



# The future of work in government

Navigating a shifting talent landscape

## About the authors

**WILLIAM EGGERS** is the executive director of Deloitte's Center for Government Insights, where he is responsible for the firm's public sector thought leadership. His most recent book is *Delivering on Digital: The Innovators and Technologies that Are Transforming Government* (Deloitte University Press, 2016). His other books include *The Solution Revolution*, *Washington Post* bestseller *If We Can Put a Man on the Moon*, and *Governing by Network*. He coined the term Government 2.0 in a book by the same name. His commentary has appeared in dozens of major media outlets including the *New York Times*, *Wall Street Journal*, and *Washington Post*. He can be reached at [weggers@deloitte.com](mailto:weggers@deloitte.com) or on Twitter @wdeggers. He is based in Rosslyn, Virginia.

**JOHN O'LEARY** is the state and local government research leader for the Deloitte Center for Government Insights. Prior to joining Deloitte, he served as the vice president of communications and executive reporting with State Street Bank. O'Leary previously served in multiple senior leadership roles for the Commonwealth of Massachusetts and was a distinguished research fellow at the Kennedy School of Government at Harvard University. He is the coauthor of the 2009 *Washington Post* bestseller *If We Can Put a Man on the Moon*. He is based in Boston.

**AMRITA DATAR** is a researcher with the Deloitte Center for Government Insights. Her research focuses on emerging trends at the intersection of technology, business, and society and their influence on the public sector. Her previous publications cover topics such as customer experience, digital transformation, innovation, and future trends in government. She is based in Toronto. Connect with her on Twitter @Amrita07.

## About the Deloitte Center for Government Insights

The Deloitte Center for Government Insights shares inspiring stories of government innovation, looking at what's behind the adoption of new technologies and management practices. We produce cutting-edge research that guides public officials without burying them in jargon and minutiae, crystalizing essential insights in an easy-to-absorb format. Through research, forums, and immersive workshops, our goal is to provide public officials, policy professionals, and members of the media with fresh insights that advance an understanding of what is possible in government transformation.

# Contents

Introduction		2
Work: Reshaping how government work gets done		5
Workforce: Widening the definition of the government workforce		11
Workplace: Creating the right environments and support structures for the future of work		18
Tackling the challenges		24
Endnotes		28

Today's business challenges present a new wave of HR, talent, and organization priorities. Deloitte's Human Capital services leverage research, analytics, and industry insights to help design and execute critical programs from business-driven HR to innovative talent, leadership, and change programs.

# Introduction

“People are our greatest asset.” This is a truism in today’s economy. But it wasn’t always the case.

ONE HUNDRED YEARS ago, employees were largely viewed as interchangeable cogs in a machine. One assembly line worker was about as productive as the next. The difference between an outstanding toll collector and a mediocre one wasn’t terribly consequential. But in the digital age, creative and collaborative talents are integral to delivering value. An employee motivated to learn and grow can be much more valuable than a less interested coworker.

Many future-focused organizations today truly recognize the value of their people and devote considerable resources to creating an environment that unleashes their unique talents. These organizations aim to understand their employees and enhance their skills so they can be successful, both as individuals and as part of a team. They are reimagining the workforce to include people and machines, enterprise employees, and ecosystem talent, expanding the view of where and how work gets done.

Many of the most successful private sector firms are part of this trend, moving toward enlightened talent management. In the past, talent management was primarily about the logistics of personnel administration—tracking hours, pay, benefits, and the like. But the modern paradigm sees worker engagement as a critical strategic differentiator. From

pay to leave policies, training to remote work, to the increasingly sophisticated efforts to measure individual and team engagement, many companies are reimagining the employee-employer connection, and are creating a more productive and rewarding relationship.

Then there is the public sector.

Perhaps nowhere is the gap between the public sector and the private sector greater than in workforce management. While much of the private

sector has transformed over the past two decades, the public sector, for the most part, has not. Most public sector organizations are still locked into decades-old workforce policies, such as rigid job classifications, lockstep pay, and reliance on seniority as a substitute for capability.

The reality is, government agencies are increasingly called upon to address society’s most complex challenges using workforce approaches rooted in the distant past. This not only makes it harder to recruit talented people but also makes it more difficult for public sector managers to provide their employees with great work experiences.

Public sector leaders know better than anyone that major changes are needed.

The good news: Change is possible—and beginning to happen.

**Perhaps nowhere is the gap between the public sector and the private sector greater than in workforce management.**

## A BRIEF HISTORY OF GOVERNMENT WORKFORCE SYSTEMS

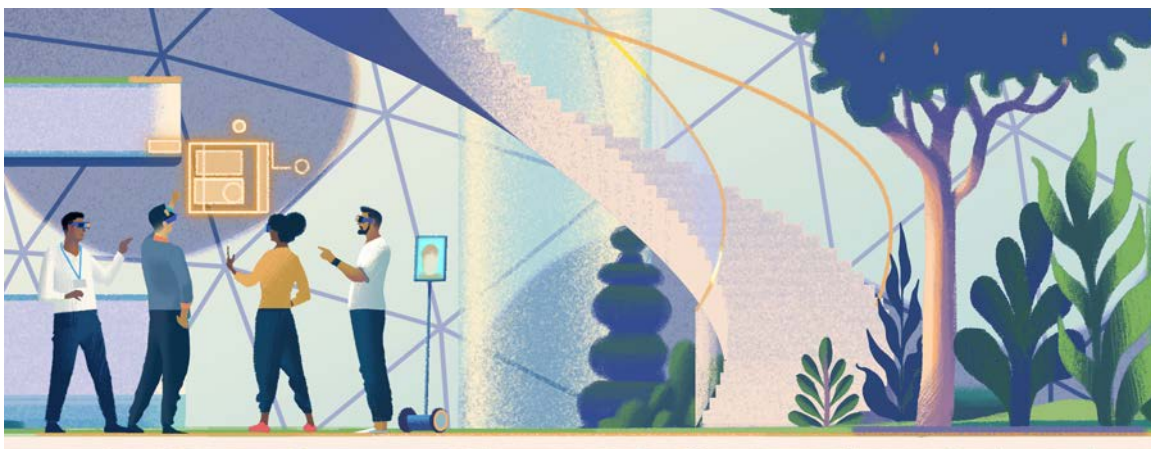
We need to remember that the outdated personnel systems now causing such frustration were once positive innovations. Civil service in the United States was introduced after President Garfield was assassinated by a campaign worker disappointed he hadn't been offered a government job and represented a giant leap forward from the "spoils system" (to the victor go the spoils) that dominated prior. The job classifications of the early 20th century reflected the scientific management principles of the time. Bureaucratic structures were introduced to help professionalize government workforces.

Once highly effective, these systems have increasingly become problematic in our current technology-driven world. With their vertical information flows and strict division of labor, most governments are organized more like mid-20th-century corporations than today's more nimble, digitally driven organizations. The rigid, hierarchical structures of the past aren't well-suited for the tech-based, information-driven, and rapidly shifting modern economy.

If history is any guide, government will follow the private sector into the new world of work that is transforming organizations around the world. As we humans start working in tandem with machine intelligence, government agencies have the opportunity to do more, do better, and do things differently.

The future of government work is unfolding along three dimensions:

- **Work.** Developments such as advanced automation and cognitive technology will change the way public sector work gets done. These emerging technologies will help employees create more value for constituents and enhance their professional satisfaction.
- **Workforce.** Enabled by technology, government will increasingly make use of more varied work arrangements, accessing more diverse pools of skills and capabilities, both inside and outside the organization.
- **Workplace.** Technology, and new models for employing talent, will redefine the workplace and its organizational supports. These changes will impact physical workspaces (including remote work) along with policies that promote employee well-being and productivity.

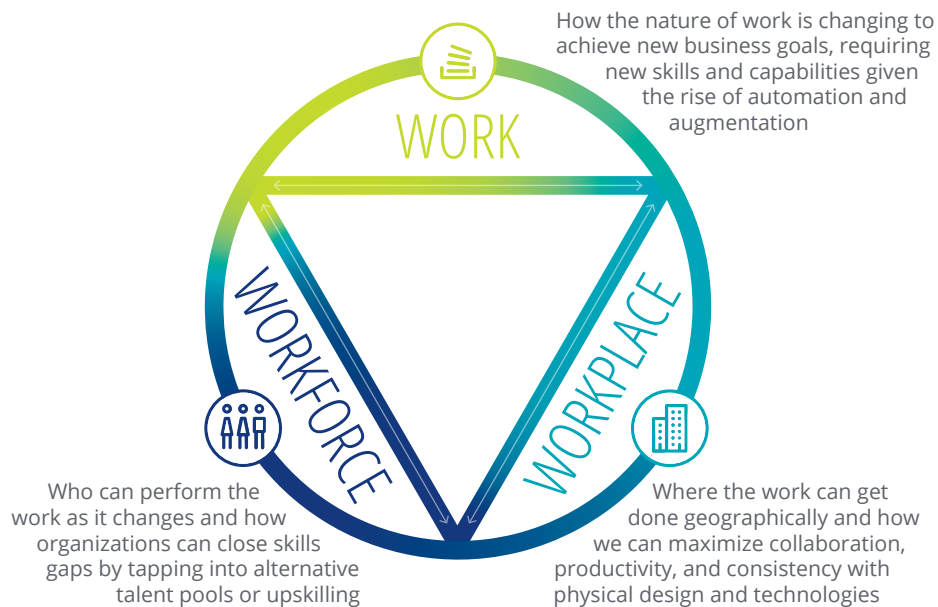


As figure 1 depicts, governments will have more options in terms of how work is performed, who performs this work, and where it is completed. These new options create a larger “opportunity space” in which government can create value. This report ex-

amines how each of these upcoming changes could reshape the landscape of public sector operations, and how government agencies can position themselves for success in this new environment.

FIGURE 1

**Creating value in government: How more options for work, workforce, and workplace expand opportunity**



Source: Deloitte analysis.

# Work

## Reshaping how government work gets done

**C**OGNITIVE TECHNOLOGY IS having a real impact on the private sector, producing value in powerful new ways. By 2017, Amazon had more than 100,000 robots working in its warehouses, augmenting the human workforce.<sup>1</sup> Some customer service centers use artificial intelligence (AI) to interact directly with customers, or to assist

### In the coming years, cognitive technologies will reshape government work.

human operators—for instance, by recommending possible responses to a customer’s query.<sup>2</sup> And the first prototypes of autonomous vehicles, from taxis to trucks to drones, are now driving passengers to the airport, hauling freight from city to city, and delivering packages to your door.

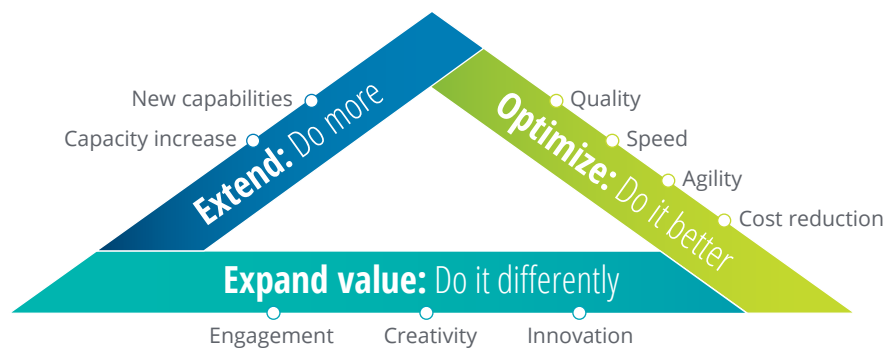
In the coming years, cognitive technologies will similarly reshape government work. Indeed, it is already starting.

In Norway, automation company Buddy Mobility has partnered with the country’s national postal service, Posten-Norgen, to use its delivery bots for last mile mail delivery. Like boxes on wheels, the bots deliver packages to 100 recipients a day and travel at 6 kilometers per hour. The bots will send notifications to package recipients via a mobile app, who can then collect their mail by opening a drawer on the bots.<sup>3</sup> Meanwhile, Germany’s national postal service also introduced a PostBOT—not to replace postal workers, but to free up their hands and assist them on the ground.<sup>4</sup>

This is just a hint of things to come. As AI technology matures, the potential for automation and AI in government is likely to grow along with the benefits (see figure 2).

FIGURE 2

#### Value drivers of AI and automation



Source: Deloitte analysis.

## The benefits of automation and AI

Automation and AI can benefit government organizations in three main ways:

1. **Extending (doing *more* work).** Computers can process vast amounts of data at high speed, enabling AI tools to perform volume-driven activities that simply aren't feasible for people to handle. Consider cybersecurity, which requires continually monitoring a massive volume of network activity. Machines can see, hear, and sense changes outside human perception, and respond more rapidly than humanly possible. Then, with help from advanced analytics and machine learning, cyber professionals can identify the causes of issues on the network, or even investigate potential incidents *before* they occur.<sup>5</sup>
2. **Optimizing (doing work *better*).** Automated systems can help organizations improve quality, lower costs, and enhance speed. Done well, automation can offer the trade-off-busting trifecta of "better, faster, cheaper." By taking over mundane tasks and bringing a more diverse set of cognitive processes to bear on a problem, these systems free employees to focus on higher-value work. Consider the task of legal discovery, in which lawyers have to wade through thousands of documents and emails—a dull task for a highly trained professional. This may explain why one study found that AI was able to locate 95 percent of the documents relevant to a legal case, while humans were able to locate, on average, only 50 percent of those documents, while taking longer than the machines.<sup>6</sup>
3. **Expanding value (doing work *differently*).** With intelligent machines serving as partners to human workers, AI gives organizations the ability to redesign work in ways that take advantage of the unique characteristics of both people and machines. Instead of merely automating tasks previously done by humans, the process can be redesigned so that AI takes over certain tasks and augments the work people do.<sup>7</sup> Consider a caseworker conversing with a client in need. As the employee engages with the client on the phone, an AI system could transcribe the conversation, automatically flagging relevant information as it comes up. At the same time, the AI could simultaneously suggest tactical

### AUTOMATION CAN CREATE ADDITIONAL CAPACITY FOR GOVERNMENT

Lower costs or provide better service? Why not both? Clearly, governments can use automation to reduce costs. But a government agency can also use technology to enhance the services delivered to citizens. When government employees are less burdened by routine tasks, they have more time to focus on higher-value activities. Indeed, this is how organizations can use technology to achieve both of these goals at once.<sup>8</sup>

Government agencies that adopt cognitive technologies can look forward to tangible gains. For example, consider the way a typical government worker spends her day today. Most likely, she allocates her labor among various items in a "basket" of tasks. By breaking a job into individual activities and analyzing how feasible it would be to automate each task, we can estimate how many hours automation could free up. A Deloitte analysis of the potential savings from AI found the US federal government could free up more than 25 percent of working hours (out of some 4.3 billion hours worked in total annually) and potentially save up to US\$41.1 billion by using cognitive technologies in this way.<sup>9</sup>

The analysis also found that some of the most labor-intensive activities performed by federal workers have moderate-to-high automation potential. Those tasks include documenting or recording information, handling and moving objects, getting information, and communicating with colleagues.<sup>10</sup>

solutions to the service rep. This would allow the caseworker to focus on the conversation, listening empathetically to the client to discover his or her underlying needs. In this example, the human and the machine work in tandem to solve the client's problem, enhancing the speed of service, preserving the quality, and improving the depth of service to the caller.

## Principles for reconstructing government jobs

When we bolt new technology solutions onto existing processes, we are limiting their potential benefit. To achieve more sustainable, lasting improvements, we need to significantly shift our thinking around work and jobs, understanding how humans and machines can optimally mix to deliver on an agency's mission.

### REIMAGINE WORK AROUND PROBLEMS, NOT TASKS

Too often, jobs are built around a series of tasks, and new technology is introduced to work within the parameters of these existing processes. Instead, we should be redesigning government work around the problems we hope to solve. To do this, leaders should figure out how to bring together the unique capabilities of humans and machines, so they can each contribute the work they do best.

Digital systems, for example, excel at processing vast volumes of data and identifying patterns. Humans can then analyze those patterns, spotting anomalies and drawing new conclusions. When engaged as partners, digital systems and human workers accomplish more work, with fewer errors. Done well, a human-machine partnership can produce better solutions than either the digital or human behaviors could have produced alone.<sup>11</sup>

By shifting the focus from carrying out narrow, routine tasks to identifying and addressing unseen problems, human workers have the opportunity to spend their time engaged in four main types of activities:

- Identifying *unseen* problems and opportunities;
- Developing approaches to solve problems and address opportunities;
- Implementing approaches; and
- Iterating and learning (reflecting) based on the impact achieved.<sup>12</sup>

For example, a tech-powered job of the future might be a mobility manager who oversees a city's transportation operating system (see figure 3). Most of the time, the system would operate autonomously, while the manager deals with exceptions or looks for opportunities to improve the system, relying on the machines to flag problems. If there

FIGURE 3

### Mobility platform manager



Source: William D. Eggers, Amrita Datar, and Jenn Gustetic, *Government jobs of the future: What will government work look like in 2025 and beyond?*, Deloitte Insights, October 4, 2018.

is an accident or delay, the algorithm might suggest a mitigating action, but it would be up to the mobility manager to accept that suggestion, or to reject it and use a different tactic. But particularly when faced with a new or unusual problem—a protest, a terrorist incident, or even something as prosaic as unexpected road work—the human manager applies his or her judgment in combination with the system, and in collaboration with colleagues across the organization, to identify a suitable solution.

#### LET HUMANS AND MACHINES PLAY TO THEIR UNIQUE STRENGTHS

To gain the full benefits of AI, governments should design work that lets humans and machines each play to their unique strengths, complementing and supporting one another.

Government agencies can integrate the abilities of humans and machines, using humans' leadership, teamwork, creativity, and social skills to complement machines' speed, scalability, endurance, and quantitative capabilities.<sup>13</sup> For example, in nursing, technology can help perform tasks such as moving

patients, delivering food and medicine, and monitoring vital signs, freeing up nurses to focus on caring for and comforting patients. Or think how

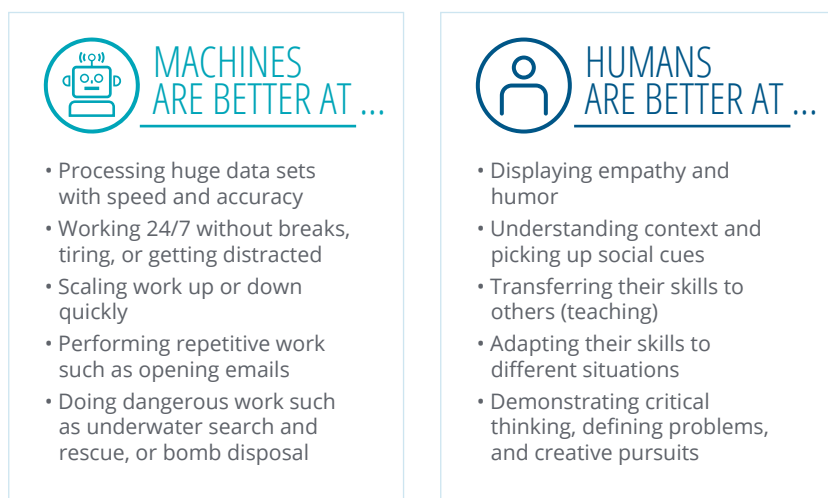
**To gain the full benefits of AI, governments should design work that lets humans and machines each play to their unique strengths, complementing and supporting one another.**

AI-enabled data analytics could enhance a family social worker's impact. By continuously monitoring data in multiple systems—such as a school absence, an emergency room visit, or a 911 call to the home—machines can send a prompt to a social worker to initiate an investigation, who can then include that information as she assesses the level of risk.

To get the most from humans and machines working in tandem (see figure 4), particular attention should be paid to designing effective interfaces between the two.

FIGURE 4

#### **Governments can make the most of what humans and machines can offer**



Source: Deloitte analysis.

## USE HUMAN-CENTERED DESIGN (HCD) TO RECONSTRUCT WORK

In developing human-machine partnerships, leaders should leverage current employees in applying human-centered design to reconstruct public sector work. The goal, after all, is a process that leverages technology to serve end users. Human-centered design requires building a deep understanding of the users of a system, or the clients of a program, to focus on serving their needs, and using that understanding to inform decisions around how a work process might be augmented by technology. HCD employs tools such as focus groups, ethnographic research, interviews, employee and customer personas and journey maps, and participatory design activities like workshops to explore the user experience. For example, when Toyota first introduced robotics in its factories in the 1980s, it not only redesigned its work processes in parallel but also consulted employees and solicited ideas for improvements.<sup>14</sup> Having employees deeply involved in codesigning or “sculpting” redesigned jobs can also help reduce potential fears that the subsequent changes were “done to them.”

## DESIGN PROCESSES THAT ALLOW HUMANS TO TAKE OVER IN THE EVENT OF A SYSTEMS FAILURE

New processes that don’t account for the needs of the humans involved can leave organizations vulnerable to some dangerous hazards. One example is the case of a June 2009 flight that crashed in the Atlantic Ocean on its way from Rio de Janeiro to Paris, killing all 228 on board. When automated systems malfunctioned, the pilots found themselves unable to take over and keep the plane aloft. They inadvertently put the plane into a dangerous stall and were unable to use “old-school” techniques to bring the aircraft under control.<sup>15</sup>

This was not an isolated problem. Studying the state of technology and pilot skill in 2013, a joint working group formed by the airline industry and

the Federal Aviation Administration (FAA) found that in general, pilots rely too heavily on automated systems; they often don’t understand those systems adequately, and can make mistakes while using them.<sup>16</sup> The group recommended the FAA develop standards to ensure pilots receive sufficient training opportunities to develop, maintain, and demonstrate manual flying skills.<sup>17</sup>

As the use of algorithms and automated systems increases in the future, processes should be designed to allow human employees to take over if systems fail and ensure that employees are trained

**In developing human-machine partnerships, leaders should leverage current employees in applying human-centered design to reconstruct public sector work.**

and equipped with the skills to do so. The system scope should include both AI and human behaviors and how they interact in both business-as-usual and exceptional situations. People are a part of the system, not just users of it.

## ZOOM IN AND ZOOM OUT

For effective work redesign, it’s helpful to adopt a two-pronged strategy of *zooming in* and *zooming out* (see figure 5). A zoom-in approach enables a government agency to start small and hone in on individual tasks and processes that have the most potential to be optimized through automation.

Zooming out enables government leaders to look at the bigger picture to determine what work redesign means for jobs, departments, and the organization as a whole. Zooming out also helps leaders look beyond the near term to get a richer view of potential opportunities on the horizon and then set better strategies anchored on that longer-term opportunity. The State of Virginia’s Department of Transportation’s Workforce of Tomorrow initiative,

FIGURE 5

## Redesign work for technology and learning



Source: Deloitte analysis.

for example, involves a deep dive into how transportation is likely to change between now and 2030 and how, in turn, this could impact the skills they will need and the composition of their workforce.

Too often, the notion of automation conjures up the image of machines replacing humans. In reality, this fear of job loss is likely overstated. After all, there is no shortage of challenges in government, and history shows that technological progress, while

disruptive, doesn't seem to create permanent joblessness. Redesigning work to account for the mixed capabilities of humans and machines is inevitable and can ultimately be a positive development for government and government workers alike. The key will be to manage the disruption so that it allows for innovation while helping individuals through the transition.

# Workforce

## Widening the definition of the government workforce

**J**UST AS OUR understanding of work has changed, the workforce is also undergoing a transformation. In the past, governments largely accomplished their missions through the work of permanent employees, complemented by contractors. Today, governments are accessing a much broader spectrum of talent options (see figures 6 and 7).

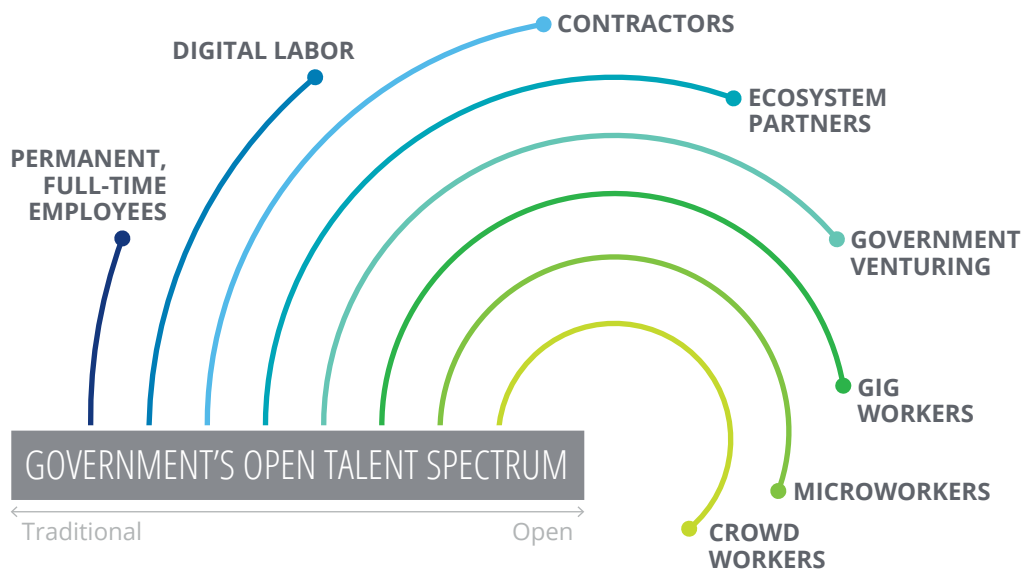
At the same time, the definition of “career” is changing; it means something very different for a young college graduate entering the working world today than it did for his or her grandparents. Skills and expertise have shorter shelf lives: Due to ongoing changes in technology, society, business models, and industrial processes, workers must update their knowledge and skills throughout their careers. People change jobs more often, whether by choice or due to the changing demands of employers. But while the average job tenure is growing shorter, people are living and working longer, increasing

**The definition of “career” is changing; it means something very different for a young college graduate entering the working world today than it did for his or her grandparents.**



FIGURE 6

## The government workforce across the open talent spectrum



**Digital labor** is the technology that can augment human capabilities and extend the reach of government workers.

**Contractors** play a key role in the government workforce. As of 2015, there were 2.6 contract or grant employees for each federal employee.

Acting as a convener, government can engage an **ecosystem of partners** to create public value and advance the mission of an agency. These partners could include private sector businesses, nonprofit organizations, innovation labs, and other entities.

Through **government venturing**, governments can use accelerators, incubators, strategic ventures, and other approaches to tap into outside innovators in order to bring new capabilities into government—effectively a reverse tech transfer.

**Gig engagements** can be a promising way to tap highly skilled workers and fill specific skills gaps—for example, cybersecurity specialists. Top talent can be brought in on short-term, temporary assignments to work on tough problems.

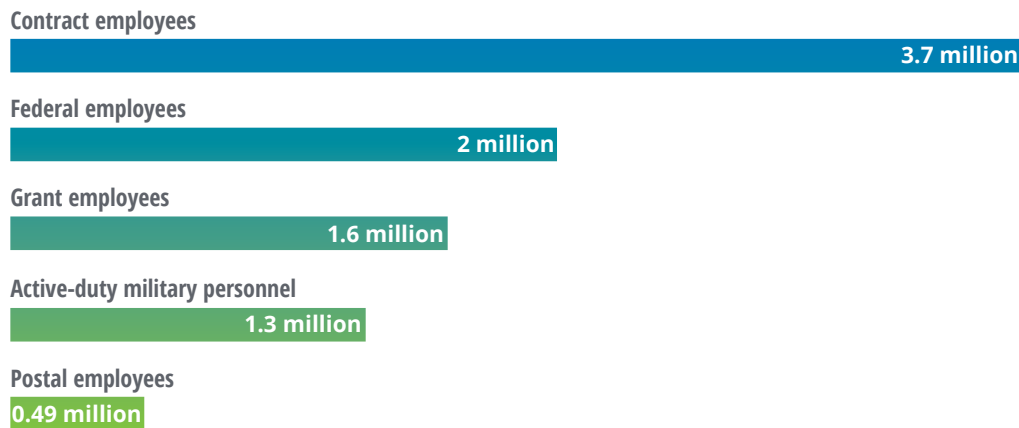
**Microwork** breaks challenges down into smaller pieces so different people can address different aspects of an issue.

One popular **crowdsourcing** strategy is to issue challenges, with prizes for the best solutions. Since 2010, 75 federal departments and agencies have issued more than 1,000 challenges and offered prizes totaling more than US\$250 million.

Source: Deloitte analysis.

FIGURE 7

## US federal workforce composition (2015)



Source: Paul C. Light, "The true size of government: Tracking Washington's blended workforce, 1984–2015," The Volcker Alliance, 2017.

### CONTRACTING IN GOVERNMENT

Governments have always used more than just permanent employees to do their work. Along with traditional part-time and full-time employees, government agencies often rely on contractors, along with employees whose tenure is tied to specific grants. In fact, in 2015, there were 2.6 contract or grant employees for each full-time US federal employee.<sup>18</sup> In the United Kingdom, temporary agency workers made up 8 percent of its 6.8 million public sector employees in 2015.<sup>19</sup>

the overall length of careers.<sup>20</sup> Instead of looking forward to a 30-year career in the same job, a public servant entering the workforce today might view a career as a series of waves, each surfed until it crests and it's time to paddle out to catch the next one. With each ride, the employee obtains new training, perfects new skills, builds their network, and accumulates new experiences.<sup>21</sup> Below is an example of what such a journey might look like (figure 8).

Reid Hoffman, cofounder of LinkedIn, has compared modern careers to "tours of duty,"<sup>22</sup> suggesting that companies should design their organizations on the assumption that most employees will only work there for a few years.

These big shifts are driving the need for new, more flexible talent and staffing models.

## New staffing and career models

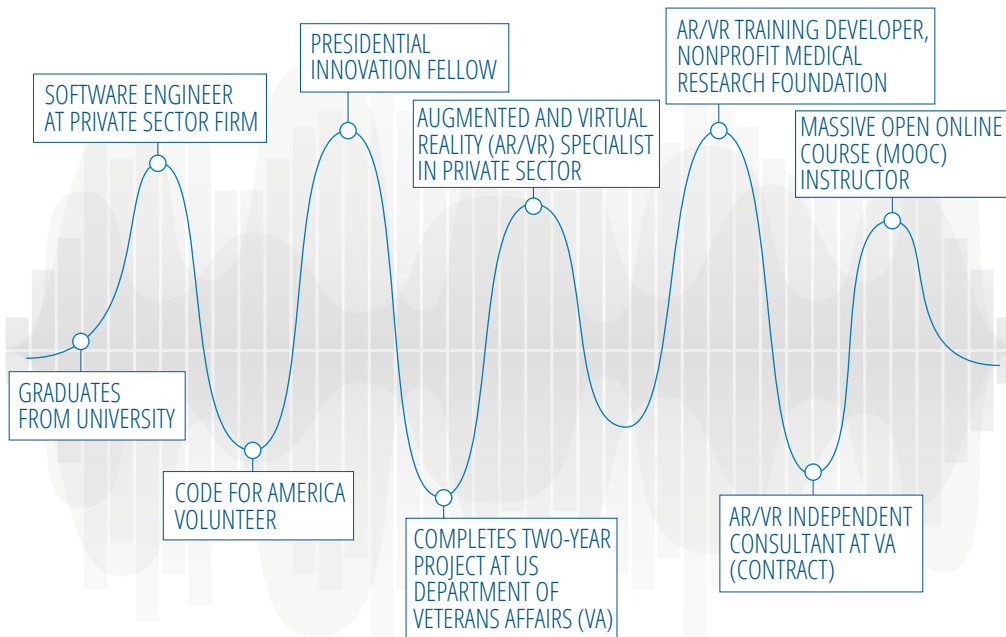
With the changing nature of work, government agencies will need to find new ways to coordinate teams and staff talent. Possible models include:

### CREATE A TALENT CLOUD

The notion of one worker, assigned to one agency, to carry out a particular set of responsibilities for years on end, may be as outmoded as the notion of one software application running on a workstation on one person's desk. Today, much of the world's IT infrastructure lives in the cloud, allowing users to access and pay for exactly the resources they need, when they need them. Access to talent can follow a similar, on-demand model.

FIGURE 8

### Example of a future career journey



Source: Deloitte analysis.

The Government of Canada (GC) is working toward this model in its GC Talent Cloud initiative. It is creating a digital marketplace of prequalified individuals who possess talent in many different areas. Agencies that need people with certain capabilities would be able to search the marketplace, quickly finding people to fill roles on projects of finite duration. Workers in this “cloud” would retain rights, benefits, and union representation and would be able to accept work inside or outside the government at any time.<sup>23</sup>

While work on the GC Talent Cloud is still in its early stages, Canada’s Free Agents pilot has been implementing this model for a few years; it started in 2016 at Natural Resources Canada and later expanded to Transport Canada and the Treasury Board of Canada Secretariat. This program allows certain public employees, chosen for their skills and their ability to innovate, to move among departments, picking projects that interest them and fit their skills. Proponents describe the Free Agents

program as a way to attract top talent by offering mobility and letting employees do work they enjoy.<sup>24</sup>

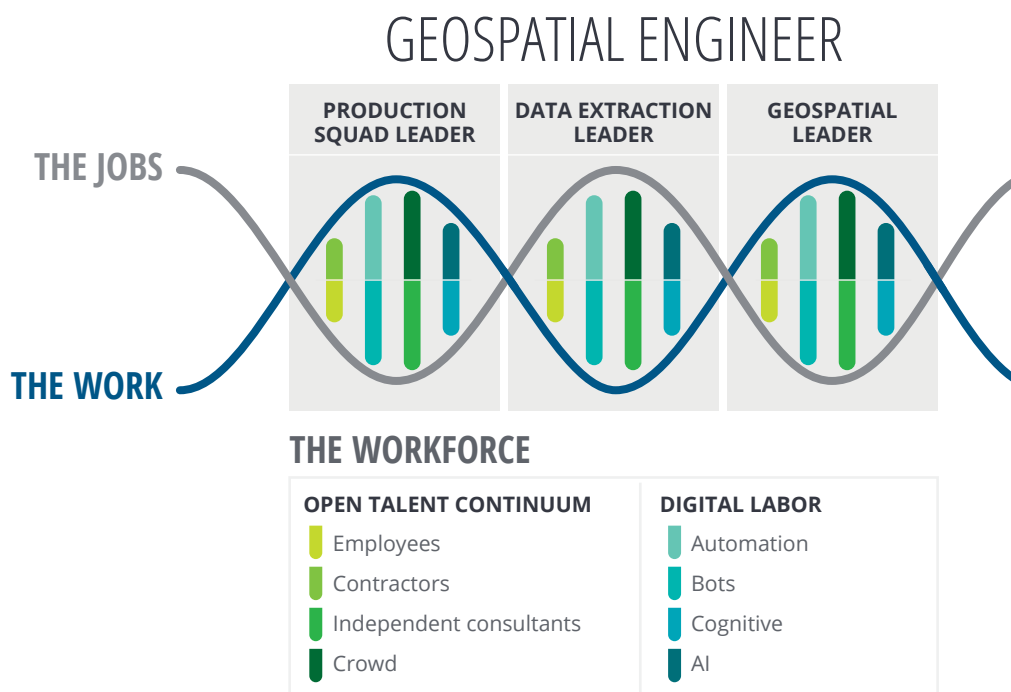
### USE BLENDED TALENT COMBINATIONS

By looking at the collection of activities that make up a particular function traditionally performed by one person (figure 9), it is possible to break the occupation into many small components and then consider each one separately to determine who (or what) can perform it best. The employer can then look across the open talent spectrum to match different tasks with different talent options—assigning some activities to in-house staff, others to contractors or gig workers, and others to crowdsourcing.

Can governments really crowdsource talent? Yes, they can. Government agencies can tap into a huge ecosystem of borrowed, freelance, and open-source talent to do cutting-edge work. Consider the US Department of Energy’s (DoE) SunShot Catalyst program, which turned to a crowdsourcing platform called Topcoder for computer programming, to

FIGURE 9

## Blended talent combinations



Source: Deloitte analysis.

solve a vexing solar energy problem. Launched in 2014, this program called upon consumers, energy companies, entrepreneurs, and startups to develop solutions for the solar marketplace. After opening the contest and receiving 140 business cases, the DoE selected 17 of the most promising and asked each to build a minimum viable product (MVP), a product that early adopters could try, allowing the DOE to see which features they liked and what needed to be changed, improved, or added.

There was only one problem: The DOE had neither the capacity nor the technical skills to build a software prototype at the pace that a typical startup would, let alone 17 startups. So they turned to the crowdsourcing platform for computer programming with more than 900,000 top-tier

developers, to work with the teams as they built their prototypes.

Each SunShot Catalyst team was given a US\$25,000 challenge budget. Teams could use the budget to engage with developers to fill gaps in their software-based solutions. On Topcoder, each task, module, design, or solution is structured as a “challenge,” and the US\$25,000

provided enough funding to cover eight to 12 challenges per team. The challenges could be used to obtain everything from app design to back-end development and testing.

Using this model, the DOE had 17 working MVPs in nine weeks, products that could be put in front of users to see which might actually increase solar adoption.

**Can governments really crowdsource talent?**  
**Yes, they can.**

## LAUNCH TOUR-OF-DUTY TALENT CADRES

To enable greater agility and nimbleness in recruiting talent with specialized skill sets from the private sector, government agencies could create cadres of experts, who could be brought in for short, two- to three-year projects or to address specific needs. These professionals could rotate in and out of the public, private, and nonprofit sectors freely. Not only could this approach improve governments' talent shortages, it also creates an opportunity for highly skilled professionals to contribute to public service, but not for their entire career.<sup>25</sup> The US federal government already has numerous "tour of duty" programs, including 18F (the General Services Administration's digital services agency), the United States Digital Service, ORISE (the Oak Ridge Institute for Science and Education), the Presidential Innovation Fellows program, and more.

These programs allow tech talent from the private sector to work on projects at various agencies on a limited-term basis.<sup>26</sup>

Another example is the Michigan Cyber Civilian Corps. Like volunteer firefighters, this group of trained cybersecurity professionals can be called upon to volunteer their assistance if the governor declares a cyber incident an emergency. Given the talent shortage in the cybersecurity domain and the growing sophistication of cyberattacks, having a team of cyber experts on standby can greatly augment the state's ability to respond during a crisis. Volunteers come from government, academia, and the private sector.<sup>27</sup>

## EXPLORE COGNITIVE STAFFING AND RECRUITMENT

Building a strong workforce requires effective hiring and retention strategies. Being able to identify the best person or right team of individuals for a job is critical, but according to past research by the US Merit Systems Protection Board, agencies

rely heavily on assessment tools—résumés, questionnaires, essays, and education level—that are not accurate determinants of future performance.<sup>28</sup>

Today, many job interviews are unstructured conversations and, for the most part, hiring managers are still using their intuition or judgment to choose candidates. The results, however, have been hit or miss. This is why more private sector organizations are exploring the use of predictive analytics and augmented decision-making to find the right new candidates.

**Government agencies could create cadres of experts, who could be brought in for short, two- to three-year projects or to address specific needs.**

GE, for example, teamed with a startup that combines machine learning and predictive analytics, to help find the right candidates for its digital transformation.<sup>29</sup> It helped GE determine what capabilities, roles, leaders, and teams were needed by leveraging data-driven matches. As a result, GE dramatically shortened its time to hire by 70 percent, reducing the time of delivery of hires from 10 to 15 weeks to two to five weeks, and widened the candidate pool to 4 million.<sup>30</sup> Once hired, these new employees were offered access to self-service career development tools. And based on an employee's skills and adaptability, as well as the company's goals, the platform suggested which employees to target for additional investments in training.

Another startup, Pymetrics, has developed a platform that taps into the power of AI and behavioral science to match candidates to jobs, while also removing bias from hiring practices. Using a series of games, the platform tests candidates for traits like memory and risk preference to determine how successful and suitable they would be for particular

roles.<sup>31</sup> This happens at the initial stages of recruitment; the platform ignores factors such as gender, level of education, and race. The idea is to first evaluate candidates based on their inherent cognitive attributes instead of their résumés.

AI-based tools like this hold the promise to increase candidate diversity, reduce time to hire, and increase retention rates. They also can help existing employees find new roles within their organization, which supports retention and internal mobility.<sup>32</sup>

While these examples may seem futuristic for many government agencies, the capabilities are rapidly evolving in the private sector and could readily be applied to building public sector workforces.

In Europe, it is already happening: Most of the public employment service portals within EURES, the European Union's public sector job mobility

platform, offer automatic matching capabilities. Key information is automatically pulled from résumés, and the engine then matches the job seeker's skills to the employers' search behaviors, saving time and effort. In Belgium, matching is done on the basis of competencies that employers are looking for rather than a job seeker's professional experience or education. Its government is also piloting an AI-driven matching tool that uses deep learning, allowing a direct keyword search of CVs and job postings.<sup>33</sup>

Better tools for candidate selection may be coming to government agencies sooner than many expect. The deeper challenges are creating a work environment that can compete with the private sector and encourage highly qualified candidates to apply.

# Workplace

Creating the right environments and support structures for the future of work

WHEN WE TALK about the government workplace of the future, we're not just talking about physical spaces. We're also exploring all of the management practices and organizational structures that support work—the overall workplace environment. These include arrangements that allow employees to work wherever and whenever they choose, promote wellness, provide employees with learning resources, and other tools to manage the quality of the overall work experience.

The private sector is working to dramatically improve workplaces by looking at the science behind work environments and using new technologies to put those insights into action. When recruiting and retaining employees, government organizations will be at a disadvantage if they cannot provide comparable work environments. The best workplace environments don't simply have free snacks in the breakroom, beanbag chairs, and the proverbial foosball table. Leading workplaces also provide access to professional development, career planning tools, and the resources needed to work remotely.

So how can government organizations bring the workplace of the future to their employees? Here are some strategies:

## CREATE PHYSICAL ENVIRONMENTS THAT DRIVE PRODUCTIVITY AND CREATIVITY

Most people are aware that physical environments influence productivity and job satisfaction.

This is especially true when value creation depends on creativity and collaboration. Too often, however, government workspaces are designed to minimize costs and fail to provide an inspiring environment.

There is strong evidence that a work environment that includes plants and a connection to nature can have a positive effect on productivity. A study by the Harvard TH Chan School of Public

**When recruiting and retaining employees, government organizations will be at a disadvantage if they cannot provide comparable work environments.**

Health showed that employees who worked in well-ventilated, “green” offices with superior air quality had stronger cognitive function. According to a study by the University of Exeter, enriching spaces with plants increased productivity by 15 percent.<sup>34</sup> Other documented benefits include improved attention span and increased happiness.<sup>35</sup>

The private sector is incorporating these insights into its new workspaces and campuses. To tap into the health benefits of natural light and fresh air, Amazon has rolled out a new workspace called “the Spheres” to allow employees to feel closer to nature and do creative work in a relaxing environment. Consisting of three glass spheres that house more than 40,000 plants, the space looks more like a rainforest than a typical office.<sup>36</sup> Similarly, Apple has a

mini-forest of 9,000 trees in its Apple Park headquarters.<sup>37</sup> Designed in a ring structure, the space blurs the line between indoors and outdoors in an effort to wake the senses.<sup>38</sup> Workplace architects are being asked to consider the human impact of their designs, rather than merely fitting the maximum number of workers into a given space.<sup>39</sup> Government agencies are also recognizing the importance of biophilic design that incorporates nature and natural elements into workplaces. For example, the Federal Center South building in Seattle, which houses the US Army Corps of Engineers, includes an open atrium with plants, rocks, and natural materials as well as views of the sky, outdoor landscape, and river.<sup>40</sup>

## USE SCIENCE TO OPTIMIZE INDIVIDUAL AND TEAM PERFORMANCE

Organizations are tapping into cognitive technologies, analytics, and behavioral science to optimize worker performance. This isn't a modern version of Taylorism, which looked to squeeze the maximum productivity from each employee by closely prescribing how each task was to be done. Today, when creativity and collaboration are so important, it is about providing a work environment that puts employees in a position to be successful—both individually and as part of a team.

Scientific research can help management move from intuition to precision; decisions can now be based on data and rooted in evidence. This type of performance optimization is increasingly being extended to teams. In the future, more complex work is going to require more group work rather than individual efforts handed off to others in some type of sequence, which is how many teams work today. In fact, how teams perform depends on how people work *together*, rather than merely on how they work.

Public sector leaders may feel that simply trying to hire good people is difficult enough. Increasingly, however, value isn't created by the sum of individual performers, but by putting together a high performing team. For example, the Fire Department of New York (FDNY) has an elite unit, FDNY Rescue

1, within its own special operations command. The special unit responds to a range of high-risk incidents across Manhattan—from rescuing window washers from a skyscraper to saving someone stuck under a subway car.<sup>41</sup>

Google's Aristotle project was an extensive study to discover what exactly makes the perfect team. The answer? It wasn't solely about subject matter expertise. Instead, the study showed that teams whose members possessed attributes such as generosity, curiosity toward the ideas of other teammates, empathy, and emotional intelligence were the most successful. And when members felt a sense of emotional safety, their teams performed better.<sup>42</sup>

Humanyze, meanwhile, uses data-driven tools that analyze data exhaust from systems such as email and instant messaging tools to quantify human dynamics and determine the strength of a team. Another tool they've used is similar to a "Fitbit for your career." Humanyze has used digital badges with a sensor that checks proximity to other people and a microphone that performs voice analysis. While the microphone doesn't record what employees are saying, it tracks the percentage of time they spent talking and analyzes volume and tone of voice. Only employees have access to their individual data via a dashboard. But larger patterns can shed light on how a sales team might be collaborating with the engineering team, if employees spend too much time either alone or in meetings, or if certain groups spend more time talking than others in a conversation.<sup>43</sup>

Studies also show that having a good amount of cognitive diversity—differences in perspective or information processing styles—among teams often yields better performance. What if talent recommendation engines could precisely build teams with enough cognitive diversity to solve specific challenges? What if agencies could quickly assemble flash organizations of freelance talent with enough diversity and the right capabilities? Being able to use the blend of analytics and behavioral science to precisely recruit talent, assemble teams, and manage employees with cognitive diversity will be critical to the success of organizations of the future.

Communication patterns are also strongly associated with performance. In fact, organizations are increasingly using organizational network analysis (ONA) to analyze communication patterns to predict performance. For example, one professional services firm analyzed messaging metadata (not the messages themselves) over a period of several months. Using data gleaned from a tool in conjunction with a deep learning model, the company was able to predict strong performers, or “rock stars,” with high accuracy. The study found that top performers communicated often, were quick to respond, and were action-oriented.<sup>44</sup>

Of course, the best teams aren’t just a collection of superstars. Just as a good basketball team needs a blend of scorers, passers, and defenders, a

office, while others are based in remote locations, including their own homes.

Automation, AI, and other emerging technologies can have a dramatic impact on the efficiency, comfort, and satisfaction of field and frontline workers, who often face different challenges than office workers do.

For example, inspectors doing site visits could benefit from having an AI-enabled digital assistant to help record case notes on the go (see figure 10). Armed with a combination of facial recognition software, automation, and AI to examine documents, ask questions, and capture information, customs and border security officers could focus on observing travelers for suspicious behavior. Airports in the United States have already started using

facial recognition technology to identify people who might be traveling with falsified documents.<sup>45</sup>

Similarly, the US Border Patrol has been testing the use of personal unmanned aerial vehicles (UAVs) to help agents surveil remote areas, places where they otherwise would have no way of seeing what is going

on. Equipped with day/night cameras and radar, the UAVs can help agents on the ground quickly discover the source of a sensor alert. Did animals or people trigger the sensor? If people, how many, and were they armed? It would likely take hours for humans acting alone to acquire this information.<sup>46</sup> Technology can play a role in augmenting agents’ situational awareness, which is often critical to their job.

## FOCUS ON EMPLOYEE WELL-BEING

Employee wellness initiatives, if done well, can enhance worker satisfaction and productivity. According to Gallup’s 2017 State of the American Workplace report, more than 50 percent of employees reported that achieving better overall well-being was *very important* to them.<sup>47</sup> In the

## Studies also show that having a good amount of cognitive diversity—differences in perspective or information processing styles—among teams often yields better performance.

high-performing team needs a balance of skills appropriate for the task at hand. There is art as well as science behind building great teams.

It may be a while before these tools penetrate public workforce management. But these insights, based on science, can help managers unlock the mystery of individual and team productivity.

## TAP INTO TOOLS THAT HELP OPTIMIZE PERFORMANCE IN THE FIELD

The government workforce performs its duties across a variety of work environments—from agency headquarters, office buildings, airports, borders, and national parks to military bases and hospitals, even to the International Space Station. Some workers spend their days in the field moving from place to place, some work in a traditional

FIGURE 10

## How a food inspector in the future could leverage technology in the field



11:00 AM

Richard heads out for his first inspection of the day—a fast food restaurant. Based on a spike in negative reviews and complaints, **Intellispect—a predictive analytics tool**—had flagged the establishment as high-risk and recommended a surprise inspection. As he drives to the location, a digital assistant offers background details by reading out the summary of information aggregated from Intellispect and the digital inspection management system.

11:45 AM

At the location, Richard informs staff of the inspection and begins to examine the kitchen. An interactive checklist on his tablet guides him through the inspection process and highlights potential violations. He notices a number of issues: uncovered waste bins and staff not wearing gloves while handling uncooked garnishes. He records his observations and takes pictures on his tablet. To determine if the food is safe, he swabs for bacteria and checks the internal temperature of certain foods using his smart food thermometer. The readings from his **smart testing instruments** are automatically sent to his tablet and analyzed. He also talks to members of the kitchen staff and probes them on their cleaning and pest-control procedures.

12:45 PM

After he has finished inspecting the restaurant, the system automatically generates a summary of violations, remedial actions, and penalties. Richard communicates these to the restaurant manager, along with a date for a follow-up inspection.

Source: William D. Eggers, Amrita Datar, and Jenn Gustetic, *Government jobs of the future: What will government work look like in 2025 and beyond?*, Deloitte Insights, October 4, 2018.

2017 Federal Work Life Survey, only 35 percent of respondents felt their workplace demonstrated a commitment to improving employees' physical, mental, and emotional well-being.<sup>48</sup>

Modern work situations can create unhealthy stress levels for employees who struggle to unplug. Mobile devices have created a world in which many employees never feel like they are truly "off duty." Studies show that 40 percent of workers contend with significant job-related stress, which makes them less productive, less healthy, and may undermine family relationships.<sup>49</sup>

There is growing evidence to support the contention that well-being affects workers' performance. One study showed that when employees suffer from illness and stress, the loss of productivity costs the employer 2.3 times more than do the associated medical and pharmacy costs.<sup>50</sup> The average national turnover rate in time-intensive and high-stress government occupations like child welfare caseworkers is 30 percent and represents a heavy cost to many state agencies.<sup>51</sup> Emerging technologies and automation can help alleviate documentation burdens and ease workloads for caseworkers.

Well-being is also highly affected by how well (or poorly) an employee is managed. In fact, a study by Gallup showed that close to 50 percent of employees leave their organization because of their

manager, which indicates that bad managers are a leading cause of stress for workers.<sup>52</sup> Therefore, wellness initiatives should also focus on improving management practices and policies.

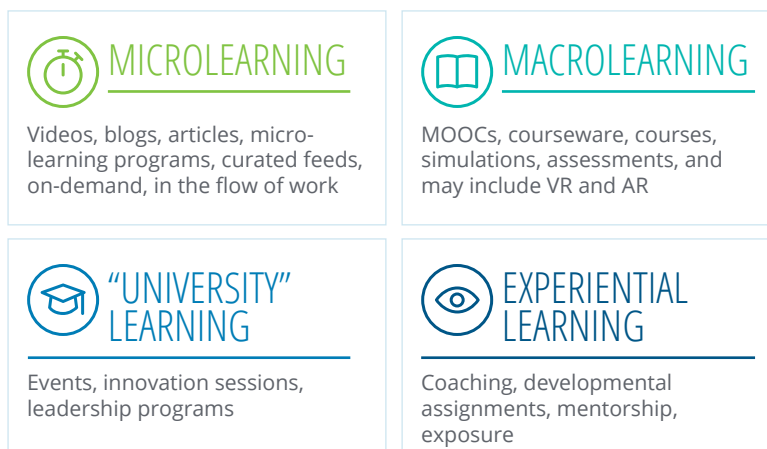
Research also shows that employees who spend significant time learning at work are more confident, successful, and happy. "Heavy learners," or those who spent more than five hours a week engaged in a learning activity, are 47 percent less likely to be stressed at work.<sup>53</sup> Government agencies sometimes fail to invest in the professional development of their workers. In some instances, the percentage of labor dollars spent on training can be as low as 1 percent or 2 percent.<sup>54</sup> But "professional development" doesn't have to be a separate training program; it can also be something that happens on the job, in the flow of work.

## ENABLE LEARNING IN THE FLOW OF WORK

In the future, learning and development will play a bigger role in the workplace. This will involve continual learning and reinvention: Employees will periodically refresh their skills when their work demands it. For this to meaningfully occur, the ways in which learning and training happen at work should change (see figure 11).

FIGURE 11

### Learning modalities in the future of work



Source: Deloitte analysis.

Instead of being a distinct task or activity that workers need to make time for, in the future, learning will happen organically, in the flow of work. It will be baked into everyday work, at moments where that knowledge or skill is needed, through small, actionable nuggets of information or microlearning modules. Larger, more time-intensive learning programs will still be needed to help employees learn an entirely new skill from scratch, but these trainings will be complemented by microlearning on the job, which allows for periodic review and retrieval.

Experiential learning involves learning by doing, especially working alongside others. Like context and culture, tacit knowledge can be difficult to transfer digitally. It involves observation, socialization, and reading between the lines. Research on tacit knowledge has found that “by watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art ... not only the types of conscious actions which could be described equally well in words, but also those which are not explicitly known to the master himself.”<sup>55</sup> Work groups will become even more important in the future, serving as a platform for tacit learning. Gaining new skills and developing capabilities isn’t solely a matter of an apprentice watching the master, but also entails the

collective, collaborative efforts of a group in which every member has different strengths that others can absorb without being fully aware of the knowledge transfer. The best teams won’t merely share preexisting knowledge, they will create new understandings as an outgrowth of their joint efforts.

An important means of learning on the job is through feedback—from peers, managers, and others. The US Office of Personnel Management’s 2018 Federal Employee Viewpoint Survey Government-wide Management Report showed that 91 percent of federal workers are looking for ways to do their jobs better and 96 percent are willing to put in extra effort to get their job done.<sup>56</sup> New AI-driven tools help workers learn to change their behavior and improve performance. After performing an initial assessment, the AI tool can use the data it has gathered to provide employees and managers personalized *nudges*—timely suggestions to promote positive behaviors around teamwork and well-being—almost like a personal coach.<sup>57</sup>

Public agencies seeking to upskill their employees may want to partner with a local university or other learning platforms, which could deliver a customized curriculum. As digital government becomes more prevalent, external partnerships such as these show particular promise.

# Tackling the challenges

FUNDAMENTALLY REDESIGNING GOVERNMENT work, workforces, and workplaces will not happen overnight. In most cases, it will be a long journey filled with obstacles. Here are some of the biggest challenges and ideas for how to address them.

## Challenge No. 1: Rigid job descriptions

Many government jobs are designed around static job descriptions and skills requirements. This has made it increasingly difficult for government agencies to compete with the private sector for talent—particularly for technology or specialized roles, such as cybersecurity. Going forward, work will need to be continually redesigned (people and machines); the capabilities people will need will include ongoing learning and reinvention.

### **The response: Simplify job classifications.**

To address this challenge, a number of state governments and government agencies have embarked on job reclassification efforts. In 2013, the state of Tennessee reclassified its positions, asking existing employees to reapply for the newly reclassified roles. The idea was to fill staffing needs from within the organization. In the past few years, this has enabled Tennessee to retain skilled talent by helping them into new career paths; it has also helped the state identify gaps that they have been able to fill with a training experience designed around new classifications.<sup>58</sup>

Similarly, California's IT and Human Resources departments underwent a job classification consolidation process as a part of a wider Civil Service

Improvement (CSI) program.<sup>59</sup> To date, more than 700 job classifications have been abolished.<sup>60</sup>

Ultimately, the objective should be to create a shift in hiring criteria—from a focus on specific skills and experiences toward hiring for competencies and capabilities. The goal isn't to improve job descriptions, it's to create an adaptive workforce that evolves along with new technologies.

## Challenge No. 2: One-size-fits-all compensation

Most government personnel systems are one-size-fits-all, which can make it hard to attract and retain talent.

**The response: More flexible personnel systems.** The US Department of Homeland Security is piloting a new personnel system to address one of its most pressing challenges: the shortage of cyber talent. The system would equip the department with new tools to recruit and reward employees—including a flexible benefits package tailored to a professional's life stage—and provide more flexibility than the current system. "It makes no sense to me whatsoever that we have to turn around and try to recruit, hire, retain, and pay people in a system that was designed in the 1940s," says Angela Bailey, the department's chief human capital officer.<sup>61</sup> She has been working with CIO John Zangardi, and the buy-in from both the business leaders and HR has helped move the new approach forward. "If your HR folks are on-board and recognize this is important, that's a good thing. I'm not fighting her. She's probably pushing me more than I'm pushing her and that's good," said Zangardi.<sup>62</sup>

## Challenge No. 3: Evolving jobs require new skills

In the world of human-machine collaboration, many employees will need training before they can profit from the opportunities and jobs that new technologies are creating.

**The response: Continuous upskilling.** As the nature of work changes, reskilling and upskilling can help employees shift to higher-value positions. According to the World Economic Forum, 54 percent of employees in large firms will need to upgrade their skills or acquire entirely new skills.<sup>63</sup>

A similar challenge looms in the government workforce. A toll-collector's job doesn't entail skills that easily translate to other roles. This is also true for transaction processing roles, warehouse, and transportation workers. Bringing these employees forward will require building new skills, looking beyond the tasks they currently perform and focusing on potential capabilities. Greater resources will likely be required.

## Challenge No. 4: Generalized training has become less effective

As the pace of change accelerates, the value of training for static job capabilities makes less sense.

**The response: Adaptive upskilling for today's jobs with an eye to future needs.** Some organizations have been retraining low-skilled workers already on their payrolls to perform more sophisticated tasks that produce greater value. For example, Lamar Advertising Company has trained some employees who build or paint physical billboards for the higher-paying job of repairing digital billboards.<sup>64</sup> In the government context, Tyson Meadors, director of cybersecurity policy at the National Security Council, has suggested that retraining could be the key to filling some 285,000 government cybersecurity positions that stand vacant today.<sup>65</sup> Reskilling is an opportunity for or-

ganizations to develop a more capable workforce for tomorrow's needs.

Start with units that have open positions or have identified future needs. Instead of delivering generalized training, this kind of effort focuses on preparing workers for particular roles that particular parts of the organization need. Using internal trainers or working with external training partners, including higher education partners, government agencies can design and, in some cases, deliver programs that create a more adaptive workforce. Agencies can help prepare job-ready employees with skills that match their immediate business needs. For example, Maryland's EARN (Employment Advancement Right Now) program, a workforce development initiative, allows private sector employers to design the training they need for their workforces. Because the organizations' skill needs are known in advance, the program's success rate—measured as the percentage of individuals trained who then find jobs—is high. As of June 2018, 81 percent of those trained through EARN have found employment and it has helped more than 5,200 incumbent workers enhance their skills.<sup>66</sup>

## Challenge No. 5: Traditional jobs are disappearing

Technology will eliminate or reduce many current roles in government.

**The response: Reskill workers into new roles.** For jobs that could be replaced by technology, government organizations can move those individuals into higher-value positions by examining their skills and then identifying other roles that require the same skill sets. For example, one analysis found that secretaries and administrative assistants might be moved into positions such as insurance claims clerks; library assistants and other kinds of clerical workers; production, planning, and expediting clerks; or concierges.<sup>67</sup>

One way to advance reskilling efforts is to improve internal mobility and internal job markets. In one of the largest upskilling initiatives in the

United States, AT&T set out to help employees quantify their skills in terms of competencies and credentials against the company's future needs. It then launched internal tools to connect employees to skills training options. These include individual online courses and certifications, as well as nano-degrees—course bundles that deliver specialized training and upskilling options, such as preparing programmers to become software engineers. AT&T also partnered with Georgia Tech and Udacity to deliver an online master's degree through a MOOC. The company partly covers the cost of several of these options.<sup>68</sup>

## Challenge No. 6: New roles are beyond the reach of current workers

Future roles may require skills not currently within reach for workers.

**The response: Use technology to amplify human capabilities.** By using augmented reality (AR) and virtual reality (VR) for contextual or adaptive learning, government agencies can help current workers transcend limitations.

Some agencies today are applying advanced technologies such as AR and VR in their learning ecosystems. For example, the US Air Force is re-designing its pilot training program to include VR simulation. The system tracks factors such as cognitive load levels, stress levels, and a pilot's ability to plan ahead and strategize. Pilots learn better this way, gaining a deeper understanding of principles, and the program has cut training time for a new pilot from more than a year to just six months. As one of the designers of the system explains, "The AI will build a custom syllabus for each pilot based on what's going on in their mind."<sup>69</sup>

At NASA, Lockheed Martin technicians working on the Orion spacecraft are now using VR headsets in place of 1,000+ page binders of written assembly

instructions. Workers wear headsets that show holograms of virtual models with instructions overlaid on each part. The models are color-coded to the role of the technician using the headset, making it easier for technicians to quickly find exactly which part they should work on and what they should do. As a result, technicians are quickly able to familiarize themselves with new tasks and perform them.<sup>70</sup>

## Challenge No. 7: No path exists for "middle skills" jobs

Certain jobs require four-year or advanced degrees. But others require "middle-skills": a certain level of specialized training, but not necessarily expensive, time-consuming degrees. But employees often lack a path to acquire these middle skills.

**The response: Next-gen apprenticeships.** Apprenticeships blend education and work experience, providing a chance to gain specific skills while practicing them on the job. Within government workforces, one particularly good environment for apprenticeship might be an initiative that brings together different agencies to work on challenges they share. As apprentices graduate from this borderless approach to working and learning, any of the agencies involved in the collaboration could benefit from their talents and newly developed skills. For example, in the United Kingdom, the Government Digital Services (GDS) launched an academy that uses boot camp-style training to teach employees digital skills like agile and user-centered design. When employees return to work, they are given new roles that utilize the skills they just learned. They are not fully proficient in these skills, nor are they expected to be. But they are skilled enough to help on a project and build their skills on the job, working alongside more experienced colleagues. Over the past three years, the GDS academy has trained more than 5,000 employees across agencies in this way.<sup>71</sup>

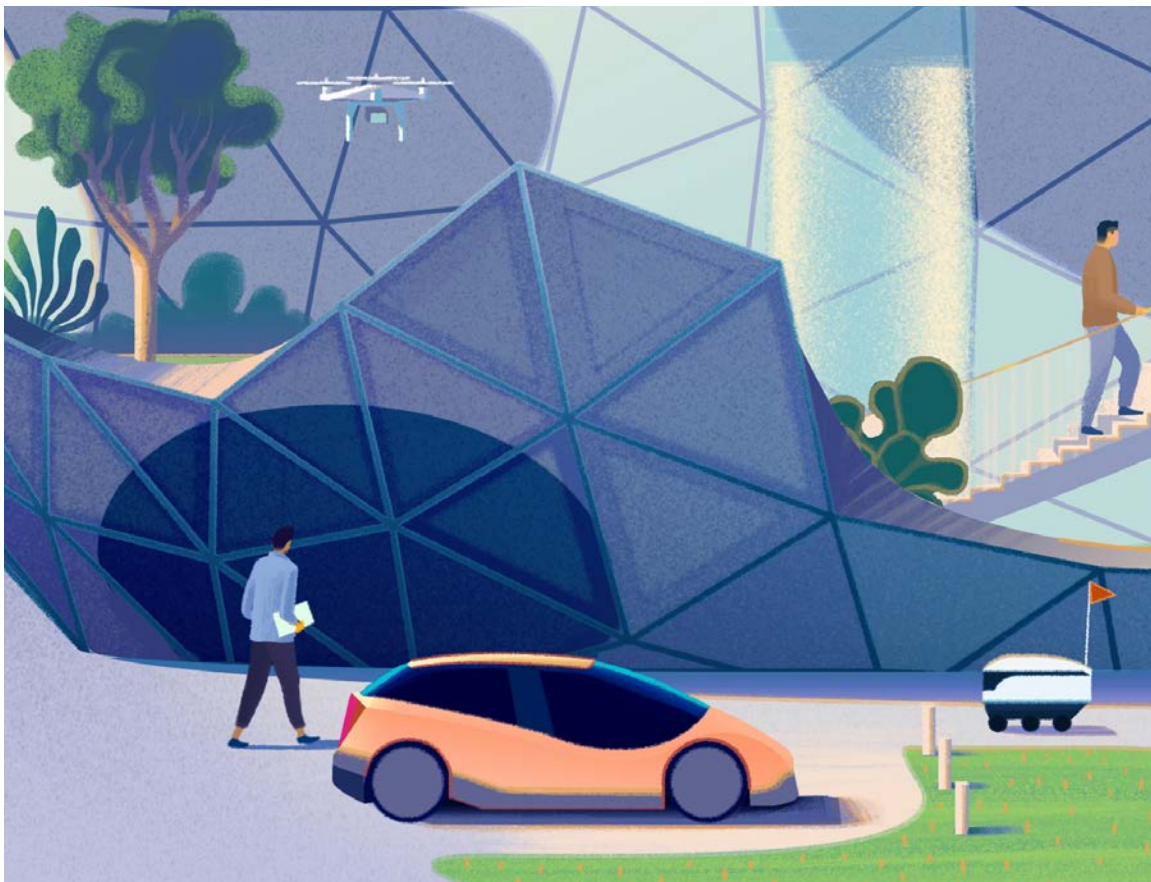
## The dawn of a new era of possibilities

The way the public sector creates value—the work, the workforce, and the workplace—is changing. Government cannot address today’s complex challenges with outdated systems. Writing of the need for businesses to evolve with technology, Futurist Tim O’Reilly put it this way: “We can’t just accept whatever results we get from following old rules; we must constantly measure our actions against their results. And when we see that the results don’t measure up to our dreams, we must rewrite the rules.”<sup>72</sup> Those on the front line of government management are frequently frustrated by the old rules and recognize that new approaches to public management are necessary.

The potential is enormous. To grasp a brighter future, however, we need to realize that we have

the power to change for the better. The current approaches to how government manages its people are not carved in stone. We need fresh thinking to address the issue of how the public sector delivers value. We should embrace the power of technology to amplify human capabilities.

The new era of possibility entails much more than mere technology, however. Our goal should be to unleash the productivity and talent of our people—as individuals, working in teams, and creating value in partnership with machines. The multiplier effect of collaboration—both the human-machine or the human-human variety—can produce unprecedented benefits, allowing government to better deliver on its mission. Ultimately, a reimagined future of work should produce a brighter future for those who work on behalf of government as well as those who are served by it.



## Endnotes

1. Angel Gonzalez, "Amazon's robots: Job destroyers or dance partners?," *Seattle Times*, August 11, 2017.
2. Adelyn Zhou, "How artificial intelligence is transforming enterprise customer service," *Forbes*, February 27, 2017.
3. Luke Dormehl, "In Norway, a robot will soon be delivering people's mail," *Digital Trends*, October 30, 2018.
4. Trevor Mogg, "DHL's mail robot carries heavy loads and frees up the hands of delivery workers," *Digital Trends*, October 20, 2017.
5. Deborah Golden and Ted Johnson, *AI-augmented cybersecurity: How cognitive technologies can address the cyber workforce shortage*, Deloitte Insights, June 8, 2017.
6. Anne Kershaw, "Automated document review proves its reliability," *Digital Discovery & e-Evidence*, November 2005.
7. As our colleague Peter Evans-Greenwood notes, one limitation of machines is that they can become more precise over time, but they don't do "different" well, so they won't innovate to improve the process. There's strong evidence that the majority of productivity improvement from the introduction of new technology comes from bottom-up innovation at the coal face by workers, not top-down analytical interventions by white collar workers. See James Bessen, *Learning by Doing: The Real Connection between Innovation, Wages, and Wealth* (New Haven, Connecticut: Yale University Press, 2015). In the book, Bessen writes about the power loom, showing how the initial introduction of the technology improved productivity by a factor of 2.5, while subsequent learning by doing provided another factor of 20.
8. William D. Eggers, David Schatsky, and Dr. Peter Viechnicki, *AI-augmented government: Using cognitive technologies to redesign public sector work*, Deloitte Insights, April 26, 2017.
9. Ibid.
10. Deloitte analysis of OPM FedScope and DOL O\*NET data.
11. Peter Evans-Greenwood, Alan Marshall, and Matthew Ambrose, *Reconstructing jobs: Creating good jobs in the age of artificial intelligence*, Deloitte Insights, July 18, 2018.
12. John Hagel, John Seely Brown, and Maggie Wooll, *Can we realize untapped opportunity by redefining work?*, Deloitte Insights, October 24, 2018.
13. H. James Wilson and Paul R. Daugherty, "Collaborative intelligence: Humans and AI are joining forces," *Harvard Business Review*, July-August 2018.
14. Thomas Kochan and Lee Dyer, "Robots won't steal our jobs if we put workers at the center of the AI revolution," *The Conversation*, August 30, 2017.
15. David A. Mindell, *Our Robots, Ourselves: Robotics and the Myths of Autonomy* (New York: Viking, 2015).
16. Ibid.
17. US Department of Transportation, *OIG audit report: Enhanced FAA oversight could reduce hazards associated with increased use of flight deck automation*, January 7, 2016.
18. Paul C. Light, "The true size of government: Tracking Washington's blended workforce, 1984–2015," *The Volcker Alliance*, 2017, pp. 3-4.

19. Johnny Runge, Nathan Hudson-Sharp, and Heather Rolfe, *Use of agency workers in the public sector*, National Institute of Economic and Social Research, February 2017.
20. Josh Bersin, "Catch the wave: The 21st-century career," *Deloitte Review* 21, July 31, 2017.
21. Ibid.
22. Reid Hoffman, Ben Casnocha, and Chris Yeh, *The Alliance: Managing Talent in the Networked Age* (Cambridge, Mass: Harvard Business Review Press, 2014).
23. Organisation for Economic Co-operation and Development, "Case study: Free agents and GC talent cloud-Canada," 2018.
24. Taran S. Wasson, "How can government get top talent? Canada's Free Agents work where they want," *Apolitical*, August 29, 2018.
25. NAPA, *No Time to Wait, Part 2*.
26. Partnership for Public Service, *Mobilizing tech talent*, September 2018.
27. Michigan.gov website, accessed January 14, 2018.
28. US Merit Systems Protection Board Office of Policy and Evaluation, "Improving federal hiring through better assessment," July 2018.
29. Mike Wheatley, "Ascendify lands \$11M funding to bring predictive analytics to talent management," *Silicon Angle*, October 9, 2017.
30. Ascendify, Customer story.
31. *Economist*, "Managing human resources is about to become easier," March 31, 2018.
32. BusinessWire, "Pymetrics awarded as technology pioneer by World Economic Forum," June 21, 2018.
33. VDAB, "VDAB European leader in competence-based matching," July 8, 2016.
34. University of Exeter, "Why plants in the office make us more productive," *ScienceDaily*, September 1, 2014.
35. Jessica Stillman, "The incredible science behind why Amazon filled its new office with 40,000 plants," *Inc.com*, February 5, 2018.
36. Seattle Spheres website, accessed December 14, 2018.
37. *The future of work in government* is an independent publication and has not been authorized, sponsored, or otherwise approved by Apple Inc.
38. Steven Levy, "Inside Apple's insanely great (or just insane) new mothership," *Wired*, May 16, 2018.
39. Agustin Chevez, "Artificial Intelligence humanizing the places where we will work," *Work Design*, November 29, 2018.
40. Judith Heerwagen, "Biophilic design," General Services Administration, accessed February 6, 2019.
41. John Hagel, John Seely Brown, Andrew de Maar, and Maggie Wooll, *Beyond process: How to get better, faster as "exceptions" become the rule*, Deloitte Insights, November 12, 2017.
42. Valerie Strauss, "The surprising thing Google learned about its employees—and what it means for today's students," *Washington Post*, December 20, 2017.

43. Mark Mann, "How companies are using technology to make workers 'happy' in their crappy jobs," Motherboard, September 5, 2016.
44. Josh Bersin, "What emails reveal about your performance at work," joshbersin.com, October 12, 2018.
45. Shannon Liao, "New facial recognition system catches first imposter at US airport," *The Verge*, August 24, 2018.
46. Fox News, "Border patrol testing drones to be its 'eyes in the sky,'" January 19, 2018.
47. Gallup, "2017 State of the American Workplace," accessed February 6, 2019.
48. United States Office of Personnel Management, *2017 Federal Work-Life Survey*, March 2018.
49. US Travel Association and GfK Public Affairs and Corporate Communications, *Overwhelmed America: Why don't we use our earned leave?*, August 2014.
50. Leonard L. Berry, Ann M. Mirabito, and William B. Baun, "What's the hard return on employee wellness programs?" *Harvard Business Review*, December 2010.
51. Casey Family Programs, "How does turnover affect outcomes and what can be done to address retention?," December 29, 2017.
52. Gordon Tredgold, "People leave bosses, not companies. But maybe that boss is you!" *Forbes*, December 6, 2017.
53. Josh Bersin, "New research shows 'heavy learners' more confident, successful, and happy at work," joshbersin.com, November 9, 2018.
54. Jeff Neal, "Government will spend billions in the next 2 months; here are 3 places they should spend it," Federal News Network, August 8, 2018.
55. LSE, "Tacit knowledge: Making it explicit," accessed February 6, 2019.
56. US Office of Personnel Management, "Federal Employee Viewpoint Survey 2018," 2018.
57. Humu website, accessed December 14, 2018.
58. Heather Kerrigan, "Facing competition and disruption, IT job classifications get a reboot," Government Technology, January 20, 2017.
59. Ibid.
60. Alexei Koseff, "125 state job classifications on the line in annual culling of unfilled positions," *Sacramento Bee*, February 2, 2017.
61. Nicole Ogrysko, "DHS is putting the finishing touches on a new personnel system for its cyber workforce," Federal News Network, March 8, 2018.
62. Carten Cordell, "DHS CIO Zangardi wants cyber, IT hiring to be more limber," FedScoop, October 5, 2018.
63. World Economic Forum, *The future of jobs 2018*, 2018.
64. Austen Hufford, "Companies ramp up worker-retraining efforts," *Wall Street Journal*, September 2, 2018.
65. Carten Cordell, "Retrained agency employees can be a key source of cybersecurity talent, NSC official says," FedScoop, March 8, 2018.
66. John O'Leary, China Widener, and Sushumna Agarwal, *Closing the talent gap*, Deloitte Insights, November 2, 2018.

67. World Economic Forum, "Towards a reskilling revolution: A future of jobs for all," January 22, 2018.
68. Tess Taylor, "AT&T invests over \$1B to retrain 100,000 employees," HR Dive, March 14, 2017.
69. Chris Davis, "How Austin startups are shaping the future of the military," Kxan, June 27, 2018.
70. Erin Winick, "NASA is using HoloLens AR headsets to build its new spacecraft faster," *MIT Technology Review*, October 9, 2018.
71. William D. Eggers, *Delivering on Digital: The Innovators and Technologies That Are Transforming Government* (New York: Deloitte University Press, 2016).
72. Tim O'Reilly, *What's the Future and Why It's Up to Us* (New York: Harper Business, 2017).

## Acknowledgments

Dozens of subject matter experts from throughout the Deloitte network contributed to this report. In particular, the authors would like to thank **David Dye, David Mader, David Parent, Elisa Marmol, Jeff Schwartz, Juan Garcia, Lucy Melvin, Nicole Overley, Steven Hatfield**, and **Sydney Heimbrock** of Deloitte Consulting LLP; **Maggie Wooll, Kelly Monahan**, and **Joe Mariani** of Deloitte Services LLP; **Peter Evans-Greenwood** of Deloitte Australia; and **Brett Walsh** of Deloitte UK. The authors would also like to thank **Jenn Gustetic**, digital Harvard Kennedy School research fellow, for her feedback and input.

## Contacts

### **David Parent**

Principal  
Human Capital  
Deloitte Consulting LLP  
+1 313 396 3004  
dparent@deloitte.com

### **William D. Eggers**

Executive director  
Deloitte Center for Government Insights  
+1 202 246 9684  
weggers@deloitte.com



# Deloitte. Insights

Sign up for Deloitte Insights updates at [www.deloitte.com/insights](http://www.deloitte.com/insights).



Follow @DeloitteInsight

## Deloitte Insights contributors

**Editorial:** Karen Edelman, Blythe Hurley, Rupesh Bhat, and Abrar Khan

**Creative:** Sonya Vasilieff and Molly Woodworth

**Promotion:** Alexandra Kawecki

**Cover artwork:** Sam Chivers

## About Deloitte Insights

Deloitte Insights publishes original articles, reports and periodicals that provide insights for businesses, the public sector and NGOs. Our goal is to draw upon research and experience from throughout our professional services organization, and that of coauthors in academia and business, to advance the conversation on a broad spectrum of topics of interest to executives and government leaders.

Deloitte Insights is an imprint of Deloitte Development LLC.

## About this publication

This publication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or its and their affiliates are, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your finances or your business. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser.

None of Deloitte Touche Tohmatsu Limited, its member firms, or its and their respective affiliates shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

## About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee ("DTTL"), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as "Deloitte Global") does not provide services to clients. In the United States, Deloitte refers to one or more of the US member firms of DTTL, their related entities that operate using the "Deloitte" name in the United States and their respective affiliates. Certain services may not be available to attest clients under the rules and regulations of public accounting. Please see [www.deloitte.com/about](http://www.deloitte.com/about) to learn more about our global network of member firms.