

Futurework

Trends and challenges for work in the 21st century

An adapted excerpt from a U.S. Department of Labor report (Labor Day 1999)

Just a few decades ago, business magazines celebrated the latest office technology—cutting edge equipment such as electric typewriters and Dictaphones. Today, it is digital phones and personal digital assistants.

We are living in a world few could have imagined 50 years ago. What will the workplace look like half a century from now? This article reflects on that question by highlighting three issues defining the 21st century workplace: the work being done, the effects of technology and globalization, and the implications of workplace change.

Work shifts

We anticipate the types of jobs people will have in this century based on long-term trends. At the time of the Revolutionary War, the U.S. economy was largely agricultural. But the importance of nonagricultural employment grew as manufacturing developed, eventually overtaking agricultural employment shortly after the Civil War. This shift from agriculture to manufacturing was followed by a second major shift—from manufacturing to services.

Since 1919, the earliest year for which Bureau of Labor Statistics (BLS) data are available, nonfarm employment in the service-producing sector has exceeded that in the goods-producing sector. Nearly all employment growth has been in services, and BLS projects that growth to continue.

Employment change. The number of jobs in the nonfarm goods-producing sector has been fairly stable since 1970 and is projected to remain so over the 1998-2008 period. Construction is the only major goods-producing industry in which employment is projected to increase. Although it is still the largest employer among goods-producing industries, manufacturing now accounts for only half the share of total nonfarm employment it did in 1970. Between 1998 and 2008, manufacturing is projected to decline by 89,000 jobs to 18.7 million.

More efficient assembly-line techniques introduced in the early 20th century meant fewer workers could produce more goods at a lower cost. During the latter part of the century, technology-based productivity increases have caused a similar result: more goods with fewer employees. Although manufacturing's share of total employment has declined, it still accounts for a robust 30 percent of total gross domestic product today—as it has for the last three decades.

Widespread use of “just-in-time production” contributes to manufacturing's need for fewer employees. With just-in-time production, firms schedule production based on the needs of their retail outlets or product users. Doing so allows them to avoid costly inventory holding and to avoid producing items that are selling slowly or not at all.

Imports of goods produced in low-wage factories abroad were a major cause of the recent loss of U.S. manufacturing jobs. But the response of U.S. businesses to import competition was equally important, especially in the textile and apparel industries. In response to import threats, some textile firms have invested heavily in laborsaving capital equipment, further reducing employment.

Growth in service jobs. Most job growth since 1970 has been in the service-producing sector.

This trend is expected to continue as nonhousehold service-producing jobs are projected to increase over 19 million between 1998 and 2008. (See table 1.)

Since the 1950s, jobs have increased more in healthcare than in any other comparable industry group. This is so in part because of services required for an aging population, along with new technology making it possible for people today to recover completely from ailments and injuries that decades ago would have been fatal or permanently disabling. Jobs in medical offices, clinics, and health maintenance organizations have grown



rapidly as the healthcare industry strives to provide more services in less expensive ways. Nurse practitioners, who receive more training than registered nurses, have increased in number as the healthcare industry relies on them as cost-effective providers of medical care. Health-services employment is projected to increase by 2.8 million jobs between 1998 and 2008.

Contracted-out business activities are part of the reason employment in business services has grown so rapidly. Activities previously done within firms are now accomplished externally by other businesses that specialize in these functions. This causes rapidly expanding employment in businesses such as computer and data processing services, advertising, and guard and security services.

One force driving the growth in service jobs has been a shift in work done in the home from family members to service workers. Like employers, families are either “contracting out” or bypassing altogether some of the work they used to do themselves.

To illustrate, consider family mealtimes. For meals eaten at home, people increasingly buy prepared or partially prepared foods. Food stores have responded to this preference for convenience by adding features such as delis and salad

bars and hiring workers to staff them. Fast food, carryout, and food delivery restaurants also have hired workers to meet demand. In addition, growth in the number of meals eaten outside the home—the result of both a long-term trend and the recent economic boom—has led to an increase in employment at eating and drinking establishments. And children in homes where limited cooking is done are expected to continue the trend into their adulthood.

Increases in the percentage of women who work outside the home have contributed to the growth in retail services and products. Greater spending power and limited free time have inspired the growth of stores that provide convenience—from catalog and Internet shopping to greater emphasis on customer service and personal shopper services.

Child care, too, is being “contracted out” to daycare centers and nannies. The child daycare services industry is projected to add 196,000 jobs between 1998 and 2008. Similar changes are occurring in the care of the increasing population of elderly persons. Residential care institutions—which provide 24-hour, year-round personal care and incidental health care—have multiplied, along with nursing homes and home healthcare services.

Table 1
Employment by major industry division, 1998 and projected 2008

Industry division	Thousands of jobs		Employment change, 1998-2008		Percent distribution	
	1998	2008	Number (thousands)	Percent	1998	2008
Total, all industries	140,514	160,795	20,281	14	100	100
Nonfarm wage and salary	124,887	144,526	19,640	16	89	90
Goods producing	25,347	25,694	347	1	18	16
Mining	590	475	-115	-19	0.4	0.3
Construction	5,985	6,535	550	9	4	4
Manufacturing	18,772	18,684	-89	0	13	12
Durable	11,170	11,277	107	1	8	7
Nondurable	7,602	7,406	-196	-3	5	5
Service producing	99,540	118,832	19,293	19	71	74
Transportation, communications, and utilities	6,600	7,541	941	14	5	5
Wholesale trade	6,831	7,330	499	7	5	5
Retail trade	22,296	25,363	3,067	14	16	16
Finance, insurance, and real estate	7,408	8,367	960	13	5	5
Services	36,586	48,543	11,957	33	26	30
Government	19,819	21,688	1,869	9	14	14
Federal Government	2,686	2,550	-136	-5	2	2
State and local government	17,133	19,138	2,005	12	12	12

Note: “Total, all industries” also includes agriculture, private household, and secondary jobs.

Employment in government has been decreasing at the Federal level and increasing at the State and local level. During most of the past decade, Federal Government employment has declined, settling to its lowest level in 30 years. In contrast, State and local government employment, particularly in education, has increased and is projected to continue to grow through 2008.

Technology and globalization

The networking of businesses, industries, and homes is changing the way—and the speed with which—people do business. Technological change is also intertwined with globalization. The technologies underlying the Internet and telecommunications have increased information flow between countries, speeding globalization. At the same time, the spread of free markets has promoted greater competition worldwide, creating strong incentives for domestic producers to adopt new technologies.

Technology and business. Computers and information technology have affected almost every industry. For example, computer-managed inventories and just-in-time manufacturing and servicing help businesses to control costs. Barcode scanners help businesses meet consumer demand more effectively. New and established industries alike benefit from advancing technology.

Leading manufacturers have developed computer links to their suppliers and customers. Their suppliers minimize inventories and downtime by following progress on the production line via computer hookup, allowing them to accurately schedule material shipping. Their customers have computer access to the latest production status and thus know precisely when to expect delivery. For example, a major airplane manufacturer maintains a parts-distribution website that speeds the pace at which planes are serviced. Locating a part used to take 5 to 10 hours, often forcing cancellation of a flight; now, parts are located within minutes.

Electronic commerce, or e-commerce—the business of buying, selling, or conducting other transactions via the Internet—may reduce the use of conventional stores, increase mail delivery services, and reduce inventory. The popularity of some online firms has prompted other companies to diversify for business on the World Wide Web. Between 1996 and 1997,

The continued evolution of technology affects both existing and emerging jobs.

sales through e-commerce more than doubled—from \$15.5 billion to \$38.8 billion—and in 1998, sales are estimated to have exceeded \$300 billion. Total e-commerce is expected to reach \$1 trillion per year by 2005.

New learning technologies enable employers to train their workers more efficiently and effectively. For example, the Federal Technology Training Initiative forges partnerships among Federal agencies, State and local governments, private industry, and universities. These partnerships have created technology-based materials and methods for providing training and continuing education to Federal workers.

Technology and jobs. Over the last century, declines in the number of mass-production jobs were offset by increases in office and service jobs: Instead of industrial machinery, these workers' tools are telephones, fax machines, and personal computers—tools that are available outside the workplace as well as inside. People working out of home offices have at their disposal

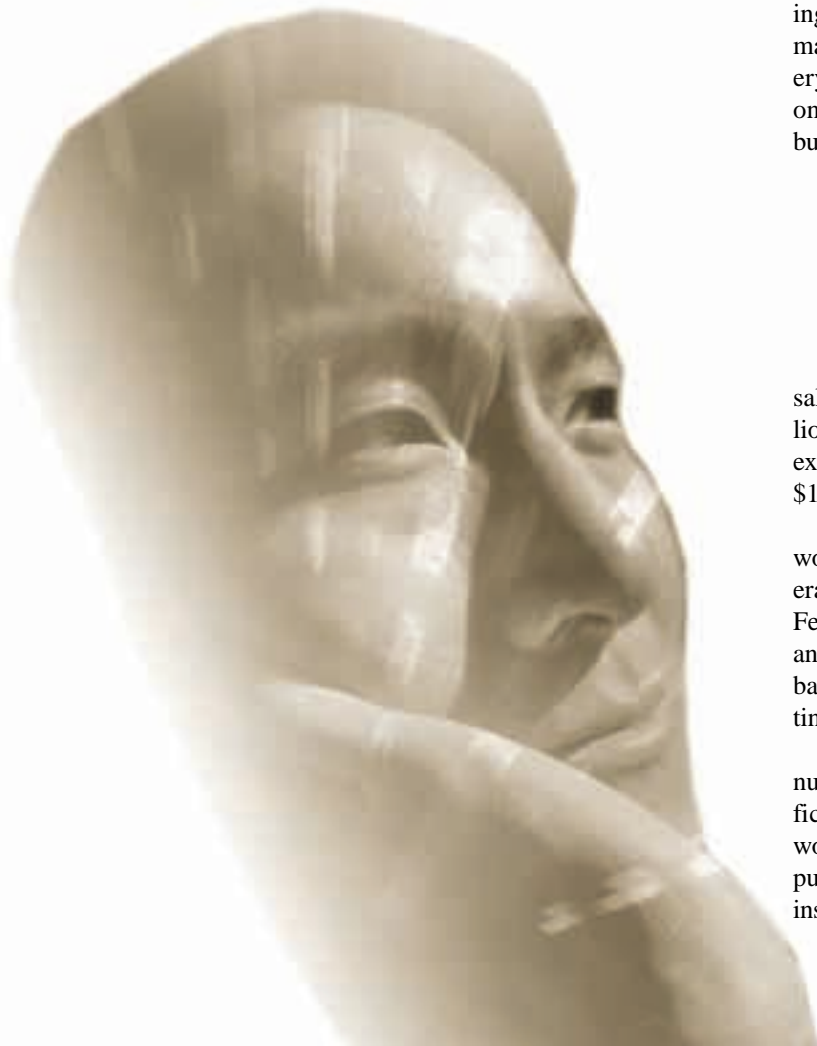


Table 2**Employment by major occupational group, 1998 and projected 2008**

Occupational group	Employment					
	Number (thousands)		Percent distribution		Employment change, 1998-2008	
	1998	2008	1998	2008	Number (thousands)	Percent
Total, all occupations	140,514	160,795	100	100	20,281	14
Executive, administrative, and managerial	14,770	17,196	11	11	2,426	16
Professional specialty	19,802	25,145	14	16	5,343	27
Technicians and related support	4,949	6,048	4	4	1,098	22
Marketing and sales	15,341	17,627	11	11	2,287	15
Administrative support, including clerical	24,461	26,659	17	17	2,198	9
Service	22,548	26,401	16	16	3,853	17
Agriculture, forestry, fishing, and related	4,435	4,506	3	3	71	2
Precision production, craft, and repair	15,619	16,871	11	11	1,252	8
Operators, fabricators, and laborers	18,588	20,341	13	13	1,753	9

Note: Detail may not equal total or 100 percent because of rounding.

an array of technology that includes mobile phones, laptop computers, e-mail, and the Internet.

The continued evolution of technology affects both emerging and existing jobs. The five occupations projected to grow fastest between 1998 and 2008 are computer related—computer engineers, computer support specialists, computer sys-

Nontraditional work arrangements help employers meet a variety of staffing needs and help workers meet personal or other obligations.

tems analysts, database administrators, and desktop publishing specialists. That growth is part of the reason professional specialty occupations, the group 4 of those 5 occupations fall into, is projected to be the fastest growing occupational group—increasing 27 percent between 1998 and 2008. (See table 2.)

But many workers in “nontech” jobs also expect their work to involve some technological know-how. For example, many administrative workers must now be familiar with word-processing programs, accounting and billing software, computer-based human resources packages, and multiline telephone systems that provide call forwarding, voice mail, and conference bridges.

Technology has also broadened access to information for workers and businesses. One-stop career centers meld personal

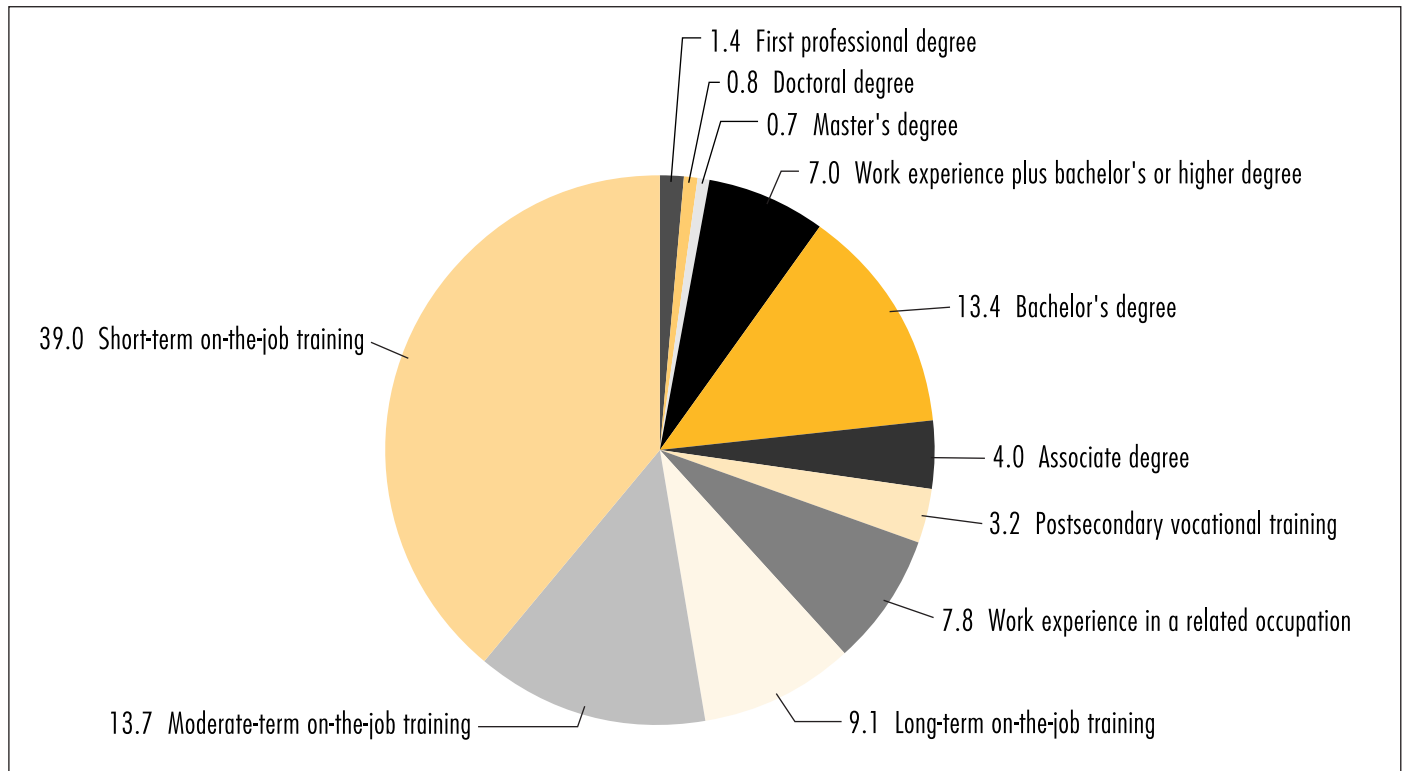
contact with physical and electronic methods of job hunting. Touch-screen kiosks simplify career search and application procedures. Internet websites provide information about job openings, education and training opportunities, company information, and more; jobseekers for some positions are able to apply directly online.

Globalization. The 1990’s will be remembered for the spread of free markets. The fall of the Iron Curtain in 1989 has led to free market economies in Eastern Europe and nearly all countries of the former Soviet Union. Concurrently, many countries in Asia and Latin America have reduced their barriers to free capital markets. The result has been expansion of trade and movement of capital and information between countries.

International trade may contribute to job growth in sectors in which the United States exports heavily. In many durable goods industries—such as industrial machinery, electronics products, and transportation equipment—exports account for large parts of total production and employment. Overall employment in these industries has usually risen since 1993. International trade probably has little effect on overall unemployment rates in the United States because the U.S. labor market is likely flexible enough to adjust to these kinds of sector shifts and to generate low unemployment rates over the long term.

Some people fear that international trade causes competition for jobs with the lowest-wage countries, leading to wage reductions around the world. But the contrary appears to be true. Following trade agreements of the 1990’s, U.S. wage levels ended a 20-year period of stagnation. And countries—including South Korea and Taiwan—that have attracted employers from the United States and Europe usually experience rising wages, narrowing the wage gap between their workers and U.S. workers.

Employment distribution by education and training category, projected 2008
(percent)



Workplace change

Technological change and international competition have created a need for workers who are educated and highly skilled. In addition to demanding increased skills, however, employers will also demand a more flexible workforce. Nontraditional work arrangements help employers meet a variety of staffing needs and help workers meet personal, professional, or other goals or obligations.

Demand for skills. Three out of four U.S. workers are in occupations that do not require a bachelor's degree. That distribution is expected to remain about the same in the near future, with workers in occupations requiring short-term on-the-job training composing nearly 40 percent of the workforce in 2008. (See chart.)

Although most of the fastest growing jobs will require a college degree, the majority of new jobs being created—from home health aides to desktop publishers—require knowledge other than that gained from earning a degree. For workers in those jobs, good basic reading, communication, and mathematics skills play an important role in getting a job and developing a career.

A 1996 American Management Association survey of mid-size and larger businesses found that 19 percent of job applicants taking employer-administered tests lacked the math and reading skills necessary for the jobs they were applying for. That percentage increased to almost 36 percent in 1998. The report attributed the sharp increase in the deficiency rate to the higher literacy and math skills required in today's workplace.

Skill requirements have increased for many jobs in the U.S. economy. Consider the change in machine shops from manually operated machine tools, such as lathes and drilling machines, to computer-programmed machine tools. The machine tool operator today is more likely to insert a programmed diskette into a control module than to set measurement devices manually. In fact, some jobs in the machine shop have been "de-skilled" while others have been redesigned to require formal education in abstract skills such as use of programming languages.

Nontraditional workers. Workers across all skill levels are in nontraditional work arrangements—that is, in work situations different from the standard full-time, year-round job in which an employer usually provides workers with benefits, training,

and retirement pension. The nontraditional workforce includes multiple jobholders, contingent and part-time workers, and people in alternative work arrangements.

Nearly four out of five employers use some form of nontraditional staffing.

The latter group is defined by BLS to include independent contractors and workers who are on call, temporary, and employees of contract companies. Of the 13 million workers in alternative work arrangements, independent contractors compose the majority—8.5 million—with temporary workers accounting for another 1.3 million.

Nearly four out of five employers, in establishments of all sizes and in all industries, use some form of nontraditional staffing. Among the most common reasons they cite are to accommodate workload fluctuations and to fill positions that are temporarily open due to permanent employees' short-term absences. Staffing strategies that combine traditional and nontraditional employees may help firms become more efficient, protect against layoffs, or use workers with special skills as the need arises.

The perception of nontraditional work arrangements is mixed. Some people view this large and growing workforce as one employers relegate to second-class employment—with no worker benefits, little or no mutual loyalty, and all risk borne by the employee—while employers benefit from lower costs. Others see the nontraditional workforce as an opportunity for

workers to achieve a flexible work schedule, reach a better balance between work and other interests, gain new experiences, or bridge periods of traditional employment. The increase in nontraditional staffing arrangements may require reexamining definitions of employer, worker, and workplace.

What does the future hold?

Preparing for tomorrow's workplace involves more than simply knowing what to expect. Acting on that knowledge—obtaining education, skills training, and occupational information for career planning—is the key to succeeding in the workforce of the future.

Meet with your school's career counselor and visit your local library to learn more about the occupations and industries that interest you. Among the helpful resources you should consult is the 2000-01 *Occupational Outlook Handbook*, which contains detailed information for about 250 occupations. The *Handbook* is available in print, on CD-ROM, and online at <http://stats.bls.gov/ocohome.htm>.

The *Occupational Outlook Quarterly* is also available online at <http://stats.bls.gov/opub/ooq/ooqhome.htm>.

For other BLS employment, occupational, and related information, visit the Bureau's website, <http://stats.bls.gov>.

For career information from the U.S. Department of Labor, check out America's Career Kit. It currently includes three databases: America's Job Bank (<http://www.ajb.dni.us>), America's Career InfoNet (<http://www.acinet.org>), and America's Learning Exchange (<http://www.alx.org>).

To view the complete Futurework report online, set your browser to <http://www.dol.gov/dol/asp/public/futurework>.

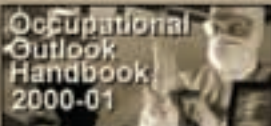


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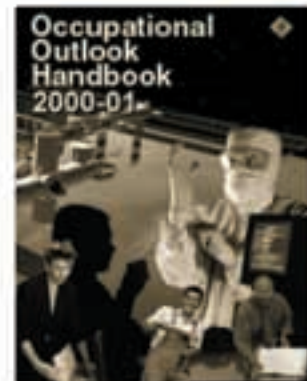
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The *Occupational Outlook Handbook* is a nationally recognized source of career information, designed to provide valuable assistance to individuals making decisions about their future work lives. Revised every two years, the *Handbook* describes what workers do on the job, working conditions, the training and education needed, earnings, and expected job prospects in a wide range of occupations.

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