

# The Transformation of the Workplace Through Robotics, Artificial Intelligence, and Automation: Employment and Labor Law Issues, Solutions, and the Legislative and Regulatory Response

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### IMPORTANT NOTICE

This publication is not a do-it-yourself guide to resolving employment disputes or handling employment litigation. Nonetheless, employers involved in ongoing disputes and litigation will find the information extremely useful in understanding the issues raised and their legal context. This report is not a substitute for experienced legal counsel and does not provide legal advice or attempt to address the numerous factual issues that inevitably arise in any employment-related dispute.

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## I. INTRODUCTION

The twin forces of technology and globalization are reinventing and redefining the workplace and the way work is performed. The workplace automation of the last century is rapidly being augmented and replaced by intelligent self-learning systems driven by cloud computing, breakthroughs in sensor technology, and creation of new algorithms that harness the power of “Big Data.”<sup>1</sup> Technologies are emerging that enhance human capabilities and allow workers to provide a wider range of services remotely and with greater efficiency. This new workplace is constantly changing, increasingly uninhibited by geographical boundaries and inspired by the arrival of robots and new technologies previously available only through the pages of science fiction.

These disruptive technologies will affect not only how work is accomplished, but, where, when, by whom and under what conditions. Nations that have attracted manufacturing through low cost human labor are being competitively challenged by the arrival of brilliant machines that can operate flawlessly 24 hours a day.<sup>2</sup> While there is support for the position that robotics increases employment in the long run by generating jobs throughout the robotics supply chain and occasioning the rise of new industries and services and stimulating the economy, in the near-term, the exponential growth of robotics and cognitive computing may likely displace many workers.<sup>3</sup> Robots are becoming more integrated into the human workplace, not only completing tasks autonomously, but also enhancing human performance and safety in the workplace and at home. As new technologies facilitate remote work, the physical and temporal bounds of the workplace are becoming more flexible. These changes are simultaneously and cumulatively transforming the conditions of work.

### A. Legal Challenges Arising From Robotics, Artificial Intelligence and Automation

As innovation continues to outpace legislation, the 21st Century technologies streaming into the workplace pose novel compliance challenges for employers. Rather than listing a dozen areas of employment and labor law and applying them generally to robotics, AI, and automation, this Report uniquely divides these disruptive technologies into four categories. Each category is then viewed through the lens of the most applicable employment and labor challenges and solutions. Specific technological innovations may cover far more than one category, nonetheless, the employment and labor law issues are more clearly understood and addressed category by category. Accordingly, this Report addresses the legal challenges that have arisen or may be on the horizon for the following categories of technology:

**Robotics and Automation:** Workforce displacement resulting from mass automation can potentially trigger notice requirements, severance benefits and retraining obligations and can likely implicate collective bargaining obligations. Potential varying technological proficiencies across different demographics will challenge employers attempting to retain a technologically capable workforce while complying with anti-discrimination laws. Integrating robotic systems in close physical proximity to human workers raises potential compliance challenges under the Occupational Safety and Health Administration (OSHA), and various industry standards such as International Organization for Standardization (ISO) and American National Standards Institute (ANSI).

- <sup>1</sup> See, e.g., Herminia Ibarra, *Hiring and Big Data: Those Who Could Be Left Behind*, HARVARD BUS. REV. BLOG NETWORK, Dec. 3, 2013, available at [http://blogs.hbr.org/2013/12/hiring-and-big-data-who-wins/?utm\\_source=Socialflow&utm\\_medium=Tweet&utm\\_campaign=Socialflow](http://blogs.hbr.org/2013/12/hiring-and-big-data-who-wins/?utm_source=Socialflow&utm_medium=Tweet&utm_campaign=Socialflow) (last visited Aug. 7, 2015); See e.g. Annie Baxter, *Job Applicants Are Wary Of Firms' Resume Sorting Software*, NATIONAL PUBLIC RADIO, Feb. 8, 2013, available at <http://www.npr.org/2013/02/28/173122980/job-applicants-are-wary-of-firms-resume-sorting-software> (last visited Aug. 7, 2015).
- <sup>2</sup> In response, China has established a five-year plan to bring robotic technology to its factories and “all areas of society” to remain an industry leader. See Chen Fei, *How China plans to become a leader in robotics*, THE CONVERSATION, Aug. 15, 2013, available at <https://theconversation.com/how-china-plans-to-become-a-leader-in-robotics-17084> (last visited Aug. 7, 2015). In the U.S., no new factory is built without a complete review of the efficiencies that can be achieved using robotics. In the Netherlands, Phillips Electronics was able to build a robotized factory to manufacture electric razors that outperform its labor-intensive Shanghai operation. See John Markoff, *Skilled Work, Without the Worker*, THE NEW YORK TIMES, Aug. 18, 2012, available at [http://www.nytimes.com/2012/08/19/business/new-wave-of-adept-robots-is-changing-global-industry.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2012/08/19/business/new-wave-of-adept-robots-is-changing-global-industry.html?pagewanted=all&_r=0) (last visited Aug. 7, 2015).
- <sup>3</sup> Andrew Soergel, *Robots Could Cut Labor Costs 16 Percent by 2025*, U.S. NEWS, Feb. 10, 2015, available at <http://www.usnews.com/news/articles/2015/02/10/robots-could-cut-international-labor-costs-16-percent-by-2025-consulting-group-says> (last visited Aug. 7, 2015) (“Increased automation in the workplace could cut labor costs by an average of 16 percent across the world’s 25 largest goods-exporting nations – 22 percent in the U.S. alone.”).

**Wearable and Performance-Enhancing Devices:** Wearable and other devices such as exoskeletons aimed at enhancing human performance pose unique compliance challenges and opportunities under laws relating to workers' compensation, OSHA, wage and hour, and disability accommodation.

**Telepresence, Telemanipulation and Remote Work:** The increasing sophistication of telepresence and telemanipulation technology and the large-scale adoption of crowdsourcing implicate questions about the extraterritorial application of state and national law. Recent controversies over the extraterritorial application of wage and hour law and the justice of independent contractor standards for remote piecework are likely preludes to the legal challenges to come in this space.<sup>4</sup> These technologies may also raise privacy concerns and potential challenges to the viability of the current models of taxation and social welfare.

**Cognitive Computing:** Artificial intelligence, cognitive computing, and the increasing use of "Big Data" will raise first-of-their-kind issues under laws relating to workplace privacy, discrimination, and electronic discovery.

As robotics, artificial intelligence, and automation become increasingly integrated into the everyday workplace, legislatures, regulators, and courts will face pressure to reinterpret existing requirements or create new regulations that better reflect the impact of these technologies.<sup>5</sup> Therefore this Report concludes with a look forward to some anticipated **Legislative and Regulatory Responses** to this wave of innovation.

## B. A Note on the Important Concepts Addressed in This Report

Increasingly, specific definitions have emerged to differentiate areas of robotics, software and AI, as well as historical, contemporary, and future automation. For example, an "industrial robot" has been defined as an "automatically controlled, reprogrammable multipurpose manipulator programmable in three or more axes which may be either fixed in place or mobile for use in industrial automation applications." While it is important to understand these industry-specific definitions, there are many other generally-applicable definitions. For example, a more elemental definition of "robot" is simply: "a machine that can do the work of a person and that works automatically or is controlled by a computer." Stated differently, a robot is: "any automatically operated machine that replaces human effort, though it may not look much like a human being or function in a humanlike manner."

While this Report does not seek to answer the technical, political, social, legal, and ethical question of what a "robot" is, its authors believe that the task of providing insight on the legal and practical implications of robots in the workplace requires working definitions of some important concepts. The following definitions are provided to aid readers' understanding of the insights and conclusions contained in this Report. It is the authors' hope that, in addition to enhancing the clarity of this Report, these definitions will expose part of the relationship between the contentious discourse surrounding robotics and its dynamic antecedents.

- **A "robotic system"** is a computer system that, using intelligent, networked devices, the Internet, Big Data, AI algorithms, and other advanced computing technology, is capable of: automatically and continually **"sensing"** what is going on in a changing physical or other environment; **"thinking"** by analyzing data it collects from the environment it is monitoring (e.g. detecting occurrences, changes, and anomalies), identifying trends, and reaching conclusions; and autonomously **"acting"** by carrying out one or more physical (e.g. navigating through an environment, manipulating an object, etc.) or non-physical (e.g. alerting human operators, recommending potential responses, making decisions, initiating commands, etc.) functions.<sup>6</sup> Stated more simply, a robotic system is any computer system capable of sensing

<sup>4</sup> The U.S. Department of Labor recently issued new guidance on the classification of independent contractors as employees under the Fair Labor Standards Act (FLSA). The Administrative Interpretation warns employers that the definition of "employ" is very broad under the FLSA. Administrator's Interpretation No. 2015-1, United States Department of Labor (Jul. 15, 2015), *available at* [http://www.dol.gov/whd/workers/Misclassification/AI-2015\\_1.htm](http://www.dol.gov/whd/workers/Misclassification/AI-2015_1.htm) (last visited Aug. 7, 2015).

<sup>5</sup> E.C. Austin, *How to judge a 'bot; why it's cover*, THE ECONOMIST (Sep. 25, 2014), *available at* <http://www.economist.com/blogs/babbage/2014/09/robot-jurisprudence> (last visited Aug. 7, 2015) ("The concern for policymakers is creating a regulatory and legal environment that is broad enough to maintain legal and ethical norms but is not so proscriptive as to hamper innovation.").

<sup>6</sup> *Skunk, USA - IFR Robot Supplier*, IFR Member Press Releases, IFR INTERNATIONAL FEDERATION OF ROBOTICS, *available at* <http://www.ifr.org/news/members-press-release/schunk-usa-ifr-robot-supplier-744/> (last visited Aug. 7, 2015).

occurrences in a dynamic situation or environment, capturing and analyzing the relevant data, and subsequently reaching conclusions, providing recommendations, making decisions, and otherwise taking action, whether of a physical or non-physical nature.

- **In this Report, we include “software robots” or “virtual agents.”** While these technologies fall outside of the many definitions of “robots,” they are frequently used to enhance human capabilities and may be used in concert with technologies that are more commonly characterized as robots. Such tools include software programs that perform a task previously done by humans, or a virtual assistant, such as a telepresence robot that performs services remotely. “Telerobotics is the area of robotics concerned with the control of robots from a distance, chiefly using wireless connections, ‘tethered’ connections, or the Internet. It is a combination of two major subfields, teleoperation and telepresence.”<sup>7</sup>
- **Automation** is defined as the “automatic operation or control of equipment, a process, or a system.”<sup>8</sup> While automated processes can be traced back centuries, the term “automation” did not come into popular use until 1947, when General Motors established an “automation department.” As used in this Report, automation refers to an operation or control system that uses intelligence. Robotics and AI are subsets of automation. However, in many instances, product manufacturers and system designers have avoided the terms “robotics” and “AI” in favor of some form of the word “automation.” For example, contemporary jet aircrafts are capable of taking off, flying, and landing by themselves with “automatic pilots.” Similarly, the term “vehicular automation” encompasses the “self-driving car,” “robot car” or “autonomous vehicle.”
- **Artificial Intelligence (AI) and Cognitive Computing** are also focal points of this Report. Artificial Intelligence is defined as “the intelligence exhibited by machines or software, and the branch of computer science that develops machines and software with intelligence.”<sup>9</sup> Computer scientist John McCarthy, who is credited with coining the term in 1955, defines it as “the science and engineering of making intelligent machines.”<sup>10</sup> “Cognitive Computing” is similar to AI insofar as it seeks to use algorithms to accomplish processes usually performed by the human mind, but the means for achieving this result differ. One way of articulating the distinction is that “typically, in AI, one creates an algorithm to solve a particular problem, [while] [c]ognitive computing seeks a universal algorithm for the brain that would be able to solve a vast array of problems.”<sup>11</sup> These technologies are included to underscore that the scope of this Report covers both hardware and software that perform tasks previously performed by humans.

## II. ROBOTICS, AUTOMATION, AND THE NEW WORKPLACE LANDSCAPE (CATEGORY ONE)

### A. Job Dislocation and Job Creation

A number of studies have found that in the aggregate, the robotics industry is creating more jobs than robots replace. For example, the International Federation of Robotics (IFR) estimates that robotics directly created four to six million jobs through 2011, with the total rising to eight to 10 million if indirect jobs are counted. The IFR projects that 1.9 to 3.5 million jobs will be created in the next eight years.<sup>12</sup> Of course, there will be workers displaced as a result of the use of robots (as well as other technologies), and employers should be mindful of the legal rights of such workers. A widely reported study

7 “Telerobotics.” TheFreeDictionary.com. 2014, available at <http://www.thefreedictionary.com/Telerobot> (last visited Aug. 7, 2015).

8 “Automation.” TheFreeDictionary.com. 2014, available at <http://www.thefreedictionary.com/automation> (last visited Aug. 7, 2015).

9 Artificial Intelligence. (n.d.) [https://en.wikipedia.org/wiki/Artificial\\_intelligence](https://en.wikipedia.org/wiki/Artificial_intelligence)[http://en.wikipedia.org/wiki/Artificial\\_intelligence#cite\\_note-Coining\\_of\\_the\\_term\\_AI-3](http://en.wikipedia.org/wiki/Artificial_intelligence#cite_note-Coining_of_the_term_AI-3)[http://en.wikipedia.org/wiki/Artificial\\_intelligence#cite\\_note-Coining\\_of\\_the\\_term\\_AI-3](http://en.wikipedia.org/wiki/Artificial_intelligence#cite_note-Coining_of_the_term_AI-3) (last visited Aug. 7, 2015).

10 John McCarthy, *Basic Questions, What is Artificial Intelligence?* Stanford University, available at <http://www-formal.stanford.edu/jmc/whatisai/> (revised Nov. 12, 2007), archived at <https://web.archive.org/web/20131011010206/http://www-formal.stanford.edu/jmc/whatisai/whatisai.html> (last visited Aug. 7, 2015).

11 Pam Baker, *IBM Researchers Go Way Beyond AI With Cat-Like Cognitive Computing*, TECH NEWS WORLD, Nov. 19, 2009, available at <http://www.technewsworld.com/story/68678.html> (last visited Aug. 7, 2015).

12 Peter Gorle and Andrew Clive, *Positive Impact of Industrial Robots on Employment*, INTERNATIONAL FEDERATION OF ROBOTICS, (updated Jan. 2013).



published by Oxford University forecast that an estimated 47 percent of the total U.S. employment is at risk of automation potentially in as few as 10 years.<sup>13</sup> However, this does not mean widespread unemployment, but rather displacement and retraining. Potential legal issues immediately include obligations for notice of layoffs, applicable severance pay, if any, and retraining opportunities.

(1) Worker Adjustment and Retraining Notification Act (WARN)

Although there are no laws in the United States specifically requiring advance notice of job loss due to displacement by robots, there are a number of laws that require advance notice of job loss generally. The most important of these advance notice statutes is the WARN.<sup>14</sup> Although WARN does not prevent an employer from implementing a mass layoff or closing a facility, it does require certain employers to notify employees, their representatives, and certain local and state government officials, 60 days in advance of such actions, but only if:

- the plant shutdown (which includes closing of departments, product lines or other recognized organizational units) will result in an employment loss of 50 or more full-time employees at that site within a 30-day period, or
- layoffs that are not the result of plant closing result in the loss of employment at a single site of employment for at least 33% of active employees, excluding part-timers, and at least 50 employees; or alternatively, results in loss of employment for 500 or more full-time employees regardless of the percentage.

A number of states (CA, CT, HI, IL, IA, MA, MD, NH, NJ, NY, TN, WI, AL, GA, MI, MN, NC, OH, TX, MN, OR) have passed statutes or ordinances, sometimes referred to as “Mini-WARN” statutes, similar to the federal WARN Act.<sup>15</sup>

WARN and Mini-WARN statutes are complicated, and employers must plan plant closings and mass layoffs in advance to determine whether notice is required and to which persons or entities. Failure to provide adequate notice under WARN or the Mini-WARN statutes generally results in employer liability to employees for compensation that the employee would have earned during the notice period.

(2) Severance

Absent any written or oral contracts providing for severance upon the termination of an individual’s employment, there is no general obligation under either federal or state law requiring severance upon an employee’s termination in general or based on displacement due to robots. All states have unemployment compensation systems that provide benefits to displaced workers for varying lengths of time through insurance-based systems. And some of the Mini-WARN statutes mentioned above require that employers pay mandatory severance benefits for failure to comply with the statute.

Many employers provide severance benefits to employees under employee benefit plans covered by the Employee Retirement Income Security Act of 1974 (ERISA) or under informal severance programs. These programs typically involve payment of severance benefits for job loss due to economic conditions, which typically would include displacement by robots. Benefits vary considerably, but often are calculated based on the employee’s pay rate and length of service.

Most employers require employees to sign a release of claims to receive all or part of offered severance benefits. Generally, release agreements signed by employees in exchange for voluntary severance payments

<sup>13</sup> Carl Benedikt Frey and Michael A. Osborne, *THE FUTURE OF EMPLOYMENT: HOW SUSCEPTIBLE ARE JOBS TO COMPUTERISATION?* (Sep. 17, 2013) available at [http://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf) (last visited Aug. 7, 2015). [http://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf)[http://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf)[http://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf)

<sup>14</sup> 29 USC 2101 *et. seq.* See also *Reductions in Force: Issues, Strategies, And The Process For The Downsizing*, Vol. II THE NATIONAL EMPLOYER, Ch. 16 (Littler Mendelson, ed. 2013-14) for more detail about WARN.

<sup>15</sup> See THE NATIONAL EMPLOYER, Ch. 16 (Littler Mendelson, ed. 2013-14).

and/or other benefits must comply with the requirements of the federal Older Workers Benefit Protection Act (OWBPA) in order for a waiver of the right to recover for age discrimination in violation of the Age Discrimination in Employment Act (ADEA) to be effective.

(3) Retraining

As briefly discussed above, if jobs are lost due to robotics technology, just as with any other WARN-triggering job loss, employers must also notify the state dislocated worker unit and the chief elected official of the local government where the closing or layoff will occur. The state dislocated worker units receiving the WARN notices vary in purpose, focus, and functionality, but the primary purpose of these units is to help reintegrate dislocated employees back into the workforce. The Department of Labor's Employment and Training Administration (ETA) also provides information on training programs and other services available to assist laid off workers, or those who are about to be laid off. In 2014, the Workforce Innovation and Opportunities Act was signed into law with the support of the Robotics Industry Association and several other employer groups focused on technology. "The new law seeks to impose more accountability on the federal-state training partnerships by requiring a 'job-driven checklist' to ensure that federal money is used effectively and by providing 'data-driven tools' to give workers better information about career prospects. It also gives cities and states greater flexibility in how they use federal money for training programs."<sup>16</sup>

## **B. Labor Unions and Collective Bargaining**

(1) Protected Concerted Activity

Probably among the greatest drivers of union organizing activity is employees' fear of losing their jobs. Unions have addressed the fear of job loss created by the specter of robotic replacement in their efforts to solicit employees. For this reason, employers should carefully and accurately discuss the benefits that automation will provide for employees: greater safety, less arduous working conditions, or an overall improvement in the workplace. If productivity doubles due to the use of robots and business correspondingly expands, this does not mean that the human workforce needs to decline.

Regardless of how the introduction of robotics is presented, employers should be ready for employees to react with concern about their jobs. Section 7 of the National Labor Relations Act (NLRA) protects employees' right to engage in concerted activity, with or without a union, for mutual aid or protection.<sup>17</sup> This means that the NLRA protects employees who act with or on the authority of other employees; seek to initiate, induce, or prepare for group action; or bring group concerns or complaints to the attention of management. Thus, within certain limits, employees may speak out against the introduction of robotics, threaten to unionize, complain to the public or the employer's customers, or even walk off the job or picket the employer as a form of protest.

Employer responses to protected concerted activity must be measured. The NLRA makes it unlawful for employers to discipline, discharge, or otherwise take adverse action against employees because they engage in protected activity. For example, an employee who complains that the introduction of robotics will result in layoffs, or otherwise protests the effect of robotics on the terms and conditions of employment, likely is engaged in protected concerted activity. Subsequently laying the employee off or taking other adverse action against him because of his complaints would likely violate Section 7. However, laying the employee off because the introduction of robotics rendered his position superfluous would not violate the NLRA. When confronted with employee behavior that appears to push the boundaries of protected activity, employers should contact legal counsel before taking action. Again, the best way to deal with employee concerns about the introduction of

<sup>16</sup> See David S. Joachim, *Obama Signs New Job-Training Law*, Jul. 22, 2014, THE NEW YORK TIMES available at [http://www.nytimes.com/2014/07/23/us/obama-signs-new-job-training-law.html?\\_r=0](http://www.nytimes.com/2014/07/23/us/obama-signs-new-job-training-law.html?_r=0) (last visited Aug. 7, 2015).

<sup>17</sup> 29 U.S.C. § 157 (2013).

robotics is by communicating often and effectively with employees about the benefits of a robotic workplace and the critical role employees serve within it.

For these reasons, an employer seeking to discuss a possible transition to a robotic workplace during an organizing campaign should tread lightly. It is almost certainly unlawful for an employer to state that if employees elect a union, it will begin automating the facility to save money and achieve flexibility and efficiency that a unionized workforce could not provide.<sup>18</sup>

If an employer's possible introduction of robotics into the workplace is an issue in an organizing campaign, the employer will need to discuss the possibility in a lawful manner. Probably the safest course would be to acknowledge that the employer has explored the issue, and whether it ultimately chooses to move forward with robotics will not depend on whether employees vote for the union, but rather global competitive forces impacting the employer. Moreover, if the employer has already made the decision to transition to robotics before the commencement of a union organizing drive, the employer may communicate that decision to employees.

## (2) Collective Bargaining

Is an employer required to bargain if it wishes to acquire robots to do work previously performed by unionized employees working under a collective bargaining agreement (CBA)? Does the CBA control the use of robots to perform this work? A unionized employer seeking to add robots to its business process should consider these questions.

Although the NLRA expressly limits the duty to bargain to certain subjects (*i.e.*, "wages, hours and other conditions of employment"), the NLRB interprets those mandatory subjects of bargaining broadly. Because an employer's use of robotics necessarily affects existing employees' terms and conditions of employment, either by substantially changing the nature of their jobs or by eliminating bargaining unit jobs or work altogether, robotics could become a mandatory subject of bargaining.<sup>19</sup> While there appear to be few NLRB decisions concerning the transition to a robotic workforce, the NLRB has long held that technological changes that significantly affect an employer's unionized workforce are a mandatory subject of bargaining.

For this reason, employers negotiating an initial CBA should generally attempt to negotiate a robust "management rights" clause that reserves the employer's right to make operational changes and a "no-strike" clause that prohibits employees from striking over such changes during the term of the agreement. This is particularly true for employers considering a move toward a robotic workplace. Such employers should seek a management rights or other clause that gives them the specific right to adopt technological or mechanical changes to their workplaces without further bargaining with the union.

Although an employer's duty to bargain over terms and conditions commonly arises in negotiations for an initial or successor contract, it applies also during the term of an existing collective bargaining agreement when one of the parties proposes a course of action or change that affects a mandatory subject of bargaining.<sup>20</sup>

Moreover, because the implementation of robotics, in most instances, will likely be a mandatory subject of bargaining, absent a clear and unequivocal waiver of the right to bargain over the subject, an employer will be obligated to bargain over the implementation of robotics even if the CBA is silent on the issue.<sup>21</sup> Even when the

<sup>18</sup> See *Idaho Frozen Foods Division*, 171 N.L.R.B. 1567, 1573 (1968) (finding violation of NLRA where employer threatened to automate areas of the plant if the union won the election).

<sup>19</sup> See, e.g., *Renton News Record*, 136 N.L.R.B. 1294 (1962).

<sup>20</sup> 29 U.S.C. § 158(d); see also *Zimmerman Painting & Decorating*, 302 N.L.R.B. 856 (1991); but cf. *NLRB v. Jacobs Mfg. Co.*, 196 F.2d 680 (2d Cir. 1952) (employers are not relieved from mid-term bargaining obligations over mandatory bargaining subjects not embodied in CBAs' terms).

<sup>21</sup> *Renton News Record*, 136 N.L.R.B. 1294 (1962). Although the NLRB refined its approach to determining whether an employer must bargain over a given decision, since *Renton News Record*, its approach to automation cases remains consistent. *Plymouth Locomotive Works, Inc.*, 261 N.L.R.B. 595 (1982) (applying *Renton News Record* paradigm, and finding that an employer had committed an unfair labor practice by failing to bargain over a decision to automate).

parties' CBA expressly permits an employer to increase its reliance on robotics without bargaining with the union, other elements of the decision may still require bargaining. For example, if the increased reliance on robotics includes the relocation of work to a more technologically advanced facility, the employer may be required to bargain over the relocation of bargaining unit work even if the CBA permits the employer to adopt technological improvements unilaterally.<sup>22</sup>

### C. Tax Implications

There is some evidence that robotics is increasing job growth in the U.S.<sup>23</sup> For example, a number of companies have brought back manufacturing jobs from China and other overseas countries in recent years. One recent study found that three to five jobs are created for each robot in use.<sup>24</sup> This in turn suggests that the current employment model used to fund social insurance programs such as Medicare, Social Security and unemployment benefits, as well as tax reporting based on an employer model (by, for example, issuing W-2s to employees each year to report their earned wages) will benefit from increased use of robotics.

However, another view is that increases in robotics investment over time will depress wages, while the decreased need for employees in certain industries could reduce overall labor force participation.<sup>25</sup> It remains a basic fact that any insurance system needs sufficient numbers to spread risk (*i.e.*, a risk pool).<sup>26</sup> Robotic technologies could negatively affect the social insurance pay-as-you-go model because they may reduce the number of available workers over which these insurance risks can be spread. Thus, such changes to the workforce could impact tax administration and social insurance because the current tax system requires the existence of a critical mass of employer-employee (or employment) relationships.<sup>27</sup> For example, using robot waiters in a restaurant is expected to reduce the number of human waiters, which in turn reduces the “wages” being paid into the funding of social insurance, while also increasing the number of unemployed workers potentially claiming unemployment benefits.<sup>28</sup> When firms determine that it is less expensive and more productive to replace an individual with a robot,<sup>29</sup> the implications for tax administration and social insurance

22 See *Dubuque Packing Co.*, 303 N.L.R.B. 386, enforced in relevant part sub. nom., *United Food & Commercial Workers Local 150-A v. NLRB*, 1 F.3d 24 (D.C. Cir. 1993).

23 See, e.g., Robert D. Atkinson, *Stop Saying Robots Are Destroying Jobs—They Aren't*, MIT TECHNOLOGY REVIEW, Sept. 3, 2013, available at <http://www.technologyreview.com/view/519016/stop-saying-robots-are-destroying-jobs-they-arent/> (last visited Aug. 7, 2015) (disputing Brynjolfsson and McAfee's assumptions, and predicting that by 2023, there will be at least 5% more jobs in the U.S. than exist today).

24 International Federation of Robotics, *Positive Impact of Industrial Robots on Employment*, Jan. 2013.

25 See, e.g., Erik Brynjolfsson and Andrew McAfee, *Why Workers Are Losing the War Against Machines*, THE ATLANTIC, Oct. 26, 2011; *A Roundup on Robots, Capital-Biased Technological Change and Inequality (plus how to tell if a person is a fiduciary)*, CLIMATEER INVESTING, Dec. 18, 2002; Noah Smith, *The End of Labor: How to Protect Workers From the Rise of Robots*, THE ATLANTIC, Jan. 14, 2013; Paul Krugman, *Technology and Wages, the Analytics (Wonkish)*, THE NEW YORK TIMES, Dec. 12, 2012; Paul Krugman, *Robots and Robber Barons*, THE NEW YORK TIMES, Dec. 9, 2012; Kevin Drum, *Welcome Robot Overlords. Please Don't Fire Us?*, MOTHER JONES, May/June 2013.

26 For a discussion of social insurance financing, see Michael Cichon et al., *Financing Social Protection*, INTERNATIONAL SOCIAL SECURITY ASSOCIATION (2004).

27 The employment model used to fund social insurance programs that provided not only for workers, but also dependents, largely developed during the Great Depression, was predicated upon then prevailing attitudes about the family and women's roles that would strike most as antiquated today. Karen Kornbluh and Rachel Homer, *The New Family Values Agenda: Renewing Our Social Contract*, 4 HARV. L. & POL'Y REV. 73, 76 (Winter 2010) (explaining that the structure of social programs such as Social Security “reflects historical choices made when the breadwinner-caregiver model was predominant, and it was intended to perpetuate that model. The system includes social insurance entitlement programs that provide benefits linked to one's income, job tenure, and full-time work, so those who sacrifice earnings to care for their children wind up as their spouses' dependents and with far less in benefits.”). In addition, theories about the links between “work” and citizenship can be seen through the lens of the framers of the Constitution and views about what work did and did not qualify for consideration within the framework of greater society. See, e.g., William E. Forbath, *Caste, Class and Equal Citizenship*, 98 MICH. L. REV. 1 (Oct. 1999).

28 Jesus Diaz, *Fully Automated Robo-Restaurant Tested (Verdict: delicious, Fun, No Bloody Tips)*, GIZMODO, Apr. 8, 2008, available at <http://gizmodo.com/377538/fully-automated-robo+restaurant-tested-verdict-delicious-fun-no-bloody-tips> (last visited Aug. 7, 2015).

29 In the near term, robots may be seen as complimenting human work and performing functions in collaboration with, rather than entirely replacing, humans. Whether that remains a longer term trend as well remains to be seen, but it nonetheless still has the potential to reduce labor participation. Tanya Anandan, *The End of Separation: Man and Robot as Collaborative Coworkers on the Factory Floor*, ROBOTIC INDUSTRIES ASSOCIATION, June 6, 2013, available at [http://www.robotics.org/content-detail.cfm/Industrial-Robotics-Featured-Articles/The-End-of-Separation-Man-and-Robot-as-Collaborative-Coworkers-on-the-Factory-Floor/content\\_id/4140](http://www.robotics.org/content-detail.cfm/Industrial-Robotics-Featured-Articles/The-End-of-Separation-Man-and-Robot-as-Collaborative-Coworkers-on-the-Factory-Floor/content_id/4140) (last visited Aug. 7, 2015). The robotics industry itself has an incentive to suggest that robotics technologies will increase rather than decrease labor participation rates.

become dire, unless those displaced workers find other employment paying wages subject to information reporting obligations and social insurance contributions.

It remains to be seen over the longer term how robotics implicates the funding of social programs through “wages” paid to employees, and how eliminating jobs or larger numbers of employers with fewer employees affects tax reporting.

#### D. Anti-Discrimination

##### (1) Age Discrimination in Employment Act of 1967 (ADEA)

The ADEA prohibits age-based discrimination against applicants or employees age 40 or over.<sup>30</sup> The ADEA also prohibits employers from discriminating on the basis of age between two individuals, both of whom are within the protected age group. The ADEA prohibits discrimination in hiring, discharge, promotion, and other terms or conditions of employment. A plaintiff establishes a case of age discrimination by demonstrating that (1) The plaintiff was in a protected age group; (2) The plaintiff was qualified for the position; (3) The plaintiff was nevertheless adversely affected; and (4) The defendant sought someone else with similar qualifications to perform the work. Claims may be brought under both disparate treatment and disparate impact theories.<sup>31</sup>

The very use of advanced robotic systems in the workplace could subject an employer to exposure under the ADEA based on older workers’ familiarities with the new technologies. If employees over 40 are less adept at working with advanced robotic systems than younger employees, employment decisions based on this criteria will likely impact them disproportionately. If those 40 or older are adversely impacted because of an employer’s use of advanced robotics systems, then the employer may face exposure to disparate impact claims under the ADEA. Latent biases and the perceptions that younger people are more technologically advanced or adaptive could lead to disparate treatment claims.

##### (2) Americans with Disabilities Act of 1990 (ADA)

Title I of the ADA,<sup>32</sup> amended by the ADA Amendments Act of 2008 (ADAAA),<sup>33</sup> prohibits both public and private employers from discriminating in employment against persons with physical and mental disabilities. The ADA requires employers to make reasonable accommodation to the needs of disabled applicants and employees, as long as such accommodation does not result in undue hardship to the employer’s operations. A reasonable accommodation may include any of the following:

- Making existing facilities used by employees readily accessible to and usable by individuals with disabilities;
- Job restructuring;
- Part-time or modified work schedules;
- Reassigning a disabled individual to a vacant position;
- Acquiring or modifying equipment or devices;
- Appropriately adjusting or modifying examinations, training materials, or policies;
- Providing qualified readers or interpreters;
- Hiring a job coach to help the employee in his or her job for a temporary period of time; and
- Other similar accommodations for individuals with disabilities.

<sup>30</sup> 29 U.S.C. §§ 621-634.

<sup>31</sup> 544 U.S. 228 (2005).

<sup>32</sup> Pub. L. No. 101-336 (1990).

<sup>33</sup> Pub. L. No. 110-325 (2008).



Today, courts may consider accommodations for certain individuals absent an undue hardship to an employer's operations. In the foreseeable future, advanced robotic systems may make such accommodations reasonable in the eyes of the court. Advanced technologies could provide never-before-seen opportunities for individuals with disabilities. For example, self-driving vehicles and advanced sensory technology could make jobs previously denied to deaf or blind applicants a real opportunity. Honda's Asimo can assist a person confined to a bed or a wheelchair by performing manual operations like turning on a light switch, opening doors, and carrying objects. Such advanced technologies could make already existing technology affordable and more accessible.

## E. The Federal Occupational Safety & Health Act

The Federal Occupational Safety & Health (OSH) Act grants the Secretary of Labor responsibility for administering the federal occupational safety and health program.<sup>34</sup> Among the Secretary's responsibilities are the promulgation of occupational safety and health standards, and enforcement efforts aimed at ensuring employer compliance. On a day-to-day basis, the Secretary's responsibilities have been delegated to the Occupational Safety and Health Administration (OSHA). Twenty five states have OSHA-approved state plans and have adopted their own standards and enforcement policies.<sup>35</sup> For the most part, these states adopt standards that are identical to those set forth by federal OSHA.

Employers must ensure that they remain in compliance with OSHA regulations as they begin introducing advanced technologies into the workplace. While there are no current OSHA standards specific to the robotics industry, certain general OSHA standards apply, such as those governing machinery and machine guarding,<sup>36</sup> electrical systems,<sup>37</sup> and lockout/tagout procedures.<sup>38</sup> OSHA guidelines aimed specifically at the robotics industry are somewhat outdated.<sup>39</sup> For example, OSHA's Guidelines for Robotics Safety was issued in 1987.<sup>40</sup> The agency's Technical Manual on Industrial Robots and Robot System Safety has a 1999 effective date,<sup>41</sup> and its manual containing a chapter on Robotics in the Workplace was last updated in 1992.<sup>42</sup> Even older, the National Institute for Occupational Safety and Health (NIOSH) issued a robotics injury prevention guide in 1984.<sup>43</sup>

However, the American National Standards Institute (ANSI) recently updated its existing standard governing robotics safety in 2012.<sup>44</sup> The new standard harmonizes its standard with the applicable International Organization for Standardization

34 29 U.S.C. § 651.

35 Alaska, Arizona, California, Connecticut (public sector only), Hawaii, Illinois (public sector only), Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Jersey (public sector only), New Mexico, New York (public sector only), North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virgin Islands (public sector only), Virginia, Washington, Wyoming. See State Occupational Safety and Health Plans, *available at* <https://www.osha.gov/dcsp/osp/index.html> (last visited Aug. 7, 2015).

36 29 C.F.R. § 1910 Subpart O, *available at* [https://www.osha.gov/pls/oshaweb/owastand.display\\_standard\\_group?p\\_toc\\_level=1&p\\_part\\_number=1910#1910\\_Subpart\\_O](https://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1910#1910_Subpart_O) (last visited Aug. 7, 2015).

37 29 C.F.R. § 1910 Subpart S, *available at* [https://www.osha.gov/pls/oshaweb/owastand.display\\_standard\\_group?p\\_toc\\_level=1&p\\_part\\_number=1910#1910\\_Subpart\\_S](https://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1910#1910_Subpart_S) (last visited Aug. 7, 2015).

38 29 C.F.R. § 1910.147, *available at* [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9804](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9804) (last visited Aug. 7, 2015).

39 For information on OSHA's guidelines and standards applicable to the robotics industry, see OSHA's webpage on Robotics, *available at* <https://www.osha.gov/SLTC/robotics/index.html> (last visited Aug. 7, 2015).

40 OSHA Instruction Pub. STD 01-12-002 [PUB 8-1.3], *Guidelines For Robotics Safety* (Sept. 21, 1987), *available at* [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=DIRECTIVES&p\\_id=1703](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=1703) (last visited Aug. 7, 2015).

41 OSHA Directive No: TED 01-00-015 [TED 1-0.15A], OSHA TECHNICAL MANUAL (OTM), § IV: Ch. 4, *Industrial Robots and Robot System Safety* (Jan. 20, 1999), *available at* [https://www.osha.gov/dts/osta/otm/otm\\_iv/otm\\_iv\\_4.html](https://www.osha.gov/dts/osta/otm/otm_iv/otm_iv_4.html) (last visited Aug. 7, 2015).

42 OSHA Pub. 3067, CONCEPTS AND TECHNIQUES OF MACHINE SAFEGUARDING, Ch. 6, *Robotics in the Workplace* (Revised 1992). *available at* [https://www.osha.gov/Publications/Mach\\_SafeGuard/chapt6.html](https://www.osha.gov/Publications/Mach_SafeGuard/chapt6.html) (last visited Aug. 7, 2015).

43 DHHS (NIOSH) Pub. No. 85-103, *Preventing the Injury of Workers by Robots* (Dec. 1984), *available at* <http://www.cdc.gov/niosh/docs/85-103/> (last visited Aug. 7, 2015).

44 ANSI 2012 R15.06. According to Robotics online (sponsored by the Robotic Industries Association), this standard provides guidelines for the manufacture and integration of Industrial Robots and Robot Systems with emphasis on their safe use, the importance of risk assessment and establishing personnel safety. This standard is a national adoption of the International Standards ISO 10218-1 and ISO 10218-2 for Industrial Robots and Robot Systems, and offers a global safety standard for the manufacture and integration of such systems. A two-year transition period over to the revised RIA R15.06 ends with the year 2014.

(ISO) standards, creating a uniform industrial robotic safety standard.<sup>45</sup> While these standards are not OSHA regulations and are voluntary, the agency notes that “they do provide guidance from their originating organizations related to worker protection.”<sup>46</sup>

OSHA’s website warns of potential dangers involved in advanced robotic systems in the workplace. The danger does not come primarily from the robotics but from human error in interfacing with the system. On July 1, 2015, a German worker entered a safety cage and died when struck in the chest. Preliminary reports cite worker error and no defect on the robot’s programming.<sup>47</sup> In 2011, an employee suffered a fatality while freeing a jam when he became caught between a robotic arm and a conveyor belt. In 2009, another employee suffered a fatality by a robotic palletizer because she entered the caged cell in which the palletizer operates without having de-energized the equipment. In 2006, a worker entered the cell of a robot to clean its sensors, and suffered a fatality because he did not utilize lockout procedures. While not common, such injuries are obviously catastrophic. In each of the above instances, the implementation of strict procedures and training programs could have prevented these fatal or serious accidents.

The use of robots can also improve ergonomics and minimize repetitive stress injuries.<sup>48</sup> NIOSH announced on July 25, 2013, that it developed a talking robotic head to aid research into factors affecting how respirators fit to workers’ faces.<sup>49</sup> Over five million Americans are required to wear respirators in their workplace. In addition, several companies currently use robots to perform work that is either unsafe or potentially hazardous to humans. For example, robots perform work in excessive heat, polluted areas, or under other extreme conditions harmful to humans.

Employers should also be aware of safety regulations from other federal agencies, such as the Federal Aviation Administration. The current use of drones and recently proposed FAA regulations indicate an increase use of drones by companies for such work as industrial-scale agriculture or transportation infrastructure, including railways, roads, ports, and waterways.<sup>50</sup> The proposed rules would allow routine use of certain small unmanned aircraft systems, such as drones, in today’s aviation system but impose strict safety regulations.<sup>51</sup>

### III. HUMAN ENHANCEMENT/WEARABLE TECHNOLOGY AND NEW POSSIBILITIES (CATEGORY TWO)

#### A. Workers’ Compensation

Advances in robotics are likely to improve workers’ health and safety and, in turn, reduce employers’ workers’ compensation costs. An example of the types of robotic applications that could have a positive impact in the workers’ compensation context is the “wearable robot,” such as the “exoskeleton.”<sup>52</sup> Aside from reducing the reliance on muscle

45 ISO 10218-1:2011, Robots and robotic devices -- Safety requirements for industrial robots -- Part 1: Robots; ISO 10218-2:2011, Robots and robotic devices -- Safety requirements for industrial robots -- Part 2: Robot systems and integration.

46 OSHA, Webpage on Robotics, available at <https://www.osha.gov/SLTC/robotics/index.html> (last visited Aug. 7, 2015).

47 “A [company] spokesman stressed that the robot was not one of the new generation of lightweight collaborative robots that work side-by-side with workers on the production line and forgo safety cages.” *Worker killed in Volkswagen robot accident*, FINANCIAL TIMES, at <http://www.ft.com/intl/fastft/353721/worker-killed-volkswagen-robot-accident> (last visited Aug. 7, 2015); See also Kukil Bora, *Volkswagen German Plant Accident: Robot Grabs, Crushes Man To Death*, INTERNATIONAL BUSINESS TIMES, Jul. 2, 2015, available at <http://www.ibtimes.com/volkswagen-german-plant-accident-robot-grabs-crushes-man-death-1993475> (last visited Aug. 7, 2015).

48 For additional examples, see International Federation of Robotics, <http://www.ifr.org/robots-create-jobs/work-unsafe-vor-humans/> (last visited Aug. 7, 2015).

49 See CDC, *Robotic Talking Head Speaks Out in Support of Respirator Fit Research*, [Press Release] (Jul. 25, 2013), available at <http://www.cdc.gov/niosh/updates/upd-07-25-13.html> (last visited Aug. 7, 2015).

50 Christopher J. Carr, William V. O’Connor, Joseph R. Palmore & Joanna Simon, *United States: Drones: Much Anticipated Small UAS Notice Of Proposed Rulemaking Released By FAA*, MONDAQ (Feb. 19, 2015), <http://www.mondaq.com/unitedstates/x/375978/government+policy+public+finance/Drones+Much+Anticipated+Small+UAS+Notice+of+Proposed+Rulemaking+Released+by+FAA> (last visited Aug. 7, 2015).

51 *Small UAS Notice of Proposed Rulemaking (NPRM)*, FEDERAL AVIATION ADMINISTRATION (Jul. 22, 2015), <https://www.faa.gov/uas/nprm/> (last visited Aug. 7, 2015).

52 See, e.g., David Goldstein, *I am Iron Man: Top 5 Exoskeleton Robots*, DISCOVERY.COM, Nov. 27, 2012, available at <http://news.discovery.com/tech/robotics/exoskeleton-robots-top-5.htm> (last visited Aug. 7, 2015).

power to perform tasks, such robots will greatly improve workers' speed, efficiency, and productivity, and will greatly increase their ability to perform tasks that are heavier and more repetitive with a reduced risk of injury. Shipyard workers in South Korea are currently using exoskeletons, giving them super-human strength.<sup>53</sup>

Despite the benefits of wearable robots, some risk of injury will always remain. For example, robots that are poorly designed and incompatible with the human body or that are well designed but poorly implemented, could easily damage muscles, tendons, and nerves, particularly when performing repetitive tasks. In addition, increased physical capabilities from using wearable robots will likely tempt workers to push the envelope by performing tasks that exceed their physical ability, thus increasing the risk of injury. For the purpose of determining eligibility for workers' compensation benefits, injuries caused by robots will be treated the same as injuries caused by using any other tool used in the workplace, such as a hammer, wrench, or computer keyboard.

## **B. Wage and Hour Law – Donning and Doffing**

Not paying workers for time spent putting on wearable robots could expose employers to liability for unpaid wages. Normally, under the Fair Labor Standards Act (FLSA), employees must be compensated for time spent changing and washing clothes that they are required to wear for work.<sup>54</sup> Therefore, employers who require employees to don wearable technology in order to perform their jobs will likely be required to pay them for the time spent changing into and out of the devices, as well as any time spent maintaining the devices.

It remains to be seen whether a narrow exception to this rule could exempt employers in some unionized workplaces from having to pay for time spent donning and doffing robotic devices. In unionized workplaces, otherwise compensable time spent changing or washing clothes at the beginning or end of shifts need not be compensated, if it is excluded from compensation by the express terms of, or by custom or practice under, a bona fide collective bargaining agreement.<sup>55</sup> The U.S. Supreme Court has made clear that this exception applies only to "clothes," which it defines as "items that are both designed and used to cover the body and are commonly regarded as articles of dress."<sup>56</sup> Safety glasses, earplugs, and a respirator did not come within this definition of clothes.<sup>57</sup> However, where such items are donned and doffed along with clothing, the time spent changing may be subject to exception by a collective bargaining agreement if the time period at issue, could, on the whole, be fairly characterized as changing and washing clothes.<sup>58</sup> For this to be the case, the "vast majority" of the time would have to be spent donning and doffing "clothes."<sup>59</sup>

Whether wearable robotic devices and other wearable technologies will fit in this definition of "clothes" is likely to depend on the nature of the device and how commonly worn such devices are outside of a small set of industries that require them. At least initially, it is unlikely that such devices will qualify as clothes because they are not "commonly regarded as articles of dress." Therefore, time spent donning and removing wearable robotics and other technology will probably be compensable, even in workplaces governed by a collective bargaining agreement that excludes time spent changing and washing clothes, unless the portion of time devoted to donning and doffing the wearable technology makes up only a relatively small portion of the time spent donning and doffing overall.

## **C. Disability Law**

Employers may one day be required to provide wearable robotic devices as reasonable accommodations, or to accommodate disabled employees who wear them.

<sup>53</sup> Technology Today, Jul. 30, 2014. See <https://www.newscientist.com/article/mg22329803.900-robotic-suit-gives-shipyard-workers-super-strength> (last visited Aug. 7, 2015).

<sup>54</sup> *Sandifer et al. v. United States Steel Corp.*, 571 U. S. \_\_\_\_ at 3-5 (2014).

<sup>55</sup> 29 U.S.C. § 203(o).

<sup>56</sup> *Sandifer et al. v. United States Steel Corp.*, 571 U. S. \_\_\_\_ at 6 (2014).

<sup>57</sup> *Id.* at 12.

<sup>58</sup> *Id.* at 14-15.

<sup>59</sup> *Id.*



Robotic arms or legs are already allowing individuals with physical disabilities to operate without physical restrictions. Cyberdyne's battery-operated exoskeleton, which is being developed in Japan, can be worn to increase mobility and muscle function in those with musculoskeletal disabilities and persons without disabilities.<sup>60</sup> The suits have been touted as the "first assistive nursing mechanism to be certified under a draft international safety standard for personal robots."<sup>61</sup> Firefighters have been able to use exoskeleton suits to "supplement muscle performance and help . . . manage all the extra weight without impeding the freedom of movement."<sup>62</sup> Wearable technologies like this have the potential to mitigate disabilities based on mobility and muscle function, broadening employment opportunities for disabled workers.

These wearable technologies may one day be required as accommodations for disabled employees. Under the ADA and similar state laws, workers' mobility limitations can require reasonable accommodation by modification of both the duties and the workplace, which includes obtaining assistive equipment.<sup>63</sup> Currently, much wearable and human enhancing technology may not be objectively reasonable or may pose undue hardships because of its novelty or cost. However, as this technology becomes more common and prices decline, it becomes more likely that employers may be required to provide it to aid disabled employees to perform their jobs.

While the overwhelming effect of these wearable enhancing devices will likely be improved physical capability, wearable technology also carries the potential to highlight disabilities that previously did not affect employees' abilities to work. Therefore, in incorporating wearable technologies, employers should be alert to the possibilities that certain workers may be limited in their abilities to use the new technology. For example, workers may be sensitive to the materials composing the wearable devices or may have preexisting disabilities that interfere with the fit and movement of the technology or that the technology would exacerbate. These limitations may qualify as disabilities, requiring accommodation in their own right.

The fast pace of innovation may also throw into question the qualifications of physicians to accurately certify workers' abilities and limitations. When employees seek reasonable accommodations, employers are entitled to at least one physician certification as to the extent of the employees' limitations.<sup>64</sup> Employers who are concerned that physicians may not be taking into account the range of potential mitigation options when they assess employees' abilities may wish to consider selecting physicians who are familiar with these innovations or educating physicians and employees on the accommodation options available to them.

#### D. OSHA

Advances in wearable technology in the workplace will lead to a massive increase in the interaction between workers and robots. This development is in direct contrast to a vast body of OSHA's safety standards – which are designed to ensure that workers and machines operate *separately*. For example, OSHA enforces regulations for machine guarding on a wide variety of equipment.<sup>65</sup> OSHA's general machine guarding standard for all machines provides, in part, that one or more methods of machine guarding "shall be provided to protect the operator and other employees in the machine area from hazards" that may be created by operation of the device.<sup>66</sup> OSHA general machine guarding standard goes on to state that "the point of operation of machines whose operation exposes an employee to injury, shall be guarded," and that in the absence of some other specific standard, the guard "shall be so designed and constructed as to prevent the operator from

60 See N.V., *Difference Engine: The caring robot*, THE ECONOMIST, May 14, 2013, available at <http://www.economist.com/blogs/babbage/2013/05/automation-elderly> (last visited Aug. 7, 2015).

61 *Id.*

62 See Glenn McDonald, *Firefighter Exoskeleton To The Rescue*, DISCOVERY NEWS, May 21, 2014, available at <http://news.discovery.com/tech/robotics/firefighter-exoskeleton-to-the-rescue-140521.htm> (last visited Aug. 7, 2015).

63 Title I of the Americans with Disabilities Act, 42 U.S.C.A. § 12101 et seq., requires reasonable accommodation of disabilities through modifications to the work or workplace. Title II requires further modifications to enhance accessibility, but only applies to certain public entities. 42 U.S.C.A. § 12111(9-10); 29 C.F.R. § 1630.2(o)(2)(ii) (listing acquisition of equipment as a reasonable accommodation).

64 29 C.F.R. Section 1630.9.

65 See, e.g., 29 C.F.R. 1910.213 (for woodworking machinery requirements); 29 C.F.R. 1910.215 (for abrasive wheel machinery); 29 C.F.R. 1910.217 (for mechanical power presses); and 29 C.F.R. 1910.218 (for forging machines)

66 29 C.F.R. 1910.212(a)(1).

having any part of his body in the danger zone during the operating cycle.”<sup>67</sup> The design and use of wearable technology and collaborative robots is not contemplated within these standards.

Collaborative robots that exert little force or that are designed to handle relatively light loads or tools are unlikely to pose a significant safety risk or challenge when the device accidentally strikes a human coworker. However, with the development of advanced collaborative robots that can carry significant weights at high speeds, all while operating in close proximity to humans, the risk of significant injury increases substantially. With this in mind, one question that will have to be answered by regulators, manufacturers, and employers is what level of injury, if any, is “tolerable” when a collaborative robot accidentally hits a coworker. The old rules and methods of guarding against all such strikes between human and machine will often have no application for collaborative robots in the workplace.

As noted above, the American National Standards Institute (ANSI) recently updated its existing standard governing robotics safety in 2012.<sup>68</sup> These standards address, among other things, the requirement that robotics systems be assessed for risk. In particular, a risk assessment must be conducted on all robotic systems by the supplier and by the end user. Ultimately, the risk assessment is used to determine whether all hazards are at an acceptable risk level for interaction with an operator of the device. The risk assessment component of the ANSI standard is designed, in part, to recognize that every robotics system is unique and that it may also present unique safety hazards as designed, as integrated into a particular operation, and as it is used.

Moreover, with the creation of additional options for remote worksites using new robotic applications, the scope of an employer’s responsibility for workplace safety may expand to new locations not directly controlled by the employer. For example, OSHA currently does not require employers to inspect home offices, OSHA generally will not conduct inspections of home offices, and OSHA typically will not hold employers liable for conditions in an employee’s home office.<sup>69</sup> However, OSHA’s own guidance regarding home offices also provides that employers are indeed responsible for hazards in home worksites that are caused by “materials, equipment, or work processes which the employer provides or requires to be used in an employee’s home.”<sup>70</sup> To the extent an employer is supplying employees with robotic applications for use in remote locations such as home offices, the employer must ensure that the equipment and the process for using the equipment complies with or exceeds recognized safety standards. The potential exposure to liability for violation of safety practices in remote work locations is further complicated by the inability of employers to consistently monitor employee behavior in remote locations. Therefore, adequate training and the development of safe work practices and procedures for the use of any robotic applications is also critical for remote work locations.

## IV. TELEPRESENCE, TELEMANIPULATION AND THE BORDERLESS WORKPLACE (CATEGORY THREE)

### A. Extraterritorial Application of Workplace Laws

Which jurisdictional laws apply to a given workplace activity depends largely on the physical location of the actors and events. As telepresence and telemanipulation technology permit employees to perform work in states and countries far from their physical locations, the distance between employees, managers and the effects of the employee’s work will increasingly raise the question of which laws govern. To illustrate this issue, this section considers wage and hour law.

Employers are subject to federal wage and hour laws such as the Fair Labor Standards Act (FLSA) and Equal Pay Act (EPA) with respect to the workers performing work in the United States. In addition, employers may be subject to the

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<sup>67</sup> 29 C.F.R. 1910.212(a)(3)(ii).

<sup>68</sup> ANSI 2012 R15.06.

<sup>69</sup> See OSHA Directive CPL 2-00.125, “Home-Based Worksites” (Feb. 25, 2000), *available at* [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=directives&p\\_id=2254](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=directives&p_id=2254) (last visited Aug. 7, 2015).

<sup>70</sup> *Id.*

wage and hour laws of various states. As a general rule, the law of the state in which the work is performed governs the employer's wage and hour responsibilities with respect to that employee.

Subject to constitutional restraints, states determine the reach of their own wage and hour laws.<sup>71</sup> Therefore, states have discretion over whether to extend wage and hour law coverage to workers whose tasks primarily produce results in another state. States may define the scope of their wage and hour statutes very broadly.<sup>72</sup> California, for example, has even required California corporations to comply with its own minimum wage standards for workers who live and work primarily out-of-state for any entire days that the out-of-state workers spend working in California.<sup>73</sup> However, so far no state has successfully subjected an employer to that state's wage and hour requirements for work conducted by an employee who performs all of his work in another state.<sup>74</sup>

Consider the example of an employee who works remotely and permanently resides in one state, but her job requires her to operate a robot located in another state. That employee would not be subject to the law of the state in which the robot she operates is located; she would likely be subject to the law of the state in which she performs the operation. However, employers located on state borders should consider the potential wage and hour implications of allowing their employees to split their time between working in the physical plant and working remotely from another state.

The same question arises when workers located in other countries operate robots located in the U.S. The FLSA states that it "shall not apply with respect to any employee whose services during the workweek are performed in a *workplace* within a foreign country or within territory under the jurisdiction of the United States."<sup>75</sup> This provision has not been applied to the question of whether the FLSA governs payment of workers located in other countries who operate robots located in the U.S. Courts usually find that when an employee of a U.S. company is physically outside of the U.S. performing work without telepresence technology for the majority of the time, they are not entitled to U.S. wage and hour protections.<sup>76</sup> The definition of "workplace," however, could be contested in the context of remote operation of robots located in the U.S. When courts do address this question, they may draw from the reasoning behind the institution of FLSA<sup>77</sup> to decline coverage to workers permanently based abroad.

## **B. Independent Contractor Issues: Remote and Crowdsourced Workers**

It appears that, for the foreseeable future, the distinction between employee and independent contractor will continue to provide the threshold for the application of wage and hour laws like the FLSA. Consequently, a question that employers must consider is how the incorporation of robotics will affect workers' classifications under this scheme. While courts have yet to address this question, the answer will likely turn, as it has for decades, on the precise terms and conditions of the working arrangement, on a case-by-case basis.

Generally, a court will consider the following six factors when evaluating independent contractor status:

- the degree to which the worker is independent or subject to the control of the "employer" as to the manner in which the work was performed;

71 See e.g. *Sullivan v. Oracle Corp.*, 557 F.3d 979 (9th Cir. 2009) (Certifying the question of applicability of wage and hour laws to in-state work by non-residents to the state court).

72 California's minimum wage law, for example, states that it covers "all" people, without mentioning any geographical limitation. Cal. Lab. Code § 1171.-71.5.

73 *Sullivan v. Oracle*, 541 Cal. 4th 1191 (2011).

74 *Sims v. WorldPac, Inc.*, 2013 U.S. Dist. LEXIS 24740 at \*6 (N.D. Cal. Feb. 22, 2013) ("In general, there is a presumption that the 'Legislature did not intend a statute to be operative, with respect to occurrences outside the state ... unless such intention is clearly expressed or reasonably to be inferred from the language of the act or from its purpose, subject matter or history.'"); See also *Sajfr v. BBG Communs., Inc.*, 2012 U.S. Dist. LEXIS 15198 (S.D. Cal. Jan 10, 2012).

75 See e.g. 29 U.S.C. § 213(f).

76 *Wright v. Adventures Rolling Cross Country, Inc.*, 2012 U.S. Dist. LEXIS 104378 at \*\*6-7 (N.D. Cal. May 3, 2012) (finding that trip guides hired by a California company on a per trip basis to conduct three-week trips in other countries were not entitled to minimum wage under the FLSA).

77 *Wright v. Adventures Rolling Cross Country, Inc.*, 2012 U.S. Dist. LEXIS 104378, at \*\*6-7 (N.D. Cal. May 3, 2012).

- the worker’s opportunities for profit or loss;
- the worker’s investment in the facilities and equipment of the business;
- the permanency and duration of the relationship between the business and the worker;
- the degree of skill required to perform the work in question; and
- the extent to which the services rendered are an integral part of the employing entity.<sup>78</sup>

Notwithstanding the difficulty of making predictions, several factors tend to support classifying more flexible employment arrangements as independent contractor relationships. Remote workers’ abilities to control when and where they work supports an inference that the business exercises relatively little control. To the extent that this increased flexibility allows workers to realize gains and losses by allocating time in their days as productively as possible, it also supports classifying remote workers as independent contractors.

Crowdsourcing, a revolutionary model for integrating technology into workplace operations, places unique strains on the traditional classification method. On crowdsourcing websites, such as Amazon’s Mechanical Turk, “[w]orkers are offered pay for completion of a series of Human Intelligence Tasks (HITs), easily fragmented activities (like transcription, categorization or tagging) in which computers” require human assistance.<sup>79</sup>

These massive workplaces raise the same question—are crowdsourced workers employees or independent contractors? At first glance, crowdsourced workers appear to be independent contractors. They perform discrete tasks for which they are paid by the piece, use their own equipment, work when and where they want, work for multiple entities, and generally receive no additional training or instruction. However, the purportedly low average rate of pay on some platforms has incited opposition to classifying crowdsourced workers as independent contractors, on the grounds that such classification circumvents the societal goals of wage and hour law.<sup>80</sup>

### C. “On Call” Employees

Telepresence and telemanipulation will likely allow some jobs that currently entail substantial downtime to be performed by employees working remotely, on an as-needed basis. This could substantially reduce the amount of compensable time worked by eliminating the obligation to compensate employees for down-time formerly spent at the workplace. However, even if these jobs can be performed remotely in a manner that allows employees to devote the downtime to non-work-related pursuits, the time that employees are “on-call” may be compensable.

Under the FLSA and many analogous state laws, employers must compensate employees for periods of inactivity during which the employer’s requirement that employees be available if needed limits the employee’s discretionary use of time. For example, the U.S. Court of Appeals for the Tenth Circuit has held that employees’ “on call” responsibilities “to continually monitor automated alarms by pager and computer,” which required them to remain close to their homes, were “sufficiently onerous” to require compensation under the FLSA.<sup>81</sup> In contrast, courts usually do not find that merely requiring an employee to return a phone call or respond to a pager causes an employer to owe the worker for the time during which that requirement exists.<sup>82</sup> Therefore, employers seeking to use robots and remote operation to lower payroll costs and other overhead by permitting employees to work remotely and as needed on a regular basis should structure remote workers’ “on call” time to

78 Matthew Bender 1-2 Wages and Hour: Law and Practice § 201A(1)(b).

79 Nancy Folbre, *The Unregulated Work of Mechanical Turk*, N.Y. TIMES BUS. DAY, Mar. 18, 2013, available at [http://economix.blogs.nytimes.com/2013/03/18/the-unregulated-work-of-mechanical-turk/?\\_r=1](http://economix.blogs.nytimes.com/2013/03/18/the-unregulated-work-of-mechanical-turk/?_r=1) (last visited Aug. 7, 2015).

80 *Id.* [http://economix.blogs.nytimes.com/2013/03/18/the-unregulated-work-of-mechanical-turk/?\\_r=1](http://economix.blogs.nytimes.com/2013/03/18/the-unregulated-work-of-mechanical-turk/?_r=1http://economix.blogs.nytimes.com/2013/03/18/the-unregulated-work-of-mechanical-turk/?_r=1)

81 *Pabst v. Oklahoma Gas & Elec. Co.*, 228 F.3d 1128 (10th Cir. 2000); *See also Reimer v. Champion Healthcare Corp.*, 258 F.3d 720, 725-26 (8th Cir. 2001); *Cleary v. ADM Milling Co.*, 827 F. Supp. 472 (N.D. Ill. 1993); *Shamblin v. City of Colchester*, 793 F. Supp. 834 (C.D. Ill. 1992).

82 *See, e.g., Reimer v. Champion Healthcare Corp.*, 258 F.3d 720, 725 (8th Cir. 2001); *Dinges v. Sacred Heart St. Mary’s Hosps.*, 164 F.3d 1056, 1059 (7th Cir. 1999); *Ingram v. County of Bucks*, 144 F.3d 265, 269-70, (3d Cir. 1998); *Paniagua v. City of Galveston*, 995 F.2d 1310, 1317 (5th Cir. 1993); *Norton v. Worthen Van Serv., Inc.*, 839 F.2d 653 (10th Cir. 1988).

minimize any restrictions on how the employees use this time. Placing restrictive requirements on employees could expose them to claims under state and federal law.

#### D. Privacy Concerns

Telepresence and telemanipulation technologies are primarily intended to allow employees to work remotely from the location where tasks are being performed by a robot or other technology; for example, a drone pilot at Amazon headquarters flying a robotic aircraft to deliver holiday presents for the tardy shopper. The remote robot, using cameras, video and audio recording devices, and other sensors, can collect information necessary for the employee to perform his/her job functions. This technology raises the risk that the employee or the robot will “over-collect” information in a way that could violate individual privacy rights.

One possibility is that the robotic technology could collect information about the employee-operator that the employer cannot lawfully collect. For example, telemanipulation technologies may incidentally capture a host of health information from an employee-operator in the process of calibrating the technology to the individual. In this example, an assisted surgery robot may recognize and learn to compensate for the tremor in a surgeon’s hand and even for the individual’s pulse. Collecting this information poses legal risks. Under the ADA, employers generally are prohibited from requiring employees to submit to inquiries about their medical condition or their disability unless the inquiry is “job-related and consistent with business necessity.”<sup>83</sup>

The robotic technology’s audio and video recording functionality also may over-collect or collect information in a way that is not lawful. By way of illustration, California prohibits the recording of communications without the consent of all parties to the communication in circumstances where the subjects reasonably believe that they would not be recorded.<sup>84</sup> Individuals in a location subject to the use of telepresence technology may not realize that the robotic technology is recording their communications, let alone consent to such recordings.

These technologies may also collect information that the employer has a legal obligation to safeguard. As noted above, telemanipulation technologies may collect health information. A telepresence screen may unwittingly capture and store private information, such as images of driver’s license numbers and financial account numbers. Many states require organizations to safeguard such personal information.<sup>85</sup> If the information is compromised, the employer may have to issue breach notifications and provide identity theft monitoring.<sup>86</sup> If the personal information is stored by a third party that controls the telepresence technology, the employer should vet the service provider’s information security program and obtain contractual assurances that require the service provider to maintain those safeguards.

U.S. courts have generally recognized that employees have a diminished expectation of privacy in the workplace. In *O’Connor v. Ortega*, the U.S. Supreme Court held that a reasonable expectation of privacy in an office may be balanced against the legitimate interests of the employer in conducting a search.<sup>87</sup> However, this balancing test becomes more challenging when the employee is virtually present in the office but is physically in his or her home. In that case, what is the “workplace”? A related risk is the collection of location information from employees with whom the employer connects through telepresence technologies. In *U.S. v. Jones*, the Supreme Court held that continuous tracking of a vehicle’s location for one month constituted an unreasonable search in violation of the Fourth Amendment, even though the vehicle’s location was in public view at any particular point in time.<sup>88</sup> Five justices found a protected privacy interest in the pattern of private activity that can be derived from continuous location tracking notwithstanding the public nature of any particular data

<sup>83</sup> 42 U.S.C. § 12112(d)(4)(A).

<sup>84</sup> Cal. Penal Code §632.

<sup>85</sup> See, e.g., Cal.Civ.Code § 1798.81.5.

<sup>86</sup> See, e.g., Cal. Civ. Code § 1798.82.

<sup>87</sup> 480 U.S. 709, 719-20 (1987).

<sup>88</sup> 132 S.Ct. 945, 946 (2012).



point.<sup>89</sup> These privacy issues will continue to emerge as technology advances and as the U.S. Supreme Court continues to rule on the challenges technology imposes on current laws.<sup>90</sup>

Employers can reduce these risks in several ways. The robotics technology itself may provide functionality that helps to reduce the risk of over-collection. Employers can train their workforce on how to use this functionality. Providing notice and obtaining consent can also go a long way towards reducing privacy risk. Effective notices will require a deep understanding of the technology's functionality. At bottom, the privacy risk is highly manageable as long as the employer makes an effort to understand the risk and how the technology can be used to reduce it.

### E. Tax Implications – Independent Contractors

Center firms arose in the late 19th and early 20th centuries to aggregate assets for efficiency, and required large numbers of employees to do so. However, technologies such as crowdsourcing and telepresence, aided by today's more efficient markets, are capable of handling transactions that previously were required to be handled within the firm.

Just as automation has driven down the number of employees required to perform tasks such as payroll and human resources, crowdsourcing will likely decrease the number of full-time employees needed to perform simple, discrete digital and manual tasks that cannot be performed by robots. This has the potential side effect of creating many firms that may keep their full-time employees to less than 50, thereby avoiding the health insurance mandates of the Affordable Care Act, and thus reducing the potential tax penalties or benefit costs associated with a larger workforce.

Remote access and crowd-sourcing technologies allow for more rapid ramp up and down of workforces through the use of independent contractors. While the status of workers as employees or independent contractors does not, by itself, cause major problems for tax administration or the funding of social insurance other than unemployment, there is no question that an increase in numerous small "firms" - whether a single person or a few people - potentially makes employer-based tax administration less effective.

## V. ARTIFICIAL INTELLIGENCE AND COGNITIVE COMPUTING SYSTEMS (CATEGORY FOUR)

### A. Workplace Privacy

Cognitive computing systems learn and interact with people to extend what humans or machines can do on their own. IBM's Watson supercomputer is the iconic example of this transformation. Having defeated two human *Jeopardy* champions, Watson is now being "tutored" by Memorial Sloan-Kettering, the world's oldest and largest private cancer treatment center, to help oncologists diagnose and treat cancer. Watson can listen to and process information while attending patient visits; process up to 60 million pages of text *per second*; and understand "natural language." Watson also has the ability to express doubt. When making a diagnosis or treatment recommendation, the supercomputer usually pairs a level of confidence to each issued series of possibilities.<sup>91</sup> IBM has also created the "IBM 'Watson' Engagement Advisor," which has a self-service mode that permits customers who contact call centers to interact directly with Watson by typing questions into a web browser or by speaking to a speech recognition program.<sup>92</sup> In fact, there is evidence to suggest that call center operations

<sup>89</sup> *Id.*

<sup>90</sup> While this case only held that police are barred from searching smart phones when they arrest someone without a warrant, the ruling has been called "the Brown v. Board of Education of privacy." The justices recognized just how much private information and data is held on such devices as cell phones. See *Riley v. California*, 134 U.S. 2473 (2014); See Neal Katyal, *Opinion: Supreme Court swings in favor of criminal defendants*, CONCORD MONITOR, July 15, 2015, available at <http://www.concordmonitor.com/home/17603291-95/opinion-supreme-court-swings-in-favor-of-criminal-defendants> (last visited Aug. 7, 2015); See Adam Liptak, *Major Ruling Shields Privacy of Cellphones*, THE NEW YORK TIMES (Jun. 25, 2014), [http://www.nytimes.com/2014/06/26/us/supreme-court-cellphones-search-privacy.html?\\_r=0](http://www.nytimes.com/2014/06/26/us/supreme-court-cellphones-search-privacy.html?_r=0) (last visited Aug. 7, 2015) ("This is a bold opinion," said Orin S. Kerr, a law professor at George Washington University. "It is the first computer-search case, and it says we are in a new digital age. You can't apply the old rules anymore.") (internal quotes added).

<sup>91</sup> Jonathan Cohen, *The Robots Will See You Now*, THE ATLANTIC, Feb. 20, 2013, available at <http://www.theatlantic.com/magazine/archive/2013/03/the-robot-will-see-you-now/309216/> (last visited Aug. 7, 2015).

<sup>92</sup> John Markoff, *The Rapid Advance of Artificial Intelligence*, THE NEW YORK TIMES, Oct. 14, 2013, available at [http://www.nytimes.com/2013/10/15/technology/the-rapid-advance-of-artificial-intelligence.html?\\_r=0](http://www.nytimes.com/2013/10/15/technology/the-rapid-advance-of-artificial-intelligence.html?_r=0) (last visited Aug. 7, 2015).

that were once outsourced to India and the Philippines are returning to the United States, only to be handled by robots and artificial intelligence systems such as Watson.<sup>93</sup>

While Watson may not be quickly introduced into most workplaces, many other forms of “Information Age” artificial intelligence systems likely will. Some companies, including several start-ups and Google, are developing personal assistants in the form of smart phone apps that use predictive search techniques to anticipate what users need *before* they ask for it. In support of wellness programs, employers may require employees to use smart phone applications, like MyFitnessPal and Azumio, to track their medical information, such as blood pressure, weight, heart rate, activity counters, and stress levels. Private sector employers are also increasingly using global positioning satellite (GPS) systems to track their employees’ whereabouts.<sup>94</sup> However, such employers should provide notice to employees that technology is tracking their location, thereby allowing employees to deactivate location tracking when they are “off the clock” and to avoid locations that would reveal private information about them when they are being tracked.

Technologies that collect biometric information, such as fingerprints or facial scans, also present hidden risks for employers. For example, New York generally prohibits employers from requiring employees to provide a fingerprint.<sup>95</sup> Moreover, California’s Attorney General has taken the position that app developers and platform providers are required to comply with California’s On-Line Privacy Protection Act (COPPA), which requires that commercial web site operators post a privacy policy on their web site with respect to mobile apps.<sup>96</sup> COPPA does not appear to apply to employers that develop or provide mobile apps for business purposes, only because the statute applies only to online services offered for sale or lease by consumers “for personal, family, or household purposes.”<sup>97</sup> However, COPPA arguably would apply if an employer were to sell mobile apps to employees for personal purposes, such as to participate in a wellness program.

## B. Anti-Discrimination Laws

Several federal laws prohibit discrimination based on race, including Title VII of the Civil Rights Act of 1964 and the Civil Rights Acts of 1866 and 1871. These laws prohibit employers from using an individual’s race or other protected category as a basis for any employment decision.

Pre-programmed or employer-programmed robotic systems could operate with inherent biases or limitations.<sup>98</sup> For example, technology that operates by voice commands could present challenges for individuals who do not speak English as their first language. Employers could minimize their exposure by customizing advanced robotic systems to meet such challenges. In addition, employers can provide targeted training to employees in a protected class in order to mitigate such issues.

## C. Computer Based Systems and eDiscovery

Technology has already significantly impacted how discovery is conducted in today’s digital age. There is no dispute that data volumes implicated in litigation have exploded during the past decade. It is simply not possible for humans to effectively analyze and review the staggering volume of data in 21<sup>st</sup> Century litigation without help from machines. Thus, industry-standard technologies have emerged to help lawyers collect, search, protect, and produce information in litigation.

93 *Id.*; Gary Marcus, *Why We Should Think About the Threat of Artificial Intelligence*, THE NEW YORKER, Oct. 24, 2013, available at <http://www.newyorker.com/online/blogs/elements/2013/10/why-we-should-think-about-the-threat-of-artificial-intelligence.html> (last visited Aug. 7, 2015).

94 *Id.*

95 N.Y. Labor Law § 201-a.

96 See Cal. Bus. & Prof. Code § 22575; California Department of Justice, *Privacy on the Go: Recommendations for the Mobile Ecosystem* at 4 (Jan. 2013) available at [http://oag.ca.gov/sites/all/files/agweb/pdfs/privacy/privacy\\_on\\_the\\_go.pdf](http://oag.ca.gov/sites/all/files/agweb/pdfs/privacy/privacy_on_the_go.pdf) (last visited Aug. 7, 2015).

97 Cal. Bus. & Prof. Code § 22577(d).

98 Walter Frick, *When Your Boss Wears Metal Pants*, 93 HARV. BUS. REV. 84 (Jun. 2015) (“Humanoid robots can create interpersonal issues in the workplace. For instance, an employee expressed jealousy after a humanoid robot complimented a colleague for being in the office all the time and therefore being a hard worker.”).

Those computer-based tools save legal professionals hundreds of thousands of hours and the related costs that would be required to review and analyze the same volume of data without help from technology.

## VI. WHAT DOES THE FUTURE HOLD?

- Potentially more regulatory and legislative responses to job dislocations caused by robotics and computer-based technologies
- Courts and regulatory agencies attempting to apply well-established labor and employment laws to virtual workplaces
- An expectation from employers for greater worker adaptability and greater technological sophistication from their employees
- Improved efficiency and safety
- Cost reduction

Legislatures are taking steps to provide the well-trained workforces that are essential to realizing the opportunities of this technology. The Workforce Innovation and Opportunity Act (WIOA) provides opportunities for employers and manufacturers of these technologies to coordinate with federal and state funders to train a workforce that meets their needs. Under the WIOA, “[s]tate and local boards will promote the use of industry and sector partnerships to address the workforce needs of multiple employers within an industry.” Such partnerships can ease the financial burden born by first movers to train employees on new technologies and help to supplement shortfalls in the labor market that cannot be resolved by individual employers, generally lowering the industry-wide costs of scaling up new technologies. The federally funded “registered apprentice” program provides another highly customizable form of on-the-job training that will be helpful in bringing workers up to speed on new and specialized technologies. Employers should be aware of these changes domestically, as well as internationally, since many countries are beginning to develop new laws and regulations surrounding the implementation of robots and automation into our societies and workplaces.<sup>99</sup>

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<sup>99</sup> The EU-backed €1.5 million RoboLaw Project was developed by a team of roboticists, lawyers, and philosophers who came up with proposals for the laws and regulations necessary to manage emerging robotics technologies in Europe. European Commission, Scuola Superiore Sant’Anna (“SSSA”), *Regulating Emerging Robotic Technologies in Europe: Robotics facing Law and Ethics (project acronym RoboLaw)*, proj. no. 289092 (Sept. 22 2014) available at <http://www.robolaw.eu/index.htm>.



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