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# Labor Law 2.0: The Impact of New Information Technology on the Employment Relationship and the Relevance of the NLRA

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**LABOR LAW 2.0: THE IMPACT OF NEW INFORMATION  
TECHNOLOGY ON THE EMPLOYMENT RELATIONSHIP  
AND THE RELEVANCE OF THE NLRA**

*Kenneth G. Dau-Schmidt\**

ABSTRACT

*The NLRA system of collective bargaining was born during the industrial age of the early twentieth century. As a result, key terms in the statute such as “employee,” “employer,” and “appropriate bargaining unit” were first interpreted in the context of long-term employment and large vertically integrated firms that dominated this era. Beginning in the late 1970s, the new information technology wrought a revolution in the organization of production increasing short-term contingent employment and the organization of firms horizontally in trading and subcontracting relationships across the globe. To maintain the relevance of collective bargaining to the modern workplace, the interpretation of the key terms of the NLRA must be updated to recognize the changed circumstances of production and interpret union access and employee mutual support in light of the new technology. However, new information technology promises further changes in the workplace with the accelerating mechanization of many jobs and perhaps a fundamental change in the relationship between labor and capital with the development of artificial intelligence. In this Essay, I explore the implications of new information technology for the workplace, the interpretation of the NLRA, and the continuing evolution of American labor policy.*

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INTRODUCTION .....	1585
I. INDUSTRIAL PRODUCTION AND THE BIRTH OF THE NLRA .....	1588
A. <i>The Organization of Industrial Production</i> .....	1588
B. <i>Labor Law 1.0: The Birth of the NLRA</i> .....	1589
II. PRODUCTION AND EMPLOYMENT USING NEW INFORMATION TECHNOLOGY .....	1591
A. <i>New Information Technology</i> .....	1591
B. <i>The Organization of Production Under New Information       Technology and the Rise of the Global Economy</i> .....	1594
C. <i>Labor Law 2.0: Interpretation of the NLRA in Light of the       Changed Methods of Production</i> .....	1599
D. <i>Labor Law 3.0: Things to Come? The Brave New World of       Employment Using New Information Technology</i> .....	1603
CONCLUSION .....	1608

## INTRODUCTION

Although aspiring to larger more timeless principles such as equity in bargaining power and industrial peace,<sup>1</sup> the language of the NLRA was formulated and first interpreted based on the economic realities of industrial production. During the industrial period, the dominant engines of economic production were large vertically integrated firms, supported by a stable workforce.<sup>2</sup> Size and vertical integration allowed firms to coordinate production ensuring that the right number and quality of parts were produced to meet assembly needs and firm demand.<sup>3</sup> A stable workforce ensured that the firm had adequate employees with the right skills to fulfill the production demands of the firm.<sup>4</sup> The employment relationship was long-term and employees of a single employer undertook work at one or perhaps a few physical locations so that employment relationships and bargaining units were relatively easy to define and stable over time, and employees regularly interacted with each other in the same physical environment.<sup>5</sup> Moreover, these long-term relationships were regulated and encouraged through a system of corporate policies and benefits that profited from employee voice and enforcement through collective bargaining.<sup>6</sup> In short, it was a time when it was relatively easy to define employers and employees in an appropriate bargaining unit that could benefit from collective bargaining and it was relatively easy for employees to communicate with each other and act in concert to represent and enforce their interests in the workplace.<sup>7</sup>

As several authors, including myself, have previously written, the rise of new information technology has changed the nature of the employment relationship, complicating the relationships of production and requiring new interpretations of the language of the NLRA consistent with its larger

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<sup>1</sup> 29 U.S.C. § 151 (2012); JAMES B. ATLESON, VALUES AND ASSUMPTIONS IN AMERICAN LABOR LAW 7 (1983).

<sup>2</sup> PETER CAPPELLI, THE NEW DEAL AT WORK: MANAGING THE MARKET-DRIVEN WORKFORCE 59–63 (1999).

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> Kenneth G. Dau-Schmidt, *Employment in the New Age of Trade and Technology: Implications for Labor and Employment Law*, 76 IND. L.J. 1, 5–6, 9 (2001).

<sup>6</sup> *Id.*

<sup>7</sup> Kenneth G. Dau-Schmidt, Kenneth M. Piper Lecture, *The Changing Face of Collective Representation: The Future of Collective Bargaining*, 82 CHI-KENT L. REV. 903, 909–10 (2007).

underlying principles.<sup>8</sup> Beginning around 1980, new information technology fostered a paradigm shift in the best business practices and the employment relationship.<sup>9</sup> During the “information age,” information technology allowed the horizontal organization of production across multiple firms and across the globe with each firm focused only on its “core competency,” or what it did best and cheapest in the global economy.<sup>10</sup> Firms organized production through more tentative relationships of subcontracting and outsourcing that were subject not to corporate administrative rules but instead more the machinations of global markets.<sup>11</sup> Employers began to seek flexibility, not stability, in employment; and “contingent employees”—the number of employees who work part-time, or are leased or subcontracted—reached new heights in the American economy.<sup>12</sup> Employees engaged in the same productive enterprise became more distant from the economic power of the firm, and each other, both in their legal relationships and their geography.<sup>13</sup> Moreover, information technology decreased the importance of the physical plant and itself raised new issues of employee access and communication. The information age raised new questions about the definitions of employers and employees in an appropriate bargaining unit that could benefit from collective bargaining and how these employees should be encouraged to communicate with each other in order to represent their interests in the workplace.<sup>14</sup>

Although the changes in the employment relationship experienced over the last forty years have left plenty of legal problems still to digest, the transformations wrought by new information technology are not done. Indeed, as information technology advances more rapidly, perhaps the largest changes are yet to come. Both the hardware and software components of new information technology have been improving exponentially.<sup>15</sup> Following “Moore’s law,” the number of transistors in a minimum-cost integrated circuit

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<sup>8</sup> CAPPELLI, *supra* note 2, at 102–05; STEPHEN A. HERZENBERG, JOHN A. ALIC & HOWARD WIAL, *NEW RULES FOR A NEW ECONOMY: EMPLOYMENT AND OPPORTUNITY IN POSTINDUSTRIAL AMERICA* 10 tbl.1 (1998); Dau-Schmidt, *supra* note 5; Dau-Schmidt, *supra* note 7.

<sup>9</sup> Dau-Schmidt, *supra* note 7, at 913.

<sup>10</sup> CAPPELLI, *supra* note 2, at 99–100.

<sup>11</sup> *Id.* at 103–04; Jane Slaughter, *Modular Assembly: The Ultimate in ‘Contracting Out’ Comes to North America*, LAB. NOTES, May 1999, at 8.

<sup>12</sup> Richard S. Belous, *The Rise of the Contingent Work Force: The Key Challenges and Opportunities*, 52 WASH. & LEE L. REV. 863, 867 tbl.1 (1995).

<sup>13</sup> *See, e.g.*, Tech. Serv. Solutions, 332 N.L.R.B. 1096 (2000).

<sup>14</sup> Dau-Schmidt, *supra* note 7, at 915–18.

<sup>15</sup> ERIK BRYNJOLFSSON & ANDREW MCAFEE, *RACE AGAINST THE MACHINE: HOW THE DIGITAL REVOLUTION IS ACCELERATING INNOVATION, DRIVING PRODUCTIVITY, AND IRREVERSIBLY TRANSFORMING EMPLOYMENT AND THE ECONOMY* 17–19 (2011).

has doubled every 12–18 months since about 1965, and there is no end to the process in sight.<sup>16</sup> The efficiency of software algorithms has grown at an even faster exponential rate.<sup>17</sup> It is not clear that many of the members of the workforce can keep up with this rate of change in adapting their skills and training.<sup>18</sup> Moreover, advances in artificial intelligence suggest that we may be building computers that are “smarter” than the average human as soon as 2029.<sup>19</sup> Once computers are “smarter” than humans, who knows what sort of improvements in information technology these machines might develop? Although many economists are hopeful about these developments, arguing that historically workers and the economy as a whole have benefited from improvements in technology,<sup>20</sup> “technologists” are not so sanguine, arguing that they portend enormous changes in the demand for labor and the allocation of the rewards from production.<sup>21</sup> SpaceX CEO Elon Musk likened building computers with artificial intelligence to “summoning the demon.”<sup>22</sup> At the very least, continuing improvements in information technology will lead to the reformation of industries and dislocations of workers that will raise issues not only under the NLRA but also for our public policies in education and social welfare.

In this essay, I will outline the impact of new information technology on the employment relationship and the implication of these changes for labor law. I will first discuss the system of industrial production that was the background for the drafting and initial interpretation of the NLRA (Labor Law 1.0). Then I will discuss new information technology and how it has developed and impacted the employment relationship. In this discussion, I distinguish between the changes that have already occurred, and their implications for labor law (Labor Law 2.0) and the changes that are projected to happen in the near future and their implications for labor law and other public policies (Labor Law 3.0).

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<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> MARTIN FORD, *THE LIGHTS IN THE TUNNEL: AUTOMATION, ACCELERATING TECHNOLOGY AND THE ECONOMY OF THE FUTURE* 52–54 (2009); RAY KURZWEIL, *THE AGE OF SPIRITUAL MACHINES: WHEN COMPUTERS EXCEED HUMAN INTELLIGENCE* 2–4, 25 (1999).

<sup>19</sup> FORD, *supra* note 18, at 2.

<sup>20</sup> See, e.g., David H. Autor, *Polanyi's Paradox and the Shape of Employment Growth* (Nat'l Bureau of Econ. Research, Working Paper No. 20485, 2014), available at <http://www.nber.org/papers/w20485.pdf>.

<sup>21</sup> FORD, *supra* note 18, at 4–6.

<sup>22</sup> Matt McFarland, *Elon Musk: 'With Artificial Intelligence We Are Summoning the Demon.'* WASH. POST, Oct. 24, 2014, <http://www.washingtonpost.com/blogs/innovations/wp/2014/10/24/elon-musk-with-artificial-intelligence-we-are-summoning-the-demon/>.

## I. INDUSTRIAL PRODUCTION AND THE BIRTH OF THE NLRA

A. *The Organization of Industrial Production*

America's period of industrial production began toward the end of the nineteenth century. The prior system of artisanal production had been marked by small local or regional "manufactories" owned by master craftsmen who supervised all facets of production.<sup>23</sup> Even in larger facilities, capitalists undertook production in partnership with master craftsmen who employed servants and whose knowledge base encompassed the entire technology of production.<sup>24</sup> Advances in communication and transportation technology increased the optimal scale of production so that many producers could sell on a regional or even a national basis.<sup>25</sup> Furthermore, advances in management techniques and the organization of production allowed mass production and the "deskilling" of jobs.<sup>26</sup> The "scientific management" techniques of Frederick Winslow Taylor were used to break each job down into its component parts to determine not only the best means to undertake production but also appropriate compensation.<sup>27</sup> In 1913, when Henry Ford added a moving assembly line to the principles of "Taylorism" at his Highland Park plant, modern industrial production was born.<sup>28</sup> Management controlled the speed of the assembly line and production while low-skilled workers performed the component parts without the necessity of understanding the entire system of production. In modern industrial production, the technology of production was incorporated into the assembly line, obviating the need for master craftsmen.

Large-scale industrial production swept the nation during the ensuing decades. By the time of the passage of the Wagner Act in 1936, America's captains of industry believed that the "best" management practices were to build a large vertically integrated firm supported by a stable workforce.<sup>29</sup> Firms "vertically integrated," performing all stages of production in house to ensure coordination of production and achieve economies of scale.<sup>30</sup> Firms

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<sup>23</sup> KATHERINE V. W. STONE, FROM WIDGETS TO DIGITS: EMPLOYMENT REGULATION FOR THE CHANGING WORKPLACE 13–15 (2004).

<sup>24</sup> *Id.* at 15.

<sup>25</sup> KENNETH G. DAU-SCHMIDT ET AL., LABOR LAW IN THE CONTEMPORARY WORKPLACE 20 (2d ed. 2014).

<sup>26</sup> See STONE, *supra* note 23, at 35.

<sup>27</sup> See *id.* at 27–41.

<sup>28</sup> DAU-SCHMIDT ET AL., *supra* note 25, at 33.

<sup>29</sup> See CAPPELLI, *supra* note 2, at 59–60.

<sup>30</sup> *Id.*

desired a stable workforce to ensure their supply of this valuable resource in maintaining production.<sup>31</sup> To preserve workforce stability, firms developed administrative rules for the retention, training, and promotion of workers within the organization.<sup>32</sup> Economists refer to these systems of administrative rules as the “internal labor market,” because, although these decisions are made in reference to external market forces, they define the terms of compensation and promotion within the firm in a way that is not directly determined by the external market.<sup>33</sup> The vertical integration of firms facilitated the retention of employees over the course of their careers because integrated firms had layers of positions or “promotion ladders” within the firm for employee advancement.<sup>34</sup> Thus, the employer became an important source of training and security throughout the employee’s life.

### *B. Labor Law 1.0: The Birth of the NLRA*

As I explained in an earlier work,<sup>35</sup> the NLRA system of electing an exclusive representative in an appropriate bargaining unit and resolving disputes through collective bargaining worked relatively well from the 1930s through the late 1970s. Because of the large-scale vertical integration of production by a single firm, the NLRA definitions of “employer” and “employee,” based on agency and tort after the Taft-Hartley amendments, generally defined the party that had control over the terms and conditions of employment of concern to the laboring party.<sup>36</sup> There were many fewer instances of subcontracting, outsourcing, and leasing employees to complicate the relationships of the parties to collective bargaining. Moreover, because jobs were well-defined and long-term, bargaining units of employees under the NLRA were relatively well-defined and stable.<sup>37</sup> Employers were relatively

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<sup>31</sup> Dau-Schmidt, *supra* note 5, at 9.

<sup>32</sup> *Id.*; PETER B. DOERINGER & MICHAEL J. PIRE, INTERNAL LABOR MARKETS AND MANPOWER ANALYSIS 1–2 (1971).

<sup>33</sup> DOERINGER & PIRE, *supra* note 32.

<sup>34</sup> CAPPELLI, *supra* note 2, at 61; HERZENBERG ET AL., *supra* note 8, at 11–12.

<sup>35</sup> Dau-Schmidt, *supra* note 7, at 910.

<sup>36</sup> See 29 U.S.C. § 152(2) (2012) (defining “employer” under the NLRA); *id.* § 152(3) (defining “employee” under the NLRA); Michael C. Harper, *Defining the Economic Relationship Appropriate for Collective Bargaining*, 39 B.C. L. REV. 329, 333–55 (1998).

<sup>37</sup> See 29 U.S.C. § 159(b) (specifying what is an “appropriate” bargaining unit under the NLRA). Early on, the NLRB determined that a proposed bargaining unit was “appropriate” if it included employees with sufficient “community of interest” with respect to their terms and conditions of employment and that in order to be approved a bargaining unit need not be the most appropriate unit, but only “an” appropriate unit. *Morand Bros. Beverage Co.*, 91 N.L.R.B. 409 (1950), *enforced sub nom. Morand Bros. Beverage Co. v. NLRB*, 190 F.2d 576 (7th Cir. 1951).



insulated from international competition and were more concerned with maintaining production than maintaining low wages.<sup>38</sup> As a result, employers were willing to be more forthcoming in providing wage and benefit victories for organized employees. Employees had a long-term interest in their jobs and a particular employer and thus had incentive to invest in organizing a workplace to reap future benefits.<sup>39</sup>

Moreover, the NLRA's traditional single-unit system of bread-and-butter collective bargaining worked well in resolving workplace disputes during this time. Due to the large-scale vertical integration of most firms, employees could address their concerns to the party with control over those issues—their employer under the NLRA. The firm that signed their paycheck was also the firm that decided how much to produce, what methods to use, and how to market production.<sup>40</sup> Traditional collective bargaining gave employees a useful voice in the administrative rules of the internal labor market, allowing them to address the issues of greatest concern to them in their work life.<sup>41</sup> Their demands for benefits, seniority, and job security were compatible with management's objective of the long-term retention of skilled workers. Employee codetermination and enforcement of the administrative rules of the internal labor market played an important role in the best management practices.<sup>42</sup> Union representation and its accompanying system of grievance and arbitration provided a fair and efficient means of enforcing the agreed-upon administrative rules of the workplace.<sup>43</sup>

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<sup>38</sup> Dau-Schmidt, *supra* note 5, at 9.

<sup>39</sup> *Id.* at 20.

<sup>40</sup> Dau-Schmidt, *supra* note 7, at 911.

<sup>41</sup> See David Weil, *Are Mandated Health and Safety Committees Substitutes for or Supplements to Labor Unions?*, 52 INDUS. & LAB. REL. REV. 339 (1999).

<sup>42</sup> See William N. Cooke, *Employee Participation Programs, Group-Based Incentives, and Company Performance: A Union-Nonunion Comparison*, 47 INDUS. & LAB. REL. REV. 594 (1994); Saul A. Rubinstein, *The Impact of Co-Management on Quality Performance: The Case of the Saturn Corporation*, 53 INDUS. & LAB. REL. REV. 197 (2000).

<sup>43</sup> See HOYT N. WHEELER, BRIAN S. KLAAS & DOUGLAS M. MAHONY, *WORKPLACE JUSTICE WITHOUT UNIONS* 32–44 (2004).

## II. PRODUCTION AND EMPLOYMENT USING NEW INFORMATION TECHNOLOGY

### A. *New Information Technology*

Large-scale vertically integrated industrial production dominated the American economy until the late 1970s.<sup>44</sup> At this time, computers, and their accompanying software and networks, began to emerge as new general purpose technology,<sup>45</sup> which, like steam and electricity before them, has remade how work and production is done. A computer is a device consisting of on-off switches that can save and retrieve information, or carry out arithmetic or logical operations according to a predesigned program.<sup>46</sup> Modern computers use integrated circuits for their on-off switches, which are growing exponentially in their speed and shrinking exponentially in their size and cost.<sup>47</sup> As previously mentioned, the number of transistors in a minimum-cost integrated circuit has been doubling every 12–18 months since about 1965 while the efficiency of computer software has been improving at even faster rates.<sup>48</sup> Since the program can be changed, the computer can be used to solve more than one kind of problem.<sup>49</sup> Computers excel at performing “routine tasks” such as organizing, storing, retrieving, and manipulating information, or executing precisely defined physical movements in a production process.<sup>50</sup> These tasks are most often found in middle-skill and middle-pay jobs like

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<sup>44</sup> See CAPPELLI, *supra* note 2.

<sup>45</sup> A “general purpose technology” is one that becomes so central to the production process that improvements in the technology spread across the entire economy. Entire economic eras are described with reference to the dominant general purpose technology of the age, for example the steam age. Timothy F. Bresnahan & Manuel Trajtenberg, *General Purpose Technologies “Engines of Growth?”* (Nat’l Bureau of Econ. Research, Working Paper No. 4148, 1992), available at <http://www.nber.org/papers/w4148.pdf>.

<sup>46</sup> DAVID R. KOEPEL, THE ONTOLOGY OF CYBERSPACE: PHILOSOPHY, LAW, AND THE FUTURE OF INTELLECTUAL PROPERTY 3 & n.6 (2000).

<sup>47</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15.

<sup>48</sup> *Id.* at 18; see also *supra* notes 15–17. Martin Grötschel, a German scientist and mathematician, has studied changes in the speed with which computers perform calculations and found that their speed improved by a factor of 43 million over a fifteen year period. Of the total, a factor of roughly 1,000 was attributable to faster processor speeds, and a factor of 43,000 was due to improvements in the efficiency of software algorithms. Steve Lohr, *Software Progress Beats Moore’s Law*, N.Y. TIMES BITS BLOG (Mar. 7, 2011, 3:56 PM), <http://bits.blogs.nytimes.com/2011/03/07/software-progress-beats-moores-law/>. William Nordhaus estimates that the real cost of performing a standardized set of computations has fallen by at least 1.7 trillion-fold since the manual computing era, with most of that decline occurring since 1980. William D. Nordhaus, *Two Centuries of Productivity Growth in Computing*, 67 J. ECON. HIST. 128 (2007).

<sup>49</sup> JOSEPH WEIZENBAUM, COMPUTER POWER AND HUMAN REASON: FROM JUDGMENT TO CALCULATION (1976).

<sup>50</sup> David H. Autor, Frank Levy & Richard J. Murmane, *The Skill Content of Recent Technological Change: An Empirical Exploration*, 118 Q.J. ECON. 1279 (2003).

clerical work, bookkeeping, and repetitive-production jobs.<sup>51</sup> However, there are other tasks that pose a serious challenge for computers and programmers.<sup>52</sup> First, computers have trouble performing “manual tasks” that require situational adaptability, visual and language recognition, or in-person interactions.<sup>53</sup> These tasks are most often found in low-skill and low-pay jobs like food preparation and service, “cleaning and janitorial work,” and “in-person health assistance” and protective services.<sup>54</sup> Second, computers have trouble performing “abstract tasks” that require problem solving, intuition, creativity, or persuasion.<sup>55</sup> These tasks are most often found in high-skill and high-pay jobs like professional, managerial, technical, and creative occupations, like law, medicine, science, engineering, advertising, and design.<sup>56</sup> Although computers are making inroads into almost all occupations, it seems that currently they tend to replace middle skill and middle-pay workers, while they tend to augment the productivity of high-skill and high-pay workers.<sup>57</sup>

Like the other transformative technologies that have come before it, new information technology has stirred up a fair amount of “automation anxiety” about the impact it will have on people’s jobs and employment. Just as the luddites and John Henry battled steam machines for their jobs, so too some have worried that computers might displace people from good paying jobs or perhaps from employment altogether.<sup>58</sup> There have been similar concerns about the impact of technology on employment in more recent history. In his widely discussed Depression-era essay, John Maynard Keynes foresaw that in a century’s time technology might make it possible that “we may be able to perform all the operations of agriculture, mining, and manufacture with a

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<sup>51</sup> Nordhaus, *supra* note 48; *see also* Autor, *supra* note 20, at 7.

<sup>52</sup> Autor et al., *supra* note 50.

<sup>53</sup> David H. Autor & David Dorn, *How Technology Wrecks the Middle Class*, N.Y. TIMES OPINIONATOR BLOG (Aug. 24, 2013, 2:35 PM), <http://opinionator.blogs.nytimes.com/2013/08/24/how-technology-wrecks-the-middle-class/>.

<sup>54</sup> Autor, *supra* note 20, at 11; *see also* Autor & Dorn, *supra* note 53.

<sup>55</sup> Autor, *supra* note 20, at 11.

<sup>56</sup> *Id.*; Autor et al., *supra* note 50, at 1286 tbl.1.

<sup>57</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15, at 50. The professions should not be entirely sanguine about job loss to computers. Computers are part of the reason for the current slump in legal hiring since they now perform most document search work better than humans. John Markoff, *Armies of Expensive Lawyers, Replaced by Cheaper Software*, N.Y. TIMES, Mar. 5, 2011, at A1, *available at* <http://www.nytimes.com/2011/03/05/science/05legal.html>. According to Markoff, computers are not only cheaper and faster than human attorneys in doing document search but also they are more accurate. *Id.*

<sup>58</sup> FORD, *supra* note 18, at 47–48; *see also* BRYNJOLFSSON & MCAFEE, *supra* note 15, at 53.

quarter of the human effort to which we have been accustomed.”<sup>59</sup> Keynes saw this as a short-run problem opining that society would adjust to “technological unemployment,” perhaps with a fifteen-hour work week.<sup>60</sup> In 1964, President Johnson appointed a “14-man blue ribbon panel” designated as the “National Commission on Technology, Automation, and Economic Progress” and charged them to assess the prospective impact of technological change on new job requirements and worker displacement.<sup>61</sup> The commission ultimately concluded that automation did not threaten employment at that time, but as insurance against this eventuality it recommended “a guaranteed minimum income for each family, using the government as the employer of last resort for the hard core jobless, two years of free education in either community or vocational colleges, a fully administered federal employment service, and individual Federal Reserve Bank sponsorship in area economic development.”<sup>62</sup>

Economists have traditionally thought that concerns about the technological displacement of workers are overstated. They note that new technology capital is both a substitute and a complement for labor in production, raising the productivity of the remaining workers.<sup>63</sup> Thus, although technological improvements may result in short-run worker displacement, historically these displaced workers are eventually retrained or resituated, and total product and the wages of the workers who employ the new technology are ultimately increased.<sup>64</sup> There is no economic law that technological change will lead to Pareto improvements that benefit everyone; there will be winners and losers with technological change, but overall the impact of technological improvements on the economy are to increase productivity and wages.<sup>65</sup> However, there is renewed concern this time around, even among some

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<sup>59</sup> JOHN MAYNARD KEYNES, *Economic Possibilities for our Grandchildren* (1930), reprinted in *ESSAYS IN PERSUASION* 358, 364 (1963).

<sup>60</sup> *Id.* at 364, 369.

<sup>61</sup> *Skirting the Automation Question*, *HERALD POST* (St. Joseph, Mich.), Feb. 7, 1966, at 2.

<sup>62</sup> *Id.* The commission’s conclusions still left some important thinkers with concerns. In an open letter to President Johnson in 1966, Nobel laureates Linus Pauling (chemistry) and Gunnar Myrdal (economics), as well as economic historian Robert Heilbroner, worried that “[t]he traditional link between jobs and incomes is being broken” and that soon “[t]he economy of abundance [would be able to] sustain all citizens in comfort and economic security whether or not they engage . . . [in] work.” Daniel Akst, *What Can We Learn from Past Anxiety over Automation?*, *WILSON Q.*, Summer 2014, <http://wilsonquarterly.com/quarterly/summer-2014-where-have-all-the-jobs-gone/theres-much-learn-from-past-anxiety-over-automation/> (internal quotation marks omitted).

<sup>63</sup> *Autor*, *supra* note 20, at 7–8.

<sup>64</sup> *Id.*

<sup>65</sup> *Id.* at 8–9; see also BRYNJOLFSSON & MCAFEE, *supra* note 15, at 38–39.

economists, that new information technology changes are so fast and may result in such a fundamental change in the relationship of capital and labor, that much more serious, and long-term, changes in the employment relationship are afoot.<sup>66</sup> At the very least, it seems that new information technology will lead to some fairly major displacement of workers across industries, a long-term reduction in middle-skilled jobs, and perhaps a long-term reduction in the bargaining power of labor.

*B. The Organization of Production Under New Information Technology and the Rise of the Global Economy*

As I noted in a previous piece,<sup>67</sup> in the 1980s, new information technology promoted the efficient horizontal organization of firms and accelerated the rise of the global economy. Employers no longer had to be large and vertically integrated to ensure efficient production; they just had to be sufficiently wired to reliable subcontractors.<sup>68</sup> The “best business practices” became those of horizontal organization, subcontracting, and outsourcing as firms concentrated on their “core competencies”—the portions of production or retailing that they did best.<sup>69</sup> Information technology allowed employers to coordinate production among various plants suppliers and subcontractors around the world while container technology made shipping even cheaper.<sup>70</sup> In this economic environment, employers sought flexibility, not stability, in employment; the number of “contingent employees”—those working part-time, or being leased or subcontracted—reached new heights in the American economy.<sup>71</sup> The new horizontal organization of firms broke down the administrative rules and job ladders of the internal labor market, and firms became more market driven.<sup>72</sup> New technology allowed “benchmarking,” or the monitoring of the efficiency of a division of a firm against external suppliers, thus bringing the market inside a firm in a way not previously experienced.<sup>73</sup> New information technology also facilitated the rise of the “big box” retailers to a position of unprecedented worldwide economic power.<sup>74</sup> The simple barcode allowed

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<sup>66</sup> Jeffrey D. Sachs & Laurence J. Kotlikoff, *Smart Machines and Long-Term Misery* 2–3 (Nat’l Bureau of Econ. Research, Working Paper No. 18629, 2012), available at <http://www.nber.org/papers/w18629.pdf>.

<sup>67</sup> Dau-Schmidt, *supra* note 7, at 913.

<sup>68</sup> CAPPELLI, *supra* note 2, at 99–100.

<sup>69</sup> *Id.*

<sup>70</sup> *Id.* at 103.

<sup>71</sup> Belous, *supra* note 12, at 867 tbl.1.

<sup>72</sup> CAPPELLI, *supra* note 2, at 101–02.

<sup>73</sup> *Id.* at 106.

<sup>74</sup> Dau-Schmidt, *supra* note 7, at 914.

Wal-Mart to master inventory control, coordinate sources of product supply worldwide, and act as the retail arm for producers around the globe.<sup>75</sup>

American workers have not fared well in the global economy of the information age. Although American workers of the post-war era enjoyed wage increases in proportion with the increases in their productivity, since the late 1970s the wages of American workers have remained flat despite significant increases in worker productivity (see graph 1 below).<sup>76</sup> As a result of this divergence between wages and productivity or wage gap, labor's share of the Gross Domestic Product (GDP) has been declining in recent years and the distribution of income and wealth in America has become more unequal.<sup>77</sup> Since 1980, the share of nonfarm domestic product going to nonsupervisory employees in the form of wages and benefits has declined from 35% to 27% of the total (see graph 2 below).<sup>78</sup> This decline in labor's share of total product has occurred in most countries around the world and in particular in developed countries.<sup>79</sup> Of course this increased production does not just disappear when it is not paid to labor, but instead can be found in higher relative payments or production shares for capital and management.<sup>80</sup>

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<sup>75</sup> Dau-Schmidt, *supra* note 5, at 14.

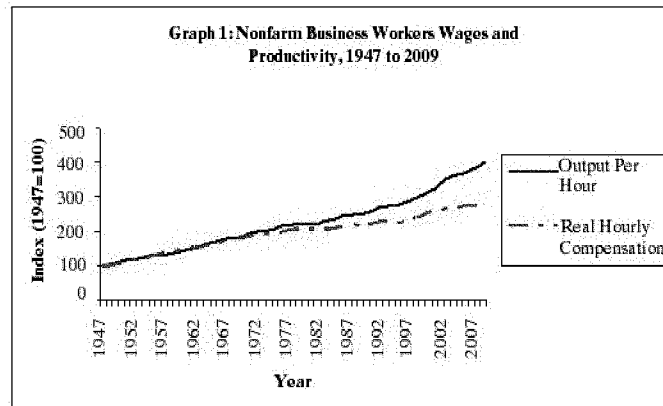
<sup>76</sup> Kenneth G. Dau-Schmidt, *Promoting Employee Voice in the American Economy: A Call for Comprehensive Reform*, 94 MARQ. L. REV. 765, 793 (2011).

<sup>77</sup> Marika Karanassou & Hector Sala, *The Wage-Productivity Gap Revisited: Is the Labor Share Neutral to Employment?* 2 (Queen Mary Univ. of London, Working Paper No. 668, 2010), available at <http://econ.qmul.ac.uk/research/workingpapers/2010/Items/docs/668.pdf>.

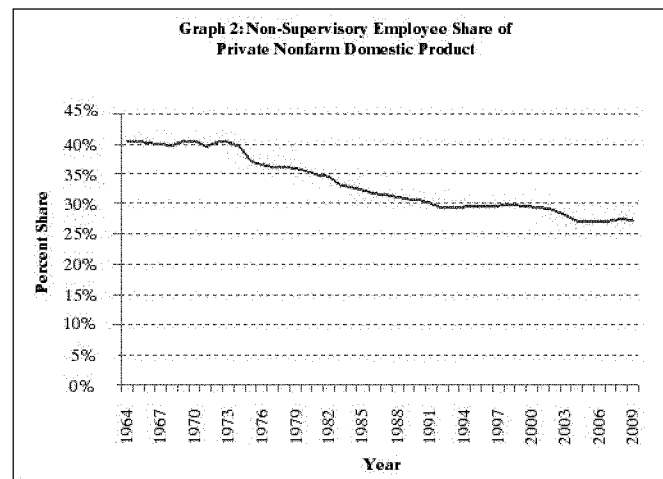
<sup>78</sup> Dau-Schmidt, *supra* note 76, at 795.

<sup>79</sup> Loukas Karabarbounis & Brent Neiman, *The Global Decline of the Labor Share*, 129 Q.J. ECON. 61 (2014).

<sup>80</sup> CAPELLI, *supra* note 2, at 106.



Source: Bureau of Labor Statistics Data Sets, <http://www.bls.gov/lpc/#data>, <http://www.bls.gov/data/>



Source: Bureau of Labor Statistics Data, <http://www.bls.gov/lpc/#data>, <http://www.bls.gov/data/>

Economists have identified several ways in which new information technology fosters higher relative payments to capital and lower relative payments to labor. First, new information technology has made investment goods cheaper and more productive, and this encouraged producers to buy more of them, substituting capital for labor in the production process.<sup>81</sup> Karabarbounis and Neiman estimate that this effect accounts for about half of

<sup>81</sup> Karabarbounis & Neiman, *supra* note 79, at 62.

the observed decline in labor's share.<sup>82</sup> Second, by globalizing the economy, new information technology has thrown American workers into competition with low-wage workers across the globe, lowering the wages and benefits these workers can demand, and raising the payment that capital can now demand.<sup>83</sup> Even simple international trade models predict that when high-wage, high-capital countries trade with low-wage, low-capital countries, the result will be decreased wages in the high-wage country and increased payments for capital that is now in greater demand.<sup>84</sup> This downward pressure on wages and upward pressure on payments to capital from international trade has become even more pronounced with the entry of eastern Europe, Russia, China, and India into the global economy, almost doubling the relevant global labor force from 3.3 billion to 6 billion while providing little increase in relevant capital.<sup>85</sup> Finally, Thomas Piketty has provided empirical evidence that the post-war period from the early 1940s to 1980 was fairly exceptional with respect to the share of GDP that was paid to labor because much of the world's capital had been destroyed in two world wars and labor was relatively scarce.<sup>86</sup> By Piketty's account, we are now returning to a more normal period in the economic history of capitalism in which the returns to capital exceed the economic growth rate and wealth becomes increasingly concentrated in the hands of a few.<sup>87</sup>

Economists have also argued that new information technology fosters higher relative payments to innovators and managers, and lower relative payments to labor, because it allows the replication of innovations on a massive scale by converting many markets from ordinary markets into ones in which compensation for a few "superstars" dominates.<sup>88</sup> Just as new information technology allows music to be recorded and distributed on a national or international basis, so too the technology allows processes and management strategies to be replicated across international firms or industries

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<sup>82</sup> *Id.* at 64.

<sup>83</sup> Dau-Schmidt, *supra* note 7, at 913–14.

<sup>84</sup> ROBERT FEENSTRA, *ADVANCED INTERNATIONAL TRADE: THEORY AND EVIDENCE* 31–63 (2004) (discussing the Heckscher-Ohlin model). This is the easy prediction of even a simple model of international trade. *Id.*; see also Doru Tsaganea, *Effects of US Trade with Low Wage Countries on US Wages: An Analysis Besed [sic] on the Heckscher-Ohlin Model 3* (July 2014) (unpublished manuscript), available at <http://web.isanet.org/Web/Conferences/FLACSO-ISA%20BuenosAires%202014/Archive/3409d03b-d8c7-4487-af1c-3f37c7830cdc.pdf>.

<sup>85</sup> RICHARD B. FREEMAN, *AMERICA WORKS: THE EXCEPTIONAL U.S. LABOR MARKET* 128–40 (2007).

<sup>86</sup> THOMAS PIKETTY, *CAPITAL IN THE TWENTY-FIRST CENTURY* 356 (Arthur Goldhammer trans., 2014).

<sup>87</sup> *Id.*

<sup>88</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15, at 42–44.



magnifying the value of these performances and allowing a few top performers or innovators to reap previously unimaginable rewards.<sup>89</sup> Although it is probably true that new information technology has helped to raise CEO pay in developed countries with large companies that reap the benefits of replication, the pay of American CEOs is well above competitive levels in the global economy due to agency problems in the organization of American firms and the short-term manipulation of stock prices for the benefit of management compensation.<sup>90</sup>

New information technology has also led to greater income inequality among workers in the American economy because it tends to eliminate middle-skilled, middle-pay jobs while creating low-skilled, low-pay and high-skilled, high-pay jobs.<sup>91</sup> Recall that, although computers can perform many repetitive “routine tasks,” reducing the number of middle-skilled workers needed to perform those tasks, computers have trouble facilitating low-skill “manual tasks” that require situational adaptability, visual and language recognition, or in-person interactions, and high-skill “abstract tasks” that require problem solving, intuition, creativity, or persuasion.<sup>92</sup> A large body of U.S. and international empirical evidence confirms that adoption of new information technology produces “job polarization,” in that the jobs that disappear are disproportionately middle-skill and middle-pay jobs while the types of jobs that continue to grow are low-skill, low-pay and high-skill, high-pay jobs.<sup>93</sup> High-skill jobs have the added advantage that high-skilled workers tend to work as complements to new information technology so that their productivity and wages can increase with its adoption.<sup>94</sup> Middle-skill jobs were hit particularly hard during the Great Recession of 2007 with many formerly middle-skill workers falling into the low-wage labor category to further depress wages there.<sup>95</sup> The middle-skilled workers who suffered this fate were disproportionately men, who did not enjoy the same opportunities for

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<sup>89</sup> Andrew McAfee & Erik Brynjolfsson, *Investing in the IT That Makes a Competitive Difference*, HARV. BUS. REV. (July 2008), <https://hbr.org/2008/07/investing-in-the-it-that-makes-a-competitive-difference>.

<sup>90</sup> Dau-Schmidt, *supra* note 76.

<sup>91</sup> Autor, *supra* note 20, at 7, 14–15.

<sup>92</sup> See *supra* notes 53–57 and accompanying text.

<sup>93</sup> Autor, *supra* note 20, at 11; see also BRYNJOLFSSON & MCAFEE, *supra* note 15, at 50; David H. Autor, Lawrence F. Katz & Melissa S. Kearney, *The Polarization of the U.S. Labor Market*, AM. ECON. REV., May 2006, at 189, 191.

<sup>94</sup> Autor, *supra* note 20, at 10.

<sup>95</sup> *Id.* at 13–14. Autor found that middle-skill occupations declined anywhere from five to fifteen percent in employment levels between 2007 and 2012 while low- and high-skilled jobs fared much better. *Id.*

educational advancement as their female colleagues.<sup>96</sup> The low-skilled jobs that remain and grow in the U.S. economy have the advantage that most of them are service jobs that cannot be outsourced to other countries.<sup>97</sup> Unfortunately, they still suffer downward pressure on wages and benefits, and more and more workers who previously would have been middle-skill workers fall into the low-skill labor market.

*C. Labor Law 2.0: Interpretation of the NLRA in Light of the Changed Methods of Production*

The new production methods of the information age are testing many of the traditional concepts that are used in enforcement of the NLRA. The old definitions of who is an employee, who is an employer, and what constitutes an appropriate bargaining unit have all become increasingly irrelevant for the purposes of determining the parties that need to negotiate together to determine the terms and conditions of employment. Workers may labor as temporary workers, subcontractors, subcontracted workers, or employees of a subcontracting employer when the real economic power in the relationship resides with a “third party” producer or retailer.<sup>98</sup> The decentralization of decision-making in the new economic environment poses a particular problem for the definition of employees and employers under the NLRA due to the Supreme Court’s broad interpretation of the managerial and supervisory employee exceptions.<sup>99</sup> The definition of an appropriate bargaining unit has lost some of its meaning not only because it is based on outdated definitions of who is an employer and who is an employee, but also because it assumes a quantum of relationship among employees in one or more physical locations

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<sup>96</sup> Autor, *supra* note 20, at 18 fig.4. Indeed, women have used their advantages in education to survive the adoption of new information technology much better than men. From 1975 to 2010, women’s real median compensation increased 39.2% while men’s real median compensation increased only 0.1%. LAWRENCE MISHEL, ECON. POL’Y INST., ISSUE BRIEF NO. 330, THE WEDGES BETWEEN PRODUCTIVITY AND MEDIAN COMPENSATION GROWTH 3 (2012), available at <http://www.epi.org/files/2012/ib330-productivity-vs-compensation.2012-04-26-16:45:37.pdf>. Some of the increase for women was due to an increase in hours worked but some was undoubtedly due to women’s advantages in education.

<sup>97</sup> Autor, *supra* note 20, at 11.

<sup>98</sup> Harper, *supra* note 36, at 333–56.

<sup>99</sup> NLRB v. Yeshiva Univ., 444 U.S. 672, 684 (1980) (upholding Board determination that managerial employees are those who are either closely aligned with management or who formulate or effectuate managerial policies for the company); Oakwood Healthcare, Inc., 348 N.L.R.B. 686, 687, 694 (2006) (defining a “supervisor” as anyone who holds authority to exercise independent judgment in performing at least one of twelve specified supervisory functions on a regular basis and such exercise constitutes at least 10%–15% of their total work time); see also Pac. Lutheran Univ., 361 N.L.R.B. No. 157, 2014 WL 7330993, at \*1 (Dec. 16, 2014) (reading *Yeshiva University* narrowly).

that may not be necessary in the “workplace” of new information technology.<sup>100</sup> What is the appropriate bargaining unit for employees who never coalesce in one physical space and may never meet, or even see, each other? Finally, our interpretation of the NLRA has to deal with the use of new information technology itself. For example, should workers have access to their work e-mail for the purposes of organizing and collective action and, if so, under what terms?<sup>101</sup> Can employers regulate employee use of social media to air complaints about their jobs? To what extent will the NLRB use new information technology to conduct and speed elections and Board proceedings?<sup>102</sup>

The Board has begun to address some of these issues and interpret the NLRA consistent with the statute’s language and its purpose of fostering collective bargaining, even under the production practices of new information technology. As early as 2000, the Board began to take account of new multiemployer production methods of the information age when, in *M.B. Sturgis Inc.*, it recognized a bargaining unit “composed of employees who are jointly employed by a user employer and a supplier employer, and employees who are solely employed by the user employer.”<sup>103</sup> This recognition of new methods of organizing production was short-lived, however, as a later Board overturned *Sturgis* in 2004 with *H.S. Care LLC (Oakwood Care Center)*, holding that “units of solely and jointly employed employees are multiemployer units and are statutorily permissible only with the parties’ consent.”<sup>104</sup> However, the Board has recently shown renewed interest in invigorating the joint employer doctrine with its invitation for amicus briefs on the subject in *Browning-Ferris Industries Inc.*,<sup>105</sup> and its recent efforts to hold the McDonald’s Corporation and its franchises liable as joint employers.<sup>106</sup>

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<sup>100</sup> Martin H. Malin & Henry H. Perritt, Jr., *The National Labor Relations Act in Cyberspace: Union Organizing in Electronic Workplaces*, 49 U. KAN. L. REV. 1, 13–21 (2000).

<sup>101</sup> See *id.* at 37–58 (discussing employee access to electronics in the workplace).

<sup>102</sup> See *id.* at 60.

<sup>103</sup> 331 N.L.R.B. 1298, 1304 (2000), *overruling in part*, *Greenhoot, Inc.*, 205 N.L.R.B. 250 (1973); see also Michael J. Hely, *The Impact of Sturgis on Bargaining Power for Contingent Workers in the U.S. Labor Market*, 11 WASH. U. J.L. & POL’Y 295 (2003).

<sup>104</sup> 343 N.L.R.B. 659, 663 (2004); see also Nolan J. Lafler, Comment, *Unionizing the Contingent Workforce: Squaring the NLRB’s 2004 Decision in Oakwood Care Center with the United States’ Obligations as a Signatory to the International Labour Organization*, 29 AM. U. INT’L L. REV. 465 (2014).

<sup>105</sup> See Notice and Invitation to File Briefs, *Browning-Ferris Indus., Inc.*, No. 32-RC-109684 (N.L.R.B. May 12, 2014), available at <http://apps.nlr.gov/link/document.aspx/09031d4581704931>.

<sup>106</sup> *So Who is Technically an Employer? We May Be About to Find Out*, CRAIN’S CHI. BUS. (Dec. 1, 2014), <http://www.chicagobusiness.com/article/20141201/NEWS04/141209972/so-who-is-technically-an-employer-we-may-be-about-to-find-out>; Rochelle Spandorf, *NLRB Will Charge McDonald’s as “Joint*

Recognition that firms now commonly conduct production with multiple employers in a single enterprise, making joint or interconnected decisions about the terms and conditions of employment, is necessary for the NLRA model of collective bargaining to have a chance of success in the new economic environment. Without such recognition, Board precedent will confine the NLRA's affirmative duty to collectively bargain to subsets of employees and employers within the enterprise who have no effective control over the terms and conditions of employment.<sup>107</sup>

The Board has also recently affirmed that NLRA protection of employee communication about the job extends to comments made through electronic social media. Beginning in 2011, the Board's General Counsel began circulating a series of three reports discussing the application of the NLRA to employee comments on social media.<sup>108</sup> The reports discussed particular cases and made it clear that, in the General Counsel's opinion, the NLRA offered similar protection for employee communication regardless of whether that communication was made in person or through social media.<sup>109</sup> Accordingly, the reports suggested that employers should not punish employee electronic posts that constitute concerted activity or make general policies regarding employee comments on social media that discourage protected concerted activity.<sup>110</sup> In 2012, the Board confirmed the thrust of the General Counsel's reports and held that employee comments on Facebook about the job, which constituted "concerted activity,"<sup>111</sup> enjoyed the same protection under the NLRA as in-person employee communications.<sup>112</sup> NLRA protection of employee social media comments applies whether or not the employees are

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*Employer" for Franchisee Labor Violations*, DAVIS WRIGHT TREMAINE LLP (Aug. 5, 2014), <http://www.dwt.com/NLRB-Will-Charge-McDonalds-as-Joint-Employer-For-Franchisee-Labor-Violations-08-05-2014/>.

<sup>107</sup> At the very least, when multiple employers jointly undertake production at a single physical location, the Board and courts should follow the express language of the NLRA and allow organization of joint employers on a *plant* basis. See 29 U.S.C. § 159(b) (2012) (specifying that appropriate units may be a "plant unit").

<sup>108</sup> *The NLRB and Social Media*, NLRB, <http://www.nlr.gov/news-outreach/fact-sheets/nlr-and-social-media> (last visited May 9, 2015).

<sup>109</sup> *Id.*; see also Robert J. Rojas, Note, *The NLRB's Difficult Journey Down the Information Super Highway: A New Framework for Protecting Social Networking Activities Under the NLRA*, 51 WASHBURN L.J. 663 (2012).

<sup>110</sup> *The NLRB and Social Media*, *supra* 108.

<sup>111</sup> For a discussion of speech that constitute concerted activity, see *Meyers Indus., Inc.*, 268 N.L.R.B. 493 (1984).

<sup>112</sup> *Hispanics United of Buffalo, Inc.*, 359 N.L.R.B. No. 37, 2012 WL 6800769, at \*1 (Dec. 14, 2012).

organized.<sup>113</sup> Just as with in-person communications, the protection does not extend to mere griping unrelated to concerted activity.<sup>114</sup>

Finally, the Board has recently made progress in ensuring the option of using modern information technology in the exercise of Section 7 rights and the conduct of representation elections. Just last year, in *Purple Communications, Inc.*,<sup>115</sup> the Board held that employees, who have been granted access to their employer's e-mail system for work purposes, have a presumptive right to use that system to engage in Section 7-protected communications and that the employer may rebut this presumption only by demonstrating special circumstances that make a ban on nonbusiness use of the system necessary to maintain production or discipline among its employees.<sup>116</sup> Although the opinion applied only to e-mail, the Board hinted at the possibility of extending the holding to other types of electronic communication.<sup>117</sup> The Board has also adopted new rules for representation elections that make use of new information technology. Not only can the parties now file and transmit documents electronically in these proceedings but the employer is now required to give the union the employees e-mail addresses and phone numbers as part of the "Excelsior List" so that the union can use modern methods of communication to communicate with prospective voters.<sup>118</sup>

Regardless of the interpretation of the Act, it is not clear that the NLRA system of collective bargaining will be as successful in new information age as it was in the industrial age either in terms of producing organized workers or higher wages and benefits. In the new economy, employers are more concerned with ensuring low prices and flexibility in production than with maintaining production or a stable workforce. As a result, employers are more inclined to resist employee organization and take advantage of the many strategies for delay and intimidation available under the current law.<sup>119</sup> Also, employees have less long-term interest in the job and, thus, less incentive to

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<sup>113</sup> The claimants in *Hispanics United of Buffalo* were not organized. *See id.*

<sup>114</sup> *Karl Knauz Motors, Inc.*, 358 N.L.R.B. No. 164, 2012 WL 4482841, at \*2 (Sept. 28, 2012).

<sup>115</sup> *Purple Commc'ns, Inc.*, 361 N.L.R.B. No. 126, 2014 WL 6989135, at\*2 (Dec. 11, 2014), *overruling* *Guard Publ'g Co.*, 351 N.L.R.B. 1110 (2007).

<sup>116</sup> *Id.*

<sup>117</sup> *Id.*; *see also* Jeff Sloan & Eugene Park, *Union Access to Employer's E-Mail Systems: Are Times A-Changin'?*, CAL. EMP. L. LETTER, Aug. 25, 2014, at 6, *available at* <http://publiclawgroup.com/wp-content/uploads/2014/10/Aug-2014-CAEMP-Labor-Law.pdf>.

<sup>118</sup> *See NLRB Representation Case-Procedures Fact Sheet*, NLRB (2014), <http://www.nlr.gov/sites/default/files/attachments/basic-page/node-3317/rulefactsheet.pdf>.

<sup>119</sup> *Dau-Schmidt*, *supra* note 7, at 916.

organize a particular employer. Why should employees incur the risks and costs of organizing a particular employer when they may well be working for a different employer next year?<sup>120</sup> The global economy of the information age places American workers in competition with low-wage workers across the globe putting constant downward pressure on wages and benefits and making it hard for unions to deliver on bargaining demands.<sup>121</sup> Moreover, new information technology allows employers to more easily relocate or outsource work to replace employees and cut wage costs.<sup>122</sup> Finally, in the new economic environment, employers strive to maintain flexibility in production and employment and to resist the promises of job security, seniority, and benefits that employers once used to bind employees to their jobs. With the decline of the internal labor market and the rise of a market-driven workforce, there are fewer managerial rules for unions to help determine and administer, and thus less for unions to achieve through traditional collective bargaining.<sup>123</sup>

*D. Labor Law 3.0: Things to Come? The Brave New World of Employment Using New Information Technology*

New information technology has already brought enormous change to the employment relationship, but some are predicting even bigger changes as the pace of technological advance continues to accelerate.<sup>124</sup> Recall that improvements in computer hardware and software have been progressing at an exponential rate.<sup>125</sup> As great as the changes and impact of this technology have been in the last forty years, they will be exponentially greater in the next forty years. What might this mean for the employment relationship and labor law?

Technologists have been pretty bold in their predictions, arguing that new information technology is evolving more quickly than past technologies, and is different in character, heralding a fundamental change in the relationship between labor and capital.<sup>126</sup> They argue that the rate of technological change of new information technology is much faster than previous technologies and this will make it much harder for people to keep up with technological changes

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<sup>120</sup> *Id.*

<sup>121</sup> *Id.* at 917.

<sup>122</sup> *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> See FORD, *supra* note 18, at 2.

<sup>125</sup> See *supra* text accompanying notes 15–17.

<sup>126</sup> FORD, *supra* note 18, at 131–33.

in their work.<sup>127</sup> New information technology threatens massive dislocation of workers in some industries. For example, the new Google driverless car threatens to dislocate many of the two million truck and taxi drivers in the shipping and transportation industries<sup>128</sup> within the next twenty years.<sup>129</sup> Frey and Osborne have estimated that forty-five percent of America's occupations, comprising forty-seven percent of the workforce, will be automated within the next twenty years including jobs in transportation, logistics, production labor, administrative support, sales, services, and construction.<sup>130</sup> Some technologists worry that the increasing inequality of income and wealth wrought by new information technology will undermine the vitality of our consumer-driven economy because many workers will not be able to buy the goods that are produced.<sup>131</sup> Others worry that the increasing inequality of wealth will keep the growing number of low-skill, low-wage workers from investing in the education necessary to advance to high-skill, high-pay jobs and benefit from new information technology.<sup>132</sup> Technologists also argue that the nature of new information technology is different from that of previous technologies in that properly programmed computers can use their enormous storage, retrieval, and computational skills to produce "artificial intelligence" allowing them to perform, or learn to perform, many of the "abstract tasks" that have previously eluded them and been reserved for humans.<sup>133</sup> The ability of computers to replace humans in so many tasks may bring about a new relationship between capital and labor in which labor is superfluous to many production processes.<sup>134</sup> Some technologists foresee a time when only a small sector of the

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<sup>127</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15, at 9–11; FORD, *supra* note 18, at 100; KURZWEIL, *supra* note 18.

<sup>128</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15, at 14; Chunka Mui, *Google's Trillion-Dollar Driverless Car Part 2: The Ripple Effects*, FORBES (Jan. 24, 2013, 9:36 AM), <http://www.forbes.com/sites/chunkamui/2013/01/24/googles-trillion-dollar-driverless-car-part-2-the-ripple-effects/>.

<sup>129</sup> *Supra* note 128.

<sup>130</sup> CARL BENEDIKT FREY & MICHAEL A. OSBORNE, OXFORD MARTIN SCH., *THE FUTURE OF EMPLOYMENT: HOW SUSCEPTIBLE ARE JOBS TO COMPUTERISATION?* (2013), [http://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf); Evan Dashevsky, *20 Jobs Likely to Be Replaced by Robots (and 20 That Are Safe)*, PC MAG. (June 30, 2014), <http://www.pcmag.com/article2/0,2817,2459986,00.asp>.

<sup>131</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15, at 48–49; *see also* FORD, *supra* note 18, at 17–20. While touring a robotic assembly line with UAW President Walter Reuther, Henry Ford II is alleged to have asked "Walter, how will you get these robots to pay UAW dues?" to which Reuther responded "Henry, how are you going to get them to buy cars?" BRYNJOLFSSON & MCAFEE, *supra* note 15, at 49.

<sup>132</sup> Sachs & Kotlikoff, *supra* note 66.

<sup>133</sup> FORD, *supra* note 18, at 3.

<sup>134</sup> *Id.* at 58. Stephen Hawking, Elon Musk, and Bill Gates have all questioned whether people will be able to keep up with computers with artificial intelligence. Peter Holley, *Bill Gates on Dangers of Artificial Intelligence: 'I Don't Understand Why Some People are not Concerned,'* WASH. POST, Jan. 29, 2015,

population needs to work, requiring us to rethink our economic and social structures—both of which revolve around individual labor.<sup>135</sup>

Most economists tend to be more moderate in their predictions regarding the future impact of new information technology on employment.<sup>136</sup> They argue that we should resist believing in the “lump labor fallacy” that labor demand in the economy is a fixed amount that is decreased when jobs are automated.<sup>137</sup> Although some workers will lose their job to computers, in the long run they will find other jobs producing other goods and services where their work is needed, perhaps in a new as yet unimagined job created using information technology.<sup>138</sup> They point out that, like other labor-saving technologies, new information technology is both a substitute and a complement for labor.<sup>139</sup> Some workers will keep their jobs, or find new jobs, and find their productivity and wages enhanced because of new information technology.<sup>140</sup> In support of this argument, they point to historical examples of new highly useful, but disruptive, technology such as the steam engine, electricity, and the assembly line.<sup>141</sup> These economists acknowledge that the dislocations will be hard for individual workers, and the necessary transitions may require some investment in retraining, but these dislocations are inevitable.<sup>142</sup> The economists also acknowledge that there is no guarantee that all workers will benefit from new information technology.<sup>143</sup> There will be winners, such as the high-skill workers whose productivity is increased by new information technology, and losers, such as the middle-skilled workers who lose their jobs and fall down into the low-skill, low-pay job market. They also acknowledge that new information technology has so far made the distribution of income and wealth less equal in our society by increasing rewards to capital and innovators and some high-skilled workers and lowering rewards for middle- and low-skilled workers.<sup>144</sup> Some acknowledge that increased inequality may sap our economy’s vitality since the true job creators in our

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<http://www.washingtonpost.com/blogs/the-switch/wp/2015/01/28/bill-gates-on-dangers-of-artificial-intelligence-dont-understand-why-some-people-are-not-concerned/>.

<sup>135</sup> *Id.* at 100–03.

<sup>136</sup> *Id.* at 3.

<sup>137</sup> Autor, *supra* note 20, at 2.

<sup>138</sup> *Id.* at 38.

<sup>139</sup> *Id.* at 1.

<sup>140</sup> *Id.* at 16.

<sup>141</sup> FORD, *supra* note 18, at 135.

<sup>142</sup> See Autor, *supra* note 20, at 39.

<sup>143</sup> *Id.* at 8–10; BRYNJOLFSSON & MCAFEE, *supra* note 15, at 38–39.

<sup>144</sup> Autor, *supra* note 20, at 23.



economy are middle-class consumers.<sup>145</sup> In response to those who say new information technology is different and will eventually replace a good portion of the work force, the traditional economist's response is that there are always some tasks—creativity, flexibility, and common sense—at which humans will have an advantage over computers.<sup>146</sup> People's tacit knowledge in solving a problem or performing a task is always greater than their explicit knowledge, and this tacit knowledge cannot be reduced to a computer program.<sup>147</sup> As a result, we will never be replaced *en masse* by machines.

Even if the boldest predictions of the technologists are tempered by the optimistic reasoning of economists, it seems certain that we are in for enormous changes in the employment relationship due to new information technology. Technology has already reformulated the way we undertake production, displaced scores of employees, and made scores of others more productive. Whether computers will actually be made that can replace human intelligence, it seems certain that at the margins it will become harder and harder for humans to adapt to this technology increasing displacement and retraining costs and shortening useful work lives. At the margins, it seems likely that this technology will make some people in our society highly productive but also increase the proportion of our society that has trouble eking out enough pay over the course of their useful work life to maintain themselves and raise and educate children.

In this brave new world, the Board will have to strive mightily to keep the NLRA system of collective bargaining relevant in addressing the problems and concerns of American workers. New information technology will pose new challenges to the definition of the basic terms of the NLRA; for example, whether the task based workers of the “sharing economy,” such as Uber drivers, are employees covered by the Act or casual employees excepted from the Act.<sup>148</sup> The middle-skill, middle-pay workers, who have been the heart and soul of the American labor movement, are in decline, and, at the very least, the Board may have to work to accommodate its doctrine and processes to

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<sup>145</sup> BRYNJOLFSSON & MCAFEE, *supra* note 15, at 47–48; Joseph E. Stiglitz, *Of the 1%, by the 1%, for the 1%*, VANITY FAIR (May 2011), <http://www.vanityfair.com/society/features/2011/05/top-one-percent-201105>.

<sup>146</sup> Autor, *supra* note 20, at 11.

<sup>147</sup> *Id.*

<sup>148</sup> Rebecca Burns, *The Sharing Economy's 'First Strike': Uber Drivers Turn Off the App*, IN THESE TIMES (Oct. 22, 2014, 4:54 PM), [http://inthesetimes.com/working/entry/17279/the\\_sharing\\_economy\\_first\\_strike\\_uber\\_drivers\\_turn\\_off\\_the\\_app](http://inthesetimes.com/working/entry/17279/the_sharing_economy_first_strike_uber_drivers_turn_off_the_app); Mary Hansen, *What If Uber Were a Unionized, Worker-Owned Co-Op? These Denver Cabbies Are Making It Happen*, YES! MAG., (Apr. 10, 2015), <http://www.yesmagazine.org/new-economy/uber-unionized-worker-owned-co-op-denver-cabbies>.

organization and collective bargaining by more low-skill or high-skill workers to keep the NLRA relevant in the new economy. There has recently been an increase in collective activity among low-skill workers as they come to see their position in the low-skill market as long-term rather than temporary, although this collective activity has taken the form of strategic national protests like “Our Walmart” or the McDonald’s worker campaign, rather than traditional collective bargaining.<sup>149</sup> The collective action of these workers is clearly protected by the Act, even though they are not yet formally represented by a union.<sup>150</sup> There is evidence that these protests are having an effect as national firms, including Wal-Mart, Target, and McDonald’s, have recently announced significant raises for their lowest paid employees.<sup>151</sup> There has even been some interest in organization among high-skill workers as they transition from independent professionals to employees in large corporations.<sup>152</sup>

There will be no shortage of needs among the workers in the new economy. They will need many things, including the following: subsidized education and retraining that allows them to work as complements to new information technology, health insurance to cover health costs that are too large for an individual to bear, income insurance to see them through periods of dislocation and retraining, perhaps a subsidized pension to maintain them after their useful

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<sup>149</sup> Henry Molski, *Black Friday Protesters Picket Walmart for Higher Wages, Consistent Work*, CINCINNATI ENQUIRER (Nov. 28, 2014, 3:24 p.m. EST), <http://www.usatoday.com/story/news/nation/2014/11/28/walmart-protests-black-friday/19620423/>; see Rachel Brody, *Should Fast Food Workers Get \$15 per Hour?*, U.S. NEWS (Sept. 4, 2014, 4:15 PM EDT), <http://www.usnews.com/opinion/articles/2014/09/04/should-striking-fast-food-workers-get-15-per-hour>; see also *McDonald’s Statement in Response to SEIU Actions at Restaurants Across the Country*, SEIU.ORG, <http://www.seiu.org/a/employeechoice/mcdonalds-statement-in-response-to-seiu-actions-at-restaurants-across-the-country.php> (last visited May 9, 2015). This is even more relevant given the recent increase in adults working minimum wage jobs. See David Cooper & Dan Essrow, *Low-Wage Workers are Older than You Think*, ECON. POL’Y INST., (Aug. 28, 2013), <http://www.epi.org/publication/wage-workers-older-88-percent-workers-benefit/>; see also *Demographics of Low-Wage Workers*, RAISE THE MINIMUM WAGE, <http://www.raisetheminimumwage.com/pages/demographics> (last visited May 9, 2015).

<sup>150</sup> Dave Jamieson, *Feds Charge Walmart With Breaking Labor Law in Black Friday Strikes*, HUFFINGTON POST, (Jan. 25, 2014, 4:01 p.m. EST), [http://www.huffingtonpost.com/2014/01/15/walmart-complaint\\_n\\_4604069.html](http://www.huffingtonpost.com/2014/01/15/walmart-complaint_n_4604069.html).

<sup>151</sup> Alexander C. Kaufman, *McDonald’s Is Raising Wages for Some Workers*, HUFFINGTON POST, (Apr. 2, 2015, 10:59 am EDT), [http://www.huffingtonpost.com/2015/04/01/mcdonalds-wages\\_n\\_6987542.html](http://www.huffingtonpost.com/2015/04/01/mcdonalds-wages_n_6987542.html); Claire Zillman, *Wal-Mart, Target Have Raised Their Minimum Wage. Why not Fast-Food Chains?*, FORTUNE MAG. (Mar. 23, 2015, 12:59 PM EDT), <http://fortune.com/2015/03/23/retail-vs-fast-food-wages/>.

<sup>152</sup> *Collective Bargaining for Employed Physicians*, AAFP, <http://www.aafp.org/practice-management/payment/collective-bargaining.html> (last visited May 9, 2015).

work lives are over, and perhaps even a guaranteed minimum income.<sup>153</sup> If these cannot be obtained through individual or collective bargaining, there will almost certainly be action on one or more of these issues in future legislatures. Of course, organized labor is useful not only for collective bargaining but also for representing workers' interests in the legislature. Perhaps preserving the possibility of the organization of labor for social and political purposes will be the future role for the Board.

#### CONCLUSION

New information technology has wrought enormous change in the employment relationship—with much more change yet to come. With the rise of this technology, the American economy has transitioned from an industrial economy dominated by large vertically integrated firms and long-term employment to one in which firms are horizontally organized with trading partners and suppliers around the world and the employment relationship has become much more transitory. This transition of the method of production has caused American employers to become much more market driven, seeking flexibility in employment, and has undermined employee and union bargaining power. New information technology promises further change as the pace of automation quickens and technologists develop computer “artificial intelligence.” This automation promises greater productivity for some workers but also threatens massive dislocations of labor, particularly mid-skill labor, and perhaps even a fundamental change in the relationship between capital and labor. Even if the most dire predictions of technologists do not occur, it would seem that further adoption of information technology will increase income inequality and cause substantial dislocation of labor, shortening useful work lives and requiring increased investment in retraining.

The Board must endeavor to interpret and apply the NLRA in light of these changed circumstances in order to maintain the relevance of the NLRA's system of employee organization and collective bargaining in the global economy of the information age. The Board will have to interpret the key concepts of the NLRA, in particular who is an “employee,” who is their “employer,” and what is an “appropriate bargaining unit,” in light of the changed organization of production. The Board must also decide how to

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<sup>153</sup> Felix Oberholzer-Gee, *Will a Guaranteed Income Ever Come to America?*, PBS NEWSHOUR (Apr. 7, 2014, 4:25 PM EDT), <http://www.pbs.org/newshour/making-sense/will-guaranteed-income-ever-come-america/>; see also *supra* note 62 and accompanying text.

incorporate the use of new information technology into its doctrines of union access and employee concerted activity. The Board has already begun some of this work with its reconsideration of the joint employer doctrine in *Browning-Ferris Industries Inc.*,<sup>154</sup> and its grant of a presumptive right of employee access to company e-mail for the purposes of concerted action in *Purple Communications, Inc.*<sup>155</sup> If the adoption of new information technology continues to undermine the bargaining power of employees and unions in the workplace, employees will have to rely more on legislation to address their needs. But at a minimum, the Board will retain the role of fostering employee organization for the purposes of facilitating political representation of the interests of working people.

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<sup>154</sup> *Supra* note 105 and accompanying text.

<sup>155</sup> *Supra* notes 115–18 and accompanying text.

