

# Automation & Artificial Intelligence: TIDE at the Tipping Point

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**The discussion of the dramatic impact of automation and artificial intelligence (AI) in the workplace began some time ago. At first, the conversation was largely limited to economists, futurists, and computer engineers. Recently, however, this critical conversation has exploded in the public consciousness, drawing in employers, employees, newsmakers, policymakers, social scientists, and the public at large.**



Indeed, in recent months, we appear to have reached a tipping point in squarely facing both the challenges and opportunities presented by the technology-induced displacement of employees (TIDE), with TIDE-related stories appearing in the news almost daily. Consider:

- The newest “employee” at Good Times Burgers & Frozen Custard in Denver, Colorado is its drive-through window attendant: an artificially intelligent voice assistant who is able to interact with customers, mimic complex human interactions, and relieve human employees of the stress of managing multiple drive-through lines—all without a salary, benefits, time off, or the need for bathroom breaks.
- In Florida, the agricultural industry has raised over \$9 million to develop “Harv”—an automated, electronic picking machine that is able to pluck fruit from the vine, doing the work of 30 people and harvesting eight acres of fruit per day. Harv was not created for the purpose of replacing human workers, but rather to respond to demographic and legal changes that have resulted in an ever-shrinking supply of human agricultural workers.
- In an interview earlier this year with Scott Pelley of CBS’s *60 Minutes*, Kai-Fu Lee, a Chinese venture capitalist and an undisputed “guru” of artificial intelligence,<sup>1</sup> calmly predicted that within the next 15 years, 40% of the world’s jobs will be displaced by AI.<sup>2</sup>
- A recent analysis in *The Economist* concluded that countries with older and more rapidly aging populations are likely to have the largest number of robots per industrial worker.<sup>3</sup> One reason for this is a matter of simple economic supply and demand: robots and AI are replacing a shrinking pool of workers in aging societies. Another reason suggests the dramatic consequences AI will bring to the healthcare industry, as robots and AI become more important in caring for and maintaining quality of life for older people.
- A report by the Partnership for Public Service and IBM’s Center for the Business of Government estimates that over the next 10 years, over 130,000 jobs in the federal government, long considered the paradigm of job security for workers, would be affected by AI. Of these jobs, only 3% will be “blue collar,” and most will impact agencies with responsibility for financial oversight, such as the Department of the Treasury, the Internal Revenue Service, the Securities and Exchange Commission, and the Pension Benefit Guaranty Corporation.<sup>4</sup> The IRS is expected to bear the brunt of these losses, with an estimated 20,000 displaced jobs being IRS examiners and agents. Other positions heavily impacted include accountants, budget analysts, auditors, and HR personnel (each expecting displacement of 10,000 or more federal employees).

1 Mr. Lee, who is CEO of Sinovation Ventures and president of Sinovation Venture’s Artificial Intelligence Institute, and has previously held leadership roles at Microsoft Research China and Google Greater China, is widely considered to be one of the world’s leading authorities on the development of AI.

2 Scott Pelley, *Facial and emotional recognition; how one man is advancing artificial intelligence*, *60 Minutes*, Jan. 13, 2019, available at <https://www.cbsnews.com/news/60-minutes-ai-facial-and-emotional-recognition-how-one-man-is-advancing-artificial-intelligence/>, <https://www.cbsnews.com/news/60-minutes-ai-facial-and-emotional-recognition-how-one-man-is-advancing-artificial-intelligence/>. This is broadly consistent with findings by the McKinsey Global Institute, a highly-respected nonpartisan think tank, which estimated that AI and automation technologies would displace 73 million American workers by 2030, see McKinsey Global Institute, *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation* 103 (2017), available at: <https://www.mckinsey.com/~media/mckinsey/featured%20insights/future%20of%20organizations/what%20the%20future%20of%20work%20will%20mean%20for%20jobs%20skills%20and%20wages/mgi-jobs-lost-jobs-gained-report-december-6-2017.ashx>, and with an analysis by Dell Technologies and the Institute for the Future finding that as many as 85% of all jobs that would exist in 2030 have not yet been created. Dell Technologies, *Realizing 2030: A Divided Vision of the Future 3* (2018), available at: <https://www.delltechnologies.com/content/dam/delltechnologies/assets/perspectives/2030/pdf/Realizing-2030-A-Divided-Vision-of-the-Future-Research.pdf>.

3 *Robots that look after grandma*, *The Economist*, Feb. 16, 2019.

4 See Partnership for Public Service & IBM Center for the Business of Government, *More than Meets AI: Assessing the Impact of Artificial Intelligence on the Work of Government* (February 2019), available at: <https://ourpublicservice.org/wp-content/uploads/2019/02/More-Than-Meets-AI.pdf>.



There is no sign that this rising tide of TIDE stories will abate; rather, every indication is that it will continue to accelerate. According to the most recent data from the Robotic Industries Association, in 2018 35,880 robots were shipped to the United States, Canada, and Mexico, a 7% increase over 2017. Almost half of these shipments were to non-automotive companies—an increase of 41% from the prior year. At the same time, robot purchases in the consumer goods sector rose 50% in 2018. Nationally, in the United States, robot shipments increased by more than 15%.<sup>5</sup> The only sector that saw major falls in robotics purchases was the automotive industry, which saw a 30% decrease in robot shipments in 2018—hardly a surprising development, given that the manufacturing sector in general, and the automotive industry in particular, was already more automated than most other sectors before the most recent developments in AI and robotics.

The accelerating adoption of automation in non-manufacturing sectors makes clear that automation and AI have already moved beyond transforming the manufacturing sector, and have begun to reshape every sector of the economy. The TIDE's disruptions are being felt at all levels of the global economy, creating great economic uncertainty for many employers and workers. Indeed, the only certainty is that the speed and pace of these disruptions will continue to increase.<sup>6</sup>

## The Staggering Depth of TIDE

To quantify the scope of the impact of the rising TIDE, the Brookings Metropolitan Policy Program recently issued a report entitled, *Automation and Artificial Intelligence: How Machines Are Affecting People and Places*. Consistent with prior findings by the McKinsey Global Institute,<sup>7</sup> Brookings found that jobs that involve predictable, physical, and cognitive tasks are the most vulnerable to displacement by automation; perhaps not surprisingly, these are most often positions that already pay the lowest wages. In contrast, the jobs Brookings found to be least threatened by automation are those requiring a bachelors' degree<sup>8</sup> and a series of non-routine and "softer" skills. As Brookings summarizes:

Among the most vulnerable jobs are those in office administration, production, transportation, and food preparation. Such jobs are deemed "high risk," with over 70 percent of their tasks potentially automatable, even though they represent only one-quarter of all jobs. The remaining, more secure jobs include a broader array of occupations ranging from complex, "creative" professional and technical roles with high educational requirements, to low-paying personal care and domestic service work characterized by non-routine activities or the need for interpersonal social and emotional intelligence.<sup>9</sup>

In the near term, it is clear that the AI revolution will disrupt and potentially eliminate a substantial number of jobs. A 2018 University of Maryland study prepared for the National Bureau for Economic Research found that, broadly speaking, robots eliminate more jobs than they create. It concluded that each robot takes the job of 5.6 workers. By that analysis, the approximately 250,000 robots that have been added to the economy since 1999 have resulted in the elimination of 1.4 million jobs.

At the same time, it is important to note that in many instances, the displacement of some jobs by automation will result in the creation of new and different jobs. Those numbers are harder to quantify. Some studies project that 85% of all jobs that will exist in 2040 have not yet been created, which, while striking, seems a reasonable conclusion. After all, could you imagine explaining to someone in 1985 what a social media manager or web designer does for a living?

5 Chloe Taylor, *A record number of robots were put to work across North America in 2018*, report says, CNBC, Feb. 28, 2019, available at <https://www.cnn.com/2019/02/28/record-number-of-robots-were-put-to-work-in-north-america-in-2018.html>.

6 At Davos, global labor leaders and executives agreed that policies and investments into skills training is the best way to prevent people from being left behind in the TIDE. See Richard Feloni, *Labor leaders and executives agree that the traditional 4-year college degree isn't enough to survive the 'Fourth Industrial Revolution' that's happening right now*, Business Insider, Jan. 24, 2019 at 2 ("Some of this fear is based on how much is unknown: There are plenty of estimates tossed around, but the bottom line is no one knows for certain which jobs will be obsolete in 10 years, and which new ones will emerge.").

7 See Mark Muro, Robert Maxim, & Jacob Whiton, *Automation and Artificial Intelligence: How Machines Are Affecting People and Places*, Brookings Metropolitan Policy Program (January 2019), available at: [https://www.brookings.edu/wp-content/uploads/2019/01/2019\\_01\\_BrookingsMetro\\_Automation-AI\\_Report\\_Muro-Maxim-Whiton-FINAL-version.pdf](https://www.brookings.edu/wp-content/uploads/2019/01/2019_01_BrookingsMetro_Automation-AI_Report_Muro-Maxim-Whiton-FINAL-version.pdf).

8 Eduardo Porter, *Tech Is Splitting the U.S. Work Force in Two*, N.Y. Times, Feb. 4, 2019.

9 *Automation and Artificial Intelligence: How Machines Are Affecting People and Places supra*, note 7, at 5



## TIDE Will Impact All, But Not All Equally

The disruption caused by TIDE will affect everyone, regardless of class, race, geography, age, or industry. However, while TIDE may affect everyone in some way, its impact will be felt by some individuals and in certain sectors more heavily than others. Analyzing the who and where of the TIDE's impact provides insight into the broad challenges it presents.

Given these facts, the impact of AI and TIDE on workers has most recently been keenly felt in the restaurant and hospitality industries—and organized labor has taken note. In 2018, 50,000 workers in Las Vegas casinos, including bartenders, cocktail servers, porters, bellmen, and others were prepared to strike over automation. The strike was averted only when the casino agreed to major concessions with the union concerning notice, training, and severance for displaced workers.<sup>10</sup> Only a few months later, 8,000 hotel workers nationwide struck over the impacts of TIDE, where robots were replacing human workers in room service, registration, and concierge positions. The settlement of the strike required the employer to include significant protections for displaced workers, including reassignment rights for workers whose jobs were eliminated by AI.<sup>11</sup>

It is evident that TIDE will disrupt virtually every sector of the economy, and have impacts that will be felt by every participant in the global labor market. But can we predict more accurately where and by whom the impact of TIDE will be felt most deeply?

### *The Impacts of TIDE Will Likely Vary by Race, Class, and Gender*

Given the nature of the skills that separate the jobs more vulnerable to automation from those less so, many experts believe that automation risks exacerbating income inequality unless stakeholders can work together with the specific objective of addressing the employment disruptions of automation.<sup>12</sup> In addition to TIDE's likely disparate impacts based on socio-economic class, the unequal effects of TIDE also implicate issues of race and nationality. Black and Hispanic workers, for example, are over-represented in the occupations most susceptible to automation, raising concern that the use of AI may exacerbate racial inequality.<sup>13</sup>

On the other hand, some expect that the rise of automation and AI will actually narrow at least one facet of economic inequality—the gender-based wage gap. Insofar as jobs that are expected to be most immune to TIDE are those requiring the “human touch” and emotional intelligence, skills such as self-awareness, self-regulation, empathy, social skills, and creative problem solving will be valued at a premium.<sup>14</sup> Given that women historically have been overrepresented in jobs requiring such skills, some expect that the rise of AI may actually benefit women at the expense of men. In other words, “it is quite possible the age of AI will belong to women.”<sup>15</sup>

10 See Marlina Baldacci & Keith Allen, CNN, “Las Vegas casino workers may strike for first time in decades,” (May 23, 2018), available at: <https://www.cnn.com/2018/05/23/us/vegas-casino-workers-strike/index.htm>.

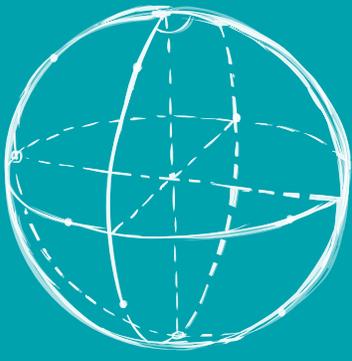
11 See Sidney Fussell, *The Quiet Ways Automation is Remaking Service Work*, TheAtlantic (Jan. 11, 2019), available at: <https://www.theatlantic.com/technology/archive/2019/01/automation-hotel-strike-ai-jobs/579433/>.

12 *Automation and Artificial Intelligence: How Machines Are Affecting People and Places supra*, note 7, at 4.

13 *Id.* at 9.

14 See Lee Rainie & Janna Anderson, *The Future of Work Jobs and Job Training* 13 at 38 (2017).

15 Sarah O'Connor, *The robot-proof skills that give women an edge in the age of AI*, Financial Times, Feb. 11, 2019.



# Impact by Industry: Not Only Blue Collar

## *The Geography of TIDE*

In terms of the geographic areas most prone to automation, the potential impact of TIDE varies (albeit perhaps not dramatically) across regions and states. According to the Brookings Institute, the state estimated to have the highest automation potential, Indiana, at 48.7%, is only marginally more prone to automation than the lowest-ranking state, New York, at 42.4%.<sup>16</sup> That said, it is possible to identify state and regional trends, which may assist in preparing for and responding to these changes.

In the United States, the highest-risk states are largely those in the heartland and Rust Belt, where large percentages of the workforce are employed in labor-intensive manufacturing and transportation industries. In Indiana, Kentucky, and South Dakota, the average automation potential for jobs exceeds 48%. Conversely, Maryland, Massachusetts, and New York have the lowest automation potential, with an average projected automation rate of less than 43.5%.

Moreover, it is possible to predict regionally and even within states where automation and the impact of TIDE may be greatest. A more granular look at the data reveals that the Toledo, Ohio; Greensboro-High Point, North Carolina; and Lakeland-Winter Haven, Florida top the list of U.S. Metropolitan Areas where jobs are most at risk from automation, while Washington DC, New York/New Jersey, and San Jose/Sunnyvale in California are the areas facing the least risk.

## *Impact by Industry: Not Only Blue Collar*

In terms of specific industries, jobs such as cooks, servers and truck-drivers—jobs that consist largely of predictable physical tasks—are exactly the type to face the most disruption. Increasingly, chain restaurants have shifted to self-ordering machines, and others are experimenting with robot-assisted kitchens to actually prepare and serve food.<sup>17</sup> Autonomous vehicles can replace short-haul delivery drivers, and major retailers are preparing to open cashier-less stores in the near future (does your grocery store or pharmacy *not* have self-checkout lanes?).

But the impact on the blue-collar workforce does not tell the whole story. While it is tempting to assume that only traditionally low-wage or blue collar occupations will be impacted by TIDE, developments in AI increasingly suggest that this will not be the case. White-collar jobs will also face disruption.

Across the globe, the banking industry is grappling with the AI revolution, and what it means for their workers and their customers. In Spain's second-largest bank, BBVA, only 10% of its last 10 billion interactions with human customers were human-to-human; the remaining 90% were human-to-machine. In the accounting industry, the Big Four are focusing on increasing the technology skills of accounting professionals, including courses on robotics process automation, advanced data analytics, and machine learning. Professional associations in the industry, like the American Institute of CPAs and the Institute of Management Accountants, are likewise offering training and certification to help accountants navigate the increased role of AI and technology in the modern accounting practice.<sup>18</sup>

In the healthcare industry, the role of artificial intelligence continues to be hotly debated. Will its primary effect be to replace human workers? Or will AI instead complement them, making their skills more effective and their use of time more efficient? The

<sup>16</sup> *Automation and Artificial Intelligence: How Machines Are Affecting People and Places* supra, note 7, at 90.

<sup>17</sup> Matt O'Brien, *Chefs and Drivers Beware: AI Is Coming For Your Jobs*, U.S. News, Jan. 24, 2019.

<sup>18</sup> Amanda Iacone, *Bots, Data and AI—All Part of Retraining the Big Four's Workplace*, Bloomberg Government, Feb. 14, 2019.

former camp notes that at least one study found that artificial intelligence systems that analyzed the medical records of 600,000 hospital patients were, in some cases, able to diagnose their conditions as accurately as doctors did.<sup>19</sup> Already today, “smart” hospital beds automatically monitor health statistics, and transmit information to nursing stations. Autonomous robotic carts are capable of delivering meals, surgical equipment, and supplies to the hospital floor.

At the same time, many point to the healthcare industry as the paradigm of AI enhancing workers skills, freeing up their time for more complex duties or for tasks that require personal, human-to-human interactions. Robots assist surgeons in the operating room—not eliminating the need for surgeons, but instead allowing them to perform delicate surgery more safely and effectively. Automated pill boxes can detect whether they have been opened, and whether pills have been taken—alerting patients, and ultimately, their caregivers, when patients appear to have missed their medication. In each instance, AI does not simply replace a human worker, but rather requires a different set of skills. As the CEO of one company that uses technology-driven innovation to drive health care solutions observed:

There is no doubt that jobs will be significantly impacted: GPs will become consultants, nurses will become data analysts and surgeons will become pilots. Yet, healthcare is not just a matter of data. The human factor is, and will always remain, capital. Clinical data shows, for example, that patient experience is strongly correlated to clinical outcomes and can lead to complication improvements by up to 50%. Medical decisions are not just rational. I believe automation is a huge opportunity that will definitely disrupt healthcare as we know it. *But, in my opinion, we will always need a medical staff to pilot the treatments and interface with the patients.*<sup>20</sup>

We can expect to see regions where all of these phenomena converge. But the *New York Times* recently examined a divergent trend in a profile of Phoenix, Arizona. High-tech employers are expanding facilities, and technology-based start-up companies are flocking to the region, creating numerous and well-paying jobs across a range of companies. At the same time, the largest increase in jobs in the area are coming not in these industries, but rather in more routine (and lower-paying) jobs such as retail, hospitality, and health care. As the *Times* observed:

These observations make plain the increasing concern of many economists that AI and TIDE will exacerbate a fracturing of the workforce and consequent economic inequality that many observers already believe to be a worrying trend in the global economy and societies. If AI widens an existing gap between a “professional” class of workers doing high-skill and well-paying work, and a “service” class of workers supporting these efforts in low-skill, low-wage jobs, the social consequences of TIDE could be as disruptive as its economic effects.

<sup>19</sup> Cade Metz, *A.I. Shows Promise Assisting Physicians*, N.Y. Times, Feb. 11, 2019.

<sup>20</sup> Charlotte Edwards, *Will automation take over healthcare jobs? Industry experts share their opinion*, May 11, 2018, <https://www.medicaldevice-network.com/features/will-automation-take-healthcare-jobs-industry-experts-share-opinion/> (emphasis added).

<sup>21</sup> *Tech Is Splitting the U.S. Work Force in Two*, *supra* note 8.

Automation is splitting the American labor force into two worlds. There is a small island of highly educated professionals making good wages at corporations like Intel or Boeing, which reap hundreds of thousands of dollars in profit per employee. That island sits in the middle of a sea of less educated workers who are stuck at businesses like hotels, restaurants and nursing homes that generate much smaller profits per employee and stay viable primarily by keeping wages low.<sup>21</sup>



## The Positive Impact of TIDE

It is critical to recognize that while the prospect of disruption caused by automation and AI may be unsettling, it does not need to be wholly negative. Many economists find that automation will likely have an overall positive effect on the labor market, leading to economic growth, reduced prices, and increased demand.<sup>22</sup> In the long run, automation may also lead to the replacement of labor-intensive, low-paying jobs with *better jobs*—assuming steps are taken to ensure that potential employees are prepared for these jobs. Employers appear to be getting this message, but progress has been gradual. Employers are not yet confronting these issues with the urgency they demand, as we enter an era where the need to continue a focus on retraining and “upskilling” could not be greater.

In Boston, Spycy—a restaurant where robots cook and plate custom meals, and perform clean up—has automated the tedious, tiring, and sometimes dangerous tasks that abound in the kitchen, but it still requires people-facing employees to serve customers.<sup>23</sup> Thus, while Spycy has fewer employees than does a typical restaurant, it has created higher-quality jobs for those it does employ. That combination—eliminating an industry’s traditional jobs while adding new jobs that require new skills—could represent a microcosm of the challenges that workers and employers will face with the TIDE in the coming years.

Some companies have managed to adopt automation without reducing—and sometimes even while expanding—the size of their workforce. Take Axon, which sells cartridges for Tasers. Axon started transitioning to using robots to assemble the cartridges ten years ago. This factory automation was wildly successful, and the company has nearly doubled in value—and at the same time nearly *tripled* its workforce. Axon is an example both of the benefits to employees of automation, and also of the premium in taking strategic, early action to prepare for TIDE and implement automation and AI appropriately. One of the creators of Harv, the agricultural fruit-picking robot, noted that his family farm business would train agricultural workers to become technicians: “We need people to clean, sanitize, and repair the machines.”<sup>24</sup>

## Response from Government

To date, the response of government at all levels has been slower than optimal. It is promising, however, that where some governmental actors may be making less progress, others are stepping up to help fill the gap.

<sup>22</sup> *Chefs and Drivers Beware: AI Is Coming for Your Jobs*, supra note 17.

<sup>23</sup> Kristin Stoller, *Rise of the Robochef: How 4 Young Entrepreneurs Built a \$25M Futuristic Restaurant Startup*, Forbes, Jan. 14, 2019.

<sup>24</sup> *How do big farmers hope to pick the next crop? Carefully -- but with robots*, Feb. 17, 2019, available at: <https://www.nola.com/homegarden/2019/02/how-do-big-farmers-hope-to-pick-the-next-crop-carefully-but-with-robots.html>.



# Automation & Artificial Intelligence

## *Activity at the Federal Level*

While, as discussed below, state and local governments have flagged TIDE as an area of concern, many stakeholders agree that the scale of the coming disruption requires national action, and that the federal government is best-equipped to lead that action. Unfortunately, given the current political climate, progress to date has been slow. To its credit, the Trump administration last year issued an executive order establishing a council and advisory board to improve job training and reskilling for students and workers, fill tech talent gaps, and address the impact of automation on the workforce. This executive order established the National Council for the American Worker to coordinate these goals. As of February 13, 2019, 25 presidents and CEOs of major corporations have joined the advisory board for this council.<sup>25</sup>

The White House issued a second AI-related executive order on February 11, 2019, which tasks federal agencies with prioritizing AI research and expanding the technology's use nationwide.<sup>26</sup> This order makes clear that “[d]eveloping America’s ability to leverage AI is critical to increasing prosperity, enhancing our national and economic security, and protecting our values,” thus—in principle, at least—establishing AI as a national and economic security issue at the national scale.<sup>27</sup> The latest executive order echoes the admonition of many of the other experts that it is essential for the United States to “train current and future generations of American workers with the skills to develop and apply AI technologies to prepare them for today’s economy and jobs of the future.”<sup>28</sup> But while the executive order sets forth the government’s priorities and principles relating to AI, it has come under criticism for not actually allocating any funds to address the issue.<sup>29</sup>

Work continues at the Department of Labor (DOL) to revamp current regulations and standards for registered apprenticeship programs. In May 2018, the administration’s Task Force on Apprenticeship Expansion released a report recommending an overhaul of current regulations, including expanding traditional work-and-learn apprenticeship models to foster increased employer engagement; streamlining and simplifying apprenticeship funding from federal and state entities; increasing awareness of apprenticeships via DOL outreach and branding; and focusing on mastery and competency, not just “seat time” or training hours. DOL is in the process of developing proposed regulations based on the Task Force’s recommendations, but no firm schedule for the publication of these regulations has been set.

Finally, the National Institute of Occupational Safety and Health (NIOSH) has begun an initiative—the Safe Steady Skills program—to broadly engage students in high school and pre-high school to ensure that they are trained in core competencies that can be used in any job environment. Given that restaurants are a major (and very often the first) employer of young people, NIOSH has partnered with state restaurant associations through small business assistance programs to make restaurant employers aware of occupational safety and health issues. NIOSH is especially interested in how improved technology can result in safer workforces for all employees.

<sup>25</sup> Emily Birnbaum, Apple, IBM, Walmart join White House advisory board, *The Hill*, Feb. 13, 2019.

<sup>26</sup> Tyrone Richardson, White House AI Order Could Jump-Start Job Talks in Congress *Bloomberg Law*, Feb. 15, 2019.

<sup>27</sup> Erin Mulvaney, Artificial Intelligence Goes to Washington, *Law.com*, Feb. 14, 2019.

<sup>28</sup> Exec. Order No. 13859, 84 Fed. Reg. 3967 (2019).

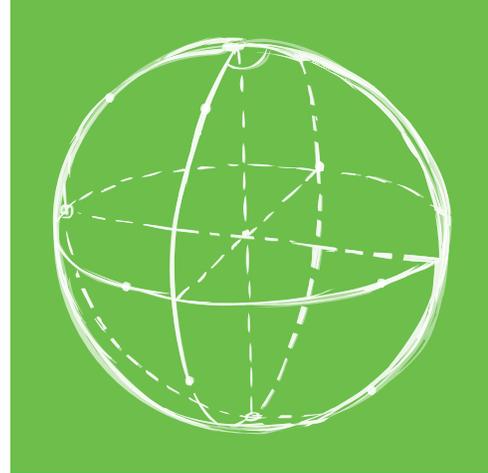
<sup>29</sup> Artificial Intelligence Goes to Washington, *supra* note 27.

On the legislative side, although a number of AI-related bills were introduced during the last legislative session, Congress has yet to devise a strategy to move many viable ideas into law. Nevertheless, because the TIDE represents a nationwide and distinctly nonpartisan challenge, there is some hope that even in the current fractured political climate, the importance of meeting the TIDE head-on will bring legislators from both sides of the aisle together to forge a path toward solution. A promising start may be found in the recently introduced H.R. 827, the “Artificial Intelligence Job Opportunities and Background Summary Act of 2019” (the “AI JOBS Act”). Introduced in the 116th Congress with strong bipartisan support, the AI JOBS Act would direct the Secretary of Labor, in conjunction with stakeholders, educational institutions and other agencies, to report to Congress on:

- The specific data necessary to properly analyze the impact and growth of artificial intelligence (and the availability of such data).
- Those industries that are projected to have the most growth in artificial intelligence use, and whether the technology will result in the enhancement of workers’ capabilities or their replacement.
- The expertise and education (including computer science literacy) needed to develop, operate, or work alongside artificial intelligence over the next two decade.
- Which demographics (including ethnic, gender, economic, age, and regional) may experience expanded career opportunities—and conversely, which may be vulnerable to career displacement—due to AI.
- Recommendations to alleviate workforce displacement, prepare future workforce members for the artificial-intelligence economy.

While the AI JOBS Act analyzes the impact of TIDE broadly, more targeted efforts to begin shaping the workforce to adapt to TIDE are also actively being explored. Senator Mark Warner (D-VA) has proposed legislation that would create Lifelong Learning and Training Accounts, which would establish tax-preferred savings accounts, with a government match, to assist workers in retraining or upskilling throughout their careers. Senator Maria Cantwell (D-WA) has likewise sponsored legislation that would create portable asset Lifelong Learning Accounts (LiLAs), similar to 401(k) plans, which workers could use to set aside money for continuing education (while encouraging employers to make matching contributions). And Senator Dick Durbin (D-IL) is expected to reintroduce legislation expanding worker training services and providing grants for workers whose jobs are displaced by automation. Most recently, John Hickenlooper, the former governor of Colorado, announced that he would seek the Democratic nomination for president in 2020—and that AI and the future of the workplace would be a cornerstone of his campaign.

<sup>30</sup> McKinsey Global Institute, *Kai-Fu Lee’s perspectives on two global leaders in artificial intelligence: China and the United States*, available at: <https://www.mckinsey.com/featured-insights/artificial-intelligence/kai-fu-lees-perspectives-on-two-global-leaders-in-artificial-intelligence-china-and-the-united-states>.





A... big factor is the government support. At a local level, cities give subsidies to AI companies that move there, they have venture capitalists that invest in AI, and they have smart people move to these cities, including overseas-returning experts. Another aspect is that the Chinese government has always been techno-utilitarian, which means when it comes to new technology, it thinks, "Let's get the technology out there." And of course, there will be issues that come up, and let's course correct as they come up. As opposed to the Western countries, which tend to want to debate and resolve issues that may relate to privacy, security, bias, and explainable AI. When there are jobs being affected, the truckers' union will appeal to the president, asking to slow down the adoption. ***Whereas, in China, it's full speed ahead with AI.***<sup>30</sup>



The need for bipartisan action is heightened further because the rising TIDE is also a matter of national security. From that standpoint, the United States is falling dangerously behind. Commenting on China's progress and advantages in developing and adopting artificial intelligence, Dr. Kai-Fu Lee observed: "Given these stakes—indeed, the economic security of our nation—the time for federal policymakers to act was yesterday."

## States Move in to Fill the TIDE Gap

In the absence of decisive federal action, governors and statehouses have been at the forefront in taking proactive steps to prepare for TIDE. In the state of Washington, which is home to nearly 200 ventures dealing with AI, the state House of Representatives has created a Technology & Economic Development Committee. The committee aims to investigate best ways to address changes to the economy given the rise of the AI industry. Among other things, the committee is looking into teaching computer science in primary schools, an early form of upskilling for the next generation of workers.<sup>31</sup>

Washington's legislature has also formed a new Future of Work Task Force within the state's Workforce Training and Education Coordinating Board. The Task Force, which comprises legislators, business leaders, academics, and labor leaders, issued its *Plan of Action for 2019* late last year.<sup>32</sup> The plan addresses head-on the issue of government's role in addressing the disruption caused by automation. The Task Force's report makes a number of recommendations, including strengthening partnerships between businesses, workers, and the public sector to advance workplace development and spur new technology. It likewise recognizes that rural economies in particular face unique challenges relating to reskilling and upskilling workers. The Task Force also highlights public infrastructure investment—such as broadband access—as necessary for businesses to remain competitive.

In California, signs of movement toward addressing the TIDE are likewise appearing on the horizon. The state's well-respected Little Hoover Commission recently issued a report called *Artificial Intelligence: A Roadmap for California*, which calls for immediate action by the governor and legislature to adopt an agenda that revolves around public engagement, building human infrastructure, addressing pressing social needs, and protecting core values such as autonomy, responsibility, privacy, transparency, and accountability. The Commission report makes a number of recommendations, including the appointment of an AI special advisor to oversee the deployment of AI technology and applications in state government; creation of an AI

<sup>31</sup> John Stang, *Could Washington state be the next AI frontier?* Crosscut, Dec. 21, 2018.

<sup>32</sup> Available at <http://www.wtb.wa.gov/Documents/FutureofWork2018Report.pdf>.

commission to develop AI-related demonstration projects for critical state services; and promotion of apprenticeships and other training opportunities for employees whose jobs and/or classifications may be displaced or transformed by AI technologies and applications.<sup>33</sup>

Taking these recommendations to heart, newly-elected California Governor Newsom announced in his State of the State address on February 12, 2019, that he had appointed a new Commission on California's Workforce & Future of Work, which includes leaders from the labor and business sectors, to develop innovative technologies and ensure opportunities for workers in the face of the changes brought on by AI and automation.<sup>34</sup>

## The Importance of Public-Private Partnership

Direct government action and policymaking will be essential to an effective TIDE response; the disruption caused by automation and AI is likely too large for the any one company or even a consortium of companies to tackle alone. But the public sector also has a significant role to play through direct reskilling programs and public-private partnerships with employers. As discussed earlier, Washington State's Future of Work Task Force highlights public-private partnerships as a key tool in helping employers and employees prepare for TIDE. Brookings likewise recommends that government at all levels work with the private sector to embrace growth and technology, so that productivity and living standards remain high.

Cargill Incorporated, the largest privately held corporation in the United States by revenue, offers a TIDE public-private partnership success story that others might model. In 2015, Cargill determined to upgrade a meat-operating plant in Columbus, Nebraska, which would lead to the loss of 160 of the plant's 240 employees. However, rather than just eliminating these positions permanently, Cargill found it in the best interests of both the community and the company itself to reskill these displaced employees—no small feat, given that many of the employees lacked English language and literacy skills. Cargill partnered with Columbus' Central Community College and eventually developed a multi-stakeholder coalition with local and state labor officials, the Nebraska Department of Education, and other private and public institutions to develop the reskilling plan.

Ultimately, every single employee affected by the plant shutdown was given the option to enroll in 36 weeks of classes. Thus, this program benefited both employees who stayed on—who gained skills, making them more productive employees—and even those whose employment was terminated. When the plant reopened after the upgrades, 90% of those who were laid off returned to the new plant *in higher-skilled positions*. On the whole, the number of employees at the plant more than doubled, and almost all new positions paid better.<sup>35</sup> While it is clear that there will be no "one-size-fits-all" approach to government partnering with businesses to meet the TIDE, Cargill's engagement with government, workers, and the community, offers a model and a means for thinking outside the zero-sum box that too often limits meaningful discussions of the disruptive effects of automation.

<sup>33</sup> Little Hoover, *Artificial Intelligence: A Roadmap for California* (Report #245, Nov. 2018).

<sup>34</sup> Yahoo Finance, *California Governor Talks Blockchain and Data Privacy in State of the State Speech*, Feb. 13, 2018.

<sup>35</sup> World Economic Forum, Centre for New Economy and Society Insight Report, *Towards a Reskilling Revolution: Industry-Led Action for the Future of Work* at 22-23.

## A New Approach: The Emma Coalition

We conclude our examination of TIDE at the tipping point by introducing the Emma Coalition, a non-partisan group of employers and industry associations first announced by Littler Mendelson P.C., the National Restaurant Association, and Prime Policy Group.

What is the Emma Coalition? It is an employer-focused, non-partisan group dedicated to educating the employer community and policymakers about the issues surrounding the TIDE, and maximizing the economic and social benefits of the TIDE for America's companies and workers while minimizing its disruptive costs for workers and companies. The Coalition is directly engaging policymakers, educating them on the importance of confronting TIDE and attempting to shape policy through thought leadership and advocacy. In addition, the Coalition is engaging with employers themselves to establish recommended practices and create training programs designed to provide employers with workers possessing the skills needed to compete in the post-TIDE economy. Our hope is to begin with an industry-wide model, and from that develop a scalable "template" for addressing TIDE's impact on every worker and every employer.

Emma is here to partner with public and private stakeholders to coordinate the best response to TIDE, whether it involves educating a politician about the importance of TIDE, planning and implementing for a reskilling or upskilling program, or negotiating a public-private partnership. At the Emma Coalition, we believe that collective action is the only way to effectively tackle this issue.

Who is Emma? Emma is the 7-year old granddaughter of one of the co-founders of the Coalition. For Emma—and for the millions of children she represents—our goal is to face TIDE head-on. To forge new and innovative ways of ensuring a skilled and prepared workforce, ready throughout their lives to meet the challenges such awesome technology will bring. To ensure a prosperous future for all Americans. Simply put, it is the Emma Coalition's goal to ensure that the 21st is the *next* American Century.

## The time to act is now.

If you have questions or would like further information, please contact the authors.



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