

## RETHINKING WORK IN THE DIGITAL AGE

*Digitization and automation are upending core assumptions about jobs and employees. Here's a framework for thinking about the new world taking shape.*



**Jacques Bughin** is a director of the McKinsey Global Institute (MGI) and a senior partner in McKinsey's Brussels office.

Digitization is sending tremors through traditional workplaces and upending ideas about how they function. Almost daily, reports of “humanoid” machines, such as Honda’s ASIMO, capture the attention of the media and the imagination of the public at large. They are also stirring existential anxieties about the future of human labor itself and the potential for major job dislocations by automation based on artificial intelligence. More prosaically, companies can harness the new power of global digital platforms, such as Toptal or Upwork, to find external freelance talent as they continue to redefine their corporate boundaries or identify the best internal talent for critical projects.



**Susan Lund** is a partner at MGI and is based in the Washington, DC, office.

While automation technologies advance, and hypotheses about their impact multiply, executives are struggling to sort through the implications. We have harnessed our own research and client experience, as well as the insights of others, to define some of the key contours of this change. Our starting place is a set of orthodoxies challenged by automation and digitization, which suggest new principles for organizing the emerging workplace. The landscape is shifting in areas such as career tracks within organizational hierarchies, notions about full-time jobs within companies, and even the core economic trade-offs between capital and labor. As the new workplace takes shape in the years to come, businesses will need to wrestle with the content of existing jobs, prepare for greater agility in the workplace, and learn to identify the early signals of change.



**Jaana Remes** is a partner at MGI and is based in the San Francisco office.

In what follows, we touch on seven orthodoxies in flux and provide further reading for digging deeper into the trends transforming them. These orthodoxies fall into three critical categories: the nature of occupations, the supply of labor, and the demand for it.

## The changing nature of occupations

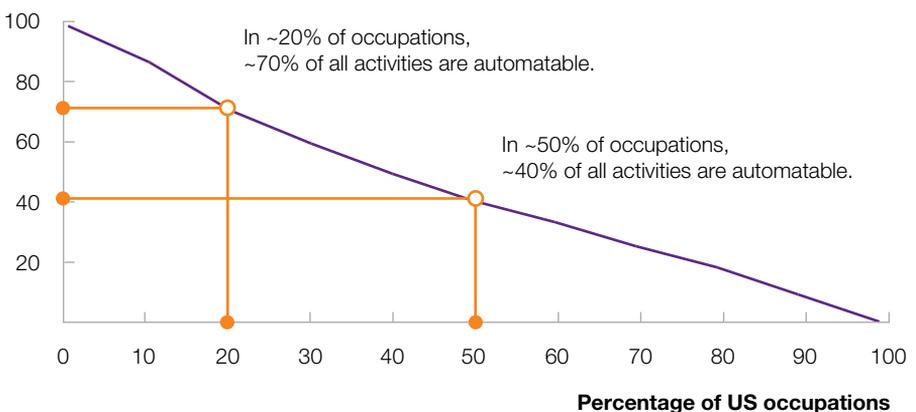
1. From 'bundled' to 'rebundled.' Digitization transforms occupations by unbundling and rebundling the tasks that traditionally constituted them. Last year, McKinsey research suggested that although fewer than 5 percent of occupations in the United States can now be fully automated, 70 percent of the job activities in 20 percent of occupations could be automated if companies adapted currently available technologies (exhibit).

Indeed, the rebundling of tasks to form new types of occupations has already begun in a number of economic sectors. Consider how automation has changed the TV-advertising marketplace. Traditionally, ad inventory was sold on “upfront” markets before the start of the season. The orthodox thinking was that program grids offered to TV networks by ad were a proxy for the size and demographic mix of the audience. Today, however, ad purchases are increasingly automated, and high levels of trading frequency are replacing one-off season sales. Moreover, ad sales are no longer just about the TV audience but also involve targeted advertising based on a big data view of audience flows and on exploiting sales opportunities across screens beyond television. Newly rebundled tasks relying on digital technologies have emerged in the industry: analytics specialists and yield-management experts, for example, navigate channels and parse traditional-versus-digital advertising inventories.

Exhibit

**If companies adapted currently available technologies, approximately 70 percent of the activities of some 20 percent of all occupations could be automated.**

### Automation potential, %



Source: McKinsey Global Institute analysis

2. *From well-defined occupations to project-based work.* Organizations hire most people for well-defined jobs. The traditional assumption has been that, eventually, these employees might move to other positions within the same organizations but that the nature of the jobs themselves wouldn't change substantially.

That's starting to evolve as work in marketing, finance, R&D, and other functions breaks away from set boundaries and hierarchies, morphing into more on-demand and project-based activity. Media production and IT development are typically project based, and that is likely to become a new norm as the level of digitization increases. Companies that harness this shift effectively have a significant potential upside: for example, 3M's integrated technology workforce-planning platform increased the internal mobility of employees and boosted productivity by 4 percent.

Our research shows that two-thirds of companies with high adoption rates for digital tools expect workflows to become more project- than function-based and that teams in the future will organize themselves. The upshot: organizational structures are starting to look different—new jobs defined by technologies that extend across functions have much shorter, project-oriented time frames.

### **The new world of labor supply**

3. *From salaried jobs to independent work.* Digitization is not only changing work within organizations but also enabling it to break out beyond them. Our latest research indicates that about 25 percent of the people who hold traditional jobs would prefer to be independent workers, with greater autonomy and control over their hours. Digitization makes the switch to skill-based self-employment or even to hybrid employment (combining traditional and independent work) much easier. TopCoder, one of the largest crowdsourcers of software development, has built a community of more than 750,000 engineers who work on tasks that are often for companies other than those (if any) that employ them.

In retailing, websites provide new avenues for entrepreneurial activity as “business in a box” applications offer global sales-distribution platforms and artificial-intelligence tools to support sales and customer care. Of course, online labor platforms (such as Upwork, Freelancer.com, and apps like Uber and TaskRabbit) have been encouraging freelance work for many years and today connect millions of workers with employers and customers across the globe. In macro terms, the constraining assumption that labor supply is relatively time inelastic (mainly a choice between full- or part-time jobs) will

be challenged as workers opt for—or, in the face of challenging employment prospects, resort to—greater self-determination in employment.

4. *From educational credentials to intrinsic reflected in data.* Degrees—particularly in the fields of science, technology, engineering, and mathematics (STEM)—have until now acted as “markers” of talent for hiring, even in the digital age. Yet as our colleagues reported in a recent article, when Catalyst DevWorks evaluated hundreds of thousands of IT systems managers, it found no correlation between college degrees and professional success. Digitization and automation seem to be placing a premium on not just technical skills but also creativity and initiative—which, recent research suggests, are becoming less correlated with formal education, even a STEM one.

Online work platforms are entering the breach and leveling the playing field: using job-rating systems and crunching big data to capture information on tasks and performance, they are proving to be a more effective way to measure abilities than educational credentials are. These dynamics have implications for workers, employers, and the economy as a whole. Our research suggests that online platforms not only induce many people to reenter the workforce in flexible employment arrangements but also improve the matching of jobs and workers within and across companies. The upshot could be a drop in the natural unemployment rate in developed economies and a boost to global GDP.

5. *From unions to communities.* In wage setting, professional training, and the like, unions remain important partners for employers’ associations and governments. But union membership has fallen precipitously in recent decades across OECD countries, and digital platforms seem poised to play a growing role in representing workers.

As we have noted, the diversity and multiplicity of work preferences is trending toward independent work and self-employment. In parallel, we see online communities flourishing as social-meeting web spaces for members and users of peer communities, some of which could become new touchpoints for labor organizations. Fruit pickers are a case in point. In the past, they looked for employers, during fruit season, on their own. Now they organize themselves via online communities and present their joint forces directly to employers. Australia’s [Fruitpickingjobs.com.au](http://Fruitpickingjobs.com.au), for example, not only enables pickers to band together but also helps with services such as visas and accommodations. The US Freelancers Union is not a union in the traditional sense of negotiating wages on behalf of its members but rather a community of independent freelancers and self-employed professionals. It offers its members networking events and online discussion forums, as well as group-insurance rates.

## The changing dynamics of demand

6. From capital substituting for labor to complementary investments in labor and capital. Economic models often assume that capital and labor are substitutes as production factors. With digitization and automation, the economics can cut differently. The companies creating the largest number of jobs are seeking workers with new skills and digital savvy. The proficiencies most in demand on platforms like LinkedIn tend to be in cloud and distributed computing, big data, marketing analytics, and user-interface design. These tend to complement rather than substitute for new forms of digital capital. Returns on investments in big data capital architecture and systems, for example, exceed the cost of capital when companies invest in complementary big data talent—both analytics specialists and businesspeople who can make sense of what they say.

However, the potential benefits from this virtuous cycle are far from being realized. McKinsey research indicates that the United States faces deep talent shortages in these areas, while insufficient levels of digital literacy hobble Europe. Both issues represent roadblocks for companies seeking to invest in new forms of digital capital.

7. Employment engines—from companies to ecosystems. Digitization has given rise to business strategies that lead companies to establish themselves as platforms, with an array of contacts across markets, that manage interactions among multiple organizations. These new business ecosystems amplify hiring beyond the boundaries of the platform owners. Apple's introduction of the iTunes store platform, for example, gave birth to a major mobile-app industry, which has created more than a million jobs in both the United States and in Europe (though Apple employs only a fraction of that number). The YouTube platform has spawned online multichannel networks (known as MCNs) that aggregate microchannels to attract advertisers looking for new ways to target spending.

Those dynamics have in turn created new jobs in content creation, digital production, and more. In e-commerce, major players such as Alibaba, Amazon, eBay, and Rakuten provide distribution and hosting platforms that help millions of small and midsize enterprises (as well as individuals) sell their products and services around the world. These ecosystems aren't direct employers. But the livelihoods of digital-age workers depend upon them

to a degree that seems to depart from the 20th-century norm of individual companies (and sometimes their supplier networks) as the dominant engines of employment.

---

How work will evolve in the second machine age is a complex and unsettled question, but old orthodoxies are already starting to fall. Companies need to become more agile so they can embrace emerging new forms of labor flexibility. Workers need to have the skills and adaptability that would help make a more flexible job environment an opportunity to shape their careers in satisfying ways—perhaps with a better work–life balance—instead of a threat to their livelihoods and well-being. To acquire new skills that automation can’t readily replace, employees will need help from companies and policy makers. And understanding how workplace orthodoxies are changing is a first step for everyone. 

### Further reading

- + *Independent work: Choice, necessity, and the gig economy*, McKinsey Global Institute, October 2016, [McKinsey.com](http://McKinsey.com)
- + Jacques Bughin, Michael Chui, and Martin Harrysson, “How social tools can reshape organization,” McKinsey Global Institute, May 2016, [McKinsey.com](http://McKinsey.com)
- + Michael Chui, James Manyika, and Mehdi Miremadi, “Where machines could replace humans—and where they can’t (yet),” *McKinsey Quarterly*, July 2016, [McKinsey.com](http://McKinsey.com)
- + Thomas D. LaToza and André van der Hoek, “Crowdsourcing in software engineering: Models, motivations, and challenges,” *IEEE Software*, January–February 2016, Volume 33, Number, pp. 74–80, [ieeexplore.ieee.org](http://ieeexplore.ieee.org)
- + “The future of work: Skills and resilience for a world of change,” *EPSC Strategic Note*, June 2016, Issue 13, European Political Strategy Centre, [ec.europa.eu](http://ec.europa.eu)
- + Aaron De Smet, Susan Lund, and William Schaninger, “Organizing for the future,” *McKinsey Quarterly*, January 2016, [McKinsey.com](http://McKinsey.com)

 For a full list of citations, see the online version of this article, on [McKinsey.com](http://McKinsey.com).

Copyright © 2016 McKinsey & Company. All rights reserved.