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SPECIAL ISSUE:

Navigating the future of work

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and social institutions in the same direction?



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Illustration by Tim Marrs

“The future is already here”

What images does “the future of work” conjure up for you? In his 1930 essay, *Economic possibilities for our grandchildren*, John Maynard Keynes foretold a future of “technological unemployment” and 15-hour workweeks.¹ We’ve long since given up on early 20th-century utopian visions of a leisure society in which machines do almost everything for us. But there’s no question that what we actually do these days is changing fast, and will continue to change.

MAYBE in your particular future of work, you imagine factories full of robots, automating commonplace tasks, while human beings orchestrate the work's ultimate goals and intent. Perhaps you think of the working population's shifting demographics, with the workforce growing older in developed nations, while emerging economies struggle to assimilate record numbers of young workers. Or you may envision a global gig economy in which most individuals work for themselves, lending their labor—physical or intellectual, online or in person—to a variety of employers on their own time and terms.

The future of work could involve all of these scenarios and more, as disparate forces act and interact to drive the way we behave in the pursuit of a comfortable living, a reasonable profit, and a stable and just society.

It's a big subject, and small wonder that pundits in the business and popular press have tended to narrow their focus, studying one or another of the dimensions of the future of work: automation, demographics, the growth of the contingent workforce, or something entirely different. While this narrowing of scope is understandable, the result is that we sometimes lose sight of the connections and inter-

dependencies across all of these dimensions. We can't grasp where we are and where we're headed without seeing the full picture of this transformation in our lives, our businesses, and our society—and we can't see the whole thing unless we take a step back and let all the elements come into view.

The outlines of the picture are already emerging. Indeed, it may be misleading to explore all this under the heading of “the *future* of work,” which suggests that the changes are not yet here, and will occur in an indeterminate number of years. The truth is that many of these changes are already playing out, driven by forces that have been underway for decades. As science-fiction novelist William Gibson reminded us, “The future is already here—it's just not evenly distributed.”

The biggest challenge in understanding the future of work comes in surfacing the implications for three broad constituencies—the individual, businesses and other employers, and social and governmental institutions—and getting all three pointed in the same direction. Unless all three of these constituencies manage to align in their understanding and actions to address emerging opportunities and challeng-

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es, the road to the future of work will be bumpy at best.

Under the best of circumstances, everyone—individuals, businesses, and public institutions—will find this fundamental evolution in the nature of work challenging and stressful. But if our organizational and public policy leaders understand more fully how this complex landscape is evolving, they can target their moves in ways that will help workforces around the world—and societies in general—anticipate and prepare for the coming challenges.

A FRAMEWORK FOR UNDERSTANDING THE FUTURE OF WORK

WHAT are the components that collectively constitute “the future of work”? Perhaps the logical place to begin is with the forces that are driving these changes (figure 1). Based on our experience and research, we have identified three forces that are shaping the nature of future work and the future workforce:

Technology. Technological advances—for example, in the areas of robotics, artificial intelligence (AI), sensors, and data—have created entirely new ways of getting work done that are, in some cases, upending the way we use and think about our tools and how people and machines can complement and substitute for one another.

Demographics. Demographic changes are shifting the composition of the global work-

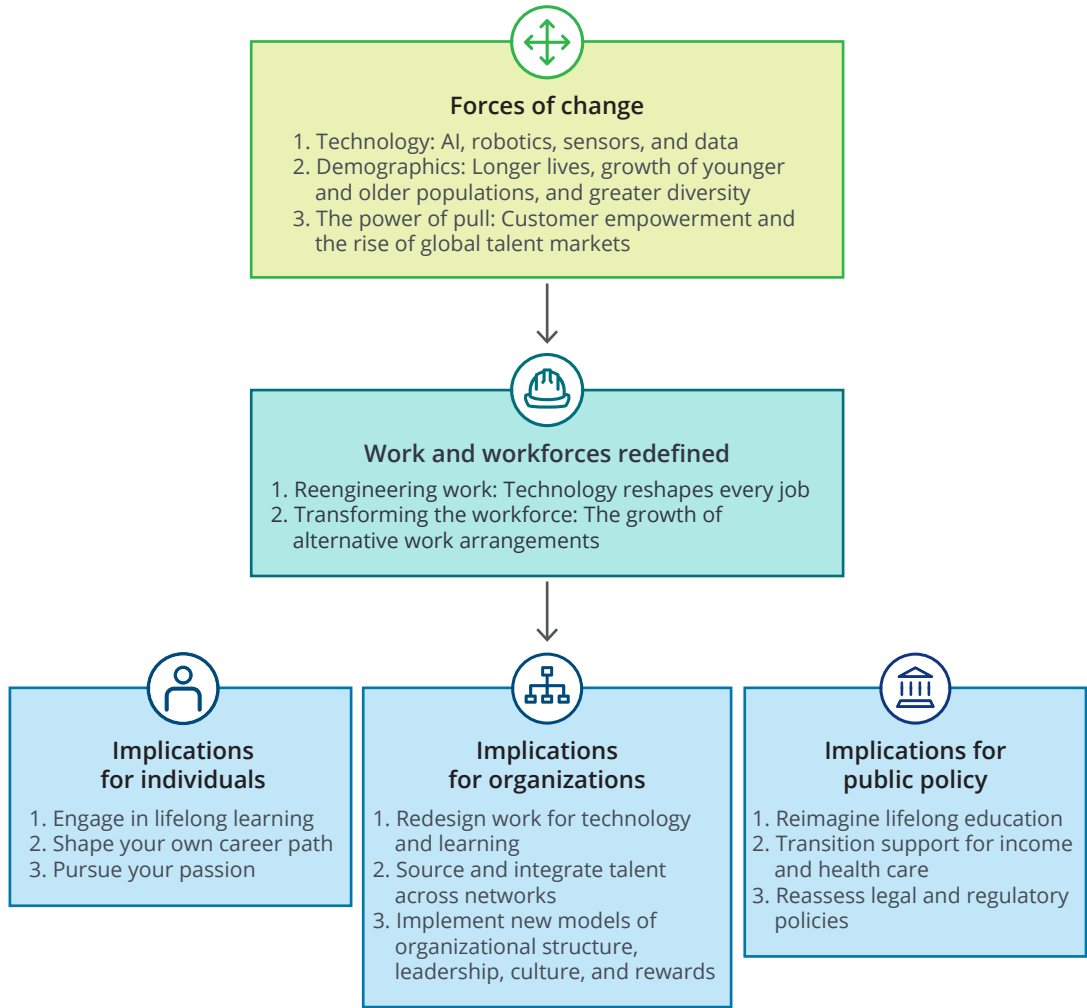
force. In most places, people are living longer than ever, and overall, the population is becoming both older and younger, with individual nations becoming more diverse. Even more challenging, the younger generations will be increasingly concentrated in developing economies, while the developed economies (and China) get ever older.

“The power of pull.” Largely thanks to digital technologies and long-term public policy shifts, individuals and institutions can exert greater “pull”—the ability to find and access people and resources when and as needed—than ever before. Institutions and prospective workers alike now have access to global talent markets, enabled by networks and platforms opening up new possibilities for the way each interacts with the other. The demand for these platforms will likely be enhanced by increasing customer power and accessibility of productive tools and machines, opening up opportunities for more creative work to be done in smaller enterprises and by entrepreneurial ventures.

While there are other forces shaping the future of work, we believe that they are part of the broader economic landscape or integrated with the forces identified above. For example, globalization is a long-term trend, which is reinforced by the technological, demographic, and “power of pull” forces discussed above.

These three driving forces are having two significant effects on work and the workforce.

Figure 1. A framework for understanding the future of work



Source: Deloitte analysis.

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First, technology is transforming the nature of work and forcing organizations to redesign most jobs. One result, we anticipate, will be the reconfiguration of jobs to leverage uniquely human skills: empathy, social and emotional intelligence, the ability to set context and define business problems. Another, due to the

accelerating rate of technological change, will be the need for individuals to continually learn new skills to remain employable.

Second, the relationship between employer and worker is shifting. Where once most workers were full-time, on-balance-sheet employ-

ees with benefits and defined salaries, employers of the future will also execute a significant proportion of their activities through individuals engaged in alternative work arrangements, from freelancing to crowdsourcing to contract-based work.

These alterations to the nature of work and the workforce will have profound implications for individuals, organizations, and public policy makers—all three of which face imperatives for change driven by the need to adapt to the new realities of work in the future.

FORCES OF CHANGE

Technology: Artificial intelligence, robotics, sensors, and data

PAST technological revolutions—mechanization, electrification, computerization—radically reshaped work, jobs, and the organization of business and society. What is different this time is that today’s advances in digital technologies are remaking not just manufacturing and low-skilled labor, the focus of past revolutions, but *every* sector of the economy and society.

Indeed, exponentially improving digital technology and infrastructures are reshaping the economics of work across the spectrum. On the one hand, automation is dramatically lowering the cost of certain routine tasks, as is expanded geographic access to low-wage labor. On the other, organizations can significantly augment the value of other tasks by leveraging technol-

ogy capabilities and the increased ability to access deep specialization, wherever it is located.

Consider how today’s technologies are beginning to augment human workers’ capabilities. As just one example, by helping us “see” much more richly the evolving world around us, applications based on augmented reality (AR) can help us focus our curiosity, imagination, and creativity on early signals of the potential changes ahead that really matter.² Already, AR technology is helping workers out in the field, far from their desktop computers, to assess unexpected developments and focus their effort on the actions that could have the greatest impact.³ And it’s hardly just cognitive technologies such as AR: In the robotics space, prosthetics and other augmentation devices are helping technicians and others to perform operations unimaginable a decade ago.

More broadly, an expanding array of technologies, ranging from 3D printing to biosynthesis, are making productive tools accessible to smaller and smaller businesses, thereby eroding some of large companies’ traditional advantages in developing and producing new products and services. This has the potential to create more viable job opportunities for workers in smaller enterprises over time.

We also should not lose sight of the impact of the accelerating pace of technology evolution and the proliferation of data on the skills required to do work. More and more knowledge

is being created—with other knowledge becoming obsolete—at an accelerating rate, making it necessary to update our skills and job descriptions ever more rapidly to keep up.⁴

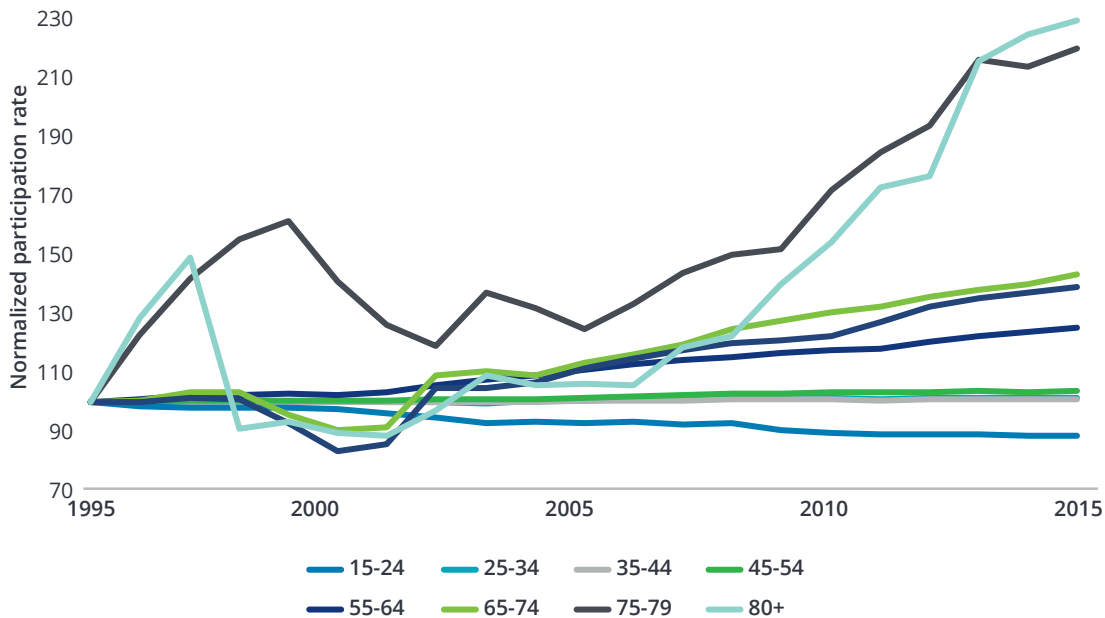
Demographics: Longer lives, growth of younger and older populations, and greater diversity

The supply of workers is rapidly evolving globally as a result of shifting demographics, enhanced longevity, and increased focus on the inclusion of marginalized segments of the population.⁵

The workforce in many economies—especially the developed economies and China—is rapidly aging, as figure 2 illustrates. This demographic trend is further amplified by both low birth-rates and enhanced longevity made possible by advances in public health and medicine. For a variety of reasons, ranging from financial need to a desire to continue to make a difference, many older workers are extending their careers well beyond traditional retirement age.⁶

The prospect of older generations working for longer periods as their physical capability to

Figure 2. OECD labor participation rate, by age group



Source: Organisation for Economic Co-operation and Development, "Labour market statistics: Labour force statistics by sex and age: indicators," OECD Employment and Labour Market Statistics (database), DOI: <http://dx.doi.org/10.1787/data-00310-en>, accessed April 21, 2017; United Nations Department of Economic and Social Affairs, *The world population prospects: 2015 revision*, 2015, <http://www.un.org/en/development/desa/publications/world-population-prospects-2015-revision.html>.

The prospect of older generations working for longer periods as their physical capability to remain employed improves could affect the pace at which younger talent and ideas renew organizations.

remain employed improves could affect the pace at which younger talent and ideas renew organizations—and potentially intensify the intergenerational competition for jobs. It could also lead to a substantial increase in seniors participating in the “gig economy,” out of post-retirement desire or necessity.

In parallel, developing economies are supplying a growing share of younger workers to the global workforce. Digital technology infrastructures are making a growing number of these workers available—as full-time or gig workers—to developed economies that are confronting an aging population, not to mention giving them access to each other across the developing world.

More generally, women and many marginalized population segments are slowly gaining ground in employment spheres around the world. As population growth in developed countries slows, organizations will be under increasing pressure to deepen the talent pool by including workers from more backgrounds. There’s growing evidence that more diverse workgroups and teams generate more creative and higher-impact results⁷—an even

more important reason for organizations to become more aggressive in drawing in diverse segments of the global population. The likely net effect of all of this will be the workforce expanding to historically underrepresented populations, as well as organizations needing to change work practices to accommodate a more diverse employee base.

The power of pull: Customer empowerment and the rise of global talent markets

Market trends will also play a role in shaping the future of work. In responding to both changing customer demand and the ability to address labor needs more flexibly, the power of pull will likely lead to much tighter alignment of work with customer needs.

Why are customers acquiring more power relative to vendors? Because of their new ability to choose from an expanding array of product and service options globally, to access more information about these options, and to switch from one vendor to another if their needs are not being met.

With buying options expanding, customers are becoming less satisfied with standardized,

mass-market products and services, instead seeking creative, tailored niche products, services, and experiences. This dynamic is playing out in digital product markets such as music, video, and software, but it has the potential to rapidly extend into physical products and services, as the technology trends outlined above make it far more feasible for niche vendors to access the means of production. The result is likely to be a growing fragmentation of product and service businesses, with small companies employing more of the overall labor force.⁸

On the supply side, labor markets are evolving in ways that enhance organizations' ability to access and work with talent when and where needed. The global digital infrastructures discussed earlier are making it possible for employers to connect with, combine, and leverage talent wherever it resides. A growing array of digital platforms is making it easier for potential employers (and customers directly) to find the most appropriate talent anywhere in the world and to pull that talent together to perform specific tasks. Conversely, the same digital platforms are making it possible for workers to exert pull of their own. Online communities such as Glassdoor offer workers a great deal of insight into prospective employers' operations and culture, narrowing employers' historical informational advantage; individuals operating in the gig economy can find, contract with, and work for employers worldwide using the Internet and other digital technologies.

The "power of pull" forces described above can spur growing demand for more creative work as customers shift away from mass-market products and services, as workers in smaller businesses gain greater access to the means of production, and as platforms help to connect niche product and service providers with smaller segments of customers globally.

WORK AND WORKFORCES REDEFINED

THESE three forces of change are leading to a profound shift in the nature of work. Employers and workers will no doubt find this shift challenging in the near term but, ideally, a growing number of people over time will be able to achieve more of their potential. Routine tasks will be increasingly automated, while technology-aided creative work expands and evolves in response to a growing array of unmet needs.⁹

Reengineering work: Technology reshapes every job

The industrial era defined work largely in the form of highly specialized and standardized tasks that became increasingly tightly integrated. This applied not only to factory jobs and manual work, but also to a broad range of white-collar and knowledge-worker jobs such as HR staff, legal staff, and even salespeople and marketers. And it is precisely components of these types of work that are vulnerable to disruption by robots and AI. Law firms are beginning to automate a significant number of

more routine tasks, news websites are beginning to use AI to write stories, and many of us use intuitive software to complete our taxes.

As technology accelerates its replacement of tasks once executed by humans, will it oust humans from performing work altogether (except for the work needed to build and maintain the machines)? Many conversations about the future of work quickly devolve into discussions of the potential of robotics and AI technology to cut costs, automate tasks, and displace human beings altogether. The anxiety is understandable, given these technologies' continuing exponential price/performance improvement and the impact they are already having on the elimination of jobs.

However, this narrow view misses much of the larger opportunity regarding future work and productivity. While perhaps a useful starting point, disassembling work into a set of tasks and orchestrating capabilities (people and machines) is not necessarily the goal. The greater opportunity to enhance productivity may lie in reinventing and reimagining work around solving business problems, providing new services, and achieving new levels of productivity and worker satisfaction and passion.¹⁰ The growing availability of cognitive technologies and data also presents an oppor-

tunity to radically reengineer business processes leveraging the breadth and unique capabilities of people, machines, and data to achieve desired outcomes. We expect to see multiple approaches to redesigning jobs emerge: from a narrow focus on identifying tasks to automate, to the radical reengineering of business processes, to the reimagining of work around problem-solving and human skills.

In this view, employers should become much more focused on exploring opportunities to create work that takes advantage of distinctively human capabilities such as curiosity, imagination, creativity, and social and emotional intelligence. Research suggests that more than 30 percent of high-paying new jobs will be social and “essentially human” in nature.¹¹ Increasing diversity

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in the workforce will likely enhance the shift from routine tasks to more creative work, and we will see the emergence of hybrid jobs that increasingly integrate technical, design, and project management skills. The specific skills will likely come from diverse domains and evolve rapidly, increasing the need to accelerate learning for both individuals and employers to stay ahead of the game.

We are in the early days of integrating industrial and software robots into work—and of un-

derstanding their varying impacts and results. Thus far, the picture is blurry. Recent MIT research, for instance, explores industrial robots' negative impact on employment and wages.¹² For example, a Mercedes-Benz production facility in Germany recently announced plans to reduce the number of robots on its production line and replace them with human labor—with increasing demand for customized auto options, reprogramming and switching out robots was more costly than shifting the line using human workers.¹³

Transforming the workforce: The growth of alternative work arrangements

Technology is transforming more than the way individual jobs are done—it's changing the way companies source labor. Many global companies already actively use crowdsourcing efforts to generate new ideas, solve problems, and design complex systems. Deloitte's Center for Health Solutions and Center for Financial Services, for example, collaborated with insurance company specialists on an online platform provided by Wikistrat, in four days generating 44 use cases regarding the potential for using blockchain technology in insurance.¹⁴ Online platforms are playing a key role in accelerating the growth of this kind of crowdsourcing.

In the next few years, three factors are likely to drive rapid growth of the gig economy—defined as individual self-employed workers bidding for short-term tasks or projects. First, as companies face growing performance pressure,

they will have more incentive to convert fixed labor costs, in the form of permanent employees, to variable labor costs incurred when there is a surge in business demand. Second, workers will likely increasingly seek work experiences exposing them to more diverse projects and helping them to develop more rapidly than in a single-employer career. (In a 2013 study, 87 percent of UK students with first- or second-class degrees said freelancing is a “highly attractive and lucrative career option.”)¹⁵ And a third factor driving the growth of the gig economy is the desire of workers who are marginalized or underemployed—younger workers in developing economies, older workers in developed economies, and unskilled workers around the world—to find some productive work, even if it may not be full-time employment.

The gig economy has already become a significant component of work in the United States. A recent study by Harvard and Princeton economists showed that 94 percent of net job growth from 2005 to 2015 was in “alternative work,”¹⁶ defined as independent contractors and freelancers. A 2014 study estimated that 53 million people freelance in the United States (34 percent of the national workforce), with 1.4 million freelancers in the United Kingdom.¹⁷

Over the longer term, the gig economy may evolve into something quite different. Many of the gigs being done today—for example, drivers of cars in mobility fleets and basic data-gathering tasks—are routine tasks that are likely to be

In the new landscape of work, personal success will largely depend on accelerating learning throughout one's lifetime. As a lifelong learning imperative takes hold, we see individuals increasingly focusing on participation in small but diverse workgroups that can amplify learning.

automated over time. Gigs based on human capabilities—emphasizing curiosity, imagination, creativity, social intelligence, and emotional intelligence—will likely grow over time.

As the gig economy shifts to more rapidly evolving creative work, the way that work is done is likely to change, moving from short-term transactions to longer-term relationships that can help to accelerate learning and performance improvement. These more creative gigs—if they still qualify as gigs—will likely be increasingly done by small teams or workgroups that will collaborate on different projects over extended periods of time.¹⁸

IMPLICATIONS FOR INDIVIDUALS, ORGANIZATIONS, AND PUBLIC POLICY

Implications for individuals

In the new landscape of work, personal success will largely depend on accelerating learning throughout one's lifetime. As a lifelong learning imperative takes hold, we see individuals increasingly focusing on participation in small but diverse workgroups that can amplify learning. Workers will need to take ac-

tion on their own to enhance their potential for success, but the impact of their efforts will be significantly influenced by the willingness and ability of the other two constituencies—businesses and public institutions—to evolve in ways aligned with the shifting nature of work.

Engage in lifelong learning. As rapid technological and marketplace change shrinks the useful lifespan of any given skill set, workers will need to shift from acquiring specific skills and credentials to pursuing enduring and essential skills for lifelong learning. Individuals will need to find others who can help them get better faster—small workgroups, organizations, and broader and more diverse social networks. We are likely to see much richer and more diverse forms of collaboration emerge over time.

Shape your own career path. Historically, a career was defined as a relatively stable, predictable set of capabilities that aligned with the needs of an organization and an industry. This included a progressive mastery of a set of predetermined skills required to advance in the corporate hierarchy, with accompanying salary boosts. But the half-life of skills and expertise

is becoming shorter and shorter, with new, unexpected skills emerging as valuable. This has two implications. With needs constantly shifting, employers are less and less able to provide employees with well-defined career paths spanning years or decades. And workers, to keep their skills current, must increasingly do whatever is necessary to accelerate their learning, including pursuing a diversity of work experiences or working for multiple “employers” at the same time.

Rather than relying on paternalistic employers to shape their careers’ nature and progression, workers will need to take the initiative to shape their own personalized careers. And as work evolves, individuals should cultivate a “surfing” mind-set, always alert to emerging, high-value skills and catching the wave at an early stage to capture the most value from these skills.¹⁹ To avoid getting stretched too thin and stay motivated, they must filter a growing array of skill opportunities through their personal passions.

Pursue your passion. What are the obstacles to success in work as it transforms? The biggest obstacle may be ourselves. Most of us have an understandably negative reaction to the mounting performance pressure that is already beginning to accompany the transition to

new forms of work. With any disruptive transition, we tend to experience fear and stress, generating an impulse to hold on to what has driven success in the past. We must resist that temptation and use the shifts in the nature of work and employment as an opportunity to achieve more of our potential.

What can help us do that? Instead of just viewing a job as a means to a paycheck, we need to find a way to pursue work that we are truly passionate about. In our research into diverse work environments where there is sustained extreme performance improvement—everything from extreme sports to online war games—we identified the one common element as participants having a very specific form of passion—something that we call the “passion of the explorer.” This form of passion has three components: a long-term commitment to making an increasing impact in a domain, a questing disposition that actively seeks out new challenges, and a connecting disposition that seeks to find others who can help them get to a better answer faster.²⁰ Tapping into this kind of passion can shift people from the fear of change to excitement about the opportunity to learn something new and to have a greater impact.

Organizations will not only need to redesign work—they will likely need to redesign work environments to support this new kind of work.

Implications for organizations

Employers can help individuals along this journey by shaping work and work environments and encouraging individuals to learn faster and accelerate performance improvement.

Redesign work for technology and learning. To take effective advantage of technology, organizations will likely need to redesign work itself, moving beyond process optimization to find ways to enhance machine-human collaboration, drawing out the best of both and expanding access to distributed talent. Businesses will be well advised to not just focus on automation but to identify the most promising areas in which digital technology can augment workers' performance as they shift into more creative and value-added work. For example, how can the technology be harnessed to “make the invisible visible” by giving workers richer, real-time views of their work? How can companies use robotics to provide workers with access to environments that would be far too dangerous for humans?²¹ What are some ways in which AI-based technology can complement human judgment and contextual knowledge to achieve better outcomes than either human or machine alone?²² This is perhaps the greatest challenge for businesses in the next decade: how to plan for the redesign and reinvention of work to combine the capabilities of machines and people, create meaningful jobs and careers, and help employees with the learning and sup-

port to navigate these rapidly evolving circumstances.

Organizations will not only need to redesign work—they will likely need to redesign work environments to support this new kind of work. There's been a lot of effort to reshape environments to make them more enjoyable and flexible to accommodate changing worker preferences and needs, but what if we took the need to accelerate learning and performance improvement as our primary design goal? What would work environments look like then?²³

Source and integrate talent across networks. As organizations develop a better understanding of the expanding array of talent options available, they will need to design and evolve networks that can access the best talent for specific work. Beyond focusing on acquiring talent to be employed in their own organizations, they will need to develop the capability to access good people wherever they reside. Since this talent will likely evolve rapidly, these networks will have to be flexible and adapt quickly to changing talent markets.

To accelerate learning and performance improvement, organizations will need to decide where they can truly be world-class and where they can access other talent from top global sources. They will need to cultivate a continuum of talent sources—on and off the balance sheet, freelancers, and crowds and competitions—that harness the full potential of the

open talent economy and tap into talent wherever it resides geographically.

Implement new models of organizational structure, leadership, culture, and rewards. Organizational structures are evolving from traditional hierarchies to networks of teams that extend well beyond the boundaries of any individual organization. Hierarchical structures are well suited for routine tasks, but as the emphasis shifts to more creative work done by small, diverse workgroups connecting with each other in unexpected ways, more flexible network structures will become more important. As the continuum of talent resources expands and becomes more diversified, organizations will need to develop richer relationships in larger business ecosystems and find ways to participate more effectively on scalable platforms to access expertise and enhance the ability to work together to accelerate performance improvement.²⁴

Organizations will need to cultivate new leadership and management approaches that can help build powerful learning cultures and motivate workers to go beyond their comfort zone. Indeed, leadership styles must shift from more authoritarian—appropriate for stable work environments shaped by routine, well-defined tasks and goals—to collaborative. In the future of work, we expect that the strongest leaders will be those who can frame the most inspiring

and high-impact questions and motivate and manage teams.

To foster these new forms of creative work, organizations will need to reassess the rewards they offer to participants. In a world where routine tasks define work, people look to extrinsic rewards such as cash compensation to stay motivated. As the nature of work shifts to more creative work that rapidly evolves, participants are likely to focus more on intrinsic rewards, including the purpose and impact of their work and the opportunity to grow and develop. Organizations may find it increasingly hard to hold on to employees if they focus narrowly on extrinsic rewards.

Implications for public policy

Policy makers have an interest in both hastening the emergence of new forms of work—the better to raise citizens’ overall standard of living—and preparing for the stresses of the transition.

Reimagine lifelong education. Policy makers face significant and formidable challenges to rethink education to draw out students’ creative capabilities and to establish a framework to help everyone develop their talent more rapidly *throughout* their lives. Our educational institutions were established, decades or even centuries ago, to provide for mass education for stable careers. The short half-life of learned skills and the rapidly evolving technological



work landscape raise the need for new models that support ongoing training and education. How can we create educational models and funding that provide employees with three, four, or more opportunities to reskill and pivot to new fields and new careers?

This emphasis on lifelong education could have an especially strong impact if it were to include a more effective focus on marginalized populations and older generations who do not want to or cannot transition out of the workforce. Payment structures and incentives could

be designed to support this approach to life-long education: facilitating access to ongoing education and training throughout a working career that might span 50 years and many different types of work.

Transition support for income and health care. What public policies can help in reducing the stresses that workers will likely face when shaping their own careers, learning new skills, and participating in global talent networks? For those caught in challenging and unexpected transitions, how can public policies help to shorten the time spent on the unemployment rolls, support necessary retraining, and ensure the provision of basic necessities such as health insurance? Digital technology infrastructures and more accessibility to data about individuals will make it increasingly feasible to tailor transition programs to people’s evolving needs. Governments around the world are considering and revisiting basic income guarantees in various forms, and some recent proposals have surfaced to tax robots as a way to provide funding for transition support programs.²⁵

Reassess legal and regulatory policies. What role can all dimensions of public policy play in accelerating broader inclusion in the workforce, talent development, and innovation capability?²⁶ Governments should consider updating the definitions of employment to ac-

count for freelance and gig economy work and the provision and access to government health, pension, and other social benefits through micro-payment programs. Business formation and bankruptcy rules could be updated to make it easier to launch—and exit—a business as an entrepreneur. The future of work will likely involve a higher percentage of start-ups and small businesses. Policymakers will likely find themselves under pressure to update regulations to make starting small ventures easier.

CONCLUSION: A FRAMEWORK FOR THE FUTURE

THE future of work is unfolding rapidly.

Today, none of these constituencies—individuals, businesses, public institutions—is prepared for the potentially turbulent and painful transition and possibilities ahead. The goal of this framework is to inform and motivate individuals, various forms of organizations, and public policy makers to *proactively* navigate the future of work and to come together and act now to make the transition as positive, productive, and smooth as possible.

Every constituency needs a plan, today, for how to prepare to address the impact of these forces and their effect on the redesign of work and jobs:

- Individuals need to set their sights on longer careers, with multiple stages, each involving ongoing training and reskilling.

- Businesses must prepare to redesign work and jobs to take advantage of the growing capabilities of machines and the need to retrain and redeploy people to higher-value and more productive and engaging jobs working alongside smart machines and many types of workers—on and off the balance sheet, in crowds, and around the world.
- Public institutions need to proactively prepare for educational challenges, including funding for ongoing education, programs to mitigate the transition costs, and updating regulatory frameworks to support new types of work and workers and a more entrepreneurial economy. ●

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Endnotes

1. John Maynard Keynes, "Economic possibilities for our grandchildren," 1930, in *Essays in Persuasion* (New York: W. W. Norton & Co., 1963), pp. 358–373, <http://georgemacianas.com/wp-content/uploads/2012/06/Economic-Possibilities-of-Our-Grandchildren.pdf>.
2. Joe Mariani, Brenna Sniderman, and Cary Harr, "More real than reality: Transforming work through augmented reality," *Deloitte Review* 21, July 31, 2017.
3. Ryan Kaiser and David Schatsky, *For more companies, new ways of seeing: Momentum is building for augmented and virtual reality in the enterprise*, Deloitte University Press, April 5, 2017, <https://dupress.deloitte.com/dup-us-en/focus/signals-for-strategists/augmented-and-virtual-reality-enterprise-applications.html>.
4. Josh Bersin, "Catch the wave: The 21st-century career," *Deloitte Review* 21, Deloitte University Press, July 31, 2017.
5. Patricia Buckley and Daniel Bachman, "Meet the US workforce of the future: Older, more diverse, and more educated," *Deloitte Review* 21, July 31, 2017.
6. Lynda Gratton and Andrew Scott, *The 100-Year Life: Living and Working in an Age of Longevity* (Bloomsbury Information Limited, 2016).
7. Scott Page, *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies* (Princeton University Press, 2008); Anita Woolley and Thomas Malone, "Defend your research: What makes a team smarter? More women," *Harvard Business Review*, June 2011.
8. John Hagel, John Seely Brown, Tamara Samoylova, and Duleesha Kulasooriya, *The hero's journey through the landscape of the future*, Deloitte University Press, July 24, 2014, <https://dupress.deloitte.com/dup-us-en/topics/operations/heros-journey-landscape-future.html>.
9. Peter Evans-Greenwood, Harvey Lewis, and James Guszczka, "Reconstructing work: Automation, artificial intelligence, and the essential role of humans," *Deloitte Review* 21, July 31, 2017; Thomas H. Davenport, "The rise of cognitive work (re) design," *Deloitte Review* 21, July 31, 2017.
10. Evans-Greenwood, Lewis, and Guszczka, "Reconstructing work."
11. Deloitte, *Talent for survival: Essential skills for humans working in the machine age*, 2016, <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/Growth/deloitte-uk-talent-for-survival-report.pdf>.
12. Daron Acemoglu and Pascual Restrepo, *Robots and jobs: Evidence from US labor markets*, National Bureau of Economic Research working paper no. 23285, March 17, 2017, <http://www.nber.org/papers/w23285>.
13. Alanis King, "Mercedes will reduce robots on production line, employ more actual humans," *Jalopnik*, February 28, 2016, <http://jalopnik.com/mercedes-will-reduce-robots-on-production-line-employ-1761720298>.
14. Christine D. Chang and Sam Friedman, *Blockchain in health and life insurance: Turning a buzzword into a breakthrough for health and life insurers*, Deloitte, 2016, <https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/blockchain-in-insurance.html>.
15. Elance, *Generation Y and the gigging economy*, www.csd.org.uk/content/uploads/2015/07/gen-y-and-the-gigging-economy.pdf, accessed April 20, 2017.
16. Lawrence F. Katz and Alan B. Krueger, *The rise and nature of alternative work arrangements in the United States, 1995–2015*, National Bureau of Economic Research working paper no. 22667, September 2016, <http://www.nber.org/papers/w22667>.
17. Sara Horowitz and Fabio Rosati, "53 million Americans are freelancing, new survey finds," Freelancers Union, September 4, 2014, <https://blog.freelancersunion.org/2014/09/04/53million/>.
18. Michael Polanyi, *The Tacit Dimension* (Anchor/Doubleday, 1967); Karl Weick, *Making Sense of the Organization, Volume Two: The Impermanent Organization* (Wiley, 2009); Douglas Thomas and John Seely Brown, "Learning for a world of constant change: Homo Sapiens, Homo Faber & Homo Ludens revisited," paper presented at the 7th Glion Colloquium, June 2009, <http://www.johnseelybrown.com/Learning%20for%20a%20World%20of%20Constant%20Change.pdf>.
19. Bersin, "Catch the wave."
20. John Hagel, John Seely Brown, and Tamara Samoylova, *Unlocking the passion of the explorer*, Deloitte University Press, September 17, 2013, <https://dupress.deloitte.com/dup-us-en/topics/talent/unlocking-the-passion-of-the-explorer.html>.

21. Mariani, Sniderman, and Harr, "More real than reality."
22. Jim Guszczka, Harvey Lewis, and Peter Evans-Greenwood, "Cognitive collaboration: Why humans and computers think better together," *Deloitte Review* 20, January 23, 2017, <https://dupress.deloitte.com/dup-us-en/deloitte-review/issue-20/augmented-intelligence-human-computer-collaboration.html>.
23. John Hagel, John Seely Brown, and Tamara Samoylova, *Work environment redesign: Accelerating talent development and performance improvement*, Deloitte University Press, June 3, 2013, <https://dupress.deloitte.com/dup-us-en/topics/talent/work-environment-redesign.html>.
24. John Hagel, John Seely Brown, and Duleesha Kulasooriya, *Performance ecosystems: A decision framework to take performance to the next level*, Deloitte University Press, January 1, 2012, <https://dupress.deloitte.com/dup-us-en/topics/operations/performance-ecosystems-which-model-is-right-for-you.html>.
25. Robert Shiller, "Why robots should be taxed if they take people's jobs," *Guardian*, March 22, 2017, <https://www.theguardian.com/business/2017/mar/22/robots-tax-bill-gates-income-inequality>.
26. William D. Eggers and John Hagel, *Brawn from brains: Talent, policy, and the future of American competitiveness*, Deloitte University Press, September 27, 2012, <https://dupress.deloitte.com/dup-us-en/topics/talent/brawn-from-brains-talent-policy-and-the-future-of-american-competitiveness.html>.

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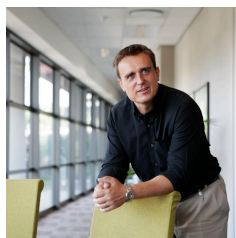
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