Rise of the humans

The integration of digital and human labor

In brief

— Despite doom and gloom scenarios for massive unemployment, cognitive technologies can spur new jobs and enhance human skills and expertise.

— The kind of jobs will likely change, however, especially middle-income routine jobs that are likely to be replaced by cognitive platforms.

— The challenge for leaders is to integrate and make the most of both kinds of labor.

— A five-stage process of inquiry can help leaders systematically think through how the shape and size of their workforce should change.

— Arguments range as to whether digital labor will remove or grow jobs, and in truth the jury is still out.

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Many jobs will be reconfigured and redesigned, causing job dislocations and requiring employees to learn new skills."

Hardly a day goes by, it seems, without apocalyptic warnings that robots in the workplace will create a dystopian destiny. The convergence of artificial intelligence, robotic process automation (RPA), machine learning, and cognitive platforms is potentially so disruptive that Klaus Schwab, founder of the World Economic Forum, calls it the "Fourth Industrial Revolution."[1]

Proponents of this vision point out that:

— Between now and 2025, up to two-thirds of the US$9 trillion knowledge worker marketplace may be affected.[2]

— The Bank of England estimates that robotic automation will eliminate 15 million jobs from the United Kingdom economy in the next 20 years.[3]

— Digital technologies will conceivably offset the jobs of 130 million knowledge workers — or 47 percent of total US employment — by 2025. Across the Organization for Economic Cooperation and Development (OECD), some 57 percent of jobs are threatened. In China, that number soars to 77 percent.[4]

As businesses and governments seek to streamline processes and reduce operating costs, cognitive technologies are rapidly creating a new class of digital labor. Many jobs will be reconfigured and redesigned, causing job dislocations and requiring employees to learn new skills.

But underlying this scenario is a series of potentially positive outcomes. Cognitive technologies can spur a growth in jobs overall and enhance human skills and expertise. Ultimately they can make every employee an innovator and transform the enterprise into an engine of unconstrained innovation.

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[1] Klaus Schwab, *The Fourth Industrial Revolution*, World Economic Forum, 2016.

[2] McKinsey Global Institute, *Disruptive technologies: Advances that will transform life, business and the global economy*, May 2013.

[3] "Robots Threaten 15m UK Jobs, Says Bank of England's Chief Economist," *The Guardian*, Nov. 12, 2015.

[4] Carl Benedikt Frey and Michael A. Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?" University of Oxford, Sept. 17, 2013.

How will jobs be affected?

Perhaps the most salient feature of today's Fourth Industrial Revolution is the widespread impact of computerization on all kinds of jobs, from butchers to nuclear power plant operators, from accountants to equipment assemblers.

What is clear is that middle-ranking jobs are just as likely to be affected as those jobs with obvious susceptibility to automation, such as bank tellers, repetitive manufacturing, and customer service representatives in call centers.

According to Frey and Osborne's touchstone research, cognitive automation or augmentation can replace almost anyone whose job does not require one or some of these characteristics:

— **Perception and manipulation** of things requiring high manual dexterity and discrimination between different objects in a cluttered environment; for example, a hairdresser (because you don't want your ear to be cut off by mistake), a street sweeper, and an occupational therapist.

— **Creativity,** particularly fine art creativity and high-order originality; for example, a landscape photographer and classical musician.

— **Social interaction and social intelligence**; for example, a social worker, a primary school teacher, and a mental health nurse.

Jobs that are the least susceptible to computerization, they wrote, are "generalist occupations requiring knowledge of human heuristics, and specialist occupations involving the development of novel ideas and artifacts."
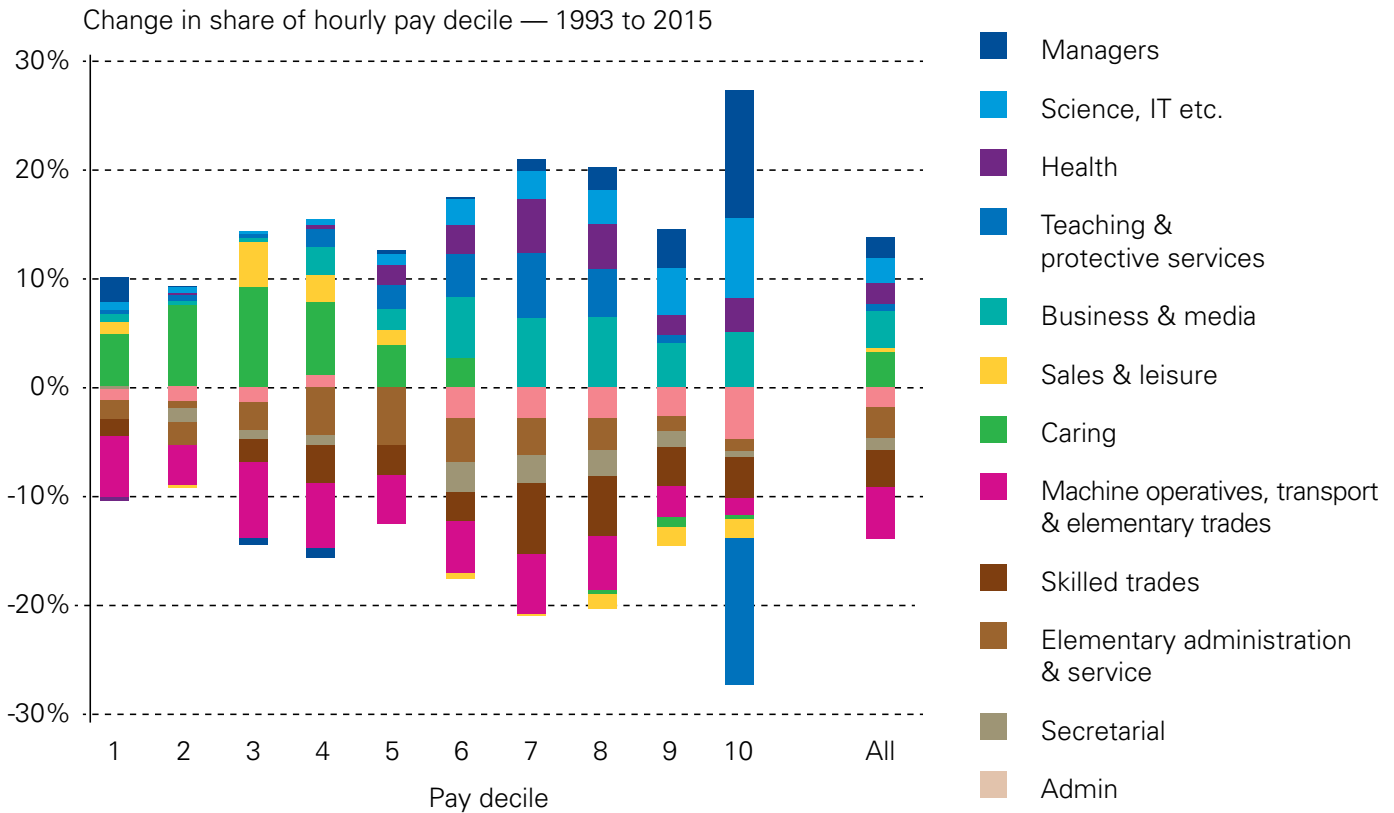
From this perspective, most management, business, and finance occupations are at low risk for computerization because they involve intensive generalist tasks requiring social intelligence. The same is true, they argue, for most occupations in education and healthcare and for arts and media jobs. Even many engineering and science occupations are not susceptible to computerization because they require a high degree of creative intelligence. As technology races

ahead, they conclude, low-skill workers will need to find jobs that require creative and social intelligence.
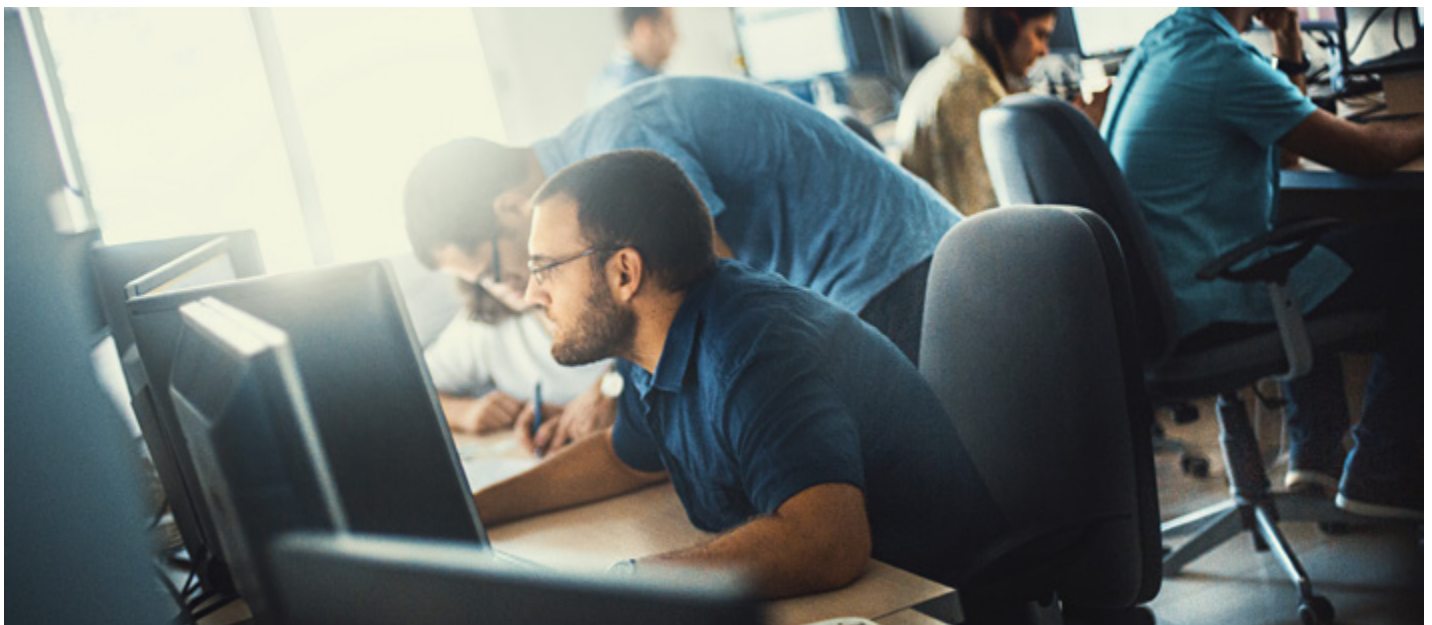
In fact, new jobs are being created. From 1993 to 2015, the hollowing out of jobs in the middle has been accompanied by a filling in with new jobs in precisely those occupations predicted to grow by Frey and Osborne — management, science and healthcare (Figure 1).[5]

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5 Torsten Bell, "Robot Wars: What do robots mean for Britain's labor market?" Resolution Foundation Robotics Conference, July 2016.

Figure 1: The hollowing out of jobs in the middle… has been accompanied by a filling in with new jobs

Change in share of hourly pay decile — 1993 to 2015

Legend:
- Managers
- Science, IT etc.
- Health
- Teaching & protective services
- Business & media
- Sales & leisure
- Caring
- Machine operatives, transport & elementary trades
- Skilled trades
- Elementary administration & service
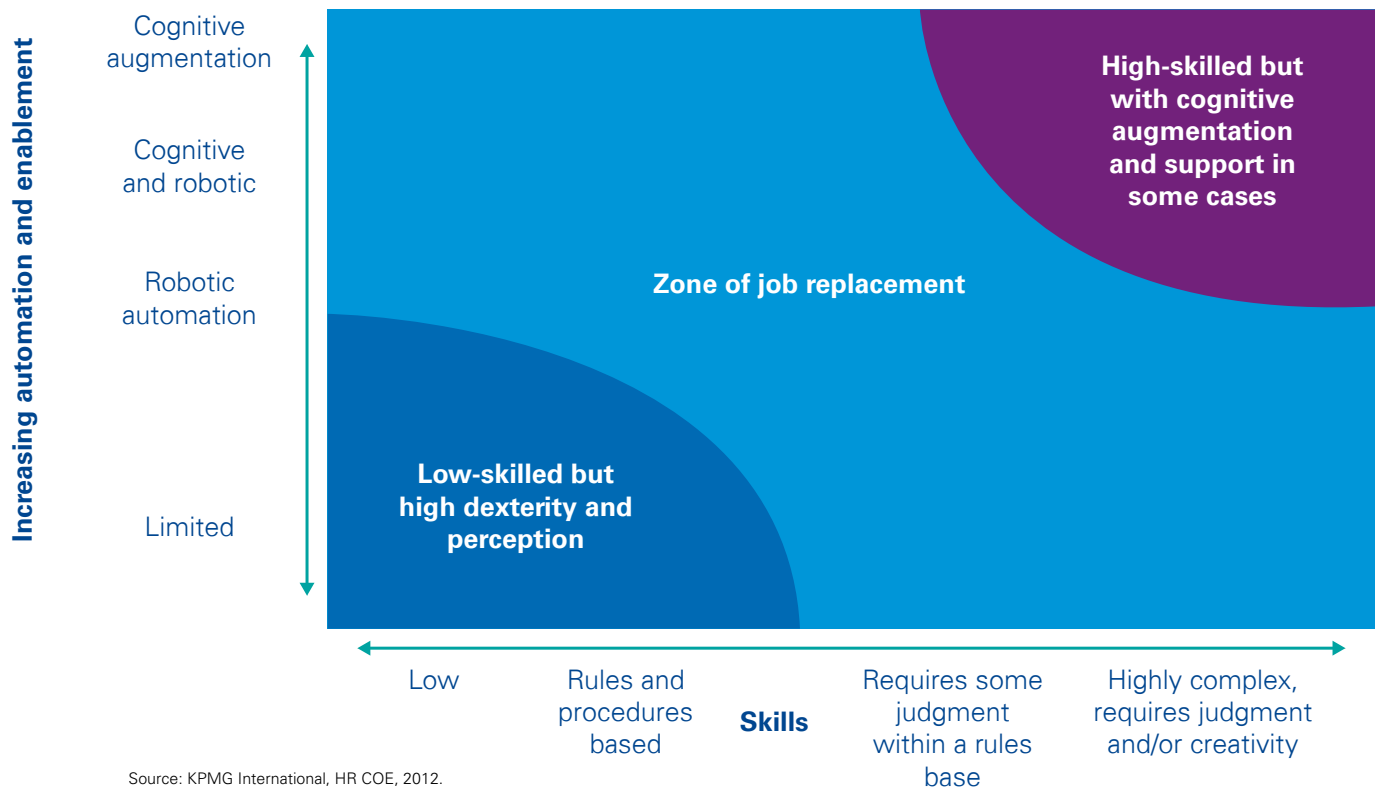- Secretarial
- Admin

Source: Presentation by Alan Manning to the Resolution Foundation, 2015.

How will jobs be affected? (continued)

The key point is the kind and quality of jobs. Goos and Manning coined the phrase "lousy and lovely jobs"[6] to describe the polarization of the workforce into low-skilled manual work and high-skilled cognitive work, leaving a hollowing-out of middle-income routine jobs. Informed by their thinking, the diagram below shows how jobs are affected across the spectrum of skills versus increasing automation and enablement (Figure 2).

Figure 2: Job impacts of cognitive processing and robotic automation: The hollowing out of the workforce

Source: KPMG International, HR COE, 2012.

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6 Maarten Goos and Alan Manning, "Lousy and Lovely Jobs: The Rising Polarization of Work in Britain," The Review of Economics and Statistics, February 2007.

In the midst of this polarization, KPMG professionals see four ways that jobs will likely be transformed. Some or all of these drivers of change can affect any job or role.

Four ways jobs will likely be transformed:

Cognitive automation drivers

1 *The leveraged professional*—Allowing lower-qualified people to deliver the same output as a fully qualified professional (a paralegal giving attorney-level advice) or allowing a higher-qualified professional to deliver a world-class output.

2 *The connected worker*—Giving everyone the technologies to access the best ideas and knowledge on a topic; for example, a surgeon learns the latest techniques from the world leader in a certain surgical procedure.

Cognitive processing and robotic automation drivers

3 *Working at the speed of thought*—Augmented professionals working faster with much greater throughput and efficiency, such as making judgments about the best tax treatments to apply to a set of company reports and accounts.

4 *The digital worker*—Using technologies to replace entire roles and job types. In particular, jobs in front line and middle-ranking occupations are likely to see the biggest impact. Digital labor can fully replace or work alongside humans—in a call center, for example.

What these technologies make clear is that human and digital labor will increasingly coexist in organizations, raising a key challenge for leaders and human resources (HR) professionals alike: create a productive integration as opposed to a destructive disconnection between both aspects of labor.

How cognitive technologies can affect a department:
The case of the Human Resources function

The case for applying digital labor in the HR function is not, currently, as strong as it is for other functions and activities. Organizations are already deploying such technology for front-line services such as the case in Banking with customer contact centers and in functions such as Finance where RPA solutions are being applied.

The other challenge for HR is that in too many organizations the state of the core data is too incomplete and fragmented and this needs to be improved before anything more sophisticated can be considered.

This said, the rise of digital labor in HR will likely come, and this section explores what that might mean for the function.

Changing roles and requirements for HR practitioners

Digital labor within HR will likely lead to a distinctly lower demand for human labor, so the remaining HR practitioners will need to evolve strong analytical skills to add further value than cognitive technologies do on their own.

Cognitively enabled data models will likely support fully integrated, real-time reporting across the organization as well as high-level predictions, giving HR access to high-quality data and higher accuracy in strategic decisions. The same systems could be the reason why many HR business partner roles are replaced by intelligent solutions.

The zone of replacement for HR would most likely be Tier 1 and 2 shared service and service delivery roles and HR administration more broadly. Cognitive automation will also augment the roles of business partners and centers of excellence.

Precise HR decision making

Increased connectivity and faster access to virtually stored evidence can give all HR employees access to the best ideas and solutions, enabling lower-qualified staff to review organizational data and perform high-level HR reporting at the level that fully qualified professionals do today.

Digital labor could immediately give workers in the remaining HR function access to organizational data that will enable them to:

— make better, more consistent and predictive decisions; for example, preempt issues with turnover and engagement

— identify the most effective spend for the HR budget

— use objective criteria to identify and assess the company talent base and conduct succession planning

— make performance management more effective

— identify the most efficient compensation and benefit packages to achieve desired behaviors

— fundamentally change recruitment processes

— automate analyses of written communication.

Transparency in HR

Automated HR is likely to lead to improved consistency in the application of HR policies, with less discretionary or emotional variation. In companies whose policies are considered fair and communicated properly, such transparency could be highly appreciated and motivating to employees. They could easily compare their own performance and development with their peers, so they could recognize their own growth potential or need for improvement.

However, transparency could lead to other challenges, such as the effect it might have on actual performance. How do you ensure high performers or average performers are motivated to perform at a higher level if they have access to information confirming their performance is already at an acceptable level?

Effect of automation throughout the HR service value chain

Virtually all HR services can be automated (Figure 3). Functions marked in green could be fully or partially affected by automation.

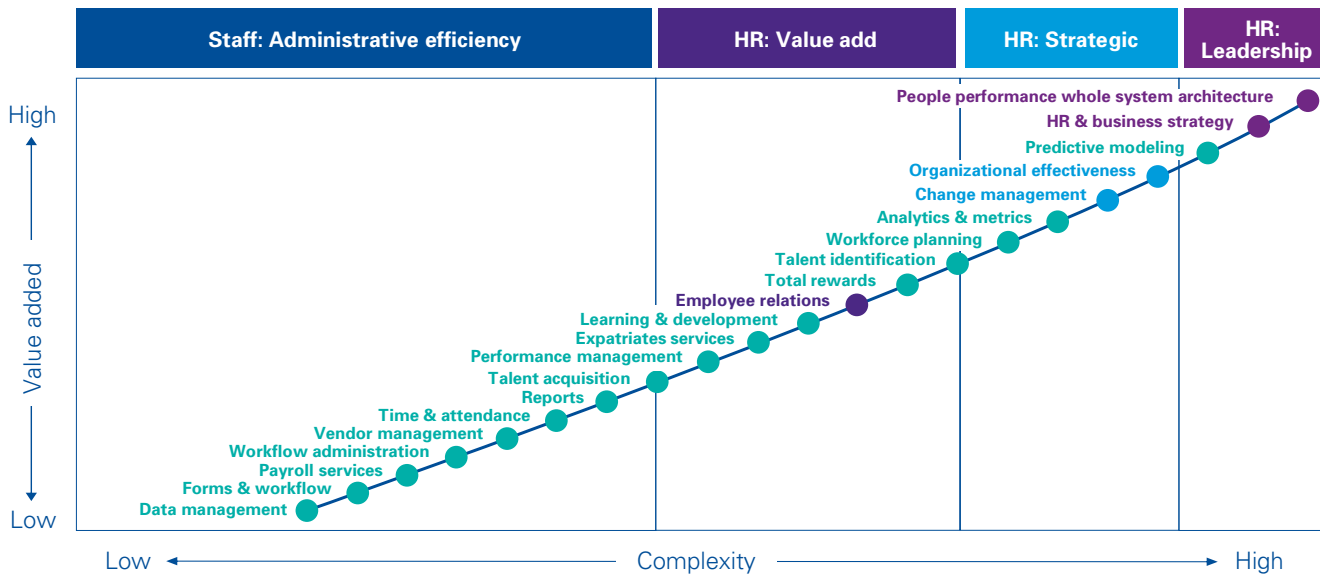## Challenges the HR function would face as a business partner

HR technology might fundamentally change the approach to human capital management. In dealing with human beings, standardized tools and applications will require a certain amount of specialized staff able to analyze and recognize threats and weaknesses in the function's people management architecture.

HR management also will need to consider important ethical matters:

— What effect will HR automation have on an individual level? Alterations to career models, job families, and employment models can fundamentally change how employees interact with each other. Will they have the capacity to grasp and handle the change both for the HR function and for the rest of the organization?

— How will privacy regulations and varying ethical considerations concerning day-to-day transparency of human performance (for example, when cognitive and wearable technologies combine) affect companies' ability to implement those technologies?

Figure 3: HR Service value chain

| Staff: Administrative efficiency | HR: Value add | HR: Strategic | HR: Leadership |

People performance whole system architecture
HR & business strategy
Predictive modeling
Organizational effectiveness
Change management
Analytics & metrics
Workforce planning
Talent identification
Total rewards
Employee relations
Learning & development
Expatriates services
Performance management
Talent acquisition
Reports
Time & attendance
Vendor management
Workflow administration
Payroll services
Forms & workflow
Data management

Value added — High / Low

Complexity — Low / High

Source: KPMG International, HR COE, 2012.

'HR in a box'

Cognitive robotics can give smaller companies and start-ups an out-of-the-box HR function. Packaged HR services might lead to higher-quality service for smaller companies that previously have not had all the resources they needed.

Overall impact

Cognitive technologies ultimately may make the HR function 'boundaryless' — smaller and with bigger strategic impact. Traditional subdivisions within HR will likely start to break down as digital and human labor work from one source of evidence-based insight. Hand-offs among centers of excellence, HR shared services, and HR business partners may be fewer in number and significance. Therefore, new organizational models for HR will likely follow.

Manifesto for action

The growing impact of cognitive technologies should encourage the HR function to be proactive in developing key objectives, such as:

— **Initiate and — with the CEO — lead the 'higher purpose' conversation.** Organizations should give serious thought to the impact of integrating human and digital labor as well as the downstream consequences for learning, career, performance, culture, and society at large. What do we want the world of work to be like?

— **Reposition HR as an evidence-based function.** For too long the practice of HR has been conducted with too little evidence. A number of practices unleashed to fight the so-called 'war for talent' — such as the forced distribution of appraisal ratings and nine-box talent grids — are now coming unraveled as evidence shows they do not have a positive impact. With the combination of cognitive, robotic, wearable, analytic, cloud, and social media technologies, the practice of HR is set for an evidence-based revolution. This requires new capabilities in HR, such as behavioral economics, systems thinking, analytics and consultancy skills.

— **Define and communicate a group HR automation strategy.** Position HR as a strategic partner to the business, ensure buy-in from the business and employees, and effectively prioritize activities.

— **Establish shared, technology-enabled processes for core HR programs.** Define clear responsibilities and accountabilities for roll-out and business as usual. Use enabling technologies such as collaboration tools.

— **Build an HR structure with clear governance for the new ways of working.** Establish group HR roles where needed as HR evolves beyond a standardized Ulrich model to more situationally specific models. Clarify responsibilities and accountabilities across all levels in HR and move HR up the value chain in terms of activities performed. Consider changing capability requirements for HR. Embed communication channels that foster collaboration and knowledge sharing, and establish clear and consistent decision-making processes.

The challenge for leaders

As more and more robots and other cognitive technologies work side by side with a human labor force, leaders are increasingly challenged to integrate and make the most of both kinds of labor. This dynamic gives rise to three sets of questions that leaders of organizations, governments, and society must tackle proactively:

Organizations

— What will our workforce of the future look like?

— How do we successfully integrate digital and human labor?

— How does this change what "career" means in our organization?

— How will our operating model evolve to remain relevant and competitive?

— How do we retain and grow employee commitment in an environment where job security is seen as increasingly threatened?

— How do we innovate to create new product and service offerings?

Organizations and society

— How do we best prepare workers for the future?

— How do we better plan and forecast in a volatile, uncertain, complex and ambiguous (VUCA) world?

Society and government

— What do we do with surplus human capacity?

— How do we exploit these technologies for the greater good?

A five-stage process of inquiry can help leaders systematically think through how the shape and size of their workforce should change.

The 5 stage Workforce Navigator

The workforce shaping process

It is important to understand the potential impacts that digital labor will have on the shape and size of organizations. Here are five suggested key steps for organizations to better understand the implications of digital labor on their workforce.

1   **Translate** business strategy into people implications. Think about where you are headed as an organization and how cognitive technologies can help execute that strategy. Then translate this business and technology strategy into the implications for people and explore which jobs will fall within the Zone of Replacement and in what ways the five drivers of change will affect key roles.

2   **Shape** the size and composition of the workforce and understand how it may evolve over time. In particular, explore different scenarios that might impact the organization and develop an appropriate response to the most likely ones. Design the ideal future profile for your workforce. Pay particular attention to the core dilemmas embedded in realizing the business strategy through people; for example, how to maximize cost-effective technologies at the same time as nurturing employee commitment.

Resolve core dilemmas with a reconciliation approach, so that the organization avoids the risk of not having a planned and managed path to the impact of these technologies on the workforce. In particular, explore supply, demand, and gap-closing strategies for key skills and roles.

3   **Design** the workforce of the future. Create a detailed blueprint of how human and digital labor can be optimally integrated. The blueprint needs to cover structural aspects, such as who sits where, accountabilities, spans, and layers, as well as enabling factors, such as information flows, capability building, and career path redesign.

4   **Change** by embarking on the journey of moving to the new shape and size of the workforce. This phase involves a number of components:

— Undertake strategic workforce planning to ensure that workforce supply and demand can be balanced over time to deliver what has been designed in the Shaping and Designing phases.

— Implement a talent strategy to enable shaping and designing to ensure that key skills are developed and careers reframed appropriately; for example, from career ladders to career lattices that promote both lateral and diagonal moves. Emphasize the importance of teams and the talent management of teams as much as individual efforts.

— Undertake the necessary change management through the five phases of:
  • make it clear
  • make it known
  • make it real (to individuals and key jobs)
  • make it happen
  • make it stick

5   **Monitor** progress. Stay alert to alternative scenarios that might take hold. Adopt an agile response to ensure that all risks are managed, including the supply of talented people, an engaged and committed workforce, organizational innovation and agility to exploit new business opportunities, and continual learning and development to support reskilling and career relevance over time.

Is the jury still out?

For decision makers concerned with the role of people in organizations, the key question seems to be, "should we be pessimistic or optimistic?" It seems that technologists, concerned about mass job losses, more often take a pessimistic outlook, while economists — the so-called practitioners of the 'dismal science' — see cause for hope. Brynolfsson and McAfee, in their book "The Second Machine Age" seem to take a less polarized and more nuanced view. They and others recognize that new technologies bring productivity and lifestyle improvements, what is sometimes called 'bounty' as the size of the pie becomes bigger.

Indeed, throughout the 20th century, as productivity increased so did employment and earnings. That said, a more negative trend can also be discerned: the fact that what economist term 'spread' increases. This is the concentration of wealth in fewer hands. They also point out that moving to the technological future is going to involve dislocation and turbulence, even if the eventual outcome is still a world of gainful employment for those who want it.

So what are the causes for hope. Here are some fairly complex and inter-related arguments reduced to the bare bones:

The impact of productivity increases

Increasing productivity means that more can be created for less, unit prices can drop, more can be bought, demand for the product increases. Demand for labor remains strong in aggregate, even though unit labor costs reduce. Also, there is an increase in capital that is generated by the owners of the business, and this needs to be put to productive use so new investments are made, thereby creating more demand for labor. This is the gist of the arguments made by Alan Manning, Professor of Economics at the London School of Economics (LSE).

The impact of technological enablement

Even with the deployment of AI technology, such as the software capable of analyzing large volumes of legal data, this has had a demand boosting effect. One might have expected demand for legal clerks and paralegals, who act as human search engines during the 'discovery' phase of a case, to drop. In fact, automation has reduced the cost of discovery and increased demand for it. Judges are more willing to allow discovery now, because it is cheaper and easier. The demand for such people has slightly increased in the US between 2000 and 2013 according to James Bessen, an economist at Boston University School of Law.

The impact of automation

As automation increases, as was the case in Banking with the introduction of ATMs, there is less need for bank tellers to undertake basic cash transaction activities. This frees them up to do more valuable tasks such as relationship-based selling of more complex products. As the cost of running a bank branch reduced, this also meant that more branches were opened. Overall, numbers of bank staff increased, as was the case in the 80s and 90s according to David Autor, Professor of Economics at the Massachusetts Institute of Technology (MIT)

The impact of digital technology to create new businesses and job types

Brynolfsson and McAfee also point to the less predictable but potentially exciting aspect that this technology may have: namely that completely new businesses and job types will be invented over the coming years from the way in which digital technologies lower the barriers to creating new combinations of knowledge, product and service offerings. These may well come from start-ups rather than the big companies, think Fintech in banking for example, but large organizations will need to learn to incubate and protect new business ideas from the dead-hand of bureaucracy. Who knows what businesses may be created with the increasing availability of 3D printing, for example, and of Gene based therapies?

Get ready for the rise of the humans

Disruption has been part of business for decades. Before the US transformed from an agricultural to an industrial economy, 41 percent of employment was involved in making food.[7] Today that figure is less than 2 percent. The remaining 39 percent went on to other jobs.

Despite all the bleak views of the rising role of robots in the workplace, automation could not be occurring at a better time. Cognitive technologies are rapidly becoming more intelligent and affordable just when the global supply of talent is getting smaller and more expensive, making the use of digital labor necessary to drive growth. As we use more robots, they become cheaper. And as we use more of them, worker productivity rises and ultimately, so do wages.

These are some of the reasons a counter-balancing dynamic will take hold and job creation will be on the agenda after all. As a result, there is potential for an innovation and agility imperative taking place in organizations. Using these technologies, new products and services can be conceived, limited only by the scope of one's imagination. As new businesses and offerings are developed, people will be needed to build, lead, maintain and market them. It will be incumbent on these organizations to grow their agility — and the agility of their workforce — to take on these new challenges. After all, financial capital will still need to be put to productive use.

Continuous organization renewal and learning will likely be a feature of work in the future — learning both for the known future needs and for positioning for unknown and emergent needs. It will all be critical. This is the reason that how we learn and what we learn in the workplace is set for a revolution.

It is nothing less than a call to arms for the leaders of enterprises and HR functions alike to take principled and proactive stands. Rather than be reactionary first responders, they should lead the conversation and preempt, understand, and manage the changes.

John Maynard Keynes foresaw some of these changes as far back as 1930, when he made two predictions.[8] One was that within 100 years our standard of living in the developed world would be four to eight times greater. Currently it is five times higher than it was in 1930.[9] Secondly, he predicted a 15-hour week owing to the liberating effects of new technology. Obviously, this prediction proved wide off the mark.

Whether his second prediction ever has any relevance — and whether his first prediction continues to stay true — depends on how well organizations integrate human and digital labor and make the most of both.

If the job is done well, there is every reason to believe organizations can improve the world of work.

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[7] Dorothy S. Brady, editor, National Bureau of Economic Research, "Output, Employment, and Productivity in the United States after 1800."

[8] John Maynard Keynes, *Economic Possibilities for Our Grandchildren*, 1930.

[9] Nicholas Crafts and Peter Fearon, *The Great Depression of the 1930s: Lessons for Today*, Feb. 28, 2013.

Definitions

Fourth Industrial Revolution refers to the transformation in the way that humans and machines connect and relate. In the view of Klaus Schwab, founder of the World Economic Forum, the first three industrial revolutions were underpinned by steam engines, mass production and electricity, and information technology. According to Schwab, the fourth revolution is in its early stages. It brings machine intelligence together with all other digital technologies that have become incredibly fast and inexpensive.

Second machine age a term coined by Brynjolfsson and McAfee in their book of the same name. Essentially meaning the same as the Fourth Industrial Revolution but in this case the first Machine Age affected manual and physical tasks and the second machine age affects cognitive tasks.

Robotic process automation (RPA) is the use of technology and 'bots' to automate work traditionally done by humans. RPA describes the continuum of technologies used to automate business processes and operations. At one end, it includes the basic automation of parts of a business process, such as auto claim adjudication. At the other end, it covers the application of sophisticated technologies involving cognitive machine processing and elements of artificial intelligence.

Software bots are robots that perform pre-programmed tasks and 'learn' how to get better at performing more intricate and varied tasks and move on to even more complex ones. For example, cognitive processing can interface with humans, thanks to a combination of artificial intelligence and cognitive technologies that mimic human thought processes and communication.

As a result, this supercomputer can pore through massive amounts of information and come to conclusions — sometimes even guesses, just like a human.

Artificial intelligence (AI) is the ability of machines to execute tasks and solve problems in ways normally attributed to humans. However, AI machines are limited by the manual nature of their programming; they cannot do — or learn to do — anything else.

— *Machine learning* — a step beyond AI — is the basis on which all large Internet companies are built. Rigorously honed algorithms rank responses to a search query, give suggestions, and select the most relevant content for a given user.

— *Deep learning*, modeled on the human brain, is infinitely more complex. Unlike machine learning, deep learning can teach machines to ignore all but the important characteristics of a sound or image. Deep learning opened the door to driverless cars, speech recognition engines, and medical analysis systems that are sometimes better than expert radiologists at identifying tumors.

Cognitive process automation is enabled by the convergence of RPA, machine learning, cognitive platforms and advanced analytics. It is one of the most important — and potentially disruptive — changes facing businesses today.

Cognitive augmentation mimics human activities such as perceiving, inferring, gathering evidence, hypothesizing, and reasoning. When combined with advanced automation, analytics, mobile, and cloud technologies, these systems can be trained to execute judgment-intensive tasks.

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