ROBOTS, NEW TECHNOLOGY, AND INDUSTRY 4.0 IN CHANGING WORKPLACES. IMPACTS ON LABOR AND EMPLOYMENT LAWS

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Structural changes in economies driven by digitalization, demographic changes, and migration are changing the shape of jobs and workplaces. Technological advances have the potential to deliver enormous benefits to society but will also have profound consequences on employment and the quality thereof.[1]

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1. *See G7 Labour Summit: Just Transition Principles Must Underpin the Future of Work*, INT'L TRADE UNION CONFEDERATION (Sept. 26, 2017), [hereinafter *G7 Labour Summit*], https://www.ituc-csi.org/g7-labour-summit-just-transition?lang=fr (arguing that the changing workplace fits into a larger pattern of depreciation of worker protections); *see also Vatican Convenes with Labour Leaders to Discuss Threats to the World of Work*, INT'L TRADE UNION CONFEDERATION (Jan. 11, 2018), https://www.ituc-csi.org/vatican-convenes-with-labour ("The increase in automatization, individualization, inequality, precarity, mass unemployment, poverty and the phenomena of exclusion and the 'discarding' of people puts the 'common home' at risk. These trends present serious challenges for all social and institutional players and in particular for the world of work."); *id.* ("An international meeting of more than 300 trade union leaders convened by the Dicastery for promoting integral human development and hosted by the Vatican has called on intellectuals, business leaders, employers, civil society, international organizations and governments to act in solidarity for integral, inclusive and sustainable development, with 'work, land and housing for all.'").

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I. INTRODUCTION: CHANGING WORKPLACE ENVIRONMENT

The very issues created by corporate restructuring and changing workplace environments, with their infusion of new technology, also create emerging employment law issues in regulating the changes and in addressing the challenges in evaluating performance. The workplace environment significantly affects an employee's work product, both in quality and efficiency.[2]

Measuring worker productivity/performance amid the ongoing restructuring of companies and changing traditional employment relationships caused by fissurization, platformization, digitalization, robotization, new technology, and remote and cross-border workplaces, and the challenges for the also changing techniques of measuring worker performance, all within the limits of employment law, are the topic of this Article.

And then there is the somewhat cynical prospect that under Industry 4.0,[3]

2. Leslie Allan, *Workplace Environment and Employee Performance*, BUS. PERFORMANCE PTY LTD, http://www.businessperform.com/workplace-training/workplace_environment.html (last visited Sept. 25, 2018).

3. *See* Martin, *Industry 4.0: Definition, Design Principles, Challenges, and the Future of Employment*, CLEVERISM (Jan. 16, 2017) [hereinafter *Industry 4.0*], https://www.cleverism.com/industry-4-0/ (defining Industry 4.0 as the fourth industrial revolution, the cyber physical age, that followed the earlier ages of mechanization, mass production, and computer and automation); *id.* ("The fourth industrial revolution takes

there will be a decreasing need for measuring worker performance due to robotization and new technology.[4] Studies predict that approximately forty-seven percent of the total U.S. employment market is at high risk of being displaced by technology, while, in Thailand and India, approximately seventy percent of total employment is at risk.[5]

> Technological advances have the potential to deliver enormous benefits to society, but will also have profound consequences on employment and the quality thereof . . . . [E]stimates on jobs displacement due to automation and the rise of [AI] vary between an alarming [fifty] per cent and a more nuanced nine per cent of occupations being displaced altogether.[6]

Industry 4.0 is a global trend taking place outside traditional employment structures because traditional employment has higher wage costs.[7]

Assessing worker performance in a technologically advancing labor market,[8] while involving many Human Resources Management ("HRM")

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the automation of manufacturing processes to a new level by introducing customized and flexible mass production technologies. This means that machines will operate independently, or cooperate with humans in creating a customer-oriented production field that constantly works on maintaining itself. The machine rather becomes an independent entity that is able to collect data, analyze it, and advise upon it. This becomes possible by introducing self-optimization, self-cognition, and self-customization into the industry. The manufacturers will be able to communicate with computers rather than operate them."); *see also Industry 4.0: The Fourth Industrial Revolution — Guide to Industrie 4.0*, I-SCOOP, https://www.i-scoop.eu/industry-4-0/ (last visited Sept. 25, 2018).

4. *Students Today Have to Learn More and Faster Than Their Parents Ever Did — A Q+A With NY Times Best Selling Author Daniel Pink*, MICH. ROSS (Sept. 8, 2017), https://michiganross.umich.edu/ross-news-blog/2017/09/08/students-today-have-learn-more-and-faster-their-parents-ever-did-qa-ny (describing a pro-employee defensive strategy for students preparing to enter the workplace where their performance will be evaluated on how to avoid being displaced by technology as presented by best-selling author Daniel Pink); *id.* ("[QUESTION]: As [AI] and automation are rapidly changing workplace roles, what are the most important skills that our students should focus on developing now to prepare them for future success? [ANSWER]: The top-level answer is to build skills that are hard to automate, hard to outsource, that deliver on the new demands of rising living standards, and that augment machine intelligence. The more granular answer is: Communication skills (especially writing); empathy; design thinking; the ability to compose; basic quantitative skills; synthesis and symphonic thinking; grit, the willingness to practice, and a strong work ethic; and anything 'multi' — multi-lingual, multi-cultural, multi-disciplinary.").

5. *See* Gerlind Wisskirchen, *Digitalization and Automatization and Their Impact on the Global Labor Market*, EUR. AM. CHAMBER COM. N.Y., https://www.eaccny.com/news/member-news/digitalization-and-automatization-and-their-impact-on-the-global-labor-market/ (last visited Sept. 21, 2018).

6. *G7 Labour Summit*, *supra* note 1.

7. *See id.* (discussing how algorithms and outsourcing will replace traditional office functions in new job structures because of the lower costs).

8. *See* Boris Ewenstein, Bryan Hancock, & Asmus Komm, *Ahead of the Curve: The Future of Performance Management*, MCKINSEY&CO. (May 2016), https://www.mc

issues,[9] also provides the opportunity to consider the employment law implications[10] when evaluated workers are "wired" to their jobs by working at remote, but "connected," locations abroad or across town, or have a "robo-boss" or robot co-workers. There are three threshold questions. First, *who* evaluates and can place consequences on evaluations, and how is that determined by the employment relationship (employer-employee/independent contractor or third-party contractor) where there is an outside, alternative workplace? Second, *how* (by what means) and by what and whose standards is the evaluation conducted (objective vs. subjective factors; use of technology in evaluations)? And third, *whether* there is legal justification for differential evaluations under anti-discrimination laws, as variant workplaces and technological efficiency may disparately impact age, gender, and disability factors in increasingly diverse workplaces.

Performance evaluations may be done by humans or technology, and most often by both, with the latter assisting the former.[11] Concerns regarding privacy and the impact of unions on restructuring and performance evaluations must be considered, even as the traditional employment relationship is transformed into models often falling outside the existing labor and employment law regulations.[12]

Familiar legal issues may arise, though perhaps with unfamiliar applications.[13] Not all jobs fall under the changing labor market conditions

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kinsey.com/business-functions/organization/our-insights/ahead-of-the-curve-the-future-of-performance-management (analyzing how performance management will change when abandoning traditional performance analysis); *see also* Judith Heerwagen, Kevin Kelly, & Kevin Kampschroer, *The Changing Nature of Organizations, Work, and Workplace*, WHOLE BUILDING DESIGN GUIDE (Oct. 5, 2016), https://www.wbdg.org/resources/changing-nature-organizations-work-and-workplace (exploring the changes in the workplace and the effects on performance); *The Future at Work—Trends and Implications*, RAND CORP. (2004), http://www.rand.org/pubs/research_briefs/RB5070/index1.html (discussing data and trends regarding the future of work).

9. Allan, *supra* note 2 (discussing the nine key workplace environment factors which determine an employee's level of performance in the workplace).

10. *See generally* Daniel A. Van Bogaert, *New Legal Battlegrounds for Performance Evaluations*, https://studylib.net/doc/8184704/new-legal-battlegrounds-for-performance-evaluations (last visited Sept. 21, 2018) (analyzing performance law issues arising out of the evaluation process).

11. *See, e.g.*, Scott Fanning, *The Internet of Things Impacts Employment Law*, INSIDE COUNS., July-Aug. 2015, at 20 (stating that performance evaluations include employee behavior, and "[c]ompanies that can track employee movement through their badges can see where they are and even how active they are" and can include such data in evaluations).

12. *Infra* Section II.

13. *See, e.g.*, Fanning, *supra* note 11; Adam S. Jacoff, Elena R. Messina, & John Evans, *Performance Evaluation of Autonomous Mobile Robots*, 29 INDUS. ROBOT 259, 259 (Feb 1, 2002) (claiming that times are changing so much that even robots are

and for those cases, traditional evaluations that measure and evaluate productivity and performance may be aided by electronic technology.[14] But for those many workers, now and in the future, working in a changing or alternative work environment[15] (at home, in a different city, or overseas), or in an ambiguous or "joint employment" relationship, questions regarding the legal application of contractual wages and statutory benefits, safety and health requirements, workers compensation, and especially anti-discrimination laws arising from these performance evaluations may create novel situations in still-developing areas of law and legal solutions.[16]

This Article addresses the employment law implications of evaluating workers in the changing labor market, especially regarding the market's workplace environments and uses of technology. Following the introduction in Part I, Part II of this Article describes the changing workplace environment with its restructuring of companies and resulting changes in the employment relationship that raise issues concerning who is the evaluator of worker performance and by what means and by whose standards an evaluation is undertaken, as well as the role of technology and unions in that evaluative process. Part III examines the legal implications of a changing workplace environment and new technology on workers and performance. Part IV analyzes the relationship between the performance evaluations arising in the changing work environment and the labor and employment laws within which performance evaluations take place and suggests possible reforms of existing employment law and performance evaluation approaches. Part V concludes.

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evaluating performances of autonomous mobile robots).

14. *See* Fanning, *supra* note 11.

15. *See generally* Joe Aki Ouye, *Five Trends that are Dramatically Changing Work and the Workplace*, KNOLL WORKPLACE RES. (2011), https://www.knoll.com/media/18/144/WP_FiveTrends.pdf (discussing alternative workplace programs, their benefits, and their detriments).

16. *See* Dorrie Larison, *The Modern Workplace—Technological Change in Employment Practices—The Law Struggles to Keep Up*, EMP. L. ALLIANCE (Apr. 12, 2012), http://www.employmentlawalliance.com/firms/gpmlaw/articles/the-modern-workplacetechnological-change-in-employment-practicesthe-law-str (contemplating the use of gaming techniques in the workplace); Michael Pooler, *Robot Army is Transforming the Global Workplace*, FIN. TIMES (Nov. 20, 2017), https://www.ft.com/content/f04128de-c4a5-11e7-b2bb-322b2cb39656 (reporting that there are "armies of robots . . . spreading throughout factories and warehouses around the world, as the accelerating pace of automation transforms a widening range of industries" in both advanced countries and emerging economies); *id.* (summarizing a report by the International Federation of Robotics that stated that 2016 global industrial robot sales "increased by [eighteen percent] to $13.1bn").

II. CHANGING WORKPLACES IN GLOBAL ECONOMIES

Measuring worker performance has become more complicated and sophisticated in light of the internal re-structuring of companies and the many changing workplace environments.[17] While the local flower shop may be able to easily observe and measure a worker's performance, for larger employers, and those with external and global connectivity, including domestic and multinational corporations ("MNCs") using contract employers and labor chain workers across jurisdictional borders, measuring performance in an increasingly blurry employment relationship is more problematic. A core issue is the employment relationship between the employer and the employed under traditional legal rules and the changing nature of employers and workers in vertical and horizontal relationships, including "platform employers,"[18] joint-employers, and MNCs, with workers categorized as employees, independent contractors, etc. Additionally, the workers may be placed in varying locations and diverse workforce compositions, external to the company's place of business, necessitating modified performance evaluation approaches. The foregoing complicates who makes a performance evaluation, how it is made, and by whose or what standards, and what is the role of technology, the union, and privacy rights? As digitalization, robotics, and technological performance measurement programs are used, new legal issues arise around the traditional task of evaluating a worker's performance.

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17. DAVID J. WALSH, EMPLOYMENT LAW FOR HUMAN RESOURCE PRACTICE ch. 16 (5th ed. 2016). *See generally* Ronald C. Brown, *Made in China 2025: Implications of Robotization and Digitalization on MNC Labor Supply Chains and Workers' Labor Rights in China*, 9 TSINGHUA L. REV. 186 (2017) (discussing the change in Chinese workplaces through robotization and digitization and their implications on restructuring how companies produce cheap goods); Eric Feigenbaum, *Employee Evaluation Laws*, CHRON, https://smallbusiness.chron.com/employee-evaluation-laws-4880.html (last visited Sept. 29, 2018) (discussing a standard way to conduct a thorough employee evaluation).

18. *See generally* Rebecca Smith, *'Marketplace Platforms' and 'Employers' Under State Law — Why We Should Reject Corporate Solutions And Support Worker-Led Innovation*, NAT'L EMP. L. PROJECT (May 18, 2018), https://www.nelp.org/publication/marketplace-platforms-employers-state-law-reject-corporate-solutions-support-worker-led-innovation/ (analyzing various state laws that use the phrase "marketplace platforms" to define companies like Uber, who's "platform workers" are, in many of these laws, statutorily independent workers, rather than employees of the "marketplace platform").

A. Employers, Employment Relationships, and Workplace Environments

1. Restructuring of Companies

American businesses are changing with new technological applications. Especially in big companies, hierarchy levels are being eliminated, resulting in smaller organizational units and companies focusing on their core competencies and outsourcing other activities.[19]

Scheduling, shipments, and production processes are increasingly using the algorithms in digitalization and robotization, as are the evaluative mechanisms to review performance of those who do the work.[20] This technological change takes place in an increasingly global economy where companies, large and small, are restructuring to cut costs and limit liabilities. Approximately "[e]ighty [percent] of world trade and [sixty percent] of global production" is undertaken by MNCs using global labor supply chains that often cross borders.[21] A recent study showed that the top fifty MNCs had only six percent "employees" in the traditional employment relationship, while the other 116 million workers in the labor supply chain were technically employed by other companies.[22] This process of shifting worker costs and liabilities outside of the traditional employment relationship is called fissurization.[23] Fissurization is usually executed by shifting work to subcontracted companies and using independent contractors internally (vertically) and externally (horizontally).[24] In that case, who is the

19. *See* Wisskirchen, *supra* note 5 (assessing the EU labor market, and concluding that, "an automatic supply chain connection between the company's systems and the systems of its external providers will be the basis for success in the digital world").

20. *See* Brown, *supra* note 17, at 193-97 (analyzing China's changing economy and the changing structures of its companies); Ted Greenwald, *How AI Is Transforming the Workplace*, WALL ST. J. (updated Mar. 10, 2017, 6:21 PM), https://www.wsj.com/articles/how-ai-is-transforming-the-workplace-1489371060?ns=prod/accounts-wsj (describing the various AI workplace applications, including worker performance evaluations).

21. *Supply Chains Resources Hub*, INT'L TRADE UNION CONFEDERATION, https://www.ituc-csi.org/supply-chains-resources-hub (last visited Sept. 28, 2018); *see also* Press Release, United Nations Conference on Trade and Development, 80% of Trade Takes Place in 'Value Chains' Linked to Transnational Corporations, UNCTAD Report Says (Feb. 27, 2013), http://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=113.

22. *See ITUC Report Exposes Hidden Workforce in Supply Chains*, INDUSTRIALL GLOBAL UNION (Jan. 19, 2016), http://www.industriall-union.org/ituc-report-exposes-hidden-workforce-in-supply-chains.

23. DAVID WEIL, THE FISSURED WORKPLACE: WHY WORK BECAME SO BAD FOR SO MANY AND WHAT CAN BE DONE TO IMPROVE IT 43-44 (2017); Ronald Brown & Olga Rymkevich, *U.S.-Russia-East Asia Comparisons of Dispatch (Temporary) Worker Regulations*, 5 RUSSIAN L. J. 6, 10 (2017).

24. *See* WEIL, *supra* note 23, at 11-15.

"employer" in the employment relationship responsible for evaluating and controlling the worker? A 2015 report by the United States Government Accountability Office, found that the United States ("U.S.") "contingent" workforce had increased twenty-five percent over the prior ten years to forty percent of the U.S. workforce.[25]

Employers may also use alternative workplaces, including locations outside the company location, such as home, remote, mobile, or even cross-border locations.[26] Alternative workplaces can raise legal issues, such as *if*, *how*, and *which* employment laws apply.[27] For example, the safety of the workplace can affect performance and consequential evaluations (e.g., does the U.S. Occupational Safety and Health Act (OSHA) apply?).[28] Similarly, the algorithmic allocation of younger and not disabled workers to remote or high-tech workplaces can impact anti-discrimination laws regarding age and disability.[29] Using alternative business models, such as platforms used by Uber and Lyft, can further compound the issues.[30] For example, it is reported that Uber has "160,000 contractors, but just 2,000 employees": an eighty to

25. U.S. GOV'T ACCOUNTABILITY OFFICE, CONTINGENT WORKFORCE: SIZE, CHARACTERISTICS, EARNINGS, AND BENEFITS 3-4, 12 (Apr. 20, 2015), http://www.gao.gov/assets/670/669766.pdf (explaining that some estimates, depending on varying definitions, range between five to thirty-three percent); *id.* ("[B]roader definitions include agency temps and day laborers, although most are standard part-time workers or independent contractors. Applying a broad definition to analysis of 2005 CWS data, our prior work estimated that 30.6 percent of the employed workforce could be considered contingent. Applying this broad definition to our analysis of data from the General Social Survey (GSS), we estimate that such contingent workers comprised 35.3 percent of employed workers in 2006 and 40.4 percent in 2010."). *See generally* Brown & Rymkevich, *supra* note 23, at 7, 8 (comparing and contrasting how the United States, Russia, and East Asia regulate their "dispatch" (temporary) workers).

26. *See* GARRY MATHIASON ET AL., LITTLER MENDELSON, P.C., THE TRANSFORMATION OF THE WORKPLACE THROUGH ROBOTICS, ARTIFICIAL INTELLIGENCE, AND AUTOMATION: EMPLOYMENT AND LABOR LAW ISSUES, SOLUTIONS, AND THE LEGISLATIVE AND REGULATORY RESPONSE 13 (2016), http://www.jdsupra.com/legalnews/the-transformation-of-the-workplace-95769/ (download PDF from link for full Publication).

27. *Id.* at 13-17.

28. *Id.* at 12-13.

29. *Id.* at 8-9.

30. *See* Miriam A. Cherry & Antonio Aloisi, *"Dependent Contractors" in the Gig Economy: A Comparative Approach*, 66 AM. U. L. REV. 635, 685-87 (2017) (summarizing the "share economy"); Amy L. Groff, Paul Callegari, & Patrick M. Madden, *Platforms Like Uber and the Blurred Line Between Independent Contractors and Employees*, K&L GATES (Dec. 2015), http://www.klgates.com/files/Publication/04dcde30-9c10-4003-b663-f7f5f2cdec32/Presentation/PublicationAttachment/805ddc72-69b2-426b-ad51-fe92be45434e/CLRI_2016.pdf (discussing the effects of labeling employees as "independent contractors").

one ratio.[31]

Measuring worker performance is typically undertaken by the "employer." With the diminishing number of traditionally-defined "employees" through fissurization, the legal protections may be diminished, though there are legal doctrines, such as "joint employment," expanding the definitions of "employer" and "employee."[32] Likewise, the changing methods of performance evaluation of employees internal and external to the company location raise issues of who evaluates and how. This is not a new issue, but when the use of changing technology, such as robotics, affects worker performance, the evaluations may need to change and new challenges arise to adapt and to stay within the limits of employment laws.

2. Workplace Technology

The introduction and integration of new technology has re-shaped the workplace environment and the methods of measuring worker performance. A recent McKinsey Report describes Industry 4.0 as the new phase in the digitization of the workplace.[33]

> [It is] driven by four disruptions: the astonishing rise in data volumes, computational power, and connectivity, especially new low-power wide-area networks; the emergence of analytics and business-intelligence capabilities; new forms of human-machine interaction such as touch interfaces and augmented-reality systems; and improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing.[34]

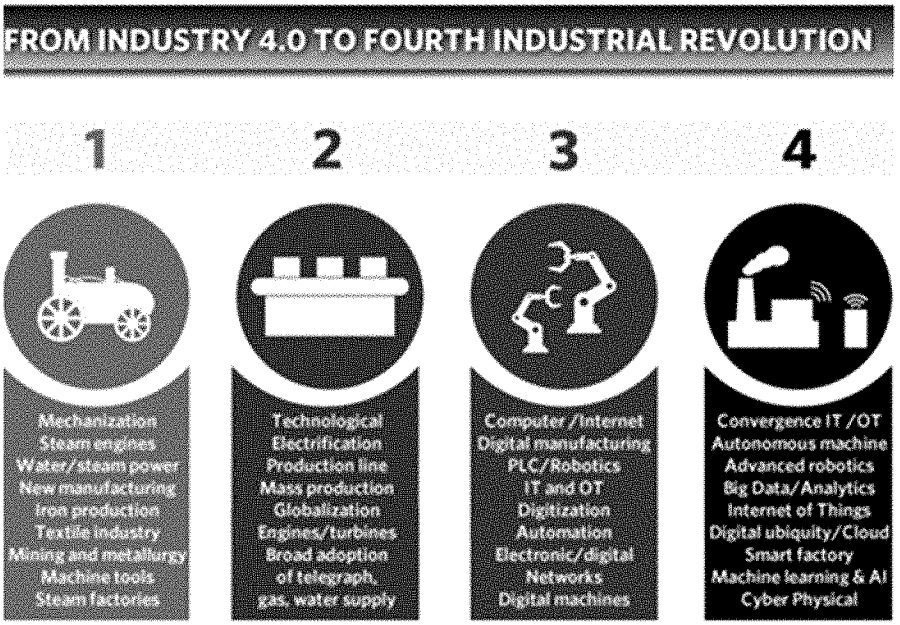
31. Tad Milbourn, *In the Future, Employees Won't Exist*, TECHCRUNCH (June 13, 2015), https://techcrunch.com/2015/06/13/in-the-future-employees-wont-exist/.

32. *See* WEIL, *supra* note 23, at 207 (analyzing the definition of "joint employment" and how it has morphed in the courts).

33. *See* Cornelius Baur & Dominik Wee, *Manufacturing's Next Act*, MCKINSEY&CO. (June 2015), http://www.mckinsey.com/business-functions/operations/our-insights/manufacturings-next-act.

34. *See id.* (discussing how some tech companies have automated many evaluation activities that managers elsewhere perform manually); *see also* Ewenstein, Hancock, & Komm, *supra* note 8 (discussing how some tech companies have automated many evaluation activities that managers elsewhere perform manually).

Figure 1[35]



Measuring worker performance in the coming years will involve understanding the increasing uses of digitalization and robotization, and the new business models emerging using platforms.[36]

> Big data analyses and intelligent algorithms are increasingly replacing or supporting humans also in the service sector. In the industry sector, automation and the use of production robots will lead to considerable savings with regard to the cost of labor and can release workers from hard and dangerous, repetitive and monotonous work . . . In the European automotive industry one working hour in production costs more than €40; the costs for using a robot range from €5 to €8 per hour. A production

35. *Industry 4.0, supra* note 3.

36. *See* Baur & Wee, *supra* note 33 (discussing the increased use of platforms (not just with Uber or Lyft) "in which products, services, and information can be exchanged via predefined streams"); *id.* ("Think open-source software applied to the manufacturing context. For example, a company might provide technology to connect multiple parties and coordinate their interactions. SLM Solutions, a 3-D-printer manufacturer, and Atos, an IT services company, are currently running a pilot project to develop such a marketplace. Customers can submit their orders to a virtual broker platform run by Atos. Orders are then allocated to SLM's decentralized network of production sites, and subsequently produced and shipped to the customer. Some companies are also trying to build an "ecosystem" of their own, as Nvidia has in its graphics-processor business. It provides software developers with resources, and offers start-ups help to build companies around Nvidia technologies.").

robot is thus only slightly cheaper than a worker in China.[37]

Human workers will also be new, improved, and more productive, working with changing automated technologies including not only wearable and performance-enhancing devices, but also devices for telepresence, telemanipulation, remote work, and, cognitive computing.[38] Artificial Intelligence (AI) is also gaining use because it combines machines and software with intelligence that can interact and solve problems using algorithms; likewise, "cognitive computing" is designed and used to solve multiple problems.[39]

Evaluating how the robot or the human is performing the job may become increasingly blurred as humans have robotic assistants and wearable robotic equipment, and are even implanted with microchips or carry other location-identifying GPS tracers:

> On Aug. 1, [2017] employees at Three Square Market, a technology company in Wisconsin, [could] choose to have a chip the size of a grain of rice injected between their thumb and index finger. Once that is done, any task involving RFID technology — swiping into the office building, paying for food in the cafeteria — can be accomplished with a wave of the hand.[40]

Of course, company-owned technology can have changing uses, once implanted, which introduces privacy and health concerns: "[a] microchip implanted today to allow for easy building access and payments could, in

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37. *See* Wisskirchen, *supra* note 5.

38. *See* MATHIASON ET AL., *supra* note 26, at 2.

39. *Id.* at 3; *see* YUVAL NOAH HARARI, HOMO DEUS: A BRIEF HISTORY OF TOMORROW 400-01 (2017) (explaining that some predict humans will continue to combine with technology to become hybrid with it in a search to be god-like); *see also* Kevin Kelly, *The Technium and the 7th Kingdom of Life*, EDGE (July 18, 2007), https://www.edge.org/conversation/kevin_kelly-the-technium-and-the-7th-kingdom-of-life ("Technology as a whole system . . . seems to be a dominant force in the culture . . . One way to think of the technium is as the 7th kingdom of life. There are roughly six kingdoms of life according to Lynn Margulis and others. As an extropic system that originated from animals, one of the six kingdoms, we can think of the technium as a 7th."); Laura Khalil, *IBM's Watson Computer and the Future of Artificial Intelligence*, KQED SCIENCE (Nov. 13, 2011), https://ww2.kqed.org/quest/2011/11/23/ibms-watson-computer-and-the-future-of-artificial-intelligence/; *Technium,* COLLINS, https://www.collinsdictionary.com/us/submission/12841/the+Technium (last visited Sept. 15, 2018) (defining technium as "the greater, global, massively interconnected system of technology").

40. Maggie Astor, *Microchip Implants for Employees? One Company Says Yes*, N.Y. TIMES (July 25, 2017), https://www.nytimes.com/2017/07/25/technology/microchips-wisconsin-company-employees.html ("The program — a partnership between Three Square Market and the Swedish company Biohax International — is believed to be the first of its kind in the United States, but it has already been done at a Swedish company, Epicenter").

theory, be used later in more invasive ways: to track the length of employees' bathroom or lunch breaks, for instance, without their consent or even their knowledge."[41]

The introduction of new technology also raises a host of legal issues under a variety of labor and employment laws as well as challenges to worker performance evaluations. For example, wearable and performance-enhancing devices (e.g., exoskeletons), telepresence and telemanipulation technology (more easily enabling remote work), and cognitive computing (e.g., AI and "Big Data") each present difficult legal questions regarding regulatory compliance, extraterritoriality, privacy, and discrimination, among other issues.[42]

> [These] pose unique compliance challenges and opportunities under laws relating to workers' compensation, OSHA, wage and hour, and disability accommodation .... 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. These technologies may also raise privacy concerns and potential challenges to the viability of the current models of taxation and social welfare .... 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.[43]

3. Other Factors

An employee's relationship with their workplace affects many things, including the quality of work product and productivity. Specifically, "how well the workplace engages an employee impacts their desire to learn skills and their level of motivation to perform. Skills and motivation level then influences an employee's . . . [performance and resulting evaluation]."[44]

a. Work Locations

Where an employee physical works impacts the ability of his or her superiors to evaluate performance. How performance is managed and measured for workers at home or in remote locations, and for those who are

41. *Id.*
42. MATHIASON et. al., *supra* note 26, at 2.
43. *Id.*
44. Allan, *supra* note 2.

mobile or cross-border, may compel reformulated performance assessment systems due to less on-site supervision.[45] Additionally, with all employees, an increased use of on-line evaluation systems also compels reformulated performance assessment systems as an efficient and cost-effective approach.[46]

The need for new approaches of supervisory monitoring and changing evaluative performance criteria at work locations, near and far, is clear, as advances in science and technology will transform jobs themselves, with new jobs requiring higher levels of qualification, fewer manual and routine functions, and different skills than more traditional jobs. Thus, some location supervision will be more challenging than others and likely will require technological variations in evaluation approaches.

As the younger generation has keen interest in the link between working hours and issues of work-life balance, members of the generation may demand more flexibility in working hours and workplace locations that can present the employer with productivity and staffing issues, as well as performance evaluation challenges, particularly at high activity and remote locations.[47]

b. Impact of Unions

The role of unions has been to protect workers' job security against the impact and erosion by automation that comes with new technology.[48] Recognizing that technology will not simply disappear, the International Trade Union Confederation (ITUC) recently stated that its position is to support innovation and automation.[49]

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45. *See, e.g.*, Ewenstein, Hancock, & Komm, *supra* note 8 (citing a company that uses an online application that allows employees to review each other in real time).

46. *Id.*

47. *See* BARBARA JANTA ET AL., RAND CORP. EMPLOYMENT AND THE CHANGING LABOUR MARKET GLOBAL SOCIETAL TRENDS TO 2030: THEMATIC REPORT 5, 36 (2015), https://www.rand.org/pubs/research_reports/RR920z5.html (discussing the increased interest in teleworking and maintaining "more autonomy and flexibility" among workers).

48. *See, e.g.,* Steve Greenhouse, *Unions Face The Fight Of Their Lives To Protect American Workers*, HUFFPOST (May 4, 2018, 5:46 AM), https://www.huffingtonpost.com/entry/american-workers-jobs-inequality-union-automation_us_5ae043f9e4b061c0bfa32e0c (illustrating one union's efforts to protect workers from displacement by seeking opportunities for robots to work alongside current employees).

49. *See G7 Labour Summit, supra* note 1 ("[D]igital divides persist in the G7 when it comes to women, disadvantaged groups and rural regions and worldwide: around fifty per cent of the world's population still has no access to the internet . . . . 'Technological innovation has always been supported by unions, and workers show a broad acceptance of new technologies. Eighty-five per cent of respondents in the ITUC Global Poll agree that new technologies will make jobs easier to do. People view technology as bringing

Still, whether labor unions can survive Industry 4.0 is being questioned:

> There is no "one best way" for unions to respond to these challenges, but there is consensus that unions will continue to remain relevant only by anticipating and adapting their organizing and collective bargaining strategies to the continuously changing economy, labor market, demography, work organization, and human resource management.
> [U]nlike digitization, automation of production is a long-lasting union challenge, that traces back to the second half of the twentieth century. The innovation of current transformations lies in the combination of automated devices with increasing connectivity . . . . [M]any unions' attempts to keep up with these changes can be reported from developed countries. In Italy, for instance, the Italian Federation of Metalworkers, FIM-CISL, . . . is promoting professional training as an individual right for workers, which should be included in the national collective agreement of the metalworking sector.[50]

While unions do show some support for innovation, they will likely resist employers' restructuring and the tendency toward more decentralized work processes and highly flexible workplace interventions. It has been proposed that

> the German model of co-determination demonstrates that workers' participation in decision-making can provide an effective solution to this issue, allowing automation and digitization to become programs for success for both employers and employees. That is why the workers voice may be expected to become one of the main union claims in face of current transformations.[51]

In the U.S., unions use education about the new technology and seek notification by the employer before the introduction of new technology so the union can prepare for changes.[52] Unions appear to have become

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opportunities but are aware that there is a chance for negative side effects on jobs that need to be addressed by rules and government action[.]'"); *see supra* note 43 and accompanying text.

50. Kavi Guppta, *Will Labor Unions Survive in the Era Of Automation?*, FORBES (Oct. 12, 2016), https://www.forbes.com/sites/kaviguppta/2016/10/12/will-labor-unions-survive-in-the-era-of-automation/#bef22c03b221.

51. *Id.*

52. Unions have been dealing with the core issue of new technology and its effects on the workforce for some years, as illustrated by union response to automation in the 1980s. Calvin Sims, *Unions Offer Labor Help on Automation*, N.Y. TIMES, Oct. 21, 1987, at D10 ("[M]any labor unions are treating expertise about new technology as one of the services they need to offer members. They hire economists and other specialists to keep members abreast of developments that may affect their jobs and seek contracts that allow them to become involved in almost every aspect of the integration of new technologies in the work place. . . . The U.A.W. has reached agreement with most major auto makers and suppliers that the local union and the national committee are to be notified before the companies introduce technologies that could displace workers or

somewhat sanguine about the entry of Industry 4.0, and often hire economists to keep them abreast of new developments in technology.

> 'Over all, local unions do not have the knowledge to really negotiate effectively with management on new computer-based systems, automated manufacturing technologies and robotics,' said Peter Unterweger, a 47-year-old economist for the United Automobile Workers who is responsible for monitoring new technology that might affect that union's 1.1 million active members. 'We are concerned that our people will not have the same expertise that the company brings to the table.'[53]

Other union responses to new technology included "participating in the design of new equipment for the office and factory, sponsorship of and participation in retraining programs, and independent checks on the health effects of the new technology on workers."[54]

Unions also negotiated with employers over contract language protecting employees' rights dealing with compensable time, worker health and safety, and non-discrimination under labor and employment laws, all involving the workplace environment and affecting performance evaluation.[55]

c. Privacy Interests

The automated collection and use of big data for applications usually requires permission, although, in the U.S., permission is frequently only needed for health data.[56] However, MNCs and other employers operating cross-border may have statutory considerations in other countries.[57] The electronic monitoring of workers' private communications on emails, social media, etc., and of individuals' locations and activities by technological

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change the scope of their jobs. Committees consisting of union members and company management have been established to decide how new technology will be applied.").

53. *Id.*

54. *Id.*

55. *See, e.g.*, Paul Ziobro, *Teamsters Tell UPS: No Drones or Driverless Trucks*, WALL ST. J. (Jan 24, 2018, 7:00 AM), https://www.wsj.com/articles/teamsters-tell-ups-no-drones-or-driverless-trucks-1516795200 (discussing the negotiations between United Parcel Service Inc. and Teamsters union that address worker issues such as unsafe conditions, having a sufficiently sized workforce, "an environment of mutual respect," and work hours).

56. *Contra* Daisuke Wakabayashi, *California Passes Sweeping Law to Protect Online Privacy*, N.Y. TIMES (June 28, 2018), https://www.nytimes.com/2018/06/28/technology/california-online-privacy-law.html (detailing the new "GDPR-like" law passed in California, signaling a changing privacy law landscape in the U.S.).

57. *See, e.g.*, European Commission Press Release Memo/17/1441, Questions and Answers: Data Protection Reform Package (May 24, 2017), http://europa.eu/rapid/press-release_MEMO-17-1441_en.htm (highlighting that the data protection reform package which entered into force in May 2016 and will be applicable as of May 2018 includes the General Data Protection Regulation).

equipment or by chips implanted in the worker's body, often raise legal issues.[58]

B. Changing Employee Performance Evaluations

It is the employer's responsibility to evaluate its employees. Of course, with corporate restructuring and fissurization, issues arise as to who is the employer and who is the worker to be evaluated. While independent contractors may fall outside the protections of most labor and employment laws, still, those independent contractors working inside the company may need to be evaluated, at least for retention purposes, though the method and usual consequences of the evaluation may differ from that of the company's "employees."[59] Likewise, outside third-party subcontractors are typically evaluated on the results of their performance with a different type of evaluation.

The standards for work performance of employees typically will be those created by the controlling employer and used by the HRM departments or other company personnel.[60] Increasingly, technology is employed in this process to varying degrees; "[a]ccording to Deloitte's 2015 Global Shared Services Survey, leaders indicated 'increasing the level of automation' as the second most important strategic priority."[61] Emblematic of automation being a high priority for corporate management is the increase in automated

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58. *See* Astor, *supra* note 40 (discussing the possibility of microchips being used to track location and timing of breaks).

59. *Independent Contractor: Audit Checklist for Maintaining Independent Contractor (IC) Status*, SOC'Y FOR HUM. RESOURCE MGMT. (Feb. 6, 2018), https://www.shrm.org/resourcesandtools/tools-and-samples/hr-forms/pages/cms_020334.aspx ("Do not conduct performance evaluations similar to employee evaluations."); HR Specialist: Emp't Law, *Should We Give Reviews to Independent Contractors?*, BUS. MGMT. DAILY (June 8, 2007, 12:00 AM), https://www.businessmanagementdaily.com/2735/should-we-give-reviews-to-independent-contractors (finding part of the reason is that if treated similarly with employees, they may become legal employees).

60. *See Automated Performance Management Systems: Efficient and Effective*, OASISBLOG, https://www.oasisadvantage.com/blog/automated-performance-management-systems-efficient-and-effective (last visited Sept. 15, 2018) ("According to a recent survey reported in *Forbes*, almost all large companies use performance evaluations for the majority of employees. Likewise, research by performance management systems providers has found that nearly 85% of small- and mid-size companies also conduct performance evaluations."). *See generally* Michael Gretczko & Rajesh Attra, *Can Robots Replace HR?*, CAPITAL H BLOG (Nov. 17, 2016), https://capitalhblog.deloitte.com/2016/11/18/can-robots-replace-hr/ (explaining the impact automation may have on HRM departments).

61. Gretczko & Attra, *supra* note 60 (citing Susan Hogan & Noemie Tilghman, *2015 Global Shared Services Survey Results*, DELOITTE (2015), https://www2.deloitte.com/us/en/pages/operations/articles/2015-global-shared-services-survey-results.html/.html?id=us:2el:3bl:hrt:awa:cons:111716.

tools:

> [o]ne [human resource] processes area that has been shown to benefit from the use of automated tools is talent management, which encompasses recruiting, employee performance management, learning management, compensation and succession planning. Employee performance management includes performance reviews, goal setting and alignment, competency/job skills management and employee development planning.[62]

At the end of the evaluation process, the technologically collected data is usually reviewed by humans and HRM decisions made; but increasingly, robots and AI can be utilized for these evaluations based on the needs of the company.[63] While AI can assess performance levels and workers' attitudes and, in some circumstances, limit human bias, it also has limitations including being ill-equipped to assess its own bias (often written into the code through an engineer's human biases) or that of a reviewing supervisor and protect a worker's privacy.[64] Privacy interests can also be affected by a third party using bots to extract personal information from an employees' outside data; for example, data that is contained in LinkedIn storage and is sold to the employee's employer that may then be used in an evaluation of the employee.[65]

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62. JP Guay, *Benefits of Automating Employee Performance Management*, MOLDMAKING TECH. (Dec. 1, 2011), https://www.moldmakingtechnology.com/articles/benefits-of-automating-employee-performance-management; *see also* Gretczko & Attra, *supra* note 60 (posing the question: "[w]hat talent is more vulnerable to poaching, given local economic development and the announced growth plans of our competitors" which could be answered by "robotic and cognitive automation technologies.").

63. Chris Nerney, *Could Artificial Intelligence Replace the Annual Performance Review?* DXC.TECH. (Jan. 26, 2017), https://blogs.dxc.technology/2017/01/26/could-artificial-intelligence-replace-the-annual-performance-review/ (giving the example of timely, consistent performance reviews as an advantage of using AI for performance reviews).

64. *Compare* Rob Light, *How Artificial Intelligence Will Revolutionize Human Resources*, G2 CROWD (Nov. 17, 2016), https://www.g2crowd.com/blog/artificial-intelligence/artificial-intelligence-will-revolutionize-human-resources/ (explaining how AI can manage the employee hiring, training, and evaluating processes better than humans), *and* Sue Walsh, *Will AI Kill the Performance Review?*, RTINSIGHTS (Oct. 20, 2016), https://www.rtinsights.com/workcompass-ai-performance-review/, *and* Itsquiz, *How AI Helps To Improve Performance Management*, MEDIUM (Feb. 1, 2017), https://medium.com/@itsquiz15/how-ai-helps-to-improve-performance-management-2a7ef816d49b, *with The Workplace of the Future*, ECONOMIST (Mar. 28, 2018), https://www.economist.com/leaders/2018/03/28/the-workplace-of-the-future ("AI's benefits will come with many potential drawbacks. Algorithms may not be free of the biases of their programmers . . . . And surveillance may feel Orwellian.").

65. *See* hiQ Labs, Inc. v. LinkedIn Corp., 273 F. Supp. 3d 1099, 1113 (N.D. Cal. 2017), *appeal docketed*, No. 17-16783 (9th Cir. Sept. 6, 2017); *see also* Edward G. Black & Patrick J. Reinikainen, hiQ Labs, Inc. v. LinkedIn Corp.*: A Federal Court Weighs in*

III. LEGAL ENVIRONMENT AND IMPACTS OF 4.0 TECHNOLOGY

The very issues created by the changing work environment and the infusion of new technology into it, with performance evaluations of workers chasing the changes, also create the emerging legal issues in regulating the changing environment. Restructuring employers create issues of coverage and application of labor and employment laws to "employers" and "employees."[66] Mobile and dispersed workplaces and workers likewise complicate the legal issues. The added abilities of technology, robotics, AI, data-gathering, and monitoring, all increase the certainty that traditional laws must grow with the changing labor market developments to protect the rights of workers and locate the limits of the law. And, worker performance evaluations take place within this changing legal environment and must therefore keep pace.

Delineating the rights of "border-line employees" is the first legal inquiry in determining the applicability of labor law rights.[67] New job structures, outsourcing, independent contractors,[68] and platform workers[69] all raise the issue of the applicability of the labor and employment laws that were mostly designed for the traditional master-servant employment relationship. Under federal U.S. law, employees have labor protections, but non-employees have much fewer.[70] Some areas in the U.S. involving drivers in "conventional" employment relationships, like Fed-Ex, and those working from platforms, like Uber and Lyft, are still battling over legislative coverage issues.[71]

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on Web Scraping, Free Speech Rights, and the Computer Fraud and Abuse Act, ROPES & GRAY (Sept. 7, 2017), https://www.ropesgray.com/newsroom/alerts/2017/09/hiQ-Labs-Inc-v-LinkedIn-Corp-A-Federal-Court-Weighs-in-on-Web-Scraping-Free-Speech-Rights.aspx.

66. *Supra* Section II.

67. *See* Orly Lobel, *The Gig Economy & the Future of Employment and Labor Law*, 51 U.S.F. L. REV. 51, 61 (2017) (explaining that, "after the passage of the Fair Labor Standards Act ("FLSA"), uncertainty about the boundary separating covered employees and independent contractors is as high as ever").

68. *See generally* Keith Cunningham-Parmeter, *From Amazon to Uber: Defining Employment in the Modern Economy*, 96 B.U. L. REV. 1673, 1688 (2016) (using Uber as an example of a company claiming to be structured around independent contractors).

69. *See also* Natasha Singer, *In the Sharing Economy, Workers Find Both Freedom and Uncertainty*, N.Y. TIMES (Aug. 16, 2014), https://www.nytimes.com/2014/08/17/technology/in-the-sharing-economy-workers-find-both-freedom-and-uncertainty.html (examining varying levels of worker dependence on peer-to-peer platforms). *See generally* Lobel, *supra* note 67 (explaining the use of platform workers).

70. *See* Lobel, *supra* note 67.

71. *See* Yasaman Moazam, *UBER in the U.S. and Canada: Is the Gig-Economy Exploiting or Exploring Labor and Employment Laws by Going Beyond the Dichotomous Workers' Classification?*, 24 U. MIAMI INT'L & COMP. L. REV. 609, 638-39, 641 (2017); *see also* Robert W. Wood, *FedEx Settles Independent Contractor*

A. Wage and Hour

Employers are subject to federal wage and hour laws (Fair Labor Standards Act ("FLSA") and Equal Pay Act ("EPA")) as well as state laws for the states in which they are operating. The minimum wage and equal pay requirements do not apply to independent contractors falling outside the liberal FLSA definition,[72] nor are subcontracted workers covered. Employer control remains the primary legal test for determining whether a worker is an independent contractor. Employee use of wearable robotic devices and other technological equipment could raise issues if putting it on and taking it off ("donning and doffing") is "compensable time" under the FLSA.[73] If a wearable device can be defined as "clothes" or falls under a collective bargaining exception, it will not be compensable.[74]

Most U.S. labor law statutes do not apply extra-territorially, with a few exceptions, such as the Civil Rights Act ("CRA") and American Disability Act ("ADA").[75] So, while the wage and benefit laws are applicable only to

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Mislabeling Case For $228 Million, FORBES, (June 16, 2015), https://www.forbes.com/sites/robertwood/2015/06/16/fedex-settles-driver-mislabeling-case-for-228-million/#5cc31515c22e); *Judge Approves FedEx's $227 Million Settlement in IC Misclassification Cases*, Staffing Industry Analysts (May 10, 2017), https://www2.staffingindustry.com/Editorial/Daily-News/Judge-approves-FedEx-s-227-million-settlement-in-IC-misclassification-cases-42019 ("FedEx Corp. will pay more than $227 million to settle some of the long-running lawsuits in 19 states brought by drivers who claim they were undercompensated because the company classified them as independent contractors rather than full-time workers. The settlements bring the total FedEx has paid to resolve driver compensation claims to at least $454 million. Other big independent contractor misclassification cases include Uber, which saw a US federal judge in August reject a $100 million settlement in a lawsuit claiming Uber misclassified drivers as independent contractors. In another lawsuit, a $27.5 million class-action settlement in an independent contractor case against human cloud, ride-sharing firm Lyft received final approval in March.").

72. *See* Fair Labor Standards Act, 29 U.S.C. §§ 201, 206 (2018); *see also* Ira H. Weinstock, *"Independent Contractors" and Employee Misclassification*, IRA H. WEINSTOCK P.C. (Mar. 16, 2016), https://www.paworkerscompensation.law/independent-contractors-and-employee-misclassification/ ("The FLSA defines 'employ' as including to 'suffer or permit to work', [sic] representing the broadest definition of employment under the law because it covers work that the employer directs or allows to take place. Applying the FLSA's definition, workers who are economically dependent on the business of the employer, regardless of skill level, are considered to be employees, and most workers are employees. On the other hand, independent contractors are workers with economic independence who are in business for themselves."); *Fact Sheet #13: Employment Relationship Under the Fair Labor Standards Act (FLSA)*, U.S. DEP'T LAB., https://www.dol.gov/whd/regs/compliance/whdfs13.htm (last updated July 2008).

73. *See* Sandifer v. United States Steel Corp., 571 U.S. 220 (2014) (holding that putting on and taking off protective gear required for employment is not compensable under the Fair Labor Standards Act).

74. *Id.* at 232.

75. Civil Rights Act, 42 U.S.C. § 2000e-1(c)(1) (2018); Americans with Disabilities

the workers in the U.S., if a worker is located overseas, but is remotely operating robots or technological equipment in the U.S.; is located overseas, but is working by teleconferencing within the U.S.; or, is hired within the U.S. but is working intermittently overseas, or traveling to remote workplaces,[76] a legal issue arises — where is their workplace for purposes of FLSA?[77] The FLSA applies to employees engaged in commerce. Title 29, Section 203(b) of the United States Code states: "'Commerce' means trade, commerce, transportation, transmission, or communication among the several States or between any State and any place outside thereof."[78]

Another growing issue deals with whether an employee who is "connected," is working. [79] Workers who stay "connected' with their employer, even with their smartphone, may not only be "on call," but may perform work that can be classified as legally compensable time for overtime liability:[80] "[d]ue to the ever-increasing use of technology in the business environment, more and more employees are performing work outside of the normal business setting. Such work, if done beyond normal working hours,

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Act, § 12112(c)(1)-(2) (2018).

76. 29 U.S.C. § 623(h) (2018) (applying statute to U.S. citizens working abroad in foreign firms under the domain of a U.S. firm); Civil Rights Act § 2000e-1(c)(1) (applying statute to U.S. citizens working outside the United States for foreign firms if the non-U.S. employer is shown to be under the "control" of a U.S. employer); *see also* Stephen Bruce, *3 FLSA Challenges: Off-Clock, Travel Time, 'Independent' Contractors*, HR DAILY ADVISOR (Apr. 22, 2013), http://hrdailyadvisor.blr.com/2013/04/22/3-flsa-challenges-off-clock-travel-time-independent-contractors/ (highlighting the challenge of defining work time in professions that require commuting to different locations); ANGELO SPINOLA ET AL., LITTLER MENDELSON, P.C., HOT WAGE AND HOUR ISSUES FOR HOME HEALTHCARE EMPLOYERS 4 (2013), https://www.littler.com/files/press/pdf/Hot%20Wage%20and%20Hour%20Issues%20for%20Home%20Healthcare%20Employers.pdf (explaining the complexities of the home health industry in compensating travel time).

77. Wright v. Adventures Rolling Cross Country, Inc., No. C-12-0982 EMC, 2012 U.S. Dist. LEXIS 104378, at *19 (N.D. Cal. May 3, 2012) (holding travel guides of a California company hired to conduct multi-week trips outside the United States on a per trip basis were not entitled to minimum wage under the FLSA); *see also* Hannah L. Buxbaum, *Determining the Territorial Scope of State Law in Interstate*, 27 DUKE J. COMP. & INT'L L. 381, 383, 385, 388 (2017); Sindhu Sundar, *Judge Limits Extraterritorial Reach of Calif. Wage Laws*, LAW360 (May 4, 2012), https://www.law360.com/articles/337378/judge-limits-extraterritorial-reach-of-calif-wage-laws.

78. 29 U.S.C. § 203(b).

79. *See* Jana M. Luttenegger, Note, *Smartphones: Increasing Productivity, Creating Overtime Liability*, 36 J CORP. L 259, 272-73 (2010) (discussing, generally, the legal compensation issues associated with employees staying "connected" through smartphone usage outside of work hours, and noting that there may be additional legal issues with the possible difference between checking emails because of the "societal pressure to stay connected" and an employee's real need to stay connected for their job).

80. *Id.*

can open up an employer to FLSA liability."[81] Already, lawyers are defending the wage issues arising from employee connectivity.

> The explosion of smartphone and tablet use has eased the way for employees to have continuous remote connectivity to the workplace, presenting yet another liability threat for employers already battling an increase in overtime pay claims. If an employee can show the employer had actual or constructive knowledge of work performed, an employer can owe overtime pay for work never requested from a worker.[82]

B. Health and Safety and Work-Related Injuries

1. Occupational Safety and Health Act

Restructuring work with new technology brings benefits and possible risks and liabilities.[83] The possibilities of software faults, and the risks associated with robot and drones use, or the malfunction of wearable technology, such as robotic exoskeletons,[84] create potential safety hazards that would need to

81. Robert S. Gilmore, *"Technology in Fair Labor Standards Act Litigation" Preventing a Suit from the Employer's Perspective*, A.B.A, http://apps.americanbar.org/labor/techcomm/mw/Papers/2009/pdf/GILMORE.pdf (last visited Sept. 30, 2018).

82. Peter Gillespie & Alfred Robinson, Jr., *Overtime Pay Claims for After-Hours Use of Electronic Devices: Avoiding and Defending Litigation*, STRAFFORD (Oct. 31, 2017), https://www.straffordpub.com/products/tldewdhdra?utm_campaign=tldewdhdra&utm_medium=email&utm_content=&utm_source=exacttarget&pid=413928&trk=EL3MG2-79ODZY&mid=133362 (explaining that employees that prevail in overtime pay claims may be entitled to back wages plus interest, liquidated damages, and attorneys' fees and costs from the employer).

83. Eric J. Conn et al., *Employment Law and OSHA Concerns with Temps, Contractors, and Joint- and Multi- Employer Sites*, OSHA DEF. REP. (Sept. 7, 2016), https://oshadefensereport.com/2016/09/07/dept-of-labor-concerns-related-to-temps-contractors-and-joint-and-multi-employer-relationships/ ("With more and more unique employment relationships and multi-employer worksites, it is crucial to understand the complexities of how the DOL and its various enforcement agencies define the employment relationship and/or assign liability in these contexts.").

84. *See, e.g.*, David Goldstein, *I am Iron Man: Top 5 Exoskeleton Robots*, SEEKER (Nov. 27, 2012), https://www.seeker.com/i-am-iron-man-top-5-exoskeleton-robots-1766089390.html; Alissa Zingman et al., *Exoskeletons in Construction: Will They Reduce or Create Hazards?* NIOSH SCI. BLOG (June 15, 2017), https://blogs.cdc.gov/niosh-science-blog/2017/06/15/exoskeletons-in-construction/.

be addressed by OSHA[85] and Workers Compensation laws.[86] Currently, there are few specific standards for the robot industry, but OSHA guidelines are outdated.[87]

While OSHA typically places obligations on the employer to maintain hazard-free workplaces, it has special rules for home offices and telecommuting.

> [A]cross the country, "safety professionals and human resources directors face a challenging task: ensuring safety for the increasing number of employees who are out of sight, working remotely from a home office. Privacy concerns dissuade some employers from conducting unsolicited home office inspections. In a 2000 directive, OSHA announced it would not conduct inspections of employees' home offices, nor would it hold employers liable for employees' home offices. But potential workers' compensation issues linger for organizations that have employees injured while working from home. What if an employee trips on an extension cord? What if an employee's home office has no smoke detector?"[88]

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85. Occupational Safety and Health Act, 29 U.S.C. §§ 651-78 (2018); *see also Summary of the Major Laws of the Department of Labor*, U.S. DEP'T LAB., https://www.dol.gov/general/aboutdol/majorlaws#safety (last visited Sept. 9, 2018) ("The Occupational Safety and Health (OSH) Act is administered by the Occupational Safety and Health Administration (OSHA). Safety and health conditions in most private industries are regulated by OSHA or OSHA-approved state programs, which also cover public sector employers. Employers covered by the OSH Act must comply with the regulations and the safety and health standards promulgated by OSHA. Employers also have a general duty under the OSH Act to provide their employees with work and a workplace free from recognized, serious hazards. OSHA enforces the Act through workplace inspections and investigations. Compliance assistance and other cooperative programs are also available.").

86. *See, e.g.*, HAW. REV. STAT. § 386 (2018) (providing an example of a state workers' compensation program); *see* Georgina Prodhan, *Europe's Robots to Become "Electronic Persons" Under Draft Plan*, REUTERS (June 21, 2016), http://www.reuters.com/article/us-europe-robotics-lawmaking/europes-robots-to-become-electronic-persons-under-draft-plan-idUSKCN0Z72AY (explaining how the EU Parliament considered having special funding for its "electronic persons" so as help compensate for losses caused by robots replacing humans and lessening available compensatory resources).

87. *See* MATHIASON ET AL., *supra* note 26 (providing a summary of existing regulations).

88. Tom Musick, *Working (Safely) From Home*, SAFETY+HEALTH (Jan. 25, 2015), http://www.safetyandhealthmagazine.com/articles/11704-working-safely-from-home; *see also* OSHA, *Instruction on Home-Based Worksites* (Feb. 25, 2000), https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=directives&p_id=2254; AON, CHALLENGES WITH TELECOMMUTING 4 (2014), http://www.aon.com/attachments/risk-services/The-Challenges-of-Telecommuting-Q2-2014.pdf (mentioning that OSHA does not inspect home offices).

2. Workers Compensation

When work-related injuries do occur in the U.S., the state worker's compensation laws apply to compensate covered injuries.[89] For compensation, the injury must "arise out of and in the course of employment;"[90] therefore, additional liability risks may come from technology, and from the ambiguities of remote workplaces or telecommuting work from home where there is no visual supervision.[91]

There are numbers of recorded injuries and deaths caused by robots and robotic equipment. According to the OSHA, it is reported that robots have caused at least thirty-three workplace deaths and injuries in the United States in the last thirty years.[92]

Conversely, there are potential benefits of new technology, such as the cutting back on workers compensation for certain injuries, such as repetitive stress injuries[93] or back injuries, with use of the exoskeleton.[94]

C. Anti-Discrimination

The changing work environment and use of technology in performance evaluations raise issues not only with attempts to eliminate human biases in interpreting data,[95] but also in algorithmic application to personnel decisions,

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89. *See generally Workers' Compensation Law - State by State Comparison*, NAT'L FED'N OF INDEP. BUS. (June 7, 2017), https://www.nfib.com/content/legal-compliance/legal/workers-compensation-laws-state-by-state-comparison-57181/ (stating that workers' compensation "requirements vary by state" and outlining comparisons of said requirements state-by-state).

90. *See, e.g., About Us*, N.Y. ST. WORKERS' COMPENSATION BOARD, http://www.wcb.ny.gov/content/main/TheBoard/glossary.jsp (last visited Sept. 30, 2018) (defining "arising out of and in the course of employment").

91. *See* Lori D. Bauer, *Telecommuting Tradeoffs*, 11 BUS. L. TODAY, no. 4, Mar.—Apr. 2002, at 16, 18 (listing worker's compensation coverage as a concern to consider when developing a telecommuting program).

92. *See* John Markoff & Claire Cain Miller, *As Robotics Advances, Worries of Killer Robots Rise*, N.Y. TIMES (June 16, 2014), https://www.nytimes.com/2014/06/17/upshot/danger-robots-working.html; *see also* Brown, *supra* note 17, at 206.

93. *See* H. Kazrooni et al., *Trunk Support Exoskeleton*, SUITX, https://www.dropbox.com/s/xluhcpxdgr48bcv/TSE%20%26%20Back%20Injury%20Paper.pdf?dl=0 (last visited Sept. 30, 2018); INT'L FED'N OF ROBOTICS, http://www.ifr.org/robots-create-jobs/work-unsafe-vor-humans/ (last visited Oct. 1, 2018).

94. Kazrooni, *supra* note 93.

95. Bernard Marr, *The Future Of Performance Management: How AI and Big Data Combat Workplace Bias*, FORBES (Jan. 17, 2017), https://www.forbes.com/sites/bernardmarr/2017/01/17/the-future-of-performance-management-how-ai-and-big-data-combat-workplace-bias/#60f9b7b84a0d ("[Human] assessor[s] [are] inclined to compare an individual's performance to his peers, rather than to defined standards of achievement[,] . . . [and give more weight to] actions in the recent past . . . than actions which happened further back in time . . . . This is where AI can come in, as bias – along

under the anti-discrimination laws, especially involving age and disability discrimination.[96]

1. Age

The Age Discrimination in Employment Act ("ADEA") prohibits discrimination against applicants or employees aged 40 or over and many state laws do not have an age threshold.[97] Therefore, if an employer or digital program were to promote workers based on stereotyping older workers as less technologically adaptable, or statistically prefer younger people for more high-tech jobs, the law may be violated.[98] Thus, the integrity and lawfulness of the performance evaluation would be compromised and invalidated.

2. Disability

The ADA[99] prohibits employers from discriminating in employment against persons with physical and mental disabilities and, upon request, requires employers to make reasonable accommodation to the needs of otherwise qualified applicants and employees, if such accommodation does not result in undue hardship to the employer.[100] With changing work

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with fatigue and logical fallibility – is a human failing that machine intelligence doesn't have to overcome.").

96. *See generally* SUSAN N. HOUSEMAN, U.S. DEP'T OF LABOR, FLEXIBLE STAFFING ARRANGEMENTS: A REPORT ON TEMPORARY HELP, ON-CALL, DIRECT-HIRE TEMPORARY, LEASE, CONTRACT COMPANY, AND INDEPENDENT CONTRACTOR EMPLOYMENT IN THE UNITED STATES 9.7 ANTI-DISCRIMINATION LAWS 46 (Aug. 1999), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.210.2977&rep=rep1&type=pdf ("Title VII of the Civil Rights Act of 1964 prohibits discrimination in employment on the basis of race, color, sex, or ethnic origin; the [ADEA] prohibits discrimination against employees 40 years and older; and the [ADA] prohibits discrimination in employment on the basis of disabilities and requires that employers reasonably accommodate individuals with disabilities who can otherwise perform a job. As with other labor standards, independent contractors generally would not be covered by anti-discrimination laws.").

97. Age Discrimination in Employment Act, 29 U.S.C. § 631 (2018); *see* HAW. REV. STAT. § 378-2 (2018).

98. *See* Wolf Richter, *Tech workers get better with age – but that's not stopping 'systemic' discrimination*, BUS. INSIDER (Oct 2, 2017, 6:44 PM), https://www.businessinsider.com/systemic-age-discrimination-even-as-tech-workers-get-better-with-age-2017-10 (discussing "age discrimination in the Tech industry, both in hiring and promotions").

99. Americans with Disabilities Act, 42 U.S.C. § 12112 (2018).

100. *Id.*; Smith v. City of Jackson, 544 U.S. 228, 228-68 (2005) (explaining the disparate-impact theory); *see also The ADA: Your Employment Rights as an Individual with a Disability*, EEOC (Mar. 21, 2005), https://www.eeoc.gov/facts/ada18.html ("Reasonable accommodation is any change or adjustment to a job or work environment that permits a qualified applicant or employee with a disability to participate in the job application process, to perform the essential functions of a job, or to enjoy benefits and privileges of employment equal to those enjoyed by employees without disabilities. For example, reasonable accommodation may include: providing or modifying equipment or

environments and performance evaluations, accommodation for disabled persons should begin including advanced robotic systems that may allow such accommodations to be reasonable, thus meeting legal standards. Robotic arms, exoskeleton suits, and other wearable technologies may open new work opportunities for the disabled and likely present economic or practical challenges for employers, as well as affect performance evaluations:

> 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. 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.[101]

D. The National Labor Relations Act and Labor Unions

Labor unions have been involved in automation and technological changes for decades. Their interest is to protect the wages, working conditions, and jobs of their constituency in the face of change.[102] They will advocate against the use of independent contractors, subcontracting, and its variants, and the use of new technologies that displace members of their constituency, unless sometimes there are retraining, and monetary benefits negotiated.[103] They

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devices, job restructuring, part-time or modified work schedules, reassignment to a vacant position, adjusting or modifying examinations, training materials, or policies, providing readers and interpreters, and making the workplace readily accessible to and usable by people with disabilities. An employer is required to provide a reasonable accommodation to a qualified applicant or employee with a disability unless the employer can show that the accommodation would be an undue hardship -- that is, that it would require significant difficulty or expense."); *The Americans with Disabilities Act: Applying Performance and Conduct Standards to Employees with Disabilities*, EEOC (Dec. 20, 2017), https://www.eeoc.gov/facts/performance-conduct.html.

101. *See* MATHIASON ET AL., *supra* note 26, at 12 (describing that advanced technologies could provide new opportunities for individuals with disabilities, such as self-driving vehicles and advanced sensory technology could make jobs previously denied to deaf or blind applicants a real opportunity); *id.* ("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.").

102. *See supra* notes 49-50 and accompanying text.

103. *See, e.g., Full and Fair Employment*, AFL-CIO, https://aflcio.org/what-unions-do/empower-workers/1099-economy (last visited Oct. 1, 2018) ("We should not allow or encourage businesses to treat their employees as independent contractors in the On

also negotiate for health and safety protections and related equipment, as well as favorable wage and benefit standards.[104] These are the standards used in the performance evaluations to calculate wages, benefits, and discipline or promotion flowing from the performance evaluations. An area ripe for negotiation may be contractually protecting the privacy interests of employees as constitutional limits are unavailable for private employees.[105]

If the workplace changes involve "mandatory' subjects, as defined under the NLRA, the employer is first required to collectively bargain with the union until impasse or agreement.[106] Thus far, the U.S. Supreme Court has not specifically ruled on whether the introduction of automation by the employer is a mandatory subject for bargaining, though there are lower decisions so holding.[107] Likewise, legal consideration of negotiated

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Demand economy or anywhere else because this weakens working people's ability to negotiate, lowers labor standards for all working people, and puts good employers at an unfair disadvantage.").

104. *See, e.g., Building Power for Working People*, AFL-CIO, https://aflcio.org/what-unions-do/empower-workers (last visited Oct. 1, 2018) (listing various issue areas that the American Federation of Labor and Congress of Industrial Organizations advocates for on behalf of its members).

105. *See, e.g.,* Richard M. Reice, *Wearables in the Workplace—A New Frontier*, BLOOMBERG L. (May 24, 2018, 6:40 AM), https://news.bloomberglaw.com/daily-labor-report/wearables-in-the-workplacea-new-frontier/ ("Surveillance of employees can violate the NLRA because it 'chills' employees from engaging in concerted activity . . . . In a unionized workplace, it may be appropriate, if not mandatory, to negotiate the who, what, where, and when of the use of wearables.").

106. National Labor Relations Act, 29 U.S.C. §§ 151-169 (2018); *see also* National Labor Relations Act, NAT'L LAB. REL. BOARD, https://www.nlrb.gov/resources/national-labor-relations-act-nlra (last visited Sept. 20, 2018) (noting that most employees in the private sector are covered by the NLRA; however, the Act does not apply to an independent contractor); *Employee Rights*, NAT'L LAB. REL. BOARD, https://www.nlrb.gov/rights-we-protect/employee-rights (last visited Sept. 20, 2018); *Frequently Asked Questions-NLRB*, NAT'L LAB. REL. BOARD, https://www.nlrb.gov/resources/faq/nlrb (last visited Sept. 20, 2018) (stating that most employees are protected under the NLRA, except for those who are supervisors, independent contractors, in government, or in agriculture).

107. First Nat'l Maint. Corp. v. NLRB, 452 U.S. 666, 686 n.22 (1981) ("In this opinion we intimate no view as to . . . automation . . . which are to be considered on their particular facts."). *See generally* Gary E. Lippman, *Will Police Body Cameras be a Mandatory Subject of Bargaining in Florida?*, 90 FLA. B. J. 57, (2016) (discussing case law surrounding "body-worn cameras" on police officers); ROBERT H. LAVITT, A.B.A., MONITORING EMPLOYEE WHEREABOUTS: COLLECTIVE BARGAINING IMPLICATIONS OF RFID AND GPS TECHNOLOGIES IN THE WORKPLACE 4 n.10 (2011) (citing *King County*, Decision 9204-A, (PECB 2007) (WA PERC)), https://www.americanbar.org/content/dam/aba/administrative/labor_law/meetings/2011/ac2011/155.authcheckdam.pdf ("Where GPS data had been used as basis for employee discipline, but union had waived any right to bargain implementation or effects of installation of GPS in workers' trucks, employer nonetheless violated state labor law by failing to timely comply with union's request for information regarding implementation and use of GPS and its effects, including

contractual management rights clauses and the waiver of the statutory right to strike may need to be weighed in looking at employee performance, since if, at present, the possibly mandatory subject of automation need not be bargained. However, times are changing and the law could evolve regarding the availability of the NLRA for use by the unions, perhaps counterbalanced by the erosion of "employees" falling under the Act.[108]

> Concerns about the spread of automation and the use of [AI] in the workplace are growing. Companies like Uber are hard at work developing technology that would allow for pilotless trucks. Ultimately, a switch to self-driving solutions could displace nearly 300,000 truckers per year. Uber purchased the autonomous trucking company, Otto, with that goal in mind.[109]
>
> 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. While there appear to be few NLRB decisions concerning the transition to a robotic workforce, the NLRB has long held [though not the U.S. Supreme Court] that technological changes that significantly affect an employer's unionized workforce are a mandatory subject of bargaining.[110]

These negotiated labor standards most often provide part of the basis upon which performance evaluations are made with consequential discipline or benefits.

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disciplinary uses of the technology."); *id.* at 6 ("[T]hat hidden surveillance cameras were mandatory subjects because they affected employee discipline and job security and thus were 'plainly germane to the working environment' and were not entrepreneurial in character or basic to managerial direction of the business.").

108. *See generally* Alexia Elejalde-Ruiz, *Supreme Court's Janus Ruling Could Undercut Private Sector Unions Too*, CHI. TRIB. (July 11, 2018, 10:00 AM), http://www.chicagotribune.com/business/ct-biz-janus-private-sector-ramifications-20180709-story.html# (discussing the changing landscape of attitudes towards and laws applying to both private- and public-sector unions).

109. Patrick T. Wilson, *Competing with a Robot: How Automation Affects Labor Unions*, WAKE FOREST J. BUS. & INTELL. PROP. (Aug. 22, 2017), http://ipjournal.law.wfu.edu/2017/08/competing-with-a-robot-how-automation-affects-labor-unions/.

110. *See* MATHIASON et. al, *supra* note 26, at 6 n.21 (citing 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 New Record*, its approach to automation cases remains consistent."); *see also* Plymouth Locomotive Works, Inc., 261 N.L.R.B. 595, 602, 606-08 (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).

E. Privacy

Protected individual privacy interests can arise in numerous ways in the changing workplace environment and inappropriately find their way into performance evaluations. Big data transfers are regulated in the European Union and many countries, but not in the U.S., where legal protections focus on individual rights and where one has a reasonable expectation of privacy.[111] For example, China regulates an increasing number of sectors.[112]

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111. *See* Wisskirchen, *supra* note 5 ("EU General Data Protection Regulation, applicable as of May 2018, provides that collecting personal data without a permissive rule is prohibited in all European countries. U.S. data privacy protection laws are not based on the general assumption that data are confidential."); *see also* Philip L. Gordon, *The Next HR Data Protection Challenge: What U.S. Multinational Employers Must Do to Prepare for the European Union's Impending General Data Protection Regulation*, LITTLER (Sept. 13, 2017), https://www.littler.com/publication-press/publication/next-hr-data-protection-challenge-what-us-multinational-employers-must (describing steps that U.S. MNCs will have to take to comply with GDPR). *Compare* European Commission Press Release MEMO/17/1441, Questions and Answers – Data Protection Reform Package (May 24, 2017), http://europa.eu/rapid/press-release_MEMO-17-1441_en.htm ("The data protection reform package which entered into force in May 2016 and will be applicable as of May 2018 includes the General Data Protection Regulation ("GDPR")."), *with* Ieuan Jolly, Loeb & Loeb, *Data Protection in the United States: Overview,* THOMSON REUTERS PRACTICAL L. (July 1, 2017), https://1.next.westlaw.com/Document/I02064fbd1cb611e38578f7ccc38dcbee/View/FullText.html (discussing the U.S. "patchwork" of laws).

112. China's Cybersecurity Law (Zhonghua Renmin Gongheguo Wangluo Anquan Fa (中华人民共和国网络安全法) [Cybersecurity Law of the People's Republic of China] (promulgated by Standing Committee of National People's Congress, Nov. 7, 2016, effective June 1, 2017); *see* Athena Jiangxiao Hou, Michael Dewey, Qing Lyu, Wei Huang, Steven Shengxing Yu, Ming Li, Ken Dai, Jingbing Li, Yanling Zheng, Hunter Wenxiong Qiu, Qiuming Chen and Rong Kohtz, (Dec. 1, 2017) China Committee's Submission to the 2017 Year in Review Subject to Revision Before Final Publication, CHINA (available with author) (It "is the first national law regulating personal information, data and cybersecurity protection. The CSL adopts a graded system for cybersecurity protection and puts forward the concept of Critical Information Infrastructure ("CII") for the first time. Among the requirements, the cross-border data transfer restriction may be one of the biggest challenges to multinational corporations . . . . CII operators, under the CSL, must comply with stricter cybersecurity protections and restrictions on data cross-border transfer. The determination of CII status is of great significance for businesses. The CSL lists certain sectors related to CII, including public communications, information service, energy, transport, water conservancy, finance, public service and electronic government administration. (art. 31). Furthermore, the Draft CII Regulation ((Guanjian Xinxi Jichu Sheshi Anquan Baohu Tiaoli (Zhengqiu Yijiangao) (关键信息基础设施安全保护条例（征求意见稿） [Draft Regulations on the Security Protection of Critical Information Infrastructure] (promulgated by Cyberspace Administration of China, July 11, 2017), http://www.cac.gov.cn/2017-07/11/c_1121294220.htm (details and extends the CII scope by including additional sectors, which will likely increase the challenges and potential exposure . . . . Under the CSL, if a company is determined to be a CII operator, personal information and important data collected and generated by it within China must be stored in China. Such restrictions, however, may also apply to general network

The risk areas of liability that could adversely affect performance evaluations might include employers collecting excess data, such as protected health information, or telepresence technology that views protected areas of a home or remote office, or unwarranted monitoring of private conversations on technology that is used.[113] Another situation can arise where employer monitoring is excessive; for example, the U.S. Supreme Court has held that continuously tracking an employee's vehicle for over a month is illegal.[114]

GPS tracking raises interesting questions of privacy, depending on the scope of the surveillance, though waivers and consent seem to at least lessen the possibilities of violations of privacy rights. The earlier illustration of the employer planting a chip in the employee's body was accomplished by employee consent.[115] With today's technology, an employer can track or measure nearly everything employees do in or outside the workplace.[116]

> Some [employers] are measuring keystrokes or using programs that can tell supervisors when a keyboard has been idle for 15 minutes. Others use keywords to flag which websites employees visit — and block ones that aren't related to work — or are checking employees' e-mails and instant messages to make sure they don't contain inappropriate or proprietary material. Indeed, nearly every aspect of work is now measurable in some way: Hours are tracked via security badges and fingerprint scanners, locations are monitored using GPS, and certain employee activities are captured by digital camera and video.[117]

In 2015, a plaintiff in California sued her former employer after she was fired for refusing to use an app on her smart phone called "Xora," which would allow her boss to track her whereabouts 24 hours a day, 7 days a week.[118] An employee's discipline or discharge for violation of being found

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operators under the data exporting rules of the CSL, which are under review. Furthermore, under certain conditions, statutory security assessments must be conducted before transferring personal information and important data outside China.").

113. *See, e.g.*, Purple Communications, Inc., 361 N.L.R.B. No. 126, 1122 (2014) (imposing limits on the employer's ability to limit employees' email use during non-working times).

114. *See* United States v. Jones, 565 U.S. 400, 404 (2012).

115. See Astor, *supra* note 40.

116. *See* V. JOHN ELLA, A.B.A., EMPLOYEE MONITORING AND WORKPLACE PRIVACY LAW, 4-5 (2016), https://www.americanbar.org/content/dam/aba/events/labor_law/2016/04/tech/papers/monitoring_ella.authcheckdam.pdf (noting a comprehensive description of the many techniques an employer can use to monitor employees and some of the legal limitations).

117. *See* Lee Michael Katz, *Monitoring Employee Productivity: Proceed with Caution*, SOC'Y FOR HUM. RESOURCE MGMT. (June 1, 2015), https://www.shrm.org/hr-today/news/hr-magazine/pages/0615-employee-monitoring.aspx.

118. *See* Complaint, Arias v. Intermex Wire Transfer, LLC, No. S-1500-CV-284763

to be in the wrong location would certainly find its way into an employee performance evaluation in this changing work environment.[119]

A case currently before the Ninth Circuit, *hiQ Labs Inc. v., LinkedIn Corp.*, involves a company, hiQ, that used bots to "scrape out" information from LinkedIn to track public profile changes of LinkedIn clients who also use LinkedIn's *Recruiter* to indicate interest in relocating.[120] hiQ Labs Inc., has two products — Keeper and Skill Mapper — which track and analyze "employee skills" and whether an employee is "at risk of being recruited away," respectively.[121] LinkedIn attempted to block hiQ's access to its data, but a court issued a temporary restraining order which held that the block would violate antitrust laws.[122] Though this is a commercial issue, it is

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SPC (Cal. Super. Ct. Bakersfield, Co., May 5, 2015); Jose Pagliery, *Woman Fired After Disabling GPS on Work Phone*, CNN (May 13, 2015), http://money.cnn.com/2015/05/13/technology/fired-gps-app/; *see also* Jennifer M. Holly, *There's An App For That: Considerations in Employee GPS Monitoring*, SEYFARTH SHAW (Jan. 26, 2017), http://www.calpeculiarities.com/tag/arias-v-intermex-wire-transfer/ (reporting that the employee "sued for wrongful termination, invasion of privacy, unfair business practices, retaliation, and other claims, seeking over $500,000 in damages. This suit, privately settled, is likely not the last of its kind. An additional source of legal restriction on remote employee monitoring is California Penal Code section 637.7, which prohibits the use of 'an electronic tracking device to determine the location or movement of a person' via a 'vehicle or other moveable thing' *unless* 'the registered owner, lessor, or lessee of a vehicle has consented to the use of the electronic tracking device with respect to that vehicle.'").

119. *See* Katz, *supra* note 117.

120. *See* hiQ Labs, Inc. v. LinkedIn Corp., 273 F. Supp. 3d 1099, 1113 (N.D. Cal. 2017), *appeal docketed*, No. 17-16783 (9th Cir. Sept. 6, 2017); *see also* Black & Reinikainen, *supra* note 65 ("In granting a preliminary injunction guaranteeing a company the right to scrape data, the court found that the public nature of the information sought potentially vitiates the application of the federal Computer Fraud and Abuse Act's ("CFAA") civil and criminal provisions and other legal restrictions on scraping and similar forms of data harvesting. In reaching its decision, the court even suggested, albeit without specifically holding, that serious questions exist as to whether there is a free speech right under the California State Constitution to access and obtain information that has already been made publicly available on the internet. Plaintiff, hiQ Labs, Inc. ("hiQ"), brought a federal action against Defendant, LinkedIn Corp. ("LinkedIn"), the popular business and professional social network, asserting claims under California common law, California's Unfair Competition Law, and the California State Constitution.").

121. Patrick Thibodeau, *LinkedIn Case Highlights Employee Privacy Issues*, TECHTARGET, http://searchhrsoftware.techtarget.com/feature/LinkedIn-case-raises-employee-privacy-concerns (last visited Sept. 30, 2018).

122. *Id.* ("LinkedIn said the scraping of members' personal data is being done 'without their consent' and is in violation of the Computer Fraud and Abuse Act (CFAA), the 1986 anti-hacking law, according to court records filed in the U.S. District Court in the Northern District of California, where the employee monitoring case is being heard. But hiQ argues it only uses profile data that is 'wholly public information' and accessible to anyone. It 'pulls data for a limited subset of users — usually its client's employees —

obvious that technology in the workplace reaches directly into the possible privacy interests of employees and certainly affects employee performance (and retention) evaluations.

IV. ANALYSIS: PERFORMANCE EVALUATIONS WITHIN LEGAL LIMITS IN A CHANGING WORK ENVIRONMENT

What are the legal impacts and limits of employers' restructuring and increasing use of technology for evaluating employee performance in this changing work environment? Objective and subjective data collected by humans and machines on work performance, including appraisal of productivity, conduct, and attitudes, while never an exact science, raise legal issues. Certain issue areas, below, are identifiable though their resolutions may still be evolving.

1. Restructured employers and fissurization shrink the number of "employees" and thus, labor rights.

2. New technology, more inclusive, expansive, and intrusive in the workplace, pervasively enables and encapsulates workers and raises new legal issues involving wage and hours, occupational safety and health, workers compensation, collective bargaining, anti-discrimination, and privacy.

3. Assessing worker performance must navigate these workplace changes.

Many of the changes taking place in the workplace environment with the use of new structural approaches and technology present old problems in new packages. For example, the issues arising from fissurization and restructuring companies raise the continuing, but accelerating, dichotomy between employees and independent contractors, the latter most often excluded from many or most of the labor and employment law protections.[123] Future labor protections will come from labor reforms replacing the traditional master-servant employment relationship with an expanding definition of protected workers.[124] This more liberal approach could

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and uses scientific methodology to analyze the information,' it wrote in a court filing. The two sides have sharply different views on how the LinkedIn data may be used. The information developed by hiQ in its Keeper tool, the company explained, may prompt an employer to give an employee at risk of leaving a 'stay bonus' or career development or internal mobility opportunity.' LinkedIn describes a less positive outcome to employee monitoring: 'If an employer thinks an employee is about to leave, the employer could terminate her or refuse to give her access to sensitive information, even if she actually has no intention of departing.'").

123. *See* Brown & Rymkevich *supra* note 23, at 10-11; Lobel *supra* note 67, at 55-56.

124. *See generally* Lobel, *supra* note 67 (suggesting four proposals for reform that go

embrace currently ambiguous platform workers, contingent workers, etc., under a more inclusive legal test of distinguishing "dependent contractors," such as that used by the FLSA or the Canadian approach, or as is developing in Europe.[125]

> The boundaries between dependent employment and self-employment have increasingly become blurred in some areas in recent years, in a context of changing labour markets and the spread of practices such as outsourcing and contracting-out. This process has led to growing interest in 'economically dependent workers'- workers who are formally self-employed but depend on a single employer for their income - and calls from trade unions and other sources for such work to be regulated and social security coverage and employment law protection to be provided.[126]

Expansion of labor and employment law protections can also arise from expanding definitions of the "employer" to include concepts such as "joint-employers" in cases of independent contractors, contingent, franchise, and subcontracted workers.[127]

New technology changes the work environment, the worker's performance, and the evaluation of worker performance. The continuing introduction of automation and infusion of technology into the workplace brings changing skill requirements and the need to confront digitalization, electronic monitoring, telecommunications, wearing electronic equipment, and working with robots, or maybe being replaced by one.[128] All require continual training and upgrading of skills; and, resulting performances will be measured for purposes of retention, benefits, and discipline. Performance may be further complicated by having to fairly measure comparative performances of those inside and outside the traditional office and working cross-border and remotely, including home workplaces which could raise

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"beyond [the] master-servant" relationship).

125. *See generally* Heather Hettiarachchi, *Understanding Dependent Contractors, and How to Avoid Legal Action*, SMALL BUS. BC (last updated Oct. 27, 2016), http://smallbusinessbc.ca/blog/understanding-dependent-contractors-and-how-to-avoid-legal-action/; Roberto Pedersini, *'Economically Dependent Workers', Employment Law and Industrial Relations*, EUROFOUND (June 13, 2002), https://www.eurofound.europa.eu/observatories/eurwork/comparative-information/economically-dependent-workers-employment-law-and-industrial-relations; *see also* Cherry & Aloisi, *supra* note 30, at 685-87 (discussing the gig economy in the United States).

126. Pedersini, *supra* note 125.

127. *See* Lobel, *supra* note 67, at 63 (stating that the Department of Labor, "in response to the wave of worker misclassification issues arising from the explosion of the Gig Economy . . . referenced the definition contained within the FLSA for what constitutes employment — 'to suffer or permit work' — which is for all intents and purposes, a very broad standard").

128. *See* Sandifer v. United States Steel Corp., 571 U.S. 220 (2014); Astor, *supra* note 40; Holly, *supra* note 118; Pooler, *supra* note 16.

claims of unlawful discrimination.

Measuring workers' production performance often utilizes the latest technological methodology for efficiency and cost-savings.[129] How that is affected by a given workforce varies, but as described above, the methods are designed to obtain a bottom-line as to the amount of productive contribution by the worker, as measured by an employer's own criteria. The data collected and the way it is collected and by whom allows for ultimate evaluation by either a bot or a human or both in tandem. The amount and relevancy of the evaluations collected may or may not raise legal issues of privacy, as discussed above.[130]

The overlay of law on the changing work environment and performance evaluations should be tailored to the operations of specific employers, including MNCs, but generalizations can be made. As stated above, until there are changes and reforms in the labor and employment laws, the trajectories of legal application are predictable and can be anticipated as a company's changing work environment occurs, though sometimes novel applications and policy interpretations will be needed.[131]

As required skills change, training programs can be used to identify and prepare individuals who will perform best.[132] Performance evaluation schemes must avoid data shortcuts based on stereotypes of age, race, gender, disabilities, etc. And, companies need to keep apprised of robotic assistance available to meet the demands of "reasonable accommodation" requests under the ADA.[133] Proper and ongoing training of new technology also cuts back on injuries causing delays in productivity and the costs of worker injuries, covered by workers compensation.[134]

For alternative workplaces, an employer needs to keep aware of its responsibilities and/or liabilities for protecting employees' health and safety; and, for off-site workplaces, the employer must be mindful of sufficiently monitoring the workplaces but at the same time considering whether it is exercising such dominion and control over "independent contractors" to convert them into "employees" or itself into a "joint employer." Too much connectivity with employees can create overtime liabilities under the FLSA; likewise, excessive monitoring may violate privacy protections.[135]

One legal obligation always continues in a unionized workplace, and that

129. *See generally* Ewenstein, Hancock & Komm, *supra* note 8.

130. *See* Astor, *supra* note 40; ELLA *supra* note 116.

131. *See* Lobel, *supra* note 67.

132. *See* Larison, *supra* note 16; Richter *supra* note 98.

133. *See* MATHIASON ET AL., *supra* note 26, at 12.

134. *See id.*; Zingman, *supra* note 84.

135. *See* Conn et al., *supra* note 83; ELLA, *supra* note 116.

is the continuing obligation to negotiate with the union about new technology or its effects or before significant workplace changes are instituted.[136] Contract provisions such as waivers, management rights clauses, etc. are available, but must first be negotiated. Some unions have negotiated information and training requirements to accompany the innovations. An area ripe for negotiation may be contractually protecting the privacy interests of employees as constitutional limits are unavailable for private employees.

Lastly, privacy concerns are also ever-present and should be re-emphasized. Employment performance evaluations must always be scrutinized for perceived intrusions of employees' privacy interests; and, if present, to eliminate them or consider informing the employees and obtaining consents.[137] While close monitoring of employees and their use of vehicles may improve the bottom-line, consideration of job satisfaction and motivation must be factored into the performance evaluation, as well as legal privacy concerns.[138]

V. CONCLUSION — NEW APPROACH OR TWEAK?

The ever-evolving legal applications arising from changing technology and work environments will evolve by usual legal processes, but the law will always be a step behind. The politics of reform are formidable, but many of the necessary and significant technical legal changes of reform could occur by definitional or interpretive tweaks in the laws, enlarging coverages and protecting worker rights while balancing the employers' needs to immerse into Industry 4.0.

136. *See G7 Labour Summit*, *supra* note 1.

137. *See* Astor, *supra* note 40; ELLA, *supra* note 116; Holly, *supra* note 118.

138. *See* Holly, *supra* note 118.