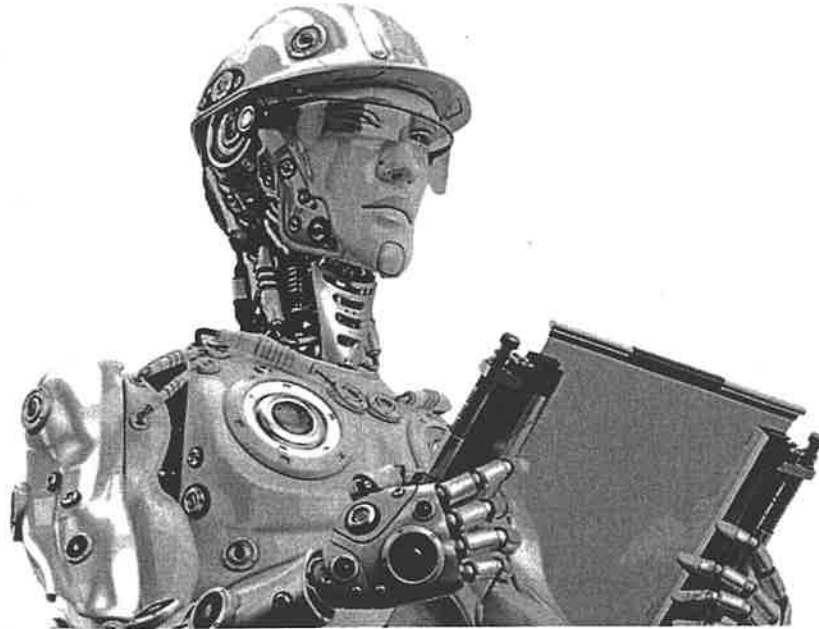


Meet Your Competition

New Technology is enabling machines to do things they've never done before—including many jobs previously held by humans



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"The jobs that the robots will leave for humans will be those that require thought and knowledge."

APRIL 4, 2016 | By Erik Sherman and Rebecca Zlssou

The staffers at the Henn-na Hotel near Nagasaki, Japan, are always friendly, start work on time, and never call in sick. But they aren't ordinary employees—they're robots. At the world's first hotel staffed almost entirely by machines, humanlike robots chat with guests, carry customers' luggage, and deliver room service.

The hotel, which opened last summer, may sound like fun, but it's no laughing matter for the people who weren't hired because of the robots. And they're about to get a lot of company. According to researchers at Oxford University in England, nearly half of all U.S. jobs—and 70 percent of low-skilled jobs—are at risk of being replaced by technology within the next 10 to 20 years.

Worldwide, many hospitals are already using robots to run lab tests and help diagnose patients. Restaurants are relying on computers to take orders and prepare food. And in recent years, many bank tellers, tollbooth operators, cashiers, tax preparers, and travel agents have been replaced by machines.

With so much technology reporting for duty, what will happen to human workers? Historically, advances in technology have created more jobs than they eliminated. But recent developments—including driverless cars and robots that can read facial expressions—have some people worried that machines are becoming so sophisticated that huge numbers of humans will eventually be pushed out of the workforce.

"Machines are learning to do human things that they never, ever could do before," says Andrew McAfee, a scientist at the Massachusetts Institute of Technology (MIT).

Still, most experts are confident that people won't see all jobs going to robots. Even though technology will likely replace many low-skilled jobs (which are easier to automate), plenty of new positions will be created, they believe. However, technology writer Howard Rheingold says that the jobs created by machines in the coming years will likely require a lot of training—and in many cases, a college degree.

"The jobs that the robots will leave for humans will be those that require thought and knowledge," he told the Pew Research Center. "In other words, only the best-educated humans will [be able to] compete with machines."

AN ONGOING ISSUE

The struggle between technology and jobs has been going on for centuries. In 1589, Queen Elizabeth I of England refused to give inventor William Lee a **patent** for a machine he developed that would have replaced hand knitting. She worried that the device would eliminate the need for human workers, leading to widespread unemployment and poverty.

During the Industrial Revolution of the 18th and 19th centuries, the rise of factories and power-driven machines eventually did eliminate the need for many skilled laborers, including carpenters and weavers, who made items by hand. But factories also created new job opportunities, especially for unskilled workers. For decades afterward, millions of laborers worked in factories on assembly lines, producing everything from cars to electronics. But beginning in the 1960s, many factory workers were themselves replaced by machines, which could perform the same tasks in less time.

While technology in the workplace is nothing new, experts say there are some major differences today. Until recently, robots mainly did dull or repetitive work in factories and warehouses. Now, however, recent advancements are allowing machines to do more complex jobs across more industries than ever before.

Many law firms, for example, are using computers to draft contracts and search through documents, cutting down on the need for legal assistants. In hospitals, machines are being used to give anesthesia for certain medical procedures.

Another major difference, says Tom Standage, digital editor for *The Economist*, is that technology is advancing faster than at any other point in history, leaving people with little time to learn new skills. "Previous technological revolutions happened much more slowly," he told the Pew Research Center, "so people had longer to retrain."

WILL ROBOTS TAKE YOUR JOB?

Not necessarily. Here, the percent chance of various professions being automated within 20 years.

99%
TELEMARKETER



94%
WAITER



68%
MAIL CARRIER



55%
COMMERCIAL PILOT



23%
FINANCIAL ANALYST



17%
FIRE-FIGHTER



4%
VETERINARIAN



1%
TEACHER



SOURCE: *The Future of Employment*, Oxford University

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THE TECH ADVANTAGE

If machines are such a threat to jobs, **why do companies** use them? For starters, robots are able to perform certain tasks faster and more efficiently than humans. Machines also never get sick, don't take time off, and don't need to be paid. Often, it's cheaper for businesses to use technology than to employ enough human workers to do the same jobs.

The National Institutes of Health, for example, is using several robotic systems to run lab tests. A single robot can run 3 million tests every week. A person would need to work eight hours a day, seven days a week for 12 years to run that many tests.

According to Frank Levy, an economist at MIT, machines don't have to do all the work of humans to eliminate their jobs, just enough of the necessary tasks. For instance, ATMs have cut down the need for bank tellers because they replaced a part of the tellers' job, he explains.

And yet some job loss is good if it means saving people from dangerous situations. Experts say that sophisticated robots will soon serve as first responders following disasters, such as earthquakes and nuclear meltdowns, when it's too risky to send in people. Robots might even be used in battle. Former U.S. Army General Robert Cone has predicted that robots could replace thousands of the branch's soldiers within the next few years. That could save many lives.



Bloomberg via Getty Images

Robots work the front desk at the Henn-na Hotel in Japan

HIGHLY SKILLED WORKERS WANTED

Although several jobs are being taken over by robots, experts agree that technology can generate jobs too. The main difference is that the positions created by machines tend to require more skills and training than the ones that are eliminated.

While technology has reduced the number of jobs in manufacturing and agriculture, for example, positions in other fields have skyrocketed. Today, tech companies like Google, Apple, and Yahoo! employ millions of workers. Plus, many people nationwide work as social media managers and app developers—just two of the many jobs produced by technological advancements that didn't exist even a decade ago. As long as robots are part of the workforce, we'll also need people to design, build, and maintain them.

In addition, technology creates jobs by boosting productivity and efficiency. When companies are able to make goods at a lower cost, they can lower their prices. That increases demand, which often leads to more hiring.

HOW TO COMPETE

Since machines are set to play an even bigger role in employment in the coming years, experts say that job seekers will need to be well versed in technology. To make sure that kids today will be able to compete in the future job market, President Barack Obama has called for a \$3 billion investment in STEM (science, technology, engineering, and math) education.

But does preparing for the future mean studying only STEM? Not necessarily, say experts. While demand will continue to rise for people who can write computer code and build robots, many other types of jobs will be necessary too. For one thing, machines don't understand emotion and are poor at problem solving, critical thinking, and creativity. Most robots aren't yet adaptable or versatile.

That means that a scientist developing robotics systems might have a safe job, but so would a salesperson, a teacher, or a plumber. Such professions require understanding people or working in unpredictable environments.

Ultimately, many experts maintain, machines are being designed to help humans and to make our jobs easier—not to replace us entirely.

"Technology is not something to be afraid of—just the opposite," says Ken Goldberg, a robotics expert at the University of California, Berkeley. "Robots are being designed to inspire and enhance humans, not eliminate us."

CORE QUESTION: What are some of the advantages and disadvantages of robots in the workplace?

THREE BIG QUESTIONS: "MEET YOUR COMPETITION" ARTICLE

*Use the sentence starters in your notes and respond in complete sentences.

Block: _____ Partner Names: _____

<p>What surprised us? (Provide 3 separate answers)</p>	<p>What did the author think we already knew? (Provide 3 separate answers)</p>
<p>What challenged, changed, or confirmed what we knew? (Provide 3 separate answers)</p>	<p>In one sentence, state the central/main idea of this article.</p>