



THE LIST: JOBS OF THE FUTURE

BY PARAG KHANNA AND AARON SMITH

IN 1945, WHEN MORE than 15,000 Manhattan elevator operators and maintenance workers went on strike, New York's skyline simply shut down. Business ground to a halt for a full workweek, causing Mayor Fiorello LaGuardia to desperately appeal for the strikers to return to work. Today, of course, the elevator operator is another casualty of automation, along with the likes of the professional typist and the switchboard operator. But though fears of a robot army displacing hordes of human laborers have so far proved premature, today's global workforce is at a moment of major upheaval (even putting aside widespread unemployment). We're still not quite at Ray Kurzweil's "singularity"—the move to a world where humans are more integrated with digital and automated technologies—but get ready: Many jobs we now take for granted will soon disappear, while others will emerge that are simply unimaginable today. Here's a look at five jobs that may be on the chopping block and what might replace them:

Market researcher → Predictive data analyst

Every minute YouTube users upload 48 hours of video, Facebook users share 684,478 pieces of content, and Google receives 2 million search queries, according to the business analytics company DOMO. As Big Data gets even bigger, fewer people will be needed to collect information, and more people will be needed to analyze and discover the value stored within these billions of terabytes. Some of the sexiest and best-paying jobs of the next 10 years will belong to the likes of Internet statisticians and data miners, people who don't just crunch raw numbers but analyze their hidden patterns to shape business decisions.

Visionary: Andrew Pole, statistician for Target and leading practitioner of consumer behavior prediction.

Hospital orderly → Medical roboticist

In this summer's sci-fi blockbuster *Prometheus*, an astronaut climbs into a fully robotic surgical pod to have an alien baby removed by cesarean section. Although extraterrestrial cross-breeding is a ways off (let's hope), advanced medical robots are rapidly evolving to keep up with an aging global population. Japan leads the way in robot innovation to care for its growing elderly population, including rehabilitative and therapeutic robots from Honda and Toyota. Medical roboticists will be needed to design, build, and operate these intelligent devices, which will increasingly replace humans—and provide more precise care—in doctors' offices and hospitals.



Visionary: Catherine Mohr, director of medical research at Intuitive Surgical, which develops cutting-edge surgical robots and procedures.

Teaching assistant → Educational technologist

While public university systems in many countries are plagued by inadequate funding, higher education as a whole is one of the fastest-growing sectors: 170 million people were enrolled in

partisan games can get out of control, as illustrated by last year's debt-ceiling debacle, which threatened a U.S. default and pushed Standard & Poor's to downgrade America's sacred AAA sovereign credit rating. Already, the upcoming fight over the \$607 billion "fiscal cliff" of automatic spending cuts and tax increases set to go into effect next year—a potentially devastating hit to an already sluggish economy—is starting to roil markets, and rightly so.

Behind this disturbing new political reality in advanced countries is a common cause: the government's inability to deal with the aftermath of a huge wave of excessive debt creation and credit entitlement gone crazy. With economic growth stagnating and joblessness remaining way too high, this shortfall has now exposed troubling gaps in politics and social policies. But where politicians and public-sector institutions act ponderously, markets don't. They move at much faster speeds, anticipating uncertainty and amplifying it.

So as The New Normal morphs into The New New Normal, the economic and financial system risks breakages that the political system will be increasingly incapable of mending rapidly enough. The result: more political dysfunction and greater sluggishness in economic growth, unacceptably high youth unemployment and long-term joblessness, redoubled debt and deficit concerns, and worsening inequalities between rich and poor. (If you want to get a sense of how disruptive this could get in the United States if we're not careful, just look at the turmoil in Europe, where the region's historical integration project is at risk in ways that not so long ago would have been unthinkable.)

The markets understand these dynamics well, even as they contribute to it. Companies and investors in Europe and the United States have become much more risk-averse over the past few years. In record numbers, they are refraining from long-term investment

higher ed in 2009, a 160 percent increase from 1990. And online education, once derided as correspondence classes for those who couldn't get into a four-year college, is booming. Software coders and curriculum developers will be needed to design online courses that deliver memorable learning in a new virtual medium. On the heels of Udacity and MIT's OpenCourseWare, new educational platforms have emerged that require the virtual curation of online, collaborative student groups, facilitating a multidirectional learning process. Rejoice! The days of tweed-jacketed professors droning on in lecture halls are nearly over.



Visionary: *Salman Khan, founder of the popular, free online education platform Khan Academy, which features more than 3,000 videos teaching everything from basic algebra to the French Revolution.*

Construction foreman → Smart engineer

Bricks and mortar aren't what they used to be. Construction represents more than \$7 trillion of the world's economic output, and it's expected to grow to \$12 trillion by 2020, as emerging markets bulge in China, India, Latin America, and the Middle East. And new transportation systems—from driverless cars to maglev trains—require infrastructure to be updated and reinvented. In developed countries, creaking urban centers will be retrofitted—or replaced—with new, sustainable technologies and materials. And with the development of “smart houses,” already in the works from Microsoft, new types of engineers, designers, and construction workers will be needed to seamlessly integrate and install digital technology in our homes.



Visionary: *Sebastian Thrun, who led development of the Google self-driving car.*

Tour guide → Space navigator

There's almost nowhere you can't get to by plane or boat these days. And with a flourishing private space race, a ride above Earth's atmosphere soon won't be solely for astronauts (or the ridiculously rich). The U.S. Federal Aviation Administration predicts space tourism will be a billion-dollar industry within the next 10 years. Virgin Galactic has more than 500 reservations for suborbital flights, slated to launch as soon as next year. And the space venture company Bigelow Aerospace plans to open a space hotel in 2016. It may sound like something out of an Isaac Asimov novel, but if there's one thing we know about the future of the workforce, it's that wherever professionals and technologists are going, sci-fi writers have already been.



Visionary: *Richard Branson, founder of Virgin Galactic, poised to be the first suborbital space tourism company.*

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activities, preferring instead to hoard cash in large quantities, despite what are historically very low, even negative nominal interest rates. The more this happens, the greater the withdrawal of the oxygen that is central to the vitality of market-based economies. And as the economy suffocates, a dysfunctional political sphere, instead of breathing life back into the system, seems content to apportion blame, aggravating a massively unstable economic picture.

No wonder it has become so hard to point to Western countries that have found consensus on the roots of their malaise, let alone come together to undertake the multiyear efforts needed to put their economies back on track. Already, almost half of the eurozone countries have kicked their governments out of office. Traditional political parties and ruling elites are increasingly discredited. Fringe parties are sprouting right and left, eager to dismantle the past but with little agenda for the future.

Will U.S. President Barack Obama be one of the last political leaders left standing when the dust settles in November? With Republican candidate Mitt Romney still struggling to unite his party, let alone capture the country's imagination, this may well happen. But there's no guarantee that either man has the ability to get at the root of the problem or even understand the severity of the crisis.

The stakes could hardly be much higher, particularly for Europe. While government leaders endlessly schedule meetings in Brussels, investors and companies are exiting the eurozone in ever larger numbers. If things get worse on the continent, few countries anywhere will escape without collateral damage. Ultimately, their ability to bounce back will be determined by how the world's largest single economy, the United States, navigates the aftermath of its own election cycle.

Sadly, neither Obama nor Romney has yet offered a meaningful, forward-looking economic reform program to address problems such as a malfunctioning labor market, unsustainable public finances, a broken credit system, inadequate infrastructure, and a lagging education system. The risk for the United States, as well as the global economy, is that a lack of vision and political courage ends up leading to even greater economic disappointment and financial instability, bringing with it the social unrest we've seen in so many other countries over the past 18 months. Occupy Wall Street and the Tea Party may have somewhat fizzled, but populist anger could return with a vengeance.

The longer America's interlocking economic and political challenges persist, the greater the number of companies and long-term investors that begin to worry—and, more importantly, act on those fears. They hire fewer people and invest less in factories and equipment. As they increasingly sit on the sidelines, the country's fate will be left in the hands of tactical position players and short-term traders, further ramping up volatility and reducing future growth and job opportunities. And when day traders and company flippers start running a country's economy, watch out.

The warning bells are ringing, and they are ringing loudly. We've already allowed bad economics to lead to bad politics. Now, it's high time to put a stop to the cycle where bad politics undermines an already fragile economy.

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