,121
3. Texas	179,855	39. Nevada	9,020
4. Virginia	163,692	40. New Mexico	8,916
5. Florida	131,424	41. Delaware	8,519
6. Illinois	115,626	42. Hawaii	8,514
7. New Jersey	108,630	43. Mississippi	7,914
8. Pennsylvania	106,408	44. West Virginia	7,501
9. Massachusetts	106,078	45. Idaho	7,311
10. Georgia	95,616	46. North Dakota	6,484
11. Ohio	91,290	47. Vermont	6,415
12. Washington	88,638	48. Montana	6,146
13. Maryland	82,661	49. South Dakota	3,060
14. Colorado	75,534	50. Alaska	2,624
15. Michigan	73,132	51. Wyoming	2,471
16. North Carolina	63,959		
17. Minnesota	62,338	<b>U.S. Total</b>	<b>2,749,830</b>
18. Missouri	54,273		
19. Wisconsin	42,166		
20. Arizona	38,946		
21. Connecticut	38,812		
22. Utah	32,178		
23. Indiana	31,113		
24. District of Columbia	31,106		
25. Oregon	29,333		
26. Tennessee	29,192		
27. Alabama	26,539		
28. Iowa	26,129		
29. Kentucky	22,838		
30. Nebraska	20,689		
31. Kansas	20,221		
32. South Carolina	17,710		
33. Oklahoma	17,480		
34. Louisiana	15,866		
35. Arkansas	15,636		
36. New Hampshire	14,420		

U.S. Bureau of Labor Statistics

### States Ranked by Wages, 2006

1. Washington	\$99,205	37. Arkansas	\$51,185
2. Massachusetts	\$97,975	38. Kentucky	\$48,464
3. California	\$97,938	39. Iowa	\$47,332
4. Virginia	\$85,938	40. Alaska	\$46,077
5. New York	\$82,236	41. North Dakota	\$44,760
6. New Jersey	\$81,444	42. Mississippi	\$44,729
7. District of Columbia	\$81,388	43. Oklahoma	\$43,866
8. Rhode Island	\$80,666	44. New Mexico	\$43,781
9. Colorado	\$80,083	45. Idaho	\$43,513
10. Maryland	\$79,698	46. Maine	\$43,364
11. Connecticut	\$76,510	47. Louisiana	\$41,152
12. Illinois	\$75,630	48. West Virginia	\$40,535
13. New Hampshire	\$75,172	49. Montana	\$40,354
14. Texas	\$74,806	50. South Dakota	\$36,197
15. Georgia	\$72,467	51. Wyoming	\$34,229
16. Minnesota	\$69,017		
17. Oregon	\$66,262	<b>U.S. Total</b>	<b>\$75,376</b>
18. Delaware	\$65,910		
19. Michigan	\$65,689		
20. Pennsylvania	\$65,292		
21. North Carolina	\$62,986		
22. Ohio	\$62,396		
23. Florida	\$62,209		
24. Nevada	\$62,127		
25. Missouri	\$61,957		
26. Hawaii	\$59,354		
27. Arizona	\$58,969		
28. Alabama	\$58,769		
29. Vermont	\$58,013		
30. Utah	\$57,443		
31. Kansas	\$57,047		
32. Nebraska	\$56,347		
33. South Carolina	\$54,576		
34. Wisconsin	\$53,935		
35. Indiana	\$52,355		
36. Tennessee	\$51,739		

U.S. Bureau of Labor Statistics

## The U.S. Software and Information Industries: Measuring a Moving Target

A review of existing U.S. government sources shows considerable room for improvement in the collection of reliable data about the evolving software and information industries. More precise statistics and indicators are needed to measure these evolving sectors of the U.S. economy. The industry is evolving faster than the data-collection methods and definitions. Why is this so?

- U.S. economic indicators lag behind developments in these vibrant industries. This is due to the unique characteristics of the software and information industries, which set them apart from traditional goods and services and provide challenges to fixed definitions. Although government measures are adapting, they still only capture imperfectly the full economic impact of software and information technologies.
- Current statistical industry classifications used by the U.S. government do not allow us to fully portray the evolution of many of the newest business activities of the software and information industries. For instance, capturing newly emerging industries such as the nascent social networking industry is difficult to do using the current industry classification structure.

Nonetheless, what the available statistics do tell us with certainty is that the software and information industries are important and growing segments of the U.S. economy. They are dynamic engines of growth and are likely to remain so.

### **SIIA's Definition of the Software and Information Industries**

In preparing this report, SIIA carefully examined all the U.S. industry classification codes to identify those industry codes that best define the software and information industries in the United States. Based on this review, SIIA identified 28 North American Industry Classification System (NAICS) codes to define the software and information industries. These NAICS codes cover those industries that produce, process or transmit software and information goods and services.

The development of good data on the software and information industries is limited by the deficiencies in the official tools the government uses to define the U.S. economy. The U.S. government uses the NAICS codes to classify businesses by industry and to calculate the economic activity of these industries within the U.S. economy. These NAICS codes fall into several broad categories: publishing industries (including software publishers and Internet publishing and broadcasting), Internet service providers, Web search portals, data processing services, other information services, computer systems design and related services, and a category that captures other aspects of the software and information industries, including those establishments involved in the mass reproduction of software. These industries, according to SIIA's best judgment, meet the criteria of being software and information producers.

## The Software and Information Industries As Defined By NAICS

NAICS	INDUSTRY
<b>511</b>	<b>Publishing Industries (Except Internet)</b>
5111	Newspaper, Periodical, Book and Directory Publishers
51111	Newspaper Publishers
51112	Periodical Publishers
51113	Book Publishers
51114	Directory and Mailing List Publishers
51119	Other Publishers
511191	Greeting Card Publishers
511199	All Other Publishers
<b>5112</b>	<b>Software Publishers</b>
<b>516</b>	<b>Internet Publishing and Broadcasting</b>
<b>518</b>	<b>Internet Service Providers, Web Search Portals, and Data Processing Services</b>
51811	Internet Service Providers and Web Search Portals
518111	Internet Service Providers
518112	Web Search Portals
518210	Data Processing, Hosting, and Related Services
<b>519</b>	<b>Other Information Services</b>
519110	News Syndicates
519120	Libraries and Archives
519190	All Other Information Services
<b>5415</b>	<b>Computer Systems Design and Related Services</b>
54151	Computer Systems Design and Related Services
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
541513	Computer Facilities Management Services
541519	Other Computer Related Services
<b>Other</b>	
334611	Software Reproducing
5232	Securities and Commodity Exchanges
611710	Educational Support Services

Source: Office of Management and Budget

## Sources

The majority of the statistics presented in this report are based on the most current available data from U.S. government data sources at the time this report was prepared in fall 2007. Additional information is drawn from data collected by international and non-governmental organizations. The primary data sources used in this report are:

Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics)

Service Annual Survey (U.S. Census Bureau)

U.S. International Services (U.S. Bureau of Economic Analysis)

Annual Industry Accounts (U.S. Bureau of Economic Analysis)

Information Technology Outlook (OECD)

Global Entertainment and Media Outlook (PriceWaterhouseCoopers)

- <sup>1</sup> The information industry is here defined by the U.S. government data as newspaper, periodical, book and directory publishing industry, which includes businesses engaged in publishing newspapers, magazines, other periodicals, books, directories, and mailing lists, and other works, such as calendars, greeting cards, and maps. These works are characterized by the intellectual creativity required in their development and are usually protected by copyright.
- <sup>2</sup> The software publishing industry is composed of businesses engaged in computer software publishing or publishing and reproduction. Such businesses carry out operations necessary for producing and distributing computer software such as designing, providing documentation, assisting in installation and providing support services to software purchasers.
- <sup>3</sup> See definitions beginning on previous page.
- <sup>4</sup> Robert D. Atkinson and Andrew S. McKay, *Digital Prosperity: Understanding the Economic Benefits of the Information Technology Revolution*, the Information Technology and Innovation Foundation, March 2007 [http://www.itif.org/files/digital\\_prosperity.pdf](http://www.itif.org/files/digital_prosperity.pdf), p. 1.
- <sup>5</sup> U.S. Bureau of Labor Statistics, *National Industry-Specific Occupational Employment and Wage Estimates*, <http://www.bls.gov/oes/current/oesrci.htm#51>.
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designing, providing documentation, assisting in installation and providing support services to software purchasers.

<sup>29</sup> The newspaper, periodical, book and directory publishing industry includes businesses engaged in publishing newspapers, magazines, other periodicals, books, directories and mailing lists and other works, such as calendars, greeting cards and maps. These works are characterized by the intellectual creativity required in their development and are usually protected by copyright.

<sup>30</sup> The computer systems design and related services industry covers businesses engaged in providing services in the field of information technologies through one or more of the following activities: (1) writing, modifying, testing and supporting software to meet the needs of a particular customer; (2) planning and designing computer systems that integrate computer hardware, software and communication technologies; (3) on-site management and operation of clients' computer systems and/or data processing facilities; and (4) other professional and technical computer-related advice and services.

<sup>31</sup> The U.S. Bureau of Economic Analysis did not provide data for computer systems design and related services sales through affiliates for 2005 to prevent disclosure of individual company data.

<sup>32</sup> This figure includes trade between an American company and an independent foreign company (also known as unaffiliated trade). It does not cover payments by foreign affiliates of U.S. multinational companies to the parent company (also known as intrafirm trade), which are not captured in current U.S. government data on royalties and license fees.

<sup>33</sup> Figures on U.S. packaged software sales cover software products for general sales that are publicly available over the counter, by mail order or by telephone and include the total value of the package (intellectual content, any manuals, etc.). Data on packaged software do not include the value of custom software (customized technical data) that is exported and imported on media, since the shipper is only required to report the value of the media, and do not include the value of software embedded or pre-loaded on hardware that is exported and imported.

<sup>34</sup> Digital/mobile revenues include: online subscription rentals, digital movie/TV downloads, video-on-demand, digital music downloads, mobile music, online advertising, online video games, wireless video games, electronic books, and online gaming. See PriceWaterhouseCoopers, *Global Entertainment and Media Outlook 2007-2011*.

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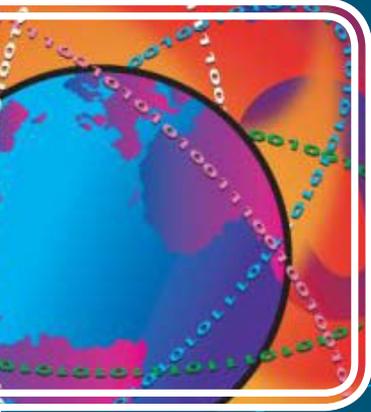
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