

THE GREAT RESET

Recession, technology kill middle-class jobs

Study of employment data shows trend in developed countries.

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Associated Press

NEW YORK — Five years after the start of the Great Recession, the toll is terrifyingly clear: Millions of middle-class jobs have been lost in developed countries the world over.

And the situation is even worse than it appears.

Most of the jobs will never return, and millions more are likely to vanish as well, say experts who study the labor market. What's more, these jobs aren't just being lost to China and other developing countries, and they aren't just factory work. Increasingly, jobs are disappearing in the service sector, home to two-thirds of all workers.

They're being obliterated by technology.

Year after year, the software running computers and an array of other machines and devices becomes more sophisticated and powerful and capable of doing more efficiently tasks that humans have always done. For decades, science fiction warned of a future when we would be architects of our own obsolescence, replaced by our machines; an Associated Press analysis finds that future has arrived.

"The jobs that are going away aren't coming back," said Andrew McAfee, principal research scientist at the Center for Digital Business at the Massachusetts Institute of Technology and co-author of "Race Against the Machine." "I have never seen a period where computers demonstrated as many skills and abilities as they have over the past seven years."

The global economy is being reshaped by machines that generate and analyze vast amounts of data; by devices such as smartphones and tablet computers that let people work just about anywhere, even when they're on the move; by smarter, nimbler robots; and by services that let businesses rent computing power when they need it, instead of installing expensive equipment and hiring IT staffs to run it. Whole employment categories, from secretaries to travel agents, are disappearing.

"There's no sector of the economy that's going to get a pass," said Martin Ford, who runs a software company and wrote "The Lights in the Tunnel," a book predicting widespread job losses. "It's everywhere."

The numbers startle even labor economists. In the United States, half of the 7.5 million jobs lost during the Great Recession paid middle-class wages, ranging from \$38,000 to \$68,000. But only 2 percent of the 3.5 million jobs gained since the recession ended in June 2009 are midpay. Nearly 70 percent are low-paying jobs; 29 percent pay well.

In the 17 European countries that use the euro as their currency, the numbers are even worse. Almost 4.3 million low-pay jobs have been gained since mid-2009, but the loss of midpay jobs has never stopped. A total of 7.6 million disappeared from January 2008 through last June.

Some occupations are beneficiaries of the march of technology, such as software engineers and app designers for smartphones and tablet computers. But, overall, technology is eliminating far more jobs than it is creating.

To better understand the affect of technology on jobs, the Associated Press analyzed employment data from 20 countries; and interviewed economists, technology experts, robot manufacturers, software developers, CEOs, and workers who are competing with smarter machines.

The AP's key findings:
• During the past 50 years, technology has drastically reduced the number of jobs in manufacturing. Robots and other machines controlled by computer programs work faster and make fewer mistakes than humans. Now, that same efficiency is being unleashed in the service economy.

• Technology is being adopted by every kind of organization that employs people. It's replacing workers in large corporations and small busi-



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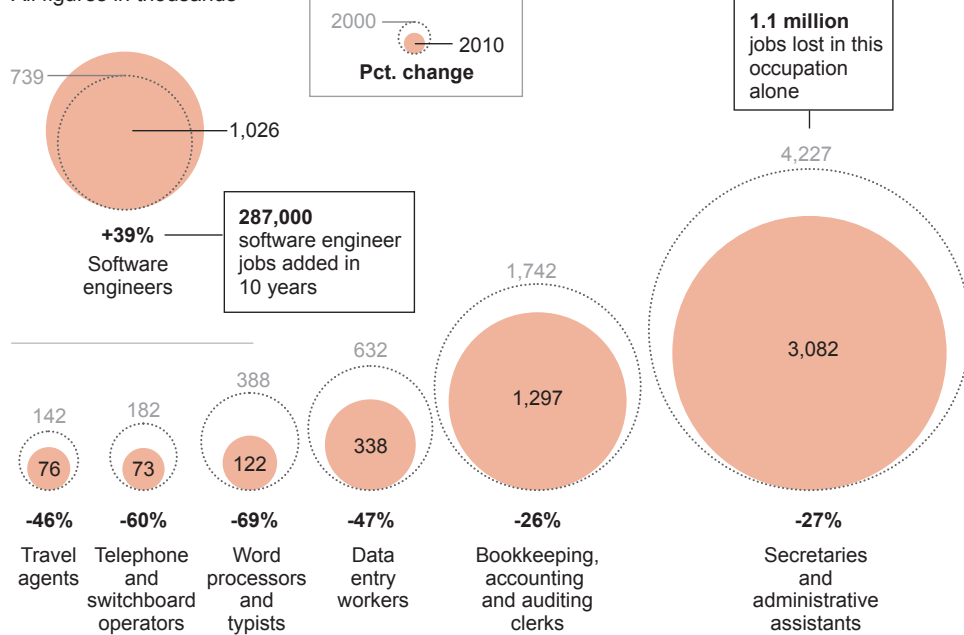
A row of self checkout lines are available at a Big Y supermarket in Manchester, Conn. According to a three-month AP investigation, five years after the start of the Great Recession, instead of relying on someone else in the workplace or their personal lives, people are using technology to do tasks independently.

Traces of technology's impact on the job market

Employment in many midwage occupations has fallen sharply since 2000. A key reason is powerful software that runs computers and other devices and allows them to do work humans have always done. At the same time, there have been beneficiaries. Software engineer jobs are up 39 percent.

CHANGE IN TOTAL NUMBER OF JOBS, 2000-2010

All figures in thousands



nesses, established companies and startups, schools, hospitals, nonprofits and the military.

• The most vulnerable workers are doing repetitive tasks programmers can write software for — an accountant checking a list of numbers, an office manager filing forms, a paralegal reviewing documents for key words to help in a case.

• Startups account for most of the job growth in developed economies. Thanks to software, entrepreneurs are launching businesses with a third fewer employees than in the 1990s.

• It's becoming a self-serve world. Instead of relying on someone else in the workplace or our personal lives,

we use technology to do tasks ourselves. This trend will grow as software permeates our lives.

• Technology is replacing workers in developed countries regardless of their politics, policies and laws.

The lingering pain of the Great Recession is not entirely a result of technology's advances. Other factors are keeping companies from hiring — partisan gridlock in the U.S., for instance, and the debt crisis in Europe, which has led to deep government spending cuts.

But to the extent technology has played a role, it raises the specter of high unemployment even after political troubles lift and economic growth accelerates.

Jobless recovery

In the U.S., the economic recovery that started in June 2009 has been called the third straight "jobless recovery."

But that's a misnomer. After the recessions that ended in 1991 and 2001, jobs lost were slow to return, but they all returned within three years.

But 42 months after the Great Recession ended, the U.S. has gained only 3.5 million, or 47 percent, of the 7.5 million jobs lost. The 17 countries that use the euro had 3.5 million fewer jobs last June than in December 2007.

This has truly been a jobless recovery, and the lack of midpay

jobs is almost entirely to blame.

Fifty percent of the U.S. jobs lost were in midpay industries, but Moody's Analytics, a research firm, said just 2 percent of the 3.5 million jobs gained are in that category. After the four previous recessions, at least 30 percent of jobs created — and as many as 46 percent — were in midpay industries.

Other studies that group jobs differently show a similar drop in middle-class work.

Some of the most startling studies have focused on mid-skill, midpay jobs that require tasks that follow well-defined procedures and are repeated throughout the day. Think travel agents, salespeople in stores, office assistants and back-office workers like benefits managers and payroll clerks, as well as machine operators and other factory jobs. An August 2012 paper by economists Henry Siu of the University of British Columbia and Nir Jaimovich of Duke University found these kinds of jobs comprise fewer than half of all jobs, yet accounted for nine of 10 of all losses in the Great Recession. And they have kept disappearing in the economic recovery.

In Europe, companies couldn't go back even if they wanted to. The 17 countries that use the euro slipped into another recession 14 months ago, in November 2011.

"The recessions have amplified the trend," said Maarten Goos, an economist at the University of Leuven in Belgium. "New jobs are being created, but not the middle-pay ones."

Developing economies have been spared the technological onslaught — for now. But even they are beginning to use more machines in manufacturing. The cheap labor they relied on to make goods from apparel to electronics is no longer so cheap as their living standards rise.

One example is Sunbird Engineering, a Hong Kong firm that makes mirror frames for heavy trucks at a factory in southern China. Salaries at its plant in Dongguan have nearly tripled from \$80 a month in 2005 to \$225 today. "Automation is the obvious next step," CEO Bill Pike said.

Sunbird is installing robotic arms that drill screws into a mirror assembly, work now done by hand. The machinery will allow the company to eliminate two positions on a 13-person assembly line. Pike hopes that additional automation will allow the company to reduce another five or six jobs from the line.

History of jobs and technology

NEW YORK — To workers being pushed out of jobs by today's technology, history has a message: You're not the first.

From textile machines to the horseless carriage to email, technology has upended industries and wiped out jobs for centuries. It also has created millions of jobs, though usually not for the people who lost them.

"People suffer — their livelihoods, their skills and training are worth less," said Joel Mokyr, a historian of technological change at Northwestern University. "But that is the price we pay for progress."

A look at breakthroughs making the goods we buy more affordable, our lives more comfortable — and our jobs more precarious:

The first industrial revolution

For most of history, people made many goods themselves. It changed with the First Industrial Revolution, which began in England in the mid-18th century and lasted about 100 years.

New mechanical devices that allowed one man to do the work of several flooded the market with products, most notably textiles. Using cords, wheels and rollers, inventors sped up the twisting of threads to make yarn and the weaving of yarn to make cloth.

In America in 1793, Eli Whitney freed slaves from the laborious work of picking sticky seeds from cotton balls by inventing a cotton gin to do automatically

The second industrial revolution

Life sped up more in this second period of innovation, from the mid-19th century to the early 20th century, an age of steel and electric power, expanding railroads and the automobile.

In 1856, an Englishman discovered a way of making steel fast and cheap, and other inventors soon improved the process.

In 1861, a telegraph line was strung from coast to coast in the U.S., vastly improving communication. It wiped out the Pony Express delivery service.

In 1879, Thomas Edison made a light bulb that wouldn't burn out in a few hours. Factories replaced gas lights, reducing fires.

The information age

The inventor's focus shifted from building things to manipulating information. The tools of this new period help people gather and analyze data and communicate faster, cheaper and better.

No invention is commonly accepted as first of the age, but one contender is the first digital computer in 1937, created by George Stibitz of Bell Labs, the former research arm of AT&T.

In 1971, the first email was sent by a Defense Department computer engineer.

In 1983, Motorola introduced the first portable cell phone, a two-pound clunker called the DynaTac 8000x. In 1984, the first PDA, or personal digital assistant, was sold — the long-forgotten Psion. In 1994, BellSouth sold its first Simon, the start of a stream of ever-smarter smartphones from which you can access virtually any information while on the run, including that staple of the telephone operator — a phone number.

Which helps explain why there were just 36,000 U.S. operators in 2010, down nearly two-thirds in 10 years.

A job that rose in the same period? Software engineer. They numbered 1.03 million in 2010, up nearly 40 percent.

— Associated Press

information technology and procurement have disappeared in the U.S. and Europe since the Great Recession. And it pins the blame for more than half of the losses on technology. These are jobs that used to fill cubicles at almost every company — clerks paying bills and ordering supplies, benefits managers filing health-care forms and IT experts helping with computer crashes.

Looking ahead

What hope is there for the future?

Historically, new companies and new industries have been the incubator of new jobs. But even these companies are hiring fewer people. The average new business employed 4.7 workers when it opened its doors in 2011, down from 7.6 in the 1990s, according to a Labor Department study released last March.

Technology is probably to blame, wrote the report's authors, Eleanor Choi and James Spletzer. Entrepreneurs no longer need people to do clerical and administrative tasks to help them get their businesses off the ground.

Entrepreneur Andrew Schrage started the financial advice website Money Crashers in 2009 with a partner and one freelance writer. The barebones start-up was only possible, Schrage said, because of technology that allowed the

company to get online help with accounting and payroll and other support functions without hiring staff.

"Had I not had access to cloud computing and outsourcing, I estimate that I would have needed five to 10 employees to begin this venture," Schrage said. "I doubt I would have been able to launch my business."

Technological innovations have been throwing people out of jobs for centuries. But they eventually create more work, and greater wealth, than they destroy. Many economists are encouraged by history and think the gains eventually will outweigh the losses. But even they have doubts.

"What's different this time is that digital technologies show up in every corner of the economy," said MIT's McAfee, a self-described "digital optimist." "Your tablet (computer) is just two or three years ago, and it's already taken over our lives."

Occupations that provided middle-class lifestyles for generations can disappear in a few years. Utility meter readers are just one example. As power companies began installing so-called smart readers outside homes, the number of meter readers in the U.S. plunged from 56,000 in 2001 to 36,000 in 2010, according to the Labor Department.

In 10 years? That number is expected to be zero.

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