

## 10 The Future of Work

We all know someone who doesn't use email, doesn't carry a smartphone, and shuns social media. Some of us might use the term Luddite to describe someone "who fears technology (or new technology), as they seem pleased with how things currently are."<sup>1</sup> As Richard Conniff writes for *Smithsonian*, "The word 'Luddite' is simultaneously a declaration of ineptitude and a badge of honor."<sup>2</sup> The term originated in conjunction with a British industrial protest more than two hundred years ago. The protests started on March 11, 1811, in Nottingham, a textile manufacturing center, at a time of economic upheaval, food shortages, and high unemployment. Disgruntled textile workers smashed machinery that night and subsequent evenings, inspiring a series of similar attacks across northern England. The workers naïvely thought that the destruction of the machines would protect their jobs. The government retaliated quickly, first by posting soldiers to protect the factories, then by passing laws that classified the destruction of machines as a capital offense.<sup>3</sup>

Today, we live in a different world, not least in economic outlook. Yet increasingly, we face uncertainty about the impact of new technologies on the work we do and on the organizations where we work. In some cases, this uncertainty is accompanied by fears of jobs being lost to cheaper and more effective technologies. As companies struggle to adapt to the changes wrought by technology over the past two decades, this disruption shows no signs of slowing down. If anything, the magnitude of the changes coming down the pipeline for the next decade or two will likely prove to be even more significant and disruptive. In this chapter,

we consider the implications this ongoing disruption will have for individuals and organizations.

Some caveats are necessary, however, before we discuss how technology will disrupt work in the future. First, questions about *whether* these disruptions will happen are different from questions about *when* they will happen. Experts often disagree significantly about when certain digital disruptions will come to fruition, and many arguments waged by skeptics point out the difference between the current state of technology and the future promised state. Here, we focus more on the “if” than on the “when” disruption will happen to specific fields. We recognize, however, that a key aspect of strategic decisions is the need to understand when changes will happen and how quickly to respond to them. Nevertheless, comprehension of what types of changes are likely to happen is not without value. If managers have a good understanding of what disruptions are likely on the horizon, they will be better able to focus on signs or triggering events that indicate when particular changes will happen. Furthermore, understanding the types of disruptions that are coming can help people prepare for a changing future, regardless of when it finally arrives.

When technological disruption of human jobs happens, it will likely occur in two stages—first augmenting and enhancing the human worker, then replacing the human altogether. The implication of this perspective is that many jobs will become enhanced and improved by technology right before technology fully replaces them. Do not be fooled into thinking that disruption won’t happen simply because technology makes human workers more valuable in the short term. This augmentation step will make the professionals more valuable in the medium term because it will free up experts to shift from routine to value-added tasks. The question will be whether human employees can develop these new value-added roles before technology takes over those roles entirely. Then, the question shifts to whether human employees can take on other value-added roles and work. Certainly, aspects of some jobs will never be fully replaced. For example, although some parts of a radiologist’s job may be automated, we expect that most patients will prefer to receive a cancer diagnosis from a human not a computer. But

just because certain aspects of a job have not yet been replaced by technology does not mean they can't or won't be.

The transition between augmentation and replacement will likely happen quickly when it does. The augmentation stage will probably be more protracted as people begin to get comfortable with automation supervised by humans. Yet, once people are comfortable with supervised automation, they may then rapidly decide that human oversight is no longer worth the cost or the extra effort. A similar dynamic occurred in the newspaper industry during the dot-com boom, when revenues slowly rose until they fell off a cliff shortly after 2000. The internet initially enabled established news companies to extend their reach and lower their production costs, thereby increasing advertising revenues. It was a boon for publishers until other competitors—such as Craigslist—began to enter the market and take a considerable portion of these revenues with much lower overhead. Today, Craigslist still has only about fifty employees and brings in around \$700 million through classified ads, which used to be a key source of revenue for newspapers.

### **How Will Technology Disrupt Work?**

In chapter 4, we discuss the potential effects of autonomous vehicles on several industries, including automotive, real estate, and insurance. These vehicles may have still bigger implications for work. Yet, even a disruption as significant as autonomous vehicles pales in comparison to the potential disruption in work by artificial intelligence (AI). Some estimates suggest that as many as 80 million jobs in the United States will be affected by AI, including those of telemarketers, paralegals, cashiers, fast food cooks, and various positions in the financial services industries.<sup>4</sup> AI is particularly well suited to replace either routine work or skilled jobs that are based on making predictions from past data. For example, radiologists spend years studying to distinguish the difference between normal and abnormal X-rays, CT scans, and other types of medical imaging, and they typically earn between \$400,000 and \$500,000 annually. AI will be able to train on millions

of images in a matter of days, becoming far more accurate than its human counterparts. Even general managers might be at risk of being disrupted. The enterprise collaboration platform Slack is working on AI to monitor employee communications and automate many managerial tasks, reducing the need for face-to-face meetings.

Still other technologies are looming that will disrupt jobs even further. Although bitcoin is arguably the best-known application of blockchain, the potential impact of blockchain goes far beyond cryptocurrencies. As a technology that enables a secure public record, blockchain is poised to eliminate jobs that depend on mediating trust between parties. For example, it could be used to create self-executing contracts that would eliminate the need for escrow services. We can envision similar scenarios with additive manufacturing, virtual reality (VR), and augmented reality (AR).

Each of these coming technological trends alone—autonomous vehicles, AI, blockchain, additive manufacturing, and AR/VR—could have a significant effect on jobs over the next decade. Taken together, however, these multiple technological trends portend massive disruption in the future of work. Indeed, the path of digital disruption ahead suggests that we may be closer to the beginning than to the end of the type of disruptive influence that technology will have on work. In our experience, even though many people know this disruption is coming, employees and leaders are not generally considering how these technologies will affect their careers.

### **The Future of Work or the Work of the Future?**

The impact of these technologies on work are complex and not entirely predictable. For example, as MIT economist David Autor notes, there are nearly twice as many bank teller jobs today as there were at the introduction of ATMs; but those teller jobs are very different than they were before.<sup>5</sup> They have become less about counting money and keeping records and more about developing relationships with customers and providing financial advice. Similarly, we can see how radiologists may spend less time discerning abnormal from normal images and more time focused on analyzing the abnormal images. Or managers can spend less

time on task oversight and project management and more time on coaching, mentoring, and developing their teams. Autor notes that many pundits claim that “this time, disruption is different,” but adds that people have always thought that the disruption they lived through was different from the previous ones. We can look back to see how previous generations adapted to deal with the disruptions they faced, but we can’t look forward to see precisely how to adapt to the one we’re facing.

Echoing this sentiment, Deloitte CEO Cathy Engelbert notes that she prefers to talk about these trends as the “work of the future” rather than the more commonly used term “the future of work.” We concur with this shift in terminology, as we think the former terminology is far more optimistic (and, we believe, more accurate) than the latter. It implies a shift in how work will be performed in the future, rather than questioning whether work has a future and will still exist. Autor notes that, in many ways, full-time work doesn’t “need” to exist now. If people were content with the standard of living as it was one hundred years ago, they would need to work only about seventeen weeks per year. Instead, people work harder and adapt their skill sets to improve their quality of life. Nevertheless, while we agree with the sentiment echoed in the formulation of “the work of the future,” we have instead retained the more widely used formulation of “the future of work” because this terminology is the most commonly used to discuss these issues, in our experience.

In the past, people adapted their skill sets quite resiliently to the types of work that were available in the economy. In 1910, the most common job was farmer or farm worker, with farm-related employment making up nearly 40 percent of the US workforce. By 2000, only about 2 percent of US workers were employed in farming.<sup>6</sup> In contrast, around 20 percent of workers in 1910 were employed in professional, clerical, managerial, or service positions, but in 2000, about 70 percent of workers were employed in these categories. The skill sets of these workers have also shifted to adapt to these jobs. In 1940, less than 5 percent of workers had bachelor’s degrees, whereas just over 33 percent have a bachelor’s degree today.<sup>7</sup> This number was only 28 percent a decade ago, and the trend is driven by younger workers, 37 percent of whom

have a four-year degree. As work has changed, people have adapted their skill sets to accommodate the demands of that work.

Of course, this shift to new ways of working will not be smooth and painless. It is likely inevitable that wide swaths of people will be unable to adapt and be left behind. A report by the *Atlantic* describes much of the societal disruption that accompanies these types of shifts.<sup>8</sup> People who are left behind because they are unable to adapt for whatever reason often experience psychological effects, societal disruption, and substance abuse. Of course, these societal effects of economic disruption are not “different this time,” either. In Clay Shirky’s book *Cognitive Surplus*, he argues that the gin craze of the 1700s was largely in response to the increasing urbanization and economic disruption in London. People drank to cope with the economic disruption they were living through. A similar reason might also undergird the recent opioid epidemic in the United States, as people struggle with the disruptions they are experiencing. The difficulties caused by shifts in work can likely only be addressed through public policy and government intervention, which are worthy topics but not ones that we address in this book.

We do think that, as in previous periods of technological disruption, workers and the economy will adapt to new demands. And, as in these previous periods, that process will often be painful and disruptive as people seek to adapt. This time may seem different because one can look back on previous examples and jump to the resolution without living through the uncertainty and difficulty required to get to it.

### **What Work Are People Best At?**

Although we do not know precisely how people will adapt or what most jobs will look like, several pundits have pointed in the direction of identifying the areas in which people are better than computers. Some, like columnist and author Tom Friedman, suggest that providing caring is another way in which people are better than computers. He notes, “We used to work with our hands for many centuries; then we worked with our heads, and now we’re going to have to work with our hearts, because there’s one thing machines cannot, do not, and never

will have, and that's a heart. I think we're going from hands to heads to hearts."<sup>9</sup> Anthony Goldbloom, the founder and CEO of Kaggle, suggests that making decisions from incomplete data is one way in which people are better.<sup>10</sup> This insight is related to something Pablo Picasso said of computers: "But they are useless. They can only give you answers."

While identifying the types of work that only humans can do may be a valuable exercise at times, it may not be the most productive way to prepare for the future of work. In theory, there are types of problems that computers are fundamentally incapable of addressing—such as Alan Turing's halting problem, in which he showed in a 1936 proof that a computer cannot tell whether it will successfully finish running a set of code prior to running it. In practice, computers have proved far better at performing tasks that we once thought impossible, like facial recognition and language translation. If we primarily fit human work into the gaps left by what computers cannot do, people will increasingly be squeezed out as technology becomes more advanced.

For example, Cynthia Brezeal, of MIT Media Lab, is designing so-called sociable robots that can approximate empathetic connections. Research has shown that people are also more likely to open themselves up to robots than to humans, because fear of judgment is significantly diminished.<sup>11</sup> So robots may, in fact, be capable of performing caring jobs in ways that people cannot. Simulations can also enable AI to make novel insights from past data that humans cannot. For example, when the AI system AlphaGo competed solely against itself to learn the game Go, instead of using data from human players, it was able to create insights and strategies that people working at the game had not developed over the centuries of playing it.<sup>12</sup>

This logically raises the question, How are people truly better than computers? As humans create and find new opportunities in responses to technological evolution, technology may evolve to take over those new roles eventually as well. Yet, this development will create even more new opportunities for work that humans can figure out. If, as Picasso suggested, people are good at asking questions, then what questions should we be asking? In the near term, one certainly might be, What are the new opportunities that arise as technology takes over certain aspects of work?

## Seeking the Right New Opportunities

At first, autonomous vehicles will certainly give rise to different types of work. Doctors, nurses, lawyers, and other professionals may be more apt to conduct house calls, as they'll be able to use the travel time productively. People may be able to use their kitchens to start restaurants that rely on self-driving vans for food delivery. Certainly, still other new jobs are possible. Autor reminds us that not being able to envision them now doesn't mean they won't happen. The farmer who was disrupted in the 1900s probably did not envision the future job of data analyst predicting yield. We must not be ignorant to the fact that technology is likely to evolve to take over those new roles eventually as well—the sympathetic robot may one day replace the traveling human doctor. But we expect these changes to take place over time. Marco Iansiti and Karim R. Lakhani argue that it will likely be twenty years or more, for example, before blockchain becomes mainstream.<sup>13</sup> Even if technologies evolve more quickly, societies and institutions often change more slowly.

Before Picasso, Voltaire said, “Judge a person by their questions rather than their answers.” Ironically, asking questions about new opportunities for work in light of technological disruption may, in fact, be the one task for which humans are inherently superior than computers. In many ways, the ability to ask these questions combines the earlier examples, nominated by others, of tasks that humans are inherently superior to computers at accomplishing. This ability to question is part Friedman's empathy, since it involves identifying unmet human needs and desires in the new environment. Questions are also part Goldbloom's decision making based on incomplete data, since the questions identify needs in a new environment created by technological evolution. In other words, the very task that computers may not be able to do better than humans is identifying opportunities created in the wake of technological evolution and disruption. Humans may be uniquely well suited to identify these gaps, adapting their skill sets and spending their time meeting these needs. Asking the right questions is, at least for now, a uniquely human capability.



### Implications for Individuals: “Pivoting” on the Career Path

What are the implications of the work of the future for individuals? Perhaps most important, people need to prepare to be *lifelong learners*. As technology continues to change at an increasing rate, people will clearly need to learn new skills to remain relevant. This essentially requires an extension of the growth mindset throughout one’s career. Identifying the ways in which humans can uniquely provide value to the human-computer partnership is one thing, but being able to execute on those opportunities is another altogether. People will need to develop new skills as they adapt to the changes wrought by advances in technology and the human-machine partnership.

Although one possible implication for this prediction is that people will need to continually learn new skills to remain in their chosen professions, a more likely interpretation of this dynamic is that the concept of a lifelong career will become an artifact of the past. The pace of technological disruption is such that any jobs people do at the beginning of their careers will be obsolete long before those careers end. Even if the jobs still exist, technology will have reshaped the work required to perform them to such a degree that the required skill sets will be almost entirely different. Instead, people will “pivot” to new careers as their skill sets become undervalued in one job or sector, requiring them to repurpose them in new roles or industries. This pivot may take the form of traditional retraining, or it may involve applying existing skills in new contexts, which, presumably, will provide workers with a new set of skills that would then be resources for the next pivot. Just as organizations need absorptive capacity to adapt to innovations, as we address in chapter 2, so ongoing learning and a growth mindset will allow individuals to remain flexible enough to develop new skills.

This need to pivot will mean that individuals will need to *chart their own career path* amid these changes in work. A metaphor for these types of career paths for the future can be found in surfing. Surfers catch a wave for a set period, riding it to its natural completion, at which point

they must paddle out and look for the next wave to catch.<sup>14</sup> Some surfers choose to ride a wave as far as it will take them, while others choose to bail out once the wave passes its peak, so that they can be better positioned to catch the next wave. Likewise, some workers will choose to stay on particular paths longer, while others will attempt to pivot more quickly and jump from crest to crest. Regardless, organizations will likely need to help support these different career paths so that they can ensure access to the needed talent, in much the way Cigna charted and supported valued skill sets, as described in the previous chapter.

### Allied Talent

Chip Joyce, of Allied Talent, envisions that companies will interact with employees in very different ways in the future. Drawing on work from Reid Hoffman's book *The Start-Up of You*, Joyce thinks that companies will engage with employees not through indefinite employment but through shorter tours of duty, designed to deepen skills while engaging employees in creating their career paths. A typical tour lasts for two to four years and is focused on specific goals that support both the corporate mission and the employee's career. Managers are committed to developing employee skills needed to complete the tour and to then discuss additional tours of duty based on both the company's needs and the employee's career goals.

Workers can choose tours of duty based on their current career goals. They may take an engagement at a slightly lower salary for an opportunity to develop new skills or one with more modest hourly work requirements when starting a family. Conversely, they could sign up for higher-paying engagements that maximize their existing skill sets and require working eighty hours per week when their career aspirations are so aligned.

Joyce envisions digital dashboards that allow companies to find employees with the right skill sets and the right career aspirations to match a given requirement. The result is not a one-size-fits-all approach to employment, but a more nuanced perspective that allows employers to match the right job with the right candidate given the current expectations of both. Joyce envisions this arrangement will help companies attract more motivated workers and enable employees to find the right opportunities given their career stage.

## More than One Way to Pivot

Tom Davenport and Julia Kirby describe several different ways in which employees can pivot in their career path in response to digital disruption, except they refer to it in terms of five different “steps” employees can take.<sup>15</sup>

- **Step up.** When employees step up, they choose to develop the skills that will make them more valuable and marketable in a digitally disrupted business. Examples of this step include pursuing advanced degrees and continuing skill development to keep up with disruption. Companies could support this by developing a strategic talent development plan like Cigna’s, described in chapter 9.
- **Step aside.** Employees who step aside develop strengths in areas that are not easily disrupted by technology, such as emotional IQ or tacit knowledge that isn’t easily codified. An example here might be developing creative skills or tradecraft. This step may also help address the interest of companies in a combination of hard and soft skills.
- **Step in.** When someone chooses to step in, they begin to develop their skill set for the digitally disrupted industry. An example might be radiologists becoming adept at using and understanding computer diagnostics to monitor the diagnoses and learn when to intervene. Companies need to support employees’ efforts to learn new technologies in their specialty.
- **Step narrowly.** In this situation, employees specialize deeply in an area that computers are not likely to disrupt in the near future. Davenport and Kirby use an example of a man who specializes in matching up buyers and sellers of Dunkin’ Donuts franchises. It is a niche competency that may never attract enough attention for automation. Organizations may be well served to identify and support employees with these niche competencies, as they may become an important source of differentiation from competitors.
- **Step forward.** With stepping forward, workers attempt to get out ahead of digital disruption and develop the technology that will

represent the next wave of disruption. These people would now be working on the next great application for blockchain or developing components for autonomous vehicles. Companies in various industries are supporting these efforts by funding and engaging with an ecosystem of startup companies.

### **The “Glass Is Half Full” Perspective**

While it’s tempting to mourn the loss of the security of a lifetime career, this destruction and creation of career paths does have some upside. We all probably know people who feel stuck in a job they dislike, simply because they feel that they cannot afford to pursue new opportunities. These dead-end jobs will be much less likely in the future of work, because the changes in technology will make linear career paths obsolete, and particular careers may not last long enough to become a dead end. Companies have already begun to adapt to these changes in individual career paths. Allied Talent (see above) suggests that companies adopt short-term tours of duty, with people placed in roles for a few years, at which point they are shifted to new roles. The upside of this approach is the prospect of continual learning embedded in the organizational structures and processes. People not only learn new skills in their new roles, but they also bring fresh perspectives and skill sets to these established jobs.

While some older workers may groan at the thought of needing to learn new skills late in their careers, we think this response primarily stems from thinking they wouldn’t need to engage in continual learning. People coming into the workforce in the 1980s and 1990s thought they could engage in a set of skills for their entire careers, and they are understandably disappointed that they cannot do so. Learning these skills is also harder because they have not practiced lifelong learning. Workers of today will not share those assumptions, and they will be more accustomed and able to learn the skills as needed.

This need to continually pivot to the next possible career wave also has another implication—the need and/or the ability for employees to

chart their own course of career exploration with *passion*. By passion, we don't necessarily mean an overriding and long-term desire for a specific goal. Instead, we envision it as the opportunity to scan the environment and find the point at which personal interest and market opportunity are maximized. The American writer Frederick Buechner describes this as one's calling, where the world's deep need and the individual's deep joy meet. The World Economic Forum describes this intersection in terms of the Japanese concept of *ikigai*—the junction at which what you love, what you are good at, what you can be paid for, and what the world needs all come together. We think these successive career waves can provide greater opportunities for employees to achieve *ikigai*, pursuing new avenues as their passions change and the disrupted world creates new opportunities to do so.

Conniff argues that the Luddites were (contrary to popular opinion) not opposed to technology per se. Rather, “the original Luddites would answer that we are human.” In a world where people fear being replaced by machines, whether textile manufacturing machines, in the case of the Luddites, or robots and AI today, employees are looking for ways to find meaning from their contributions. It's not the technology that strips away meaning; it's the tacit assumption that the workers themselves are commodities that can be easily replaced. “Getting past the myth that people simply object to technology and seeing their protest more clearly is a reminder that it's possible to live well with technology—but only if we continually question the ways it shapes our lives.”<sup>16</sup>

Takeaways for Chapter 10

What We Know	What You Can Do about It
<ul style="list-style-type: none"><li>• Technology will continue to disrupt all types of work, even if we do not know precisely how and when that disruption will happen. Paradoxically, work about to be disrupted may become particularly valuable before disappearing.</li></ul>	<ul style="list-style-type: none"><li>• Pay attention to how work is being disrupted and what types of skills are being replaced by technology. Identify the jobs in your organization that are likely to be disrupted in the next year, one to three years, and three-plus years.</li></ul> <div>(continued)</div>

Takeaways for Chapter 10 (continued)

What We Know	What You Can Do about It
<ul style="list-style-type: none"><li>• For the work of the future, people will have to be lifelong learners, acquiring new skills to help them address the needs and opportunities created by digital disruption.</li></ul>	<ul style="list-style-type: none"><li>• For each job category that has the potential to be disrupted, create an action plan for how to handle the affected employees.</li><li>• As appropriate, link these action plans to training and learning opportunities to ensure that employees have a chance to position themselves for the work of the future.</li></ul>