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Digital Labor Platforms as Machines of Production

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Debate about the regulation of "digital labor platforms" abounds globally among scholars, legislators, and other analysts concerned about the future of work(ers). In 2024, the European Parliament passed a first-of-its kind "Platform Work Directive" aimed at extending and growing protections for workers who labor for firms that utilize "automated systems to match supply and demand for work." In this Essay, we consider the problematics of regulating the digital labor platform as a distinct subtype of firm and "platform work" as a novel form of employment. We propose that digital platforms are not firms, but rather labor management machines. Thus, the Directive is vastly underinclusive in its extension of much-needed rights to workers who toil under algorithmic decision-making systems.

Using extant empirical evidence from both the United States and Brazil of occupational injuries faced by workers who interact with platforms (as disciplinary machines, not as firms), we show that, like early-Twentieth-Century industrialists who employed new mechanical systems for production, contemporary firms using platforms cause workers to suffer high rates of physical and psychosocial injury. Accordingly, lawmakers across the globe should consider how firms in many

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sectors use these digital machines to increase control of the labor process and how this heightened control impacts worker health and safety. By recognizing the contemporary social relationship between firms and workers, legislators can regulate algorithmically managed work to make it safer, more tolerable, and more dignified.

Essay Contents

Introduction

Globally, regulatory and juridical debates about the "future of work" are replete with discussions about "digital platforms" or even "labor platforms." The European Union's "Platform Work Directive," for example, is the first comprehensive legislative attempt in the world to address the labor conditions of workers across "digital labor platforms."[1] The Directive, which estimates that 43 million workers across Europe will be working for labor platforms by 2025, aims to do two main things: to (1) "help[] determine the correct employment status of people working across digital platforms" and (2) "establish[] the first EU rules on the use of algorithm systems in the workplace."[2] In delineating rules to accomplish both goals, the Directive uses the term "digital labor platforms" to refer to firms that utilize "automated systems to match supply and demand for work" and that use algorithms for human resource management.[3]

The Directive, the first of its kind in the world, may dramatically improve the livelihoods of the precarious workers, many of whom earn far-below-subsistence wages while laboring in physically dangerous and demanding jobs. It

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[1] Council of the European Union, Proposal for the Directive of the European Parliament and of the Council on Improving Working Conditions in Platform Work, No. 7212/24 of 8 Mar. 2024, art. 1(3) [hereinafter Platform Work Directive].

[2] *EU Rules on Platform Work*, EUROPEAN COUNCIL (Mar. 21, 2024), https://www.consilium.europa.eu/en/policies/platform-work-eu [https://perma.cc/G4LY-YRVE].

[3] *Improving Working Conditions of Persons Working Through Digital Labour Platforms*, LEGIS. OBSERVATORY (Sept. 12, 2021), https://oeil.secure.europarl.europa.eu/oeil/popups/summary.do?id=1685563&t=d&l=en [https://perma.cc/7FZU-LHN2]. More specifically, Article 2 of the Platform Work Directive defines "digital labor platform" as "any natural or legal person providing a service which meets all of the following requirements: (a) it is provided, at least in part, at a distance through electronic means, such as a website or mobile application; (b) it is provided at the request of a recipient of the service; (c) it involves, as a necessary and essential component, the organization of work performed by individuals in return for payment, irrespective of whether that work is performed online or in a certain location; (d) it involves the use of automated monitoring or decision-making systems[.]" Platform Work Directive, *supra* note 1, art. 2(1).

may also put forth strong legal standards for other jurisdictions to emulate in their own regulatory efforts to ensure that "platform workers" benefit from the same—and even greater—rights and protections as workers who perform other jobs.[4] At the same time, we contend, the Directive as written may have unintended consequences both for how employment is imagined and for how work is regulated in relation to digital technologies.

Indeed, the Platform Work Directive and similar proposed and enacted laws that are directed specifically at digital labor platforms make a critical error in language and logic, one that we hope can be corrected in future legislative efforts. The authors of the Platform Work Directive, like many other legislators, judges, scholars, and journalists over the past decade, incorrectly define and categorize "digital labor platform." Critically, digital platforms (or "labor platforms," as they are sometimes called) are not a new category of *firm.* Rather, they are better understood as a complex array of *digital machinery* utilized by firms for many purposes, including as a means of production for labor control and discipline.

Perhaps more than any other machine in the history of modern capitalism, platforms can be designed and used to injure workers materially, psychically, and physically through exacting (and often individualized) forms of labor discipline. Without legal guardrails, they can be metaphorically sharper and more deadly than the blades of factory machines. They should be regulated accordingly. By confusing the machine for the firm—or by using it as a shorthand for companies with specific business models—the proposed legislation reifies these firms' claim of novelty. As a result, the legislation also

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[4] The Directive defines "platform worker" as "any person performing platform work who has an employment contract or is deemed to have an employment relationship as defined by the law, the collective agreements or practice in force in the Member States with consideration to the case-law of the Court of Justice[.]" Platform Work Directive, *supra* note 1, art. 2(1). "Platform work," in turn, is defined as "any work organized through a digital labor platform and performed in the Union by an individual on the basis of a contractual relationship between the digital labor platform or an intermediary and the individual, irrespective of whether a contractual relationship exists between the individual or an intermediary and the recipient of the service[.]" *Id.*

misdirects much-needed labor regulation of technology at work toward circumscribing the digital management of only a *specific* group of firms, thus inviting attempts at definitional arbitrage. We maintain that the Directive and future labor rights regulation should target *all* firms' use of this digital machinery.

In this Essay, we consider the problematics of regulating "labor platforms" as a distinct subtype of firm and "platform work" as a novel form of employment. First, we argue that any labor regulation must originate with an empirical analysis of the social relationship between firms and the workers who labor for them. Traditionally, the first step in analyzing the social relationship of employment and labor law has not hinged on the types of technologies used by a company. Nor, in our view, should it. Instead, workplace laws have been purposively rooted in concerns over human health, safety, well-being, and the consequences of unfettered subordination of workers. Considering this, the Directive's focus on digital labor platforms and its attempted management of platform work as the primary and principal focal point to regulate the relationship between particular workers and firms elides the degree to which the problems of algorithmic management—more specifically, "automated monitoring systems" (AMS) and "automated decision-making systems" (ADS)—pervade the entire labor market.[5] As such, the Directive represents a sharp rupture in the logic of labor regulation, one that deviates from common-sense structural understandings of capitalist production.

Over the past three decades, firms that self-describe as digital platforms in other economic spaces have generated mythologies that obfuscate information law and policy. To avoid similar problems in labor policy, digital labor platforms must be recognized not as new types of firms but rather as novel workplace technologies deployed by an array of firms and used for, among other things, automated labor control,

[5] For an extensive overview of the ways in which a range of automated technologies are used in contemporary workplaces for purposes of labor control and discipline, see IFEOMA AJUNWA, THE QUANTIFIED WORKER: LAW AND TECHNOLOGY IN THE MODERN WORKPLACE 73-260 (2023).

surveillance, and discipline.[6] The Directive announces new workplace rights that limit algorithmic management at work, but by treating digital labor platforms as firms instead of as machines, it peculiarly cabins those rights to workers at a subset of firms. In this way, the Directive fails to recognize that workers across many sectors face similar workplace dangers and hazards.[7]

Second, we argue that if, for conceptual and legal purposes, we are to define "digital labor platforms" as machines of production—as core parts of the labor process[8]—operated by firms across the globe, then we should examine not only the productivity measures of those machines but also how that

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[6] Meredith Whittaker argues that modern computing machines were designed as tools for automating and disciplining labor. Meredith Whittaker, *Origin Stories: Plantations, Computers, and Industrial Control*, LOGIC(S) (2023), https://logicmag.io/supa-dupa-skies/origin-stories-plantations-computers-and-industrial-control/ [https://perma.cc/QFE9-CYL2].

[7] We are not alone in making this observation. As Antonio Aloisi and Valerio De Stefano write, "[t]he startling result is that platform workers could mobilise stronger data-protection rights than workers in conventional labour-market sectors." Antonio Aloisi & Valerio De Stefano, *'Gig' Workers in Europe: The New Platform of Rights*, SOC. EUR. (Mar. 16, 2024), https://www.socialeurope.eu/gig-workers-in-europe-the-new-platform-of-rights [https://perma.cc/SZM5-NHDG].

[8] In the context of industrialization, Harry Braverman famously argued that "[t]he reduction of the worker to the level of an instrument in the production process is by no means exclusively associated with machinery. We must also note the attempt, either in the absence of machinery or in conjunction with individually operated machines, *to treat the workers themselves as machines.*" HARRY BRAVERMAN, LABOR AND MONOPOLY CAPITAL: THE DEGRADATION OF WORK IN THE TWENTIETH CENTURY 172-73 (1974). He continued:

> The mass of humanity is subjected to the labor process for the purposes of those who control it rather than for any general purposes of "humanity" as such. In thus acquiring concrete form, the control of humans over the labor process turns into its opposite and becomes the control of the labor process over the mass of humans. Machinery comes into the world not as the servant of "humanity," but as the instrument of those to whom the accumulation of capital gives the *ownership* of the machines.

Id. at 193. For these reasons and others, we believe it is critical to intervene in the social relationship between workers and the owners of the machines—here, the owners of platforms.

machinery materially impacts workers, and we should legislate directly to curb harm. In many states across the Global North and South, including the sites of our respective empirical analyses, the United States and Brazil (two of the largest labor markets in which digital platforms have been employed), legislators passed labor laws during the Industrial Revolution to protect workers and to reallocate the physical and financial risks of capitalism. These laws responded to the demands of labor movements and to critical social scrutiny of the relationship between workers and firms—including the human impacts of those relations. As is well known, the rise of the wage relation alongside concomitant productivity pressures led to high rates of on-the-job injury and death, inciting workers across the world to form unions and agitate collectively for workplace regulation.[9] Early labor laws in both the United States and Brazil thus not only set minimum standards regarding wages and working time, but they also directed how firms could use certain machinery by mandating safeguards and state oversight of high-risk workplaces. As we discuss below, contemporary comparative analysis of occupational injury data of workers who interact with digital platforms (as disciplinary machines, not as firms) from both the United States and Brazil suggests that like early industrial machines, digital platforms produce alarmingly dangerous and high-risk work.

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[9] Nate Holdren writes in his historical study of the law of workplace injuries:

> We have only partial data on workplace injuries in the twentieth century, but from the data we do have, it is clear that in the United States in this era people suffered injuries . . . with appalling frequency. For example, in 1910, . . . [the] estimated . . . number of deaths due to accidents in mining between 1899 and 1908 totaled 19,775 people. Non-fatal injuries were even more frequent, with more than 5,000 such injuries per year in [those] years . . . . And these are only the figures for mining. Employment was incredibly dangerous in this era, with employees harmed regularly. Historian James Schmidt has characterized the pervasive harm to employees in the economy as "industrial violence."

NATE HOLDREN, INJURY IMPOVERISHED: WORKPLACE ACCIDENTS, CAPITALISM, AND LAW IN THE PROGRESSIVE ERA 1 (2020).

The dangers posed by these digital machines are not inherent but are the result of how firms design and operate them. The impacts, while neither necessary outcomes nor desirable ones, have largely escaped enforcement under existing occupational health and safety laws. New laws, which often focus on and legislate through these firms' alleged novelty, also do not adequately or directly address such issues. Rather than exceptionalize firms that utilize digital labor platforms for (among other things) labor management—and thereby legally entrench the discursive mythologies of those firms as mere intermediaries of data and value—regulators should, we argue, return to regulating labor conditions through the lens of the social or class relationship *and* to enforcing new and old laws that make work safer, more tolerable, and more dignified.

In Part I of this Essay, we discuss why and how digital machinery in the workplace must be regulated, and we explore the limitations of the European Union's approach. The Platform Work Directive, while attempting to bring many subordinated workers who labor through and with digital labor platforms under state protections, exceptionalizes a subset of workers. In addition to ensuring that platform workers "have—or can obtain—the correct employment status in light of their actual relationship with the [firm]," the Platform Work Directive adds to existing employment rights "fairness, transparency and accountability in algorithmic management in the platform work context."[10] Here, again, the Directive

[10] *Commission Proposal for a Directive of the European Parliament and of the Council on Improving Working Conditions in Platform Work*, at 3, COM (2021) 762 final (Dec. 9, 2021). Notably, it extends these rights to workers regardless of whether they are considered employees. Platform Work Directive, *supra* note 1, art. 1(2). In Article 2, the Directive defines "platform work" as "any work organized through a digital labor platform and performed . . . by an individual on the basis of a contractual relationship between the digital labor platform or an intermediary and the individual, irrespective of whether a contractual relationship exists between the individual or an intermediary and the recipient of the service[.]" *Id.* art. 2(1). The definition includes the "intermediary" as a potential contracting party because firms like Uber have responded to employment regulation mandates by contracting with staffing agencies. In other instances, precarious workers—particularly undocumented workers—contract with

references not work that is controlled through digital machinery but rather work produced by particular firms that meet the Directive's definition of "digital labor platform," assigning to these firms the responsibility to curb physical and psychosocial harms.[11]

In Parts II and III, we examine the historical context of worker health and safety protections and extant data from two critical national contexts, Brazil and the United States. Based on these analyses, we recommend for future laws a regulatory framework that not only recognizes the default social relationship between worker and the firm as one of employment, but that also mandates labor protections for *all* firms utilizing digital machines for labor management. In particular, we call for robust health and safety standards and requirements that safeguard the physical and mental integrity of workers who labor alongside, with, and/or through digital machines. Critically, such laws should go well beyond the Directive's existing requirement to disclose the logic and parameters of the machine's management. We argue that they should also explicitly ban automated work intensification and digitalized discipline, including through gamification techniques, digitalized variable payment, and automated termination.[12]

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an individual or entity who holds the primary account with the main firm. They labor through that person's account, and often pay for their ability to do so. *Id.*

[11] Platform Work Directive, *supra* note 1, recital 50.

[12] The Platform Work Directive acknowledges that "algorithmic direction, evaluation, and discipline intensify work effort by increasing monitoring, raising the pace required from workers, minimizing gaps in workflow, and extending work activity beyond the conventional workplace and working hours." *Id.* It also states that "limited learning at work and influence over tasks due to the use of non-transparent algorithms, work intensification and insecurity . . . is likely to increase workforce stress and anxiety." *Id.* But instead of directly intervening in these harmful outcomes, the Directive places the responsibility to mitigate such harms on firms, requiring that they evaluate the risks and "take appropriate preventive measures." *Id.* This mandate of self-regulation likely will be very difficult to enforce. For an overview of the how the Directive inadequately addresses worker health and safety, see Aude Cefaliello et al., *Making Algorithmic Management Safe and Healthy for Workers: Addressing Psychosocial Risks in New Legal Provisions*, 14 EUR. LAB. L.J. 192 (2023).

Finally, we argue that whether workers are legally labeled "employees," "independent contractors," "consumers," or something else entirely, firms that control the digital machines must make those machines safe for human interaction.[13] New protections related to algorithmic management must be tailored to the specific occupational health and safety risks posed by these new practices and should logically extend to *all* firms using digital machines for labor management. They should not be limited to a subset of firms that (inaccurately) self-define as "digital platforms" because a firm's shift in business model could then change whether they are subject to such laws, and because the uses and impacts of digital machines already extend well beyond this subset of firms.[14] We end by considering the contours of an ideal regulatory approach.

I. Ford Is Not a Conveyor Belt, Uber Is Not a Platform: Regulating the Social Relationships of Production

Digital platforms are machinery that use digitally automated procedures to receive, process, and produce data and information. Typically, the platforms' digital automation processes use big data to train algorithms for workforce management and/or use artificial intelligence (AI) tools for the same purpose. The processes embodied in such digital machinery serve the firms' economic goals and mediate or control the labor processes, including by hiring and firing, surveilling and disciplining, disseminating work, determining wages, and using psychosocial insights to shape behavior.[15] Thus, a digital platform is a means of production, and for regulatory purposes, we can conceptualize its role through analogy to other types of pre-digital workplace machinery, such as conveyor belts, scaffolds, and hydraulic presses. Even in the context of AI, digital platforms do not and will never

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[13] Simply referencing the EU's Occupational Health and Safety (OSH) Framework Directive of 1989, as the Platform Work Directive does, fails to adequately address the worker health crises caused by algorithmic management. *See* Platform Work Directive, *supra* note 1, recital 50.

[14] For example, many practices associated with firms like Uber, including algorithmic wage discrimination and automated hiring and firing, now extend to other workplaces through the application of digital machines to everyday labor management.

[15] *See generally* AJUNWA, *supra* note 5, at 73-320.

have independent will, nor do they function spontaneously.[16] Above all, they are not firms. Rather, they are designed and used by firms to produce services or goods, often through the management of labor.[17]

The Platform Work Directive is not alone in fetishizing digital or labor platforms as special types of firms in need of unique regulations instead of recognizing them as machinery utilized by firms for economic purposes. In Brazil, for example, debates over firms structured like Uber refer to these firms as "digital platforms," thus fundamentally misunderstanding such firms as mere intermediaries between workers and consumers, not as corporations that control the machines and their human impacts. Accordingly, Brazil's Supreme Federal Court is considering whether these corporations are so different from other firms that they should not be forced to comply with basic labor laws. The case, Recurso Extraordinário No. 1446336 (Tema 1291), which Uber set into motion, will not only determine the outcome of more than 10,000 similar cases in Brazil but also potentially undermine labor regulation in the

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[16] As Alex Hanna and Emily Bender have written:

> The gold rush around so-called "generative artificial intelligence" (AI) tools like ChatGPT and Stable Diffusion has been characterized by breathless predictions that these technologies will be the harbingers of death for the traditional search engine or the end of drudgery for paralegals because they seem to "understand" as well as humans. In reality, these systems do not understand anything. Rather, they turn technology meant for classification inside out: instead of indicating whether an image contains a face or accurately transcribing speech, generative AI tools use these models to generate media. They may create text which appears to human eyes like the result of thinking, reasoning, or understanding, but it is in fact anything but.

Alex Hanna & Emily Bender, *"AI" Hurts Consumers and Workers -- and Isn't Intelligent*, TECH POL'Y PRESS (Aug. 4, 2023), https://www.techpolicy.press/ai-hurts-consumers-and-workers-and-isnt-intelligent [https://perma.cc/X38E-UUR8].

[17] In a sense, the notion of a "labor platform" as a firm is even more problematic. It represents a kind of double fetishism because it suggests a subset of firms with specific features: digital platforms that "deal" with labor.

country more broadly.[18] President Lula's government has also proposed a new law limiting labor protections for passenger transport workers who labor for "digital platforms."[19] Indeed, in research in both the United States and Brazil, these companies are often discussed as though they constitute a new economic sector.[20]

Of course, obfuscating what the firm is and does for purposes of regulatory arbitrage is neither new nor limited to companies popularly conceived of as digital platforms. In the early 2000s, content-producing companies like Google and YouTube[21] also began to use the term "platform" as a discursive tool. As Tarleton Gillespie writes, "[i]n the context of . . . financial, cultural, and regulatory demands," these firms positioned themselves "to strike a regulatory sweet spot between legislative protections that benefit them and obligations that do not, and to lay out a cultural imaginary

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[18] *See* Cristiane Sampaio, *Dispute Between Apps and Delivery Workers to Be Ruled by the Supreme Court; Decision Will Have an Impact on the Job Market*, BRASIL DE FATO (Feb. 12, 2024), https://www.brasildefato.com.br/2024/02/12/dispute-between-apps-and-delivery-workers-to-be-ruled-by-the-supreme-court-decision-will-have-an-impact-on-the-job-market [https://perma.cc/8UVH-CC5R]. More than 600 academics from 40 countries have signed a solidarity letter warning the Brazilian Supreme Court that this decision will "not only affect digital platform workers, but will apply to virtually any worker." Solidarity Letter with Brazilian Labor Law 2 (2024), https://docs.google.com/document/d/143qxvAS2rGL8OiXFM7fLZR4BoCL6Rccq-zQCKTSh-Ks/view [https://perma.cc/HB33-BL85]. The letter explains that the Court will effectively decide that once "digital platforms" and "platform workers" sign a civil contract stating that the workers are not employees, the on-the-ground facts of control and subordination no longer matter. *Id.* at 1-3.

[19] *Brazil's Lula Proposes Law to Regulate Labor on Ride-Hailing Apps*, REUTERS (Mar. 4, 2024), https://www.reuters.com/world/americas/brazils-lula-proposes-law-regulate-labor-ride-hailing-apps-2024-03-04 [https://perma.cc/A65U-LDEE].

[20] *See, e.g.*, DIANA FARRELL ET AL., THE ONLINE PLATFORM ECONOMY IN 2018: DRIVERS, WORKERS, SELLERS, AND LESSORS 2 (2018), https://www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/institute/pdf/institute-ope-2018.pdf [https://perma.cc/8NT3-QDMM] (lumping platform-enabled transportation, hospitality, and other services into one "economy").

[21] Both companies are now owned by Alphabet.

within which their service makes sense."[22] For social-media and content-producing firms, this characterization as a platform and claims of novelty have prompted intense and ongoing regulatory debates about the types of legal obligations that the characterization entails.[23]

Uber and similarly organized firms took a lesson from these world-transforming information and communications companies. When they first opened shop in San Francisco, Uber, Lyft, and their erstwhile competitor Sidecar claimed to exist entirely outside the realm of capitalism; in the companies' (then-widely accepted and adopted) narratives, people were "sharing" their cars—not working for firms in exchange for wages.[24] In regulatory and judicial contexts, the companies later argued that they were not service-providing transportation firms but merely go-betweens connecting riders and drivers.[25] More recently, these firms and some state regulators have categorized them and comparable food delivery companies as a new type of firm entirely: platforms that "network" services as opposed to firms that employ workers to provide those services.[26] When legislators have

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[22] Tarleton Gillespie, *The Politics of 'Platforms'*, 12 NEW MEDIA & SOC'Y 347, 348 (2010).

[23] *See, e.g.*, K. Sabeel Rahman, *Regulating Informational Infrastructure: Internet Platforms as the New Public Utilities*, 2 GEO. L. TECH. REV. 234 (2018); Ganesh Sitaraman & Morgan Ricks, *Tech Platforms and the Common Law of Carriers*, 73 DUKE L.J. 1037 (2024).

[24] For more on how widely adopted this narrative was, see, e.g., Sam Harnett, *Words Matter*, *in* BEYOND THE ALGORITHM: QUALITATIVE INSIGHTS FOR GIG WORK REGULATION 169-88 (Deepa Das Acevedo ed., 2020).

[25] Indeed, the companies continue to make this argument in court. *See, e.g.*, Allie Reed, *Uber Executive Says App Is a Service for Drivers, Not Employer*, BLOOMBERG L. (May 29, 2024), https://news.bloomberglaw.com/litigation/uber-works-for-drivers-not-vice-versa-executive-tells-judge [https://perma.cc/7ATC-QXHJ].

[26] In California, Uber won this discursive battle as early as 2013, when the state's public utility commission decided that Uber neither a taxi company nor a charter-party carrier but instead a "transportation network company." *See* Decision Adopting Rules and Regulations to Protect Public Safety While Allowing New Entrants to the Transportation Industry, Dec. No. 13-09-045, Cal. Pub. Utils. Comm'n, at 11-14 (Sept. 19, 2013). To date, Uber self-identifies in promotional material as a "[g]lobal platform" for mobility. *See 2023 Agency Partnerships Product Guide*, UBER,

attempted to regulate the social relationship between the company and its workers, the firms have protested that any such regulation will affect the platform's flexibility—discursively eliding the firm itself as the decision-maker in the process of production.[27]

Across academic disciplines, scholars have adopted the logic of Uber and its peers, even when writing critically of the firms and their societal impacts. In the management-science literature, platforms are ubiquitously understood as firms that "extend[] value creation" by creating new markets or by "foster[ing] innovation."[28] This scholarship tends to exceptionalize the platforms as newfangled companies that create novel infrastructures and "ecosystems"[29] and even more extremely that "def[y] conventional regulatory theory."[30] Critical sociology, too, has developed a field of labor "platform studies" that does not just study the materiality of the machine and its effects but also looks more broadly at the worlds created by firms that "reconfigur[e] the nature of work" in part through regulatory arbitrage.[31] But this literature often adopts the term "platform" to refer to workers who interact with firms that remotely control and discipline through digital machinery.

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https://uber.app.box.com/s/mclvjxsykwonb3ka5pzv0auf9hivaxih?uclick_id=b4d008ab-ce33-40a1-b4dc-f1f29aadec74 [https://perma.cc/GKP3-WVTC].

[27] For example, when California legislators were considering A.B. 5, which made it legally clear that Uber drivers were employees, the company repeatedly told members of the media, regulators, and workers themselves that treating them like employees would result in loss of the platform's flexibility, as though this were a natural outcome of the platform rather than a business decision by the firm. Judy Lin, *What Happens to Uber and Lyft Drivers Once AB 5 Passes?* ABC10 (Sept. 6, 2019), https://www.abc10.com/article/news/politics/103-8a1a6cb4-fb1e-47df-8d40-4583dd819f3c [https://perma.cc/3MMG-2RB3].

[28] Daniel Trabucchi et al., *Platform-Driven Innovation: Unveiling Research and Business Opportunities*, 30 CREATIVITY & INNOVATION MGMT. 6, 7 (2021).

[29] Marshall W. Van Alstyne et al., *Pipelines, Platforms, and the New Rules of Strategy*, HARV. BUS. REV. (Apr. 2016), https://hbr.org/2016/04/pipelines-platforms-and-the-new-rules-of-strategy [https://perma.cc/5KTA-ZYK2].

[30] Orly Lobel, *The Law of the Platform*, 101 MINN. L. REV. 87, 90 (2016).

[31] Steven Vallas & Juliet B. Schor, *What Do Platforms Do? Understanding the Gig Economy*, 46 ANN. REV. SOCIO. 273, 275 (2020).

Even in our own scholarship, one of us has been caught in the problematic trappings of this language.[32]

Though it may be helpful to describe businesses that remotely manage labor, the use of "platform" as shorthand for a particular subset of firms mystifies the critical structural and social continuations of the waged relation. In the case of the EU's Platform Work Directive, this mystification has garnered important, though limited, fairness and transparency rights for a subset of workers, including the "right to know" workplace rules. But it leaves a growing number of workers across sectors who are also controlled by digital machinery and who face similar risks without any such rights and protections. Perhaps most troublingly, the Directive recognizes the significant physical and psychosocial harms that arise from the use of automated monitoring and decision-making machine systems, but it relegates to the firms the responsibility to "evaluate those risks, assess whether the safeguards of the systems are appropriate . . . [,] and take appropriate preventive and protective measures."[33]

Contrary to the claims of some scholars, "digital platforms" are not neutral apparatuses that fundamentally reshape the logic of capitalism. To the contrary, labor platforms are machines—albeit sophisticated and complicated ones—used by firms to manage workers and extract value. Understanding the impact of workplace machines and concomitant workplace regulations in a historical context, we argue in the next section, is critical for developing future laws of work that safeguard human health and life.

II. Historically Situating "Platforms" for Labor Regulation

To situate the labor regulation of firms that utilize digital machinery, we return to a previous era of "technological revolution" as it relates to shifts in work, work experiences, and workplaces. In the mid-to-late Nineteenth Century, well-capitalized firms in the United States, then the epicenter of the Industrial Revolution, transformed a small producer and craftsmen economy to one constituted largely by wage

[32] Veena Dubal, *The New Racial Wage Code*, 15 HARV. L. & POL'Y REV. 511 (2021).
[33] Platform Work Directive, *supra* note 1, recital 50.

laborers. Workers struggled against their new subordination to and dependence on corporations and the decisions of corporate representatives.[34] Concentrations of capital enabled the creation and introduction of workplace machinery that dramatically increased rates of production.[35] In a sense, use of these machines extended and regularized the wage relationship—the subordinating relationship between workers and firms. As Harry Braverman famously wrote of the time, "a social evolution [took] place which parallel[ed] the physical evolution of machinery: a step-by-step creation of a 'labor force' in place of self-directed human labor; that is to say a working population conforming to the needs of this social organization of labor," also known as the firm.[36]

New machinery alongside a revolution of labor management both boosted worker productivity and resulted in widespread injuries and workplace fatalities. Machines with exposed blades cut limbs and fingers; steam engines exploded; furnaces asphyxiated workers with toxic gases; and exposed wires caused electrocution. As historian Mark Aldrich found, between 1869 and 1927, the more horsepower a machine used, the more likely workers were to be injured on the job.[37] Importantly, these injuries were not inherent to the machines, but the result of how firms used the machinery to manage the workforce. Many large companies used their asymmetrical power over workers to squeeze out as much production as possible at the lowest price, enforcing hierarchical shop-floor rules, imposing productivity quotas, and exacting harsh discipline.[38]

For example, the 1914 introduction of the (in)famous conveyor belt to create Ford Motor Company's assembly line transformed the everyday work of highly skilled auto-body

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[34] *See generally* LAWRENCE B. GLICKMAN, A LIVING WAGE: AMERICAN WORKERS AND THE MAKING OF CONSUMER SOCIETY (1997).

[35] *See* 3 KARL MARX, CAPITAL: A CRITIQUE OF POLITICAL ECONOMY 241-59 (Frederick Engels ed., Progress Publishers 1974).

[36] BRAVERMAN, *supra* note 8, at 194.

[37] MARK ALDRICH, SAFETY FIRST: TECHNOLOGY, LABOR, AND BUSINESS IN THE BUILDING OF AMERICAN WORK SAFETY 1870-1939 165 (1997).

[38] *See, e.g.*, STEPHEN MEYER III, THE FIVE DOLLAR DAY: LABOR MANAGEMENT AND SOCIAL CONTROL IN THE FORD MOTOR COMPANY, 1908-1921 61-62 (1981).

craft workers into "repetitive, monotonous, and alienating work," the pace of which bosses directed via machines.[39] While the speed of the unprotected conveyor belt crushed workers' bodies, the repetitive nature of the work caused widespread and long-lasting—if less spectacular—musculoskeletal injuries.[40] The assembly line management systems also negatively affected workers' mental health by transforming their identities in relation to their jobs, limiting the possibility of working-class leisure, and destabilizing the relationship between work and survival.[41]

Responding to the triple health crises of poverty, injury, and indignity brought on by the social evolution of wage relations (especially in relation to new machines), workers formed unions, went on strikes, and, alongside advocates, agitated for the passage of state and federal laws to regulate their relationship with firms. These laws were almost always debated in the context of worker health. Some states commissioned investigations and reports specifically to respond to high numbers of workplace injuries, finding a lack of safety standards in factories and other industrial workplaces.[42] Many of the first labor laws and regulations in the United States—which was neither the first nor the most exceptional national case—directly responded to complaints of

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[39] Stephen Meyer, *The Degradation of Work Revisited: Workers and Technology in the American Auto Industry, 1900-2000*, AUTO. IN AM. LIFE & SOC'Y, http://www.autolife.umd.umich.edu/Labor/L_Overview/L_Overview.htm [https://perma.cc/V5NV-7XXE] (last visited June 8, 2024). For more on the logic and evolution of scientific management, see BRAVERMAN, *supra* note 8, at 155-68.

[40] *See* Meyer, *supra* note 39.

[41] At their inception, workers' compensation programs did not include musculoskeletal injuries caused by repetitive trauma. Emily A. Spieler, *Perpetuating Risk? Workers' Compensation and the Persistence of Occupational Injuries*, 18 WORKERS' COMP. L. REV. 115, 144 (1995-96). By the 1990s, their addition had led Ford to establish "ergonomics committees" as a cost-effective way to reduce injuries. *Id.* at 155 n.175.

[42] *See, e.g.*, John Fabian Witt, *The Transformation of Work and the Law of Workplace Accidents, 1842-1910*, 107 YALE L.J. 1467, 1486-1502 (1998) (discussing New York state's Wainwright Commission investigation and report).

"extremely exhaustive or unhealthy" work.[43] Legislatures addressed these problems by limiting working hours (for women and children in particular) and by remediating workplace conditions that gave rise to physical danger and death.[44] Some states, like Massachusetts, even passed laws mandating adequate ventilation and workplace inspection agencies.[45]

In lieu of robust and widespread laws governing the social relationship between workers and firms, some industrial-era workers in the United States relied on tort lawsuits against their employers to demand compensation when injured on the

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[43] Comment, *Constitutionality of a Law Limiting the Hours of Labor by Employees of Contractors on Municipal Work*, 18 YALE L.J. 121, 121 (1908).

[44] As a Supreme Court hostile to employment laws as interferences in the "freedom to contract" wrote in 1908:

> The right to purchase or to sell labor is part of the liberty protected by [the Fourteenth A]mendment, unless there are circumstances which exclude the right. There are, however, certain powers, existing in the sovereignty of each State in the Union, somewhat vaguely termed police powers . . . . Those powers, broadly stated . . . , relate to the *safety, health*, morals and general welfare of the public.

Adair v. United States, 208 U.S. 161, 173 (1908) (emphasis added). Early wage laws, even when invalidated by the same Court, were also defined through an emphasis on the need to maintain worker safety and health. For example, the law struck down in *Adkins v. Children's Hospital* set up a wage board to determine wages for women and children in the District of Columbia. 261 U.S. 525, 540-41 (1923), *overruled by* West Coast Hotel Co. v. Parrish, 300 U.S. 379 (1937). The legislature justified the law as necessary "to protect the women and minors of the District from conditions detrimental to their health and morals, resulting from wages which are inadequate to maintain decent standards of living." *Id.* at 541-42.

[45] *Factory Inspection Legislation*, U.S. DEP'T OF LAB., https://www.dol.gov/general/aboutdol/history/mono-regsafepart02 [https://perma.cc/9KYP-MARW] (last viewed June 8, 2024). In a series of decisions from the close of the Nineteenth Century to the early Twentieth Century, the U.S. Supreme Court struck down workplace protection laws, including minimum wage and maximum hours legislation, under the theory that they violated the Fourteenth Amendment's Due Process Clause by interfering with the economic freedoms of both firms and workers. This period, known as the *Lochne*r era after the name of one such case, *Lochner v. New York*, 198 U.S. 45 (1905), ended abruptly with deteriorating economic conditions during the Great Depression and under the presidency of Franklin Delano Roosevelt, who threatened to reconstitute the Court if New Deal laws were not upheld.

job. Most, however, were deterred from bringing such litigation out of fear of being blacklisted from future jobs. Workers who did dare to sue often lost.[46] Over time, in response to demands from organized labor, state legislatures passed no-fault workers' compensation laws to make it easier for workers to make financial claims for their workplace injuries.[47] Still in effect, these state laws require employers to carry insurance through which workers can obtain partial wage replacement if they are hurt on the job regardless of fault. In turn, workers who receive such compensation forfeit their right to sue the employer for negligence under tort law.[48]

Neither individualized workers' compensation protections nor tort law directly addressed the systemic problems caused by the logic that firms applied to machine-assisted production. The costs associated with workers' compensation laws did, however, incentivize some large employers to create internal safety precautions to mitigate workplace risk. For example, Ford Motor Company introduced guards to mechanical conveyor belts.[49] But although these measures reduced workplace injuries and deaths, they did not eliminate them, nor did they create standardized and collectively administrable best practices for machine safety and injury reporting across workplaces large and small.

Ensuing workplace tragedies and many decades of continued lobbying by unions led the U.S. Congress by the 1960s to consider passing federal laws to address inadequate state-level worker health and safety rules and individualized workers' compensation regimes. In 1970, Congress passed the

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[46] HOLDREN, *supra* note 9, at 20.

[47] In 1917, for example, California passed the Workmen's Compensation, Insurance and Safety Act, "(1) to ensure that the cost of industrial injuries will be part of the cost of goods rather than a burden on society, (2) to guarantee prompt, limited compensation for an employee's work injuries, regardless of fault, as an inevitable cost of production, (3) to spur increased industrial safety, and (4) in return, to insulate the employer from tort liability for his employees' injuries." S. G. Borello & Sons, Inc. v. Dep't of Indus. Rels., 769 P.2d 399, 406 (Cal. 1989).

[48] Joseph H. King, Jr., *The Exclusiveness of an Employee's Workers' Compensation Remedy Against His Employer*, 55 TENN. L. REV. 405, 407 (1988).

[49] *See* R.F. Thalner, *Safety in the Automobile Industry*, 123 ANNALS AM. ACAD. POL. & SOC. SCI. 121, 124 (1926).

federal Occupational Safety and Health Act (OSH Act),[50] imposing a federal obligation on large employers to provide safe workplaces and creating the Occupational Safety and Health Administration (OSHA). Though the OSH Act was in many ways a much less effective form of legislation than initially sought by workers' representatives, it nonetheless created federal mandates and safety guidelines for specific industries and physical machines.[51] OSHA standards, for example, demand that machines be accompanied by "guarding" to prevent hazardous materials—including "rotating parts, flying chips, and sparks" from injuring workers.[52] The OSH Act also created federal investigative oversight authority for a new executive commission and a means for the government to cite and fine violating firms.

In Brazil, regulations aimed at protecting workers from occupational accidents and illnesses also began with compensation for workplace accidents, following a 1919 decree.[53] In 1943, through the Consolidation of Labor Laws in the country, worker health and safety laws were standardized and, over many decades, expanded as firms introduced electrical installations, construction equipment, and other physical machines.[54] Four decades later, the legislature specifically amended the Brazilian Constitution to include health, hygiene, and safety standards—on top of wage and hour laws—for urban and rural workers to reduce workplace risks.[55] Over the years, Brazilian health and safety norms shifted from targeting individual safety, such as mandating individual protection equipment, to prioritizing collective measures and eliminating workplace risks. For instance, instead of focusing on how workers operate machinery, Brazilian norms state that the machine's moving components must be built with

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[50] Robert Asher, *Organized Labor and the Origins of the Occupational Safety and Health Act*, 24 NEW SOLS. 279, 290-95 (2014).

[51] For a review of some of OSHA's recent failures and successes, see David Michaels, *Is OSHA Working for Working People?*, 18 NEW SOLS. 391 (2008).

[52] 29 C.F.R. § 1910.212(a)(1).

[53] Decreto No. 3.724, de 16 de Janeiro de 1919, Diário Oficial da União [D.O.U.] de 1.18.1919 (Braz.).

[54] Decreto No. 5.452, de 1 de Maio de 1943, Diário Oficial da União [D.O.U.] de 8.9.1943 (Braz.).

[55] CONSTITUIÇÃO FEDERAL [C.F.] [CONSTITUTION] art. 7 (Braz.).

protections to prevent accidents.[56] This shift more effectively and efficiently safeguarded human health and lives.

What does this brief, cross-national, comparative history about the relationship between worker health regulations and technologies of the previous generation teach us about the regulation of contemporary firms that use digital platforms in the workplace? We maintain that although digital platforms are technically new forms of technology, they do not rupture the vertical logic of capitalism. The marriage of machinery and labor management remains intrinsic to the relationship between firms and workers. Because the digital machine—like the conveyor belt—remains in the firm's technical and operational control, the firm is responsible for protecting humans from being harmed by that machine.

Instead of blurring the relation between the firm and the machine by referring to both as "platforms"—thereby concealing the firm's direct control over the machine—we advocate for analysts and regulators to think critically about how these new machines are tools to dramatically increase control of the labor process and to subordinate workers, how these tools can be used across workplaces, and how they affect worker health and safety. What injuries do workers suffer when they are subjected to labor platform technologies, including automated monitoring and automated decision-making systems? What causes those injuries, and how do we prevent them? And most importantly, how might the past century of industrial labor regulation influence how we manage the future of work in relation to digital platforms?

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[56] *Norma Regulamentadora No. 12*, MINISTÉRIO DO TRABALHO E EMPREGO, https://www.gov.br/trabalho-e-emprego/pt-br/acesso-a-informacao/participacao-social/conselhos-e-orgaos-colegiados/comissao-tripartite-partitaria-permanente/normas-regulamentadora/normas-regulamentadoras-vigentes/nr-12-atualizada-2024-1.pdf [https://perma.cc/RTB7-3DQE] (last visited June 9, 2024); *Norma Regulamentadora No. 9*, MINISTÉRIO DO TRABALHO E EMPREGO, https://www.gov.br/trabalho-e-emprego/pt-br/acesso-a-informacao/participacao-social/conselhos-e-orgaos-colegiados/comissao-tripartite-partitaria-permanente/arquivos/normas-regulamentadoras/nr-09-atualizada-2021-com-anexos-vibra-e-calor.pdf [https://perma.cc/PDY9-RWPG] (last visited June 9, 2024).

III. Dangerous Digital Machines: Labor Platforms and Occupational Death and Injuries

Over the past eight years, research on workers who labor for companies that claim to be platforms has proliferated. In the United States and Brazil, the number of workers who labor in the private transportation and food-delivery sectors, and who do so for companies that manage their labor through smartphone applications, has also grown.[57] A review of research on these workers indicates three common problems related to their health and safety: (1) low, unpredictable wages (and accompanying long hours),[58] (2) unpredictable automated terminations with no recourse,[59] and (3) physical and emotional job-related injuries.[60] Because, as we argue above, the essential nature of the waged social relationship has not changed from

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[57] It is not known how many workers in the United States labor for food-delivery or ride-hail companies that utilize digital platforms. But one U.S. study based on tax-based measures found that from 2011-16, "virtually all expansion of the gig workforce . . . [came] from online platform work." Dmitri Koustas, *Insights from New Tax-Based Measures of Gig Work in the United States*, 21 CESIFO FORUM 5, 7 (2020). In 2016, about two million Americans, comprising one percent of the workforce, earned some income from an online platform. *Id.* In 2022, according to Brazil's National Household Sample Survey, 1.5 million people worked with on-demand digital platforms, amounting to 1.7 percent of the private-sector workforce. Caio Belandi, *Em 2022, 1,5 Milhão de Pessoas Trabalharam por Meio de Aplicativos de Serviços no País*, IBGE AGÊNCIA DE NOTÍCIAS (Oct. 26, 2023, 8:01 PM), https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/38160-em-2022-1-5-milhao-de-pessoas-trabalharam-por-meio-de-aplicativos-de-servicos-no-pais [https://perma.cc/883P-S8ZE]. None of these statistics account for the number of people across various sectors who are controlled by digital machines at work.

[58] *See, e.g.*, KEN JACOBS ET AL., GIG PASSENGER AND DELIVERY DRIVER PAY IN FIVE METRO AREAS 3 (2024), https://laborcenter.berkeley.edu/wp-content/uploads/2024/05/Gig-Passenger-and-Delivery-Driver-Pay-in-Five-Metro-Areas.pdf [https://perma.cc/5NAU-TDT5].

[59] *See, e.g.*, ASIAN LAW CAUCUS & RIDESHARE DRIVERS UNITED, FIRED BY AN APP: THE TOLL OF SECRET ALGORITHMS AND UNCHECKED DISCRIMINATION ON CALIFORNIA RIDESHARE DRIVERS 15-24 (2023), https://www.advancingjustice-alc.org/media/Fired-by-an-App-February-2023.pdf [https://perma.cc/Q67V-92KJ].

[60] *See, e.g.*, Emma Bartel et al., STRESSFUL BY DESIGN: EXPLORING HEALTH RISKS OF RIDE-SHARE WORK, 14 J. TRANSP. & HEALTH, Sept. 2019, at 1.

factory work to work conducted through platform machines, it is unsurprising that these are roughly the same concerns articulated by workers across different sectors who have interacted with different types of workplace machinery over the past century.

Still, the introduction of digital technologies via the digital platform, combined with the lack of labor regulation, has changed the nature and experience of these jobs in many ways. From workers' perspective, this change has often been for the worse. For example, transportation workers who labored for traditional taxi companies during the Twentieth Century complained of low wages and occupational injuries. Due to the taxi licensure system, workers in many U.S. jurisdictions had some protections from unjust termination. Though taxi workers' wages were often variable and uncertain, they were structured by municipal price regulations and supply limitations.[61] Beyond the dispatch system, on-the-job direction and surveillance was also extremely limited until GPS systems were introduced in the 2000s.[62] To be sure, taxi workers commonly experienced workplace harassment (both by taxi riders and by firm and state representatives, including the police), workplace violence, and workplace injury.[63] In response to these on-the-job dangers, the National Institute for Occupational Safety and Health (NIOSH) and other federal regulators issued "best practices" to taxi companies and taxi workers to lower incidents of workplace violence.[64] Though not

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[61] *See* Veena B. Dubal, *The Drive to Precarity: A Political History of Work, Regulation, & Labor Advocacy in San Francisco's Taxi & Uber Economies*, 38 BERKELEY J. EMP. & LAB. L. 73, 109-16 (2017).

[62] According to ethnographic research by one of us, GPS was introduced into San Francisco taxis in 2002. *See also* Joyce Slaton, *Luxor's New Luxury / How GPS Gets the Taxi to You Faster*, SFGATE (Jan. 21, 2022), https://www.sfgate.com/news/article/Luxor-s-New-Luxury-How-GPS-Gets-the-Taxi-to-You-2881375.php [https://perma.cc/XUA2-LGUN].

[63] *See* Cammie Chaumont Menéndez, *Preventing Violence against Taxicab Drivers*, NIOSH SCI. BLOG (June 16, 2008), https://blogs.cdc.gov/niosh-science-blog/2008/06/16/taxi/ [https://perma.cc/Q9VL-DZQS].

[64] *NIOSH Fast Facts: Taxi Drivers—How to Prevent Robbery and Violence*, NIOSH/OSHA (Nov. 2019), https://www.osha.gov/sites/default/files/publications/OSHA3976.pdf [https://perma.cc/5A33-VG5J]. The OSH Act established the National Institute of Occupational Safety and Health (NIOSH) as a research agency.

mandated under federal law, these best practices were utilized by several local jurisdictions, which required taxi companies to standardize features such as silent alarms and bulletproof barriers.[65] Epidemiologists and public health advocates also researched occupational hazards of taxi work and made interventional recommendations.[66]

But more recent occupational recommendations and mandates have not yet centered taxi work in relation to the use of platform machinery.[67] Statistical research on these workers and their injuries is also limited because the workers have yet to be treated as employees by the firms, who otherwise would have to report injury data to state and federal entities. Nevertheless, preliminary occupational research in both Brazil and the United States of workers whose labor is managed by digital platforms indicates a high number of workplace accidents, injuries, and deaths, as well as high levels of psychosocial injuries.[68]

In Brazil, the percentage of workers injured when working with digital platforms is extremely high relative to injured

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[65] *See, e.g.*, Sewell Chan, *Taxi Partitions, Born of Danger, May Be Set for a Makeover*, N.Y. TIMES (Aug. 9, 2005), https://www.nytimes.com/2005/08/09/nyregion/taxi-partitions-born-of-danger-may-be-set-for-a-makeover.html [https://perma.cc/87ZC-FSNL]; *Distress Lights for Raleigh Cabs*, WUNC (Dec. 3, 2010), https://www.wunc.org/politics/2010-12-03/distress-lights-for-raleigh-cabs [https://perma.cc/8B83-WNP3].

[66] *See, e.g.*, Kate E. Murray et al., *Occupational Health Risks and Intervention Strategies for US Taxi Drivers*, 34 HEALTH PROMOTION INT'L 323 (2019).

[67] For example, during the COVID-19 pandemic, which disproportionately impacted transportation workers, OSHA extended limited best practices to "rideshare" industries. *See OSHA Alert: COVID-19 Guidance for Rideshare, Taxi, and Car Service Workers*, OSHA, https://www.osha.gov/sites/default/files/publications/OSHA4021.pdf [https://perma.cc/TKY5-C3GK].

[68] In the European context, a comprehensive literature review by the European Trade Union Institute of studies examining the psychosocial impacts of "gig work" found that workers suffered high rates of depression relative to other jobs. PIERRE BÉRASTÉGUI, EXPOSURE TO PSYCHOSOCIAL RISK FACTORS IN THE GIG ECONOMY: A SYSTEMATIC REVIEW 15-16 (2021), https://www.etui.org/sites/default/files/2021-01/Exposure%20to%20psychosocial%20risk%20factors%20in%20the%20gig%20economy-a%20systematic%20review-web-2021.pdf [https://perma.cc/KQ32-44AM].

workers in the broader labor market. Firm-sponsored research on drivers and couriers managed through digital platforms found that 25% of workers suffered accidents, 18% suffered racism or gender-based violence, and 8% were robbed at work in the last three months.[69] Among drivers, 15% said they had an accident, 14% were victims of racism or gender violence, and 9% were robbed.[70] In sharp contrast, according to official Brazilian records of the formal employee labor market in 2022, the only occupations for which the incidence of workplace accidents reached or exceed 5% were livestock workers, rural workers in general, and postal workers.[71]

Independent research finds an even higher percentage of injured workers among delivery workers who labor for firms using platforms. In 2020, a first-of-its-kind survey of delivery workers in the state of Bahia, conducted by scholars and the Brazilian government, found that one in three respondents (33%) had been injured on the job.[72] Between 2021 and 2023, the survey was repeated with even bleaker results. When asked about the existence of injuries incurred at work, 58.9% of delivery workers reported having suffered a traffic accident, illness, robbery, assault, or shooting.[73] Under Brazilian

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[69] VICTOR CALLIL & MONISE PICANÇO, MOBILIDADE URBANA E LOGÍSTICA DE ENTREGAS: UM PANORAMA SOBRE O TRABALHO DE MOTORISTAS E ENTREGADORES COM APLICATIVOS [URBAN MOBILITY AND DELIVERY LOGISTICS: AN OVERVIEW OF THE WORK OF DRIVERS AND DELIVERY PEOPLE WITH APPS] 70 (2023).

[70] *Id.* at 46.

[71] *Série SmartLab de Trabalho Decente 2023: Mortalidade no Trabalho Cresce em 2022 e Acidentes Notificados ao SUS Batem Recorde* [*SmartLab Decent Work Series 2023: Mortality at Work Grows in 2022 and Accidents Reported to the SUS Break Record*], ORGANIZAÇÃO INTERNACIONAL DO TRABALHO [INT'L LAB. ORG.] (Mar. 29, 2023), https://www.ilo.org/brasilia/noticias/WCMS_874091/lang--pt/index.htm [https://perma.cc/ZK7C-2YGW].

[72] PROJETO CAMINHOS DO TRABALHO [PATHS OF WORK PROJECT], LEVANTAMENTO SOBRE O TRABALHO DOS ENTREGADORES POR APLICATIVOS NO BRASIL [SURVEY ON THE WORK OF DELIVERY DRIVERS USING APPLICATIONS IN BRAZIL] 22 (2020), http://abet-trabalho.org.br/wp-content/uploads/2020/08/Relato%CC%81rio-de-Levantamento-sobre-Entregadores-por-Aplicativos-no-Brasil.pdf [https://perma.cc/E3UJ-LTN9].

[73] PROJETO CAMINHOS DO TRABALHO [PATHS OF WORK PROJECT], LEVANTAMENTO SOBRE O TRABALHO DE ENTREGADORES E MOTORISTAS

occupational health and safety laws, all these incidents qualify as work accidents.[74]

The high rate of accidents is not surprising given the low wages and long hours faced by workers who are managed by digital platforms. The Brazilian National Household Sample Survey found that drivers controlled by "applications" work seven hours more per week but earn 15.25% less per hour than those who do the same work without platform management.[75] Delivery workers who are controlled by digital platforms earn 36.78% less per hour than other delivery workers.[76] Like drivers, their working hours are also longer. Offline delivery workers labor for an average of 42.8 hours per week, while workers controlled through digital platforms average 47.6 hours.[77]

In the United States, both national and regional data underscore the outsized dangers of delivery and ride-hail work managed through digital machinery. Extant research shows that these dangers relate to the legal treatment of workers as unprotected independent contractors, the occupational hazards posed by sectors using digital labor platforms to manage workers, and the specific nature of injuries associated with use of this machinery—that is, the extraordinary practices of labor discipline and control exerted through digital machines.

DAS AUTOINTITULADAS "PLATAFORMAS DIGITAIS" [SURVEY ON THE WORK OF DELIVERY DRIVERS AND DRIVERS ON SO-CALLED "DIGITAL PLATFORMS"] 17 (2023), https://www.gov.br/fundacentro/pt-br/comunicacao/noticias/noticias/2023/agosto/fundacentro-e-ufba-celebram-acordo-para-mapear-adoecimento-ocupacional/relatorio-caminhos-do-trabalho-2023-entregadores-e-motoristas-final.pdf [https://perma.cc/Y6HE-22UR].

[74] Incident rates were highest for motorcyclists (63.6%), followed by cyclists (50%) and car drivers (45.5%). *Id.*

[75] *Pesquisa IBGE-PNAD Demonstra Precarização do Trabalho em Plataformas Digitais [IBGE-PNAD Research Demonstrates the Precariousness of Work on Digital Platforms]*, MINISTÉRIO PÚBLICO DO TRABALHO EM CAMPINAS [PUBLIC MINISTRY OF LABOR IN CAMPINAS] (Oct. 25, 2023), https://www.prt15.mpt.mp.br/2-uncategorised/1644-pesquisa-ibge-pnad-demonstra-precarizacao-do-trabalho-em-plataformas-digitais [https://perma.cc/7RU2-PY8J].

[76] *Id.*

[77] *Id.*

A 900-person national survey of Uber and Lyft drivers conducted in 2023 by the Strategic Organizing Center (SOC) found that 67% of drivers reported violence, harassment, and/or abuse on the job.[78] Ten percent had been robbed or carjacked; 3% had been sexually assaulted or raped, and 2% had been shot or stabbed.[79] In 2019, Uber self-reported that it had received approximately 6,000 complaints of sexual assault in the previous two years.[80] Two years later, Lyft reported that from 2017-19, it had received approximately 4,000 sexual assault complaints.[81] The companies' data indicates that drivers experience sexual violence, including rape, at roughly the same rate as riders.[82] Food-delivery couriers report similarly violent on-the-job experiences.[83]

Regional research on food-delivery and ride-hail work also suggests extreme levels of workplace injuries. Research on 500 app-based couriers in New York City conducted by researchers at Cornell University's Worker Institute and the Worker's Justice Project/Los Deliveristas Unidos (WJP-LDU)—a membership-based advocacy group of food-delivery workers in the city—found that most workers face high rates of injury, discrimination, and/or underpayment:

> Forty-nine percent of survey respondents reported having been in an accident or crash while doing a delivery. Of these workers, 75

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[78] STRATEGIC ORG. CTR., DRIVING DANGER: HOW UBER AND LYFT CREATE A SAFETY CRISIS FOR THEIR DRIVERS 7 (2023), https://thesoc.org/wp-content/uploads/2023/04/SOC_RideshareDrivers_rpt-042023.pdf [https://perma.cc/JG48-K8J9].

[79] *Id.*

[80] UBER, 2017-2018 US SAFETY REPORT 59 (2019), https://www.uber-assets.com/image/upload/v1575580686/Documents/Safety/UberUSSafetyReport_201718_FullReport.pdf [https://perma.cc/M8U7-J5YM].

[81] LYFT, COMMUNITY SAFETY REPORT (2021), 6-7 https://assets.ctfassets.net/q8mvene1wzq4/4jxkFTH5YCQK8T96STULMd/4269e14dbcb8578ff64da45df08b8147/Community_Safety_Report.pdf [https://perma.cc/D5Y5-7BLT].

[82] UBER, 2017-2018 US SAFETY REPORT, *supra* note 80, at 10.

[83] Cyrus Farivar, *Gig Workers Fear Carjacking, Other Violence Amid Spike in Crimes*, NBC NEWS (Apr. 24, 2021), https://www.nbcnews.com/business/business-news/gig-workers-fear-carjacking-other-violence-amid-spike-violence-crimes-n1264987 [https://perma.cc/KUR2-Y5K4].

> percent said they paid for the medical care with their own personal funds. . . . Fifty four percent . . . reported having experienced bike theft, and about 30 percent of these said that they were physically assaulted during the robbery.[84]

Another study published in 2023 by the Asian Law Caucus and Rideshare Drivers United (ALC-RDU), which surveyed 810 Uber and Lyft drivers in California, found that 43% of the drivers reported experiencing sexual harassment.[85]

The ALC-RDU study also found that two-thirds of workers surveyed had been terminated at some point, severely and negatively affecting their livelihoods. Of those who had experienced temporary or permanent terminations, 18% lost their vehicles and 12% lost their housing as a result.[86] Meanwhile, the SOC study concluded that the constant fear of being terminated—augmented by not knowing what behaviors prompt termination—made work even more dangerous for drivers. Fifty-nine percent of those surveyed by SOC reported that they accept and finish rides even when they feel unsafe because they fear that terminating rides will result in poor ratings by riders (eventually leading to termination) or in immediate algorithmic termination by the firm.[87]

Independent regional studies on the wages of workers who labor for ride-hail and delivery firms using digital platforms for labor control reveal low, variable, and unpredictable incomes. The WJP-LDU study found that in New York City, 42% of delivery workers reported non-payment or underpayment of their wages, with almost no recourse because of how the firms control them through digital machinery.[88] Using industry-

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[84] MARIA FIGUEROA ET AL., ESSENTIAL BUT UNPROTECTED: APP-BASED FOOD COURIERS IN NEW YORK CITY 8 (2023), https://hdl.handle.net/1813/113534 [https://perma.cc/RYK6-ZGL8].

[85] ASIAN LAW CAUCUS & RIDESHARE DRIVERS UNITED, *supra* note 59, at 4.

[86] *Id.*

[87] STRATEGIC ORG. CTR., *supra* note 78, at 13.

[88] Stephanie Olszewski, *First of Its Kind Industry Report Shows New York City's App-Based Delivery Workers Experience Harsh Working Conditions*, WORKER INST. (Sept. 13, 2021), https://www.ilr.cornell.edu/worker-institute/blog/reports-and-publications/first-its-kind-industry-report-

provided data, New York City regulators found that, after expenses and before tips, delivery workers made roughly $4.03 per hour.[89] Similarly, studies of ride-hail drivers in California found wages to average as low as $6.20 and $5.97 per hour, respectively.[90]

We can infer that because workers across these ride-hail firms are paid variably and by the piece, they are motivated to work longer and harder in order to make a living.[91] This pay system—structured through digital machinery—helps us

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shows-new-york-citys-app-based-delivery-workers-experience-harsh [https://perma.cc/F94D-C9CG]. Lack of access to rest breaks and bathrooms can lead to what doctors call "Taxi Cab Syndrome." This syndrome, which is caused by infrequent voiding due to a lack of toilet access and the stress of working long hours without access to a wage floor, is associated with genitourinary pathologies including voiding dysfunction, infertility, urolithiasis, bladder cancer, and urinary infections. Alon Y. Mass et al., *Taxi Cab Syndrome: A Review of the Extensive Genitourinary Pathology Experienced by Taxi Cab Drivers and What We Can Do to Help*, 16 REVS. UROL. 99, 102 (2014).

[89] N.Y. CITY DEP'T CONSUMER & WORKER PROT., A MINIMUM PAY RATE FOR APP-BASED RESTAURANT DELIVERY WORKERS IN NEW YORK CITY 21 (2022), https://www.nyc.gov/assets/dca/downloads/pdf/workers/Delivery-Worker-Study-November-2022.pdf [https://perma.cc/8SSC-NFD9]. This research recommended that, based on the poverty thresholds in New York City, the significant occupational dangers of the job, and the minimum base pay for "app for-hire service drivers," these delivery workers should get a minimum pay rate of $23.82 per hour, accounting for all the time that they work, including both "trip time" and "on-call time." *Id.* at 27. After significant industry pressure, the city's Department of Consumer and Worker Protection rolled back its recommendation months later, lowering the minimum pay rate to $17.96 per hour and creating a system in which workers are not paid for individual "on-call" time. *Food Delivery Worker Laws: Frequently Asked Questions*, N.Y. CITY DEP'T WORKER & CONSUMER PROT., https://www.nyc.gov/site/dca/workers/workersrights/food-delivery-worker-laws-faqs.page [https://perma.cc/3YY4-VGRE] (last visited June 12, 2024).

[90] Eliza McCullough et al., *Prop 22 Depresses Wages and Deepens Inequities for California Workers*, NAT'L EQUITY ATLAS (Sept. 21, 2022), https://nationalequityatlas.org/prop22-paystudy [https://perma.cc/NVY5-Z5TT]; KEN JACOBS ET AL., GIG PASSENGER AND DELIVERY DRIVER PAY IN FIVE METRO AREAS 25 (2024), https://laborcenter.berkeley.edu/wp-content/uploads/2024/05/Gig-Passenger-and-Delivery-Driver-Pay-in-Five-Metro-Areas.pdf [https://perma.cc/6N5W-6SQH].

[91] Veena Dubal, *On Algorithmic Wage Discrimination*, 123 COLUM. L. REV. 1929, 1970 (2023).

understand on-the-road fatality data. We know that across the United States, the launch of ride-hailing companies in cities has been associated with a three-percent increase in the number of traffic fatalities.[92] Working long and hard, with low wages and little predictability, are not just dangerous aspects of this work but also may give rise to workplace dangers, including more crashes. A joint study of the California Public Utilities Commission and the California Department of Insurance found that ride-hailing accidents in that state alone generated 9,388 claims that resulted in a combined $185.6 million loss in 2014, 2015, and 2016.[93]

In sum, a review of the extant data in both Brazil and the United States from just the past few years suggests that the ways in which firms use digital platforms—for low, variable, digitalized piece payments; unpredictable automated terminations; and other forms of algorithmic management and control—generate unhealthy workplaces with extreme occupational injury rates. In addition to unacceptably high rates of death and physical injury, research suggests that workers are frequently underpaid (forcing them to work long hours) and arbitrarily terminated (forcing them to choose between potentially dangerous work or dangerous economic situations). We therefore argue that the labor management of this work, which is not necessitated by digital machinery but structured by firms through digital platforms, must be understood in terms of its mental and physical health impacts. It is not enough to make transparent the rules by which the digital machinery operates, as the Platform Work Directive does. Like the previous era of workplace regulations, which responded to "extremely exhaustive or unhealthy" work, new

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[92] DAVID FETTIG, THE COST OF CONVENIENCE: RIDESHARING AND TRAFFIC FATALITIES 2 (2019), https://bfi.uchicago.edu/wp-content/uploads/BFI_RB_Barrios_The-Cost-of-Convenience_Ridesharing-and-Traffic-Fatalities.pdf [https://perma.cc/B5GM-EJNL].

[93] CAL. DEP'T OF INS. & CAL. PUB. UTILS. COMM'N, JOINT STUDY OF TRANSPORTATION NETWORK COMPANY (TNC) INSURANCE COVERAGE REQUIREMENTS IN CALIFORNIA 20 (2017), http://www.insurance.ca.gov/0400-news/0200-studies-reports/upload/TNC_REPORT_AS_OF_010518.pdf [https://perma.cc/UBK4-FYM3].

labor laws must extend to protect *all* workers from digital machinery.

Conclusion: A Digital Machines at Work Directive for the Future of Labor Regulation

In this Essay, we have made two primary arguments. First, we have maintained that contrary to the assumptions of regulators across the world, digital machines ("platforms") do not change the nature of the hierarchical social relationship between workers and firms. However, the design and use of these machines do change the *nature* of labor management and firm control by making opaque the precise mechanisms of payment, management, and discipline; rendering firm control invisible to regulators; and making it harder to seek recourse, both through use of the law and directly through the firm. The relative invisibility of this control exerted through digital machines, along with the lack of political and regulatory will to mandate visibility, has made it difficult to recognize the social relationship between workers and firms as one of employment. In turn, this has largely precluded the enforcement of labor laws with respect to these firms and workers.[94] This outcome is ironic because digital technologies make it easier to prove labor relations by providing a centralized source of data collection and labor management. Firms utilizing digital platforms not only exert a great deal of formal control over wages, hours, and on-the-job activities but also have access to data and analysis shedding light on that control and its outcomes.

The EU's Platform Work Directive addresses some of these issues, but it does so only in relation to "digital platforms"—not to other firms that also use digital technologies for workforce surveillance and algorithmic management. In

[94] There are some exceptions. For example, both the Appellate Division of the New York Supreme Court and the Pennsylvania Supreme Court have found that Uber drivers are employees under unemployment insurance laws. Uber Techs., Inc. v. Comm'r of Lab. (*In re* Lowry), 138 N.Y.S.3d 238, 241 (App. Div. 2020); Lowman v. Unemployment Comp. Bd. of Rev., 235 A.3d 278, 303-08 (Pa. 2020). In addition, a lower court in Brazil found that Uber was not just an employer but a hyper employer. TRT-1, Ação Trabalhista No. 2020.5.01.0064, 08.09.2021 (Braz.).

making this distinction, the Directive both confuses the firm for the machine and limits desperately needed regulations of digital machines in the workplace to specific firms. In contrast, California's 2019 attempt to regulate the misclassification of workers through a law known as "A.B. 5" was understood as being directed at companies like Uber, DoorDash, and Instacart, but it took on the misclassification of workers across the economy by broadening the scope of workers covered by the state's labor law.[95] This is a superior approach to problems posed by firms using digital machinery in the workplace because it recognizes the classification of workers as employees as a separate, broad structural issue.

Second, we have argued that even in the absence of legal recognition of this social relationship, and of the continuing nature of the hierarchical wage dynamic, legislators must aim to make digital platforms safe for humans. Whether workers are legally recognized as employees or independent contractors does not change the importance of regulations addressing the safety of digital machinery. Just as Ford is required to make its conveyor belts safe for human use in its assembly plants, and DuPont must prevent its pipes from exploding on its sites, so, too, must Uber make its machines safe for human interaction, no matter how Uber drivers are legally identified. In the case of digital platform machinery, the need for protection is especially urgent given the data on deaths and injuries, much of which is specifically linked to underpayment, and given the unjust termination of workers who interact with these means of production.

In this sense, the protections of the Platform Work Directive and similar proposed laws, while laudable, must be far more extensive in scope and in reach to have any effect on health and safety. Article 12 of the Directive mandates that "digital labor platforms . . . evaluate the risks of automated monitoring or decision-making systems [platform workers'] safety and health, . . . assess whether the safeguards of those systems are appropriate . . . [, and] introduce appropriate preventive and protective measures."[96] We argue, as others have, that this provision should extend to *all* workers who

[95] A.B. 5, 2019 Leg., Reg. Sess. § 2 (Cal. 2019).
[96] Platform Work Directive, *supra* note 1, art. 12(1).

experience automated management.[97] But we further contend that future laws about the use of digital machines to manage, control, and discipline workers must directly regulate the risks and outcomes of digital machines instead of leaving that evaluation to the firms themselves. For example, rather than obliquely regulate to prevent "undue" work pressure, as Article 12 does,[98] a law targeting the negative health and safety effects of digital machines could ban the use of automated management in the creation, revision, and deployment of work quotas, as California's A.B. 701 does for warehouse work by requiring "a written description of each quota to which the employee is subject."[99] Such a direct and collective approach to workplace safety would effectively safeguard against the dangers posed by these new workplace machines.[100] Efforts to squarely contravene harm and injury should extend across workplaces using digitalized workforce management.

We conclude by counseling that direct regulations of digital machinery in the workplace are not only necessary but vital for human health and safety in the future of work. As we have shown using data from two national contexts, Brazil and the United States, the use of digital machines to manage and control labor in the ride-hail and food-delivery industries has had devastating impacts on workers' minds and bodies. But the same and similar forms of digitalized management extend well

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[97] As Cefaliello et al. write, "[t]here is a need for horizontal, legally binding provisions explicitly referring to [algorithmic management]." Cefaliello et al., *supra* note 12, at 206.

[98] Platform Work Directive, *supra* note 1, art. 12(3).

[99] A.B. 701, 2021 Leg., Reg. Sess. § 3 (Cal. 2021).

[100] A.B. 701, often referred to as the "Amazon warehouse bill," mandates that warehouse employers provide "a written description of each quota to which the employee is subject, including the quantified number of tasks to be performed or materials to be produced or handled, within the defined time period, and any potential adverse employment action that could result from failure to meet the quota." *Id.* Further, "[a]n employee shall not be required to meet a quota that prevents compliance with meal or rest periods, use of bathroom facilities, including reasonable travel time to and from bathroom facilities, or occupational health and safety laws in the Labor Code or division standards." *Id.* The Platform Work Directive could also have banned the use of automated management calculation of personal digitalized wages. And rather than mandating some human intervention in automated terminations, it could have barred digitalized dismissals altogether.

beyond these spaces. Even with existing employment protections in place, use of these machines likely exacerbates occupational health and safety risks. Considering this and the long history of accidents and injuries related to workplace machinery, we advocate for new, broad, national and international laws that limit, manage, and in some instances even ban the use of digital machines for worker management[101] and that directly address the physical and psychosocial injuries that arise from the unprotected use of these instruments.

[101] Banning use of automated monitoring and decision-making systems in the workplace is not unprecedented. The Platform Work Directive, for example, would ban the use of these systems if they are used to

> (a) process any personal data on the emotional or psychological state of the person performing platform work; (b) process any personal data in relation to private conversations, including exchanges with other persons performing platform work and their representatives; (c) collect any personal data while the person performing platform work is not offering or performing platform work; (d) process personal data to predict the exercise of fundamental rights, including the right of association, the right of collective bargaining and action or the right to information and consultation . . . ; (e) process any personal data to infer racial or ethnic origin, migration status, political opinions, religious or philosophical beliefs, disability, state of health, including chronic disease or HIV status, the emotional or psychological state, trade union membership, a person's sex life or sexual orientation; (f) process any biometric data . . . of a person performing platform work to establish that person's identity by comparing that data to stored biometric data of individuals in a database.

Platform Work Directive, *supra* note 1, art. 7. We note that these are critical redlines, but they are not exhaustive.