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Understanding Work in the Online Platform Economy: A Critical Review

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Abstract

The outlines of the impact upon work of the ever more pervasive online platforms are beginning to come into focus. Previously, fairly settled terms such as “jobs”, “employment”, “labor”, and even “work” itself are, for some, being replaced by “income generation” or “value creation”. To capture the difference between platform-organized work or labor and traditional activities, we use the commonly used term “platform work.” This raises the question of whether a different context for the way goods and services are delivered is emerging. This essay reviews the extant understanding of the impact of platforms on work.

Initial analyses hailed platforms as new organizational forms that could create an economy based upon communitarian ideals such as “sharing”. Unfortunately, this narrow optimistic formulation has given way to a realization that platforms are capitalist enterprises. In contrast, there have been increasing concerns about platforms’ capacity to generate significant numbers of even mediocre quality jobs, their contribution to existing inequalities, and the work experiences of those dependent upon platforms for their income. In this review, we suggest that most studies of platform work have been too narrow, focusing only on a small number of highly visible platforms that provide in-person and remote platform work. To comprehend the true extent of platform work, we argue it is necessary to extend study beyond in-person and remote service provision to include platform-mediated sales and virtual product provision. We then assess the impacts of platformizing these four categories of platform work across four different aspects of work: management power, work processes, social protection and labor rights, and skill demand and career prospects. Our conceptual analysis provides a more comprehensive understanding on the effects of online platforms on the changes in work that may serve policymakers facing the challenge of formulating, and re-formulating their targets, the categories of their policies.

1. From Sharing to Online Business Platforms

Since their emergence in the mid-1990s (Parker and Van Alstyne, 2005[4]), online platforms (hereafter we discuss only online platforms and not other types of platforms), digital places or infrastructures designed to mediate transactions and other valued exchanges of goods, services, or data/information (Gawer, 2014[5]), have expanded their presence into a growing number of sectors (Kenney and Zysman, 2016[6]; Srnicek, 2017[7]; Van Dijck et al., 2018; Zuboff, 2019[8]). By one measure, as of 2020, platforms were operating in 70 percent of all US service industries, which accounted for over 5.2 million establishments (Kenney, Bearson, and Zysman, 2021[9]).

It has become accepted that online platforms represent a new institutional form that differs from both markets and hierarchies (Williamson, 1975[10]) and network structures (Powell, 1990[11]), though it has features of all three. What is clear is that the adoption of platforms as intermediaries is deeply changing value creation, competition, power relationships, and institutional structures (Cenamor & Frishammar, 2021[12]; Gawer, 2014 [13];

[4] Parker, G. G. Van Alstyne, M W. 2005. Two-Sided Network Effects: A Theory of Information Product Design. Management Science 51 (10): 1494–1504.

[5] Gawer, A. (2014), 'Bridging differing perspectives on technological platforms: toward an integrative framework,' Research Policy, 43(7), 1239–1249

[6] Kenney, M. and J. Zysman. 2016. The rise of the Platform Economy. *Issues in Science and Technology* 32 (3): 61-69.

[7] Srnicek, N. (2017), Platform Capitalism. John Wiley & Sons: Hoboken, NJ.

[8] Zuboff, S. 2019. Surveillance Capitalism and the Challenge of Collective Action. New Labor Forum 28(1): 10–29

[9] Martin Kenney, Dafna Bearson and John Zysman. 2021. The platform economy matures: measuring pervasiveness and exploring power. Socio-Economic Review, 2021, Vol. 00, No. 0, 1–33

[10] Williamson, O. 1975. Markets and Hierarchies, New York: Free Press.

[11] Powell, W.W. 1990. Neither Market nor Hierarchy: Network Forms of Organization. Research in Organizational Behavior. Vol 12, pp 295-336.

[12] Javier Cenamor, Johan Frishammar. 2021. Openness in platform ecosystems: Innovation strategies for complementary products. Research Policy 50 (2021) 104-148.

[13] Gawer, A. (2014) 'Bridging Differing Perspectives on Technological Platforms: Toward an Integrative Framework', Research Policy, 43, 1239–1249

Jacobides et al, 2018[14]; Petit and Teece, 2021[15]; Teece and Kahwaty, 2021[16]). Accordingly, the rise of the platform economy has attracted considerable academic and policy interest. One of the areas that has received the greatest attention is the impact of platforms on work (Srnicek, 2020[17]). Early analyses hailed platforms' potential for facilitating "sharing" and creating value creation outside the existing market structures (Benkler, 2006[18]; Schor, 2016[19]). In these formulations, platforms were meant to allow individuals across the entire spectrum of skills and capabilities to earn income by providing value in terms of a good or service to a user (Howcroft and Bergvall-Kareborn, 2019[20]). Some believed that online platforms could facilitate the integration of those unable or unwilling to work regular schedules (Manyika et al. 2016[21]).

Initial analyses identified few drawbacks except violations of consumer privacy and, perhaps, firms such as Airbnb and Uber violating local zoning or national labor laws (Rahman and Thelen 2019[22]). More recently, the initial optimism has turned into growing concerns about platforms' capacity to generate even mediocre-quality opportunities to

[14] Jacobides, M. G., C. Cennamo and A. Gawer (2018), 'Towards a theory of ecosystems,' Strategic Management Journal, 39(8), 2255–2276.
[15] Petit, N. and Teece, D. J. 2021. Innovating Big Tech firms and competition policy: favoring dynamic over static competition. Industrial and Corporate Change. 30(5), 1168–1198.
[16] Teece, D. and Henry J. Kahwaty. 2021. Is the Proposed Digital Markets Act the Cure for Europe's Platform Ills? Paper prepared for the Prepared for the Computer & Communications Industry Association. https://media.thinkbrg.com/wp-content/uploads/2021/04/11215103/Is-the-DMA-the-Cure_Teece_Kahwaty.pdf Accessed January 31, 2022.
Evidence from the European Commission's Impact Assessment
[17] Nick Srnicek. 2020. Paths Forward for the Study of the Digital Economy. In James Muldoon, Will Stronge, eds. Platforming Equality: Policy Challenges for the Digital Economy. London: Autonomy.
[18] Benkler, Y. (2006). The wealth of networks: How social production transforms markets and freedom. Yale University Press: New Haven, Conn., USA and London, UK.
[19] Schor, J. (2016). Debating the sharing economy. Journal of Self-Governance and Management Economics, 4(3), 7-22.
[20] Howcroft, D. and B. Bergvall-Kareborn (2019), 'A typology of crowdwork platforms,' Work, Employment and Society, 33(1), 21–38.
[21] Manyika, J., S. Lund, J. Bughin, K. Robinson, J. Mischke and D. Mahajan (2016), 'Independent work: choice, necessity and the gig economy,' McKinsey Global Institute, accessed at https://www.mckinsey.com/featured-insights/employment-and-growth/independ ent-work-choice-necessity-and-the-gig-economy on March 21, 2019.
[22] K. Sabeel Rahman, K. S. and Thelen, K. 2019. The Rise of the Platform Business Model and the Transformation of Twenty-First-Century Capitalism. *Politics & Society* 47(2) 177– 204

generate income (Cirillo et al. 2021[23]), their contribution to existing inequalities, and their impact on employment in other established sectors (de Stefano, 2016[24]; van Dijck, Poell, and de Waal, 2018[25]).

There is much confusion in the literature analyzing "work" conducted through platforms.[26] As we discuss later, outside the direct employees and contractors to platforms, by definition, those transacting across a platform do not work for the platform. Ipso facto, the platform does not provide employment or "jobs' ' for those transacting across the platform. What provides is a virtual location where the various sides of the platform can transact and thus creators or sellers of goods or services can generate income. Clearly, a term such as "employment" is not meaningful. But even the looser term "job" that still connotes something relatively permanent is too concrete, as these jobs are at the will of the platform and thus also ephemeral and not socially recognized. The word "labor" when it means "the expenditure of physical or mental effort" is adequate, but it often is associated with wages, which income earned through the platform is not. Similarly, one meaning of the word "work" has the implication of wages or salary, which again is an inaccurate description of the income generated over a platform. To capture, the unique nature of income generation through providing value across a platform, it might be intellectually useful to term the activities we will discuss at "platform work" or "platform labor."[27] In the rest of the document, we will use

[23] Cirillo, V., Guarascio, D., & Parolin, Z. 2021. Platform work and economic insecurity: Evidence from Italian survey data (No. 2021/13). LEM Working Paper Series. https://www.econstor.eu/handle/10419/243509

[24] Stefano, V. D. 2016. The rise of the "Just-in-time workforce: On-demand work, crowdwork, and labor protection in the 'gig-economy." *Comparative Labor Law and Policy Journal*. Vol. 37:471

[25] José van Dijck, Thomas Poell, and Martijn de Waal. 2018. The Platform Society. London: Oxford University Press.

[26] We accept the definition that "work" is an activity involving mental or physical effort done in order to earn income. This definition does not specify a particular form of control of the labor process such as employment, contract, etc.

[27] In previous work, one of us, Kenney, introduced the term "platform-dependent entrepreneurs" to describe the relationship between the platform and what the management literature euphemistically calls "complementors" (Cutolo and Kenney 2021#; Cutolo et al. 2021#)

these terms to separate work monetized over a platform, from work and labor in traditional settings.

The impact of platform work is still unclear. The majority of recent studies have focused only on a remarkably small number of large, visible platforms such as Uber, Lyft, and Deliveroo and a subset of in-person and remote platform jobs (ILO, 2021[28], Kilhoffer et al, 2020[29]; Brancati, Pesole, and Fernández-Macías, 2020[30]; de Groen et al, 2021[31]; Kenney, Bearson and Zysman, 2021; Wood et al. 2019[32]). These scholars and policy-makers deliberately exclude the larger and, almost certainly, greater source of income that come from individuals and small businesses (that employ people) selling products and services across platforms and the enormous number of creators and influencers that use platforms to generate income. Our paper addresses this gap by looking at a broader set of categories of platform work. To do so, we build on Bearson, Kenney, and Zysman's (2021)[33] taxonomy of platform-enabled work, which identifies seven different types of work that can be attributed to platform firms (see Figure One). We use this framework to evaluate the impact of platform work in four different labor spheres: management power, work processes, social protection and labor rights, and skill development.

[28] International Labor Organization. 2021. World Employment and Social Outlook. The Role of Digital Labor Platforms in Transforming the World of Work. Geneva: International Labor Organization.

[29] Zachary Kilhoffer, Willem Pieter De Groen, Karolien Lenaerts, Ine Smits, Harald Hauben, Willem Waeyaert, Elisa Giacumacatos, Jean-Philippe Lhernould, Sophie Robin-Olivier. 2020. Study to gather evidence on the working conditions of platform workers. Brussels: European Commission.

[30] Urzì Brancati, M.C., Pesole, A., Fernández-Macías, E. 2020. New evidence on platform workers in Europe. Results from the second COLLEEM survey. Luxembourg: Publications Office of the European Union.

[31] Willem Pieter de Groen, Zachary Kilhoffer, Leonie Westhoff, Doina Postica and Farzaneh Shamsfakhr. 2021. Digital labour platforms in the EU. Mapping and business models. prepared by CEPS for the European Commission, Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL). Brussels: European Commission.

[32] Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. 2019. Good gig, bad gig: autonomy and algorithmic control in the global gig economy. Work, Employment and Society, 33(1), 56-75.

[33]Bearson, D., Kenney, M., and Zysman, J. 2021. Measuring the impacts of labor in the platform economy: new work created, old work reorganized, and value creation reconfigured. Industrial and Corporate Change, 30(3), 536–563.

As online platforms continue to reconfigure the landscape of work and governments develop different policy responses, our conceptual analysis will provide a more comprehensive and nuanced perspective on the effects of the wide scale adoption of online platforms on labor. Our contribution speaks to scholars interested in the transformation of capitalisms and the impact of the platform economy on work and employment. The paper is also valuable to policymakers interested in regulating working conditions in platform work. The diversity of value-creating activity conducted across online platforms means that organizing and describing the types of labor/value-creating activities will identify research problems and the difficulties state actors might have in regulating work conditions.

The remainder of the paper is organized as follows. Section Two showcases the limitations of existing studies and defines the scope of the paper by contrasting two different perspectives on the relationship between platforms and work. The first, which we call a "narrow" perspective, reflects the view that most of the literature has taken on platforms. We contrast this with what we call a "broader" or more comprehensive perspective that identifies the multiple types of work created by or affected by platforms. Section three builds on the broad definition outlined in section two to discuss four spheres that are being affected by platform work and the direction in which different types of platform work are affecting them. The final section weaves these threats together and outlines future avenues for research.

2. Understanding Platform Work

2.1 Narrow and the broad perspectives

Platform adoption accelerated in the second half of the 2000s with the introduction of technological innovations such as the iPhone. In 2021, eight of the world's ten most valuable

publicly traded firms were platforms (Statista, 2021[34]). This includes large or "gatekeeper" platforms such as Facebook, Google, and Amazon, each of which exceeds 2 billion monthly active users (Kenney, Bearson and Zysman, 2021). As platforms have matured, their number have increased, and their presence expanded across a larger number of areas of economic activity (Gawer, 2021[35]). Recent studies have identified 516 active platforms and an additional 74 inactive platforms in the EU27 (de Groen et al, 2021) and 777 active labor platforms worldwide (ILO, 2021). Others show that online platforms are present in 70 percent of service sectors in the US, representing 5.2 million establishments affected directly or indirectly by these structures (Kenney, Bearson and Zysman, 2021).

As platforms have become pervasive, so has their power to reorganize, disperse, and recompose work (Kenney and Zysman, 2016). This raises urgent questions about the impact on online platforms on the nature and the allocation of work, management power, work processes, and skills. In turn, these micro-level questions feed into broader concerns about institutions and the ability of national economies to provide economic opportunity: Do platforms exacerbate preexisting trends toward a rise in contingent work arrangements and social inequality? What types of regulation and institutions can be developed or adapted to ensure worker protection in the platform economy?

The first step in answering these questions is to systematically characterize the different types of platform labor. A number of recent studies have introduced such taxonomies. At the outset, we hasten to add that in terms of economic value, none of the platforms examined by most of these studies are the most important in terms of value created. The ILO (2021) distinguishes between workers who are employed directly by a platform on a

[34] Statista, April 2021. https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-capitalization/ Accessed February 6, 2022.
[35] Gawer, A. 2021. Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. Long Range Planning 54,5, 1, 2-45.

full time-time, part-time, or fixed-term basis (internal employment), and those whose engagement and work are mediated through web-based and location-based platforms (external employment). The OECD (2016[36]) defines two categories of platform work in service markets: services delivered physically (e.g., Airbnb or Uber) versus digitally (e.g., Upwork or Amazon Mechanical Turk). Analyses based on the EU's COLLEEM survey (Pesole et al (2018[37]) and Urzi Bracanti et al (2020[38]), follow a similar distinction between activities that are carried out online and offline or on-location as do De Stefano (2016[39]) and Howcroft, and Bergvall-Kareborn, (2019). By contrast, Kalleberg and Dunn (2016[40]) focus instead on the type of platform workers are associated with, rather than the location of the work, and identify four types of platforms: crowdwork, online freelance, delivery/home tasks, and transportation. Khun and Maleki (2017[41]), develop a framework to classify platform workers based on two factors: workers' autonomy, and their dependence on the firm. Finally, Abraham et al. (2019[42]) avoid the development of a taxonomy by presenting platform work as a type of non-employee work. Specifically, they define "gig employment" as "one-off jobs on which workers are paid for a particular task or for a defined period of time" (p 13).

[36] OECD (2016), 'New forms of work in the digital economy,' OECD Digital Economy Papers, No. 260, OECD Publishing: Paris, France

[37] Pesole, A., M. C. Urzı´ Brancati, E. Fernandez-Macıas, F. Biagi and I. Gonzalez Vazquez. (2018), 'Platform workers in Europe,' JRC Science for Policy Report, European Commission: Brussels.

[38] Brancati, U., M.C., Pesole, A., Férnandéz-Macías, E. 2020. New evidence on platform workers in Europe. Results from the second COLLEEM survey. European Commission, JRC Science for Policy Report. Luxembourg: Publications Office of the European Union.

[39] Stefano, V. D. 2016. The Rise of the Just-in-Time Workforce: On-Demand Work, Crowdwork, and Labor Protection in the Gig-Economy. ILO. Conditions of Work and Employment Series No. 71. ILO: Geneva. https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_443267.pdf Accessed February 8, 2022.

[40] Kalleberg, A. L. and M. Dunn (2016), 'Good jobs, bad jobs in the gig economy,' Perspectives on Work, accessed at http://lerachapters.org/OJS/ojs-2.4.4-1/index.php/PFL/article/viewFile/ 3112/3087 on February, 8, 2022.

[41] Kuhn, K. M., & Maleki, A. (2017). Micro-entrepreneurs, dependent contractors, and instaserfs: Understanding online labor platform workforces. *Academy of Management Perspectives*, *31*(3), 183-200.

[42] Katharine G. Abraham, John C. Haltiwanger, Kristin Sandusky, James R. Spletzer (2019). Measuring the gig economy: Current knowledge and open issues. Working Paper 24950 http://www.nber.org/papers/w24950

The taxonomies discussed above are based on analyses of a small subset of platforms operating in a few categories. For instance, the EU's COLLEEM survey examines 52 platforms, 40 of which correspond to three categories of in-person services: personal transportation services, delivery services, and domestic work (de Groen et al, 2021). Most recently, the European Trade Union Institute (ETUI) carried out a survey in 2021 that added to the in-person services, remote clickwork (e.g., Amazon Mechanical Turk), remote professional work (e.g., Upwork). Each of these taxonomies fall within what is a "narrow" perspective that considers only labor remunerated for services directly rendered and compensated over a platform (Bearson, Kenney and Zysman, 2021).

These narrow classifications are problematic for several reasons: First, such classifications exclude large sectors of activity in which platforms have become or are becoming pervasive. To illustrate, the ETUI rules out the largest categories of platform income generation -- influencers (YouTube, Instagram, TikTok), online rentals (Airbnb), and product sales online (Amazon Marketplace, app stores, Etsy, etc.) (Piasna, Zwysen, and Drahokoupil, 2022)[43] -- without any doubt, more income is earned through these platforms than in the labor platforms receiving so much attention.

However, even when it includes influencers and sellers, these taxonomies still exclude the vast population of workers whose activities have been transformed. These range from the finance sector to online gaming to healthcare. In addition, narrow taxonomies exclude different categories of work including indirect platform work and work affected by platforms. Indirect platform work includes activities such as lawyers, script writers, marketing specialists, and multimedia artists that assist platform content creators (Bearson, Kenney and Zysman, 2021). By work affected by platforms we refer to the reorganization of entire legacy

[43] Piasna, A., Zwysen, W. and Drahokoupil, J. 2022. The platform economy in Europe: Results from the second ETUI Internet and Platform Work Survey. European Trade Union Institute Working Paper 2022-5.

industries as a result of the rise of platforms (van Dijck, Poell, and de Waal, 2018[44]). One such example is the advertising industry, where social media, online search engines, streaming media platforms, online stores, and online gaming platforms have transformed traditional media buying-planning activities beyond recognition (Australian Competition & Consumer Commission, 2021[45]) and placed industry incumbents in positions of dependence on the platform owners and their control over consumers.

The limitations of the narrow perspective have important implications: by excluding enormous areas of platform-based economic activities, they dramatically understate the impact of platforms on work. The focus on a small subset of platforms highlights effects derived upon certain types of work while ignoring other effects, possibly leading to biased conclusions. Nonetheless, the most important limitation is qualitative: by focusing on a narrow set of platforms and effects, the narrow perspective ultimately fails to see the platform economy as a transformational force reverberating across all types of economic activities and most types of work.

The narrow perspective contrasts with what could be termed a "broad" perspective, which builds on a framework articulated by Bearson, Kenney and Zysman (2021). This perspective identifies three types of actors in the platform economy: platform firms, platform-dependent providers (there may be multiple sides, for example, for YouTube this would be creators and advertisers), and prosumers (for YouTube this would be viewers). Here, they build on Ritzer and Jurgenson's (2010[46]) concept of prosumption to characterize users who generate data that can be monetized by platforms. These authors consider each of these as the

[44]Dijck, J. v., Poell, T., and de Waal, M. d. 2018. The Platform Society. New York: Oxford University Press.
[45] Australian Competition & Consumer Commission, 2021. Digital Advertising Services Inquiry: Final Report. (August). https://www.accc.gov.au/focus-areas/inquiries-ongoing/digital-advertising-services-inquiry/interim-report.
[46] Ritzer, G. and Jurgenson, N. 2010. Production, consumption, prosumption: the nature of capitalism in the age of the digital 'prosumer, 'Journal of Consumer Culture, 10(1), 13–36.

site of distinct categories of labor that differ in terms of type of economic relationship to the platform, the types of actors involved, compensation, work conditions, and the process of value creation.

While Bearson et al. (2022) identify seven types of work related to the platform, in terms or direct employment by the platform, they distinguish between regular employees and contractors whose compensation and labor conditions differ dramatically -- these two groups are not considered in this paper. Our focus is on the platform-dependent complementors, which can be separated into: 1) actors that sell their goods or services through the platform, 2) actors that are contracted through the platform but provide physical services in person, 3) actors whose work is contracted for but provided remotely through the platform, and 4) actors that create content to be posed on a platform but receive compensation either through advertisement, subscription and/or patronage.

Platform-Mediated Income Generation

Platform Mediation	**Employment Type**	**Typical Platform**	**Compensation Mechanism**	**Labor Conditions**	**Value-Creation Processes**
Sellers	Independent vendors	Amazon, Craigslist, eBay, Etsy	Difference between purchase and sales price	Vendor controls	Sales but can include logistics
In-Person Service Provision	Contracted service through platform	Uber, Lyft, PostMates, GrubHub, Airbnb	Payment upon completion, by hour worked, or gig	Physical service	Provide service or monetize asset
Remote Service Provision	One-time project contract	Upwork, Fiverr, Freelancer, AMT	Agreed upon by job	Digital service	Project work

Consignment Content Creators	Not employed upload content and compensated through share of sales	YouTube, Spotify, Apple Music, App Store, Google Play; any firm with website	Income from sales or share of advertising	Skewed, with few having large returns; varies	Content creation; building websites for firms

Adapted from Bearson et al. (2020)

These types of work can be further expanded to include work that is related to or affected by platforms. As mentioned above, these include indirect platform workers, who perform tasks or render services, remotely or in person to support the activities of platform workers (for instance lawyers, actors, musicians, scriptwriters, web designers) and those in legacy industries whose work is radically transformed, as a result of platform pervasiveness.

2.2 Scope of the paper

Some types of platform work raise issues that are related to broader trends in labor markets or that are not necessarily derived from the platform's governance structure. Other types of work raise issues that either affect very large portions of society or specific professions. We exclude these types of work from the core analytical section in the third section of our paper for two reasons: a) to concentrate only on those categories that can be linked to the intrinsic features of platforms as new institutional forms; and b) to emphasize broader features about the organization of labor that affect broad, yet relatively well-defined categories of workers across industries. This section briefly discusses our rationale and provides a brief overview of the literature for the excluded types of work.

With regard to regular platform employees and contractors, there have been a variety of issues ranging from a lack of diversity, sexual harassment and dramatic pay and benefits

disparities between regular employees and contractors. These issues have gained salience following large-scale protests by platform employees such as the 2018 Google Walkout and more recent protests at other platforms such as Netflix and Facebook. (Hicks, 2018[47]; Hodgson and Kuchler, 2018[48]; Au-Yeung, 2021[49]; Koblin and Sperling, 2021[50]). However, these are longstanding issues that, in the USA, are pervasive across white-collar professional and managerial occupations, where certain ethnic groups and males tend to be overrepresented while women and other ethnic groups are underrepresented and concentrated in the lower-paid job categories (Bearson, Kenney and Zysman, 2021; Lazonick et al. 2022).[51]

Contractors working for the platform have been linked to issues of compensation, labor conditions, precarious employment, and firms' resistance to unionization (Gillespie 2018[52]; Perry et al, 2021[53]; McGee, 2021[54]). These issues also transcend platforms and are a manifestation of broader concerns about the impact of declining union membership, automation, globalization, offshoring and outsourcing (Goos et al., 2014[55]; Autor et al.,

[47] Hicks M. 2018. The long story behind the Google walkout. Verge. (November 9), Accessed February 14, 2022. https://www.theverge.com/2018/11/9/18078664/google-walkout-history-tech-strikes-labor-organizing

[48]Camilla Hodgson in London and Hannah Kuchler. 2018. Financial Times. Published November 1, 2018, accessed February 14, 2022. https://www.ft.com/content/7f70c53c-ddcd-11e8-8f50-cbae5495d92b

[49] Au-Eyung, A. 2021. Technology Employees Warn: Companies Should Expect More Uprisings in 2022. Forbes. Published, December 29, 2021. Accessed February 14, 2022. https://www.forbes.com/sites/angelauyeung/2021/12/29/technology-employees-warn-companies-should-expect-more-uprisings-in-2022/?sh=2177d2537154

[50] Koblin, J. and Sperling, N. 2021. Netflix employees walk out to protest Dave Chappelle's special. New York Times. (October 25), accessed February 14, 2022. https://www.nytimes.com/2021/10/20/business/media/netflix-protest-dave-chappelle.html

[51] For a general discussion of representation of minorities in ICT firms, see Lazonick, W., Moss, P., & Weitz, J. (2022). Equality denied: Tech and African Americans. Institute for New Economic Thinking Working Paper #177 (February 18).

[52] Gillespie, T. 2018. *Custodians of the Internet*. New Haven: Yale University Press.

[53] Andre M. Perry, Molly Kinder, Laura Stateler, and Carl Romer. 2021. Brookings. Published March 16, 2021, accessed February 14, 2022. https://www.brookings.edu/blog/the-avenue/2021/03/16/the-amazon-union-battle-in-bessemer-is-about-dignity-racial-justice-and-the-future-of-the-american-worker/

[54] McGee, P. 2021. Amazon settlement with labour board paves way for workers' union. Financial Times. Published December 23, 2021, accessed February 14, 2022. https://www.ft.com/content/507707bd-376f-4cd6-a327-87ed80efedb5

[55] Goos, M., A. Manning and A. Salomons (2014), 'Explaining job polarization: routine-biased technological change and offshoring,' American Economic Review, 104(8), 2509–2526.

2015[56]) on middle-skilled and middle-income jobs and permanent employment (Huws, 2009[57], 2014[58]; Weil, 2014[59]; Hyman, 2018[60]). Because of these reasons, we exclude these two types of work as they are directly related to the operation of the platform and are part of "normal" labor relations' practices.

The other important group of value creators for the platform are users whose usage of the platform provides the "raw material", data, from which value is extracted by selling the insights from it to advertisers or, more directly, through commission from third-party sales or subscriptions. In the case of users of Google's or Facebook's "free" products, monetization is through advertisements. Researchers have coined the term "prosumer" for these users because they *pro*duce data as they con*sume* platform services that can be converted into value and sold (Ritzer and Jurgenson 2010[61]). In this sense, everyone who connects to a platform is a prosumer. Although prosumers raise issues that are directly derived from platforms, the size and diversity of this group have led most social science scholars to examine their concerns from the point of view of data governance and fundamental rights rather than labor or value creation. Specifically, scholars have focused on how platform firms manage and use prosumers' personal data and protect prosumers' privacy (Scott Morton et al. 2019[62];

[56] Autor, D. H., D. Dorn and G. H. Hanson (2015), 'Untangling trade and technology: Evidence from local labour markets,' Economic Journal, 125(584), 621–646.
[57] Huws, U. (2009), 'The making of a cybertariat? Virtual work in a real world,' Socialist Register, 37, 1–23.
[58] Huws, U. (2014), Labor in the Global Digital Economy: The Cybertariat Comes of Age. NYU Press: New York.
[59] Weil, D. (2014), The Fissured Workplace. Harvard University Press: Cambridge, MA.
[60] Hyman, L. (2018), Temp: How American Work, American Business, and the American Dream Became Temporary. Penguin Random House: New York.
[61] Ritzer, G., & Jurgenson, N. 2010. Production, consumption, prosumption: The nature of capitalism in the age of the digital 'prosumer'. *Journal of Consumer Culture*, *10*(1), 13-36.
[62] Scott Morton, F., Bouvier, P., Ezrachi, A., Jullien, B., Katz, R., Kimmelman, G., Melamed, D., & Morgenstern, J. (2019). 'The Stigler report'. Committee for the study of digital Platforms, market structure and antitrust subcommittee, Stigler Center for the Study of the Economy and the State. https://www.publicknowledge.org/wp-content/uploads/2019/09/Stigler-Committee-on-Digital-Platforms-Final-report.pdf/.

Bourreau et al. 2020[63]; Caffarra and Valletti, 2020[64]), platform nudging and behavioral manipulation (Zuboff, 2015[65], 2019[66]; Lanier, 2018[67]; Forbrukerrådet, 2018[68]; Marsden and Podszun, 2020[69]; Gawer, 2021[70]) and prosumers' data impact on management accountability (Scott and Orlikowski, 2012[71]).

Finally, we exclude indirect platform work and legacy work affected by platforms. These types of work raise issues that are sector- and or profession-specific and therefore are better served through in-depth case studies. Indirect platform work encompasses a broad swathe of activities ranging from insurance agents (Catlin et al. 2018)[72] and automobile salespersons (Barley, 2015)[73] to software and website developers and multimedia artists; groups that vary dramatically in terms of skills, types of work, and compensation (Bearson, Kenney and Zysman, 2021; Piasna et al, 2022[74]). We also exclude fulfillment work, such as that is performed by the preponderance of Amazon employees, because it is not directly

[63] Bourreau, M., Caffarra, Chen, Z., Choe, C., C., Crawford, G., Duso, T., Genakos, C., Heudues, P., Peitz, M., Rønde, T, Schnitzer, M, Schutz, N., Sovinsky, M., Spagnolo, G., Toivanen, O., Valletti, T., & Vergé (2020). Google/Fitbit will monetise health data and harm consumers. CEPR Policy Insights No. 107. https://euagenda.eu/upload/publications/policyinsight107.pdf.pdf.

[64] Caffarra, C., & Valletti, T. 2020. Google/Fitbit review: Privacy IS a competition issue. Vox EU/CEPR. 4 March. https://voxeu.org/content/googlefitbit-review-privacy-competition-issue.

[65] Zuboff, S. (2015). Big other: Surveillance capitalism and the prospects of an information civilization. Journal of Information Technology, 30, 75-89.

[66] Zuboff, S. 2019. The age of surveillance capitalism: The fight for a human future at the new frontier of power. London: Profile Books.

[67] Lanier, J. (2018). Ten arguments for deleting your social media accounts right now. Random House.

[68] Forbrukerrådet. 2018. Deceived by design. Oslo. https://fil.forbrukerradet.no/wp-content/uploads/2018/06/2018-06-27-deceived-by-design-final.pdf.

[69] Marsden, P., and Podszun, R. 2020. Restoring balance to digital competition – Sensible rules, effective enforcement. Konrad Adenauer Stiftung. https://www.kas.de/en/single-title/-/content/restoring-balance-to-digital-competition-sensible-rules-effective-enforcement.

[70] Gawer, A. 2021. Digital platforms and ecosystems: remarks on the dominant organizational forms of the digital age. *Innovation: Organization and Managemen*t 1-15.

[71] Scott, S. V. and W. J. Orlikowski (2012), 'Reconfiguring relations of accountability: materialization of social media in the travel sector,' Accounting, Organizations and Society, 37(1), 26–40.

[72] Catlin, T., Lorenz, J. T., Nandan, J., Sharma, S., & Waschto, A. 2018. Insurance beyond digital: The rise of ecosystems and platforms. McKinsey & Company.

[73] Barley, S. R. 2015. Why the internet makes buying a car less loathsome: How technologies change role relations. Academy of Management Discoveries, 1:5-35.

[74] Piasna, A., Zwysen, W. and Drahokoupil, J. 2022. The platform economy in Europe. Results from the second ETUI Internet and Platform Work Survey. ETUI Working Paper 2022.05.

related to the platform. Despite these exclusions, the sheer diversity of work attests to the pervasiveness of platforms but also makes it difficult to cover all the possible professions and to study them as a single group or to draw generalizations from individual cases.

Similarly, the impact of platforms on work in legacy industries varies significantly in terms of timing, intensity and qualitative changes, making in-depth industry analyzes a more appropriate tool. Some authors have already started to move in that direction. For instance, Van Dijck, Poell, and de Waal (2018), while exploring the impact of platforms in the healthcare, education, media and urban transport sector, they concentrate on clashes between platform demands and the value systems in legacy sectors. A few researchers have explored the impact of platforms on legal practices (Dubois, 2021[75]; McPeak 2019[76]; ; Yao 2020)[77]. Another profession that has received significant attention is journalism. Mellado and Alfaro (2020[78]), study the impact of platforms on the scope of journalists' work and Kempton and Ahern (2021[79]) and Grygiel and Lysak (2021[80]) explore the impact of social media on journalists' roles, routines and values. Similarly, in the culture industries, such as music, the

[75] Dubois, Christophe, 2021. How do lawyers engineer and develop legal tech projects? A Story of Opportunities, Platforms, Creative Rationalities, and Strategies. Law, Technology, and Humans 3(1) https://doi.org/10.5204/lthj.v3i1.1558

[76] McPeak, A. 2019. The Internet Made Me Do It: Reconciling Social Media and Professional Norms for Lawyers, Judges, and Law Professors, 55 Idaho Law Review 205

[77] Yao, Y. 2020. Uberizing the legal profession? Lawyer autonomy and status in the digital legal market. British Journal of Industrial Relations, 58(3), 483-506.

[78] Mellado, C. & Alfaro, A. 2020. Platforms, Journalists and Their Digital Selves, Digital Journalism, 8:10, 1258-1279, DOI: 10.1080/21670811.2020.1817763

[79] Kempton SD, Connolly Ahern C. 2021. Mastering Metrics: The Impact of Social Media on the Routines and Values of Broadcast Journalists. Electronic News, 15(3-4):109-122. doi:10.1177/19312431211050050

[80] Grygiel, J. & Lysak, S. 2021. Police Social Media and Broadcast News: An Investigation into the Impact of Police Use of Facebook on Journalists' Gatekeeping Role, Journalism Practice, 15:7, 994-1011, DOI: 10.1080/17512786.2020.17591

increasing intermediation of online platforms affects not only the organization of the music industry but the actual work of making music (Morris, 2021[81]; Nordgård, 2017[82]).

The four categories of platform work that we discuss are: independent sellers that offer their goods or services, individuals that provide in-person services, those who work remotely through the platform, and consignment workers that create content for platforms. The following section explores the state of knowledge in four broad spheres of labor organization affecting these categories of platform work.

3. Effects of Platforms on Work

While the management literature has studied the distinct governance structure of platforms and their competitive dynamics, we are only starting to understand their implications for work. One difficulty is that platform work is relatively recent, and while there is a growing number of legal cases, outside the many reactions to labor relations in ride-sharing, relatively few countries have adopted legislative responses specific to platform labor. In addition, platforms operate across borders, but labor law is determined at national level and there are important cross-country differences (Spasova et al, 2019[83]), which affect policy preferences and policy procedures (Sieker, 2021; Prassl and Risak, 2017).

This section explores the existing research in four spheres that are central to the conventional work arrangements in advanced economies and are being directly challenged by the economic dynamics and the technological underwiring of online platforms: management power, labor protection and rights, work processes, and skill demand and career prospects. In

[81] Morris, J. W. (2020). Music platforms and the optimization of culture. Social Media+ Society, 6(3), 2056305120940690.

[82] Nordgård, D. 2017. Assessing music streaming and industry disruptions. In P. Meil, V. Kirov (eds.), Policy Implications of Virtual Work, Dynamics of Virtual Work. Palgrave Macmillan. DOI 10.1007/978-3-319-52057-5_6.

[83] Spasova, S. et al (2019): Self-employment and social protection: Understanding variations between welfare regimes. Journal of Poverty and Social Justice, 27(2)

what follows, we explain the tensions between the existing understanding of each of these spheres and platform work, discuss ways such tensions have been explored in the literature and identify potential lines for further inquiry.

3.1 Management Power

Employment, whereby an organization hires workers and management (hierarchy) has control over the work process, is central to the legal definition of work (Stone, 2006[84]; Williamson 1996)[85]. This conceptualization has defined how the state and society thinks about work (Weil 2014)[86]. However, employees differ from complementors that deliver a service over a platform in some fundamental ways (Moore and Joyce 2019)[87]. Employees are paid by the employer for their time and the relationship is embedded in a contract that has obligations and responsibilities for both sides. In fact, an entire body of law has emerged to manage this relationship and these bound by management power.

In contrast, online platforms define themselves as technology firms that facilitate transactions between independent workers and clients (Khun and Maleki, 2017). The implication is that platforms are intermediaries rather than employers and value creators are self-employed independent contractors (Berg, 2016[88]). This reality and numerous studies show that the relationship between online platforms and workers is based on an extreme asymmetry of power. These asymmetries derive from platforms' architecture and design and from the incentives and mechanisms that platform firms use to attract different types of

[84] Stone, K. V. (2006). Legal protections for atypical employees: Employment law for workers without workplaces and employees without employers. Berkeley Journal of Employment and Labor Law, 27, 251–286.
[85] Williamson, O. E. (1996). The Mechanisms of Governance. Oxford: Oxford University Press.
[86] Weil, D. (2014). *The Fissured Workplace*. Cambridge: Harvard University Press.
[87] Moore, P. V., & Joyce, S. (2020). Black box or hidden abode? The expansion and exposure of platform work managerialism. *Review of International Political Economy*, *27*(4), 926-948.
[88] Berg J (2016) Income security in the on-demand economy: findings and policy lessons from a survey of crowdworkers. Comparative Labor Law & Policy Journal 37(3): 543–576

workers (Cutolo and Kenney, 2021)[89]. Given that the value is created or transacted by the sellers and buyers, the platform's overarching managerial goal is to retain the various participants on the platform as it is only a "distribution" mechanism that "taxes" the value transacted across it (Pfeiffer 2022)[90].

Platform power stems from the ability to attract and retain both workers and buyers to the platform, lower transaction costs for both, unilaterally control and alter the technical architecture of the ecosystem to influence participant behavior, and leverage network and long-tail effects (Cusumano et al. 2019[91]; Parker et al. 2016)[92]. Online platforms use a variety of mechanisms to exercise their power over workers. These include withholding information, using reputation metrics to assess workers, gatekeeping and exclusion from the ecosystem for violations of community conduct, imposing platform-specific interfaces, unilaterally setting and changing the terms of engagement with workers with little or no notice, blocking workers from establishing direct relationships with clients, rate and price determination, or using obscure ranking systems and rating mechanisms.

Analyses based on qualitative case studies provide further evidence of the use of such power mechanisms to assign tasks to workers, surveil, and discipline them (Kellogg et al, 2020[93]; Mateescu and Nguyen, 2019[94]). For example, Rosenblat and Stark's (2016[95]) analysis

[89] Cutolo, D. and Kenney, M. (2021). Platform-dependent entrepreneurs: Power asymmetries, risks, and strategies in the Platform Economy. Academy of Management Perspectives. 35(4) https://doi.org/10.5465/amp.2019.0103

[90] Pfeiffer, S. 2022. Digital Capitalism and Distributive Forces. Bielefeld: Transcript Verlag: Bielefeld, Germany.

[91] Cusumano, M. A., Gawer, A., & Yoffie, D. B. (2019). *The Business of Platforms*. New York: Harper Business.

[92] Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). Platform revolution: How networked markets are transforming the economy and how to make them work for you. New York: WW Norton & Company.

[93] Kellogg KC, Valentine M and Christin A (2020) Algorithms at Work: The New Contested Terrain of Control. Academy of Management Annals 14(1): 366–410.

[94] Mateescu, A. and Nguyen, A. (2019) Explainer Algorithmic Management in the Workplace. New York: Data & Society.

[95] Rosenblat, A. and Stark, L. 2016. Algorithmic Labor and Information Asymmetries: A Case Study of Uber's Drivers. International Journal of Communication 10(2016), 3758–3784.

characterizes several features in the Uber system that showcase the asymmetries of power and information in favor of the platform (Berg and Johnston 2019)[96]; These include surge pricing, blind passenger acceptance with low minimum fares, account deactivation for canceling unprofitable fares, a rigid rating system, GPS tracking, institutionalized nudging, and decentralized, automated support systems. Veen et al (2020[97]), analysis of Deliveroo and UberEATS highlights three features through which these platforms exercise power: the use of information to limit workers' choice, the obscure character of performance evaluation systems, and the platforms' panoptic perspective. Ivanova et al (2018[98]) also discuss the use of notifications, monetary incentives, internal competition for work shifts and information withholding to exercise power.

Not all platform workers are similarly vulnerable to these mechanisms. Those for whom platform is the main source of income, or who have made a significant capital or reputational investment to work through the platform are likely to be more disadvantaged (Khun and Maleki, 2017, Lehdonvirta, 2018[99]). Among the businesses that offer their outputs through the platform, small, successful online businesses are likely to be the most vulnerable Churchod et al. 2020)[100]. Small businesses are more likely to lack access to the resources and capabilities necessary to offset and minimize the effect of platforms' power wielding mechanisms by engaging in protective mechanisms of their own, such as multihoming. In addition, successful platform vendors are potential targets of platforms that may decide to

[96] Berg, J., & Johnston, H. (2019). Too good to be true? A comment on Hall and Krueger's analysis of the labor market for Uber's driver-partners. ILR Review, 72(1), 39-68.

[97] Alex Veen, Tom Barratt, Caleb Goods. 2020. Platform-Capital's 'App-etite' for Control: A Labour Process Analysis of Food-Delivery Work in Australia. Work, Employment and Society 2020, Vol. 34(3) 388–406

[98] Ivanova, M., Bronowicka, J., Kocher, E., and Degner, A. 2018. The App as a Boss? Control and Autonomy in Application-Based Management. Arbeit | Grenze | Fluss - Work in Progress interdisziplinärer Arbeitsforschung Nr. 2, Frankfurt (Oder): Viadrina, doi:10.11584/Arbeit-Grenze

[99] Lehdonvirta. V. 2018. Flexibility in the gig economy: managing time on three online piecework platforms. New Technology, Work and Employment 33:1 ISSN 1468-005X

[100] Curchod, C., Patriotta, G., Cohen, L., & Neysen, N. (2020). Working for an algorithm: Power asymmetries and agency in online work settings. *Administrative Science Quarterly*, *65*(3), 644-676.

leverage the data accumulated by the vendors and their customers to compete directly with them (Zhu and Liu[101], Wen and Zhu, 2019[102]).

3.2 Work Processes

The technological and organizational dimensions of digital platforms and the new forms of management power that derive from them, challenge existing work processes and outcomes (Shapiro, 2018). In particular, the multi-sided nature of platforms, their use of algorithmic systems to manage relationships with workers, the shift in the balance of power between platforms and workers and reliance on large contingents of independent contractors, have triggered changes in management practices (direction, control, and discipline), human resources functions (worker recruitment, motivation, performance evaluation, and dispute resolution), working conditions (flexibility, anonymity, disaggregation of jobs into clearly defined tasks), and output distribution and delivery (Khun and Maleki, 2017; Lee et al, 2015; Wood, 2019, 2021[103]).

These areas have received differing levels of attention by scholars. The most studied aspect is perhaps the impact of platforms on management practices. Lee et al (2015) coined the term algorithmic management to refer to the use of mathematical formulas to govern the relationship between platform firms and workers. Kellogg et al (2020) argue that algorithms afford six mechanisms to direct, control, and discipline workers: 1) restricting information or access to people or resources; 2) recommending, or influencing behavior, usually through tools such as nudges and surge pricing; 3) recording finely-grained data about a wide range of worker behavior, including beyond working hours, to

[101] Zhu, F., & Liu, Q. (2018). Competing with complementors: An empirical look at Amazon. com. *Strategic Management Journal*, *39*(10), 2618-2642.
[102] Wen, W., & Zhu, F. (2019). Threat of platform-owner entry and complementor responses: Evidence from the mobile app market. *Strategic Management Journal*, *40*(9), 1336-1367.
[103] Wood, A.J. 2021. Algorithmic Management Consequences for Work Organisation and Working Conditions. JRC Working Papers Series on Labour, Education and Technology 2021/07.

provide real-time feedback; 4) rating, or gathering user- and peer-generated feedback and using predictive statistics to forecast workers' future performance; 5) replacing, or even automatically firing underperforming workers by accessing a reserve army of global workers that can be recruited rapidly; and 6) rewarding or using algorithms to recompense workers with opportunities, higher pay and promotions, penalize them, or gamify the work experience. Kellogg et al argue that algorithms' comprehensiveness, instantaneity, interactivity and opacity, make such mechanisms qualitatively different and more intrusive than traditional forms of management control. Nonetheless, the absence of human supervisors, and flexibility in deciding when, where and how to work simultaneously grants workers more autonomy, leading to what Mazmanian et al (2013[104]) call the "autonomy paradox".

The autonomy paradox helps explain contrasting assessments on algorithmic management. Some studies connect algorithmic management to a host of negative effects for workers, including anxiety, isolation, overwork, sleep deprivation, exhaustion, precarity, unsocial, irregular work schedules, and discrimination (Wood et al, 2019; Vallas, 2019[105];Vallas and Kovalainen, 2019[106]; Lee et al, 2015; Schneider and Harknett. 2019[107]; Kallengert, 2009[108]; Rosenblat et al, 2017[109]). However, negative effects coexist

[104] Mazmanian, M., Orlikowski, W. J., & Yates, J. (2013). The autonomy paradox: The implications of mobile email devices for knowledge professionals. Organization Science, 24(5), 1337-1357.
[105] Vallas, S. P. 2019. Platform capitalism: What's at stake for workers? New Labor Forum, 28(1): 48–59.
[106] Vallas, S. P., & Kovalainen, A. 2019. Taking stock of the digital revolution, work and labor in the digital age:1–12. Bingley, UK: Emerald Publishing Limited.
[107] Schneider, D. and Harknett, K. 2019. Consequences of routine work schedule instability for worker health and well-being. American Sociological Review 84, 1 (2019), 82–114
[108] Kalleberg, Arne L. 2009. Precarious work, insecure workers: Employment relations in transition. American sociological review 74, 1 (2009), 1–22.
[109] Rosenblat, A., E.C. Levy, K. E. C., Barocas, S., and Hwang, T. 2017. Discriminating Tastes: Uber's Customer Ratings as Vehicles for Workplace Discrimination: Customer Ratings and Workplace Discrimination. Policy and Internet (9) 3: 256-279.

with more positive ones such as higher levels of flexibility, autonomy, task variety and complexity (McAfee & Brynjolfsson, 2017[110]; Shapiro, 2018; Wood et al, 2019).

A growing literature has also explored the role of algorithms in transforming human resource functions. The technological architecture of platforms has transformed recruitment processes in at least three ways. The first is enabling platforms that do not provide in-person service to recruit from a larger, global workforce (Wood et al, 2019; Kellogg et al, 2020). In addition, algorithms help accelerate recruitment (Valentine et al, 2017[111]; Salehi et al. 2017[112]) via comprehensive skills and personality assessments (Ajunwa & Greene, 2019[113]) or by facilitating the identification of minority workers (Kellogg et al, 2020). Finally, rating platforms such as glassdoor.com or kununu.com, enable firms to disseminate cues about their reputation and reduce information asymmetries to attract candidate applications (Schaarschmidt et al, 2021[114]; Carpentier and Van Hoye, 2020[115], Carpentier et al, 2019[116]).

Platforms' algorithms are carefully guarded trade secrets since they are a core competitive advantage (Shapiro, 2018). Workers' difficulty understanding the rationale behind algorithmic decisions fosters feelings of alienation and loss of control (Shapiro,

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[110] McAfee, A., & Brynjolfsson, E. 2017. Machine, Platform, Crowd: Harnessing Our Digital Future. New York: W. W. Norton.

[111] Valentine, M. A., Retelny, D., To, A., Rahmati, N., Doshi, T., & Bernstein, M. S. 2017. Flash organizations: Crowdsourcing complex work by structuring crowds as organizations. Paper presented at the Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems.

[112] Salehi, N., McCabe, A., Valentine, M., & Bernstein, M. 2017. Huddler: Convening stable and familiar crowd teams despite unpredictable availability. Paper presented at the Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing.

[113] Ajunwa, I., & Greene, D. 2019. Platforms at work: Automated hiring platforms and other new intermediaries in the organization of work. In Work and Labor in the Digital Age:61–91. Bingley, UK: Emerald Publishing Limited.

[114] Schaarschmidt, M., Walsh, G. and Ivens, S. 2021. Digital war for talent: How profile reputations on company rating platforms drive job seekers' application intentions. Journal of Vocational Behavior. 131 103644.

[115] Carpentier, M., & Van Hoye, G. (2020). Managing organizational attractiveness after a negative employer review: Company response strategies and review consensus. European Journal of Work and Organizational Psychology, 1–18.

[116] Carpentier, M., Van Hoye, G., & Weijters, B. (2019a). Attracting applicants through the organization's social media page: Signaling employer brand personality.
Journal of Vocational Behavior, 115, Article 103326.

2018; Graham et al, 2017[117]), which result in lack of trust and motivation, lower productivity and high levels of worker turnover (Tomprou and Lee, 2022[118]; Bergvall Kareborn and Howcroft, 2014; Howcroft and Bergvall Kareborn, 2019; Lee et al, 2015; Shapiro, 2018). Platforms, especially those that require higher skills levels, may counter these effects by providing an environment that support worker autonomy, flexibility, specialization and autonomy (Jabari et al, 2019[119]). Alternatively, platforms compensate for these negative effects through their ability to engage new contingents of workers rapidly and exercise the types of pervasive types of control described above. However, such a business model ultimately fuels a vicious circle of distrust, high turnover, and control that should give us pause.

Whereas managers in legacy work settings appraise workers' performance periodically through subjective, human evaluations, platforms aggregate quantitative and qualitative feedback from internal and external resources to provide feedback in real-time (Kellogg, 2020). Platforms collect a constant stream of finely-grained data about a broad range of worker behavior. For example, platforms that mediate in-person services such as Uber use geolocation positioning to match drivers and customers, collect data on canceled trips, and assess drivers' quality (Rosenblat and Stark, 2016). Platforms that provide remote services such as Amazon Mechanical Turk and Upwork, track the frequency of workers' keyboard presses and mouse movements and take shots of workers' screens to assess speed and productivity (Wood et al, 2019).

[117]Graham, M., Hjorth, I., & Lehdonvirta, V. 2017. Digital labour and development: Impacts of global digital labour platforms and the gig economy on worker livelihoods. Transfer: European Review of Labour and Research, 23(2): 135–162.

[118] Tomprou, M. and Min, K. L. 2022. Employment relationships in algorithmic management: A psychological contract perspective. Computers in Human Behavior 126 106997.

[119] Nura Jabagi, Anne-Marie Croteau, Luc K. Audebrand, Josianne Marsan. 2019. Gig-workers' motivation: thinking beyond carrots and sticks. Journal of Managerial Psychology. Vol. 34 No. 4 pp. 192-213

In addition to their use of internal data, in a variety of settings platforms utilize online reviews and rating systems by clients and consumers, very often anonymous, based on their idiosyncratic personal opinions, experiences and criteria (Cameron and Rahman 2022[120]; Maffie 2022[121]; Orlikowski and Scott, (2014[122] to manage and discipline their workers. While management has always tried to enlist consumers, with platforms rating systems, the obstacles to undertaking a rating are far lower and thus may encourage expression.

The result of the enrollment of consumers in managerial functions, and the reliance on opaque algorithms means that there is often no pre-established procedure in place to challenge either a rating or the algorithmic decisions derived because of the rating (Wexler, 2018[123]) As a result, there are less opportunities to appeal for exceptions based on human empathy (Lee et al, 2015). These decision processes may violate notions of procedural justice. For example, to appeal various decisions workers may need to collect their own data, at their expense, in order to challenge platforms (Rosenblat and Stark, 2016).

Not surprisingly, given the power asymmetry and the dependence of the platform on algorithms as management tools, the work processes on the platform are determined by the needs and values of the platform owner. Those whose work process is subject to the platform have little voice and their main response is exit -- a problem that many platforms experience.

[120] Cameron, L. D., & Rahman, H. (2022). Expanding the locus of resistance: Understanding the co-constitution of control and resistance in the gig economy. Organization Science, 33(1), 38-58.
[121] Maffie, M. D. (2022). The perils of laundering control through customers: A study of control and resistance in the ride-hail industry. *ILR Review*, *75*(2), 348-372.
[122] Orlikowski, W. J. and Scott S.V.: Exploring Apparatuses of Valuation in the Travel Sector. Organization Science 25(3), pp. 868–891
[123] Wexler, R. (2018) The Odds of Justice: Code of Silence: How private companieshideflawsinthesoftwarethatgovernmentsusetodecidewhogoestoprisonandwho getsout, Chance, 31:3, 67-72

3.3 Social Protection and Labor Rights

Labor law normally assumes an employment relationship in which management has supervision of a set of workers. These relationships are assumed not to be spot-market transactions, but rather have some degree of permanence (Stone, 2006). Of course, on the peripheries of the labor market there are non-standard employment arrangements (independent contractors, temporary and on-call workers, and part-time workers) that have limited or no access to basic employment rights such as social insurance, occupational health and safety protection, antidiscrimination legislation, holiday, family, and medical leave, and low to no collective bargaining rights (Kalleberg, 2018[124]; Shevchuk 2019[125]). However, this fissured labor market is seen as an aberration that might be remedied by legal or government action. In contrast, for platforms, the relationship to the workers is, by definition, transient as it is designed to only be an anonymous matcher of a consumer and producer.

The platform, by its relationship with its complementors, has no obligations to them (De Groen et al, 2021). This enables platforms to shift the cost and responsibilities for complementor protection, taxes, and administrative costs to the workers themselves or society, as a whole (Cappelli and Keller, 2013[126]). Because they are working "at will", these workers are extremely vulnerable (Behrendt and Nguyen, 2019[127]). As of 2022, only a minority relies on platform work as their main source of income: While approximately 30 percent of the working population in Europe have done some platform work, only 1.1 percent earned more than half of their income from this type of work (Piasna et al, 2022). But as the

[124] Kalleberg, A. L. (2018). *Precarious Lives: Job Insecurity and Well-Being in Rich Democracies*. Cambridge: Polity Press.
[125] Shevchuk, A., Strebkov, D., & Davis, S. N. (2019). The autonomy paradox: How night work undermines subjective well-being of internet-based freelancers. ILR Review, 72(1), 75-100.
[126] Cappelli, P., & Keller, J. R. (2013). Classifying work in the new economy. Academy of Management Review, 38, 575–596.
[127] Behrendt, C., & Nguyen, Q. A. (2019). Ensuring universal social protection for the future of work. Transfer, 25(2), 205–219. https://doi.org/10.1177/1024258919857031

number of people whose income is generated through a platform increases, governments need to find ways to overcome the labor protection gap or risk increasing levels of societal polarization.

Although there is a broad awareness of this inherent feature (Gawer and Srnicek, 2021; Sieker, 2021[128]; Joyce et al, 2019[129]; Huws, 2017[130]; Prassl and Risak, 2017[131]; Forde et al, 2017), the literature on social protection for platform work is still in its infancy. As we saw, even defining the scope of platform labor is difficult due to the remarkable variety of value-creating activities underway and the diversity among the value creators. For these reasons, most contributions provide a general overview of the problems, but usually these are limited to one of our categories of platform work. Not surprisingly, few conceptualize the range of options available, and there is little comparative research into the motivations and the political underpinnings of different policy approaches or their effects.

Some authors (de Stefano, 2016; Joyce et al, 2019), see platform work as a manifestation of broader trends toward the casualization of work and the demutualization of risks. Joyce et al (2019) build on this assessment to argue that issues related to the social protection gap among platform workers would be best addressed through measures that tackle problems of insecure work more broadly, but he fails to make specific suggestions.

Among those who see platform work as an area that requires targeted policy responses, Prassl and Risak, (2017) suggest four different, complementary approaches:

[128] Sieker, F. 2021. Platform work and access to social protection across major European countries. Hertie School of Governance.
[129] Joyce, S., Stuart, M., Forde, C., and Valizade, D. 2020. Work and social protection in the platform economy in Europe. Advances in Industrial and Labor Relations. 25: 153-184.
[130] Huws, U. 2017. Where did online platforms come from? The virtualization of work organization and the new policy challenges it raises. In, Meil, P. and Kirov, V. 2017. Policy implications of virtual work. E-book. Palgrave Macmillan.
[131] Prassl, J. and Risak, M. 2017. The legal protection of crowdworkers: Four avenues for worker's rights in the virtual realm. In Meil, P. and Kirov, V. 2017. Policy implications of virtual work. E-book. Palgrave Macmillan.

redefining the concept of an employer based on the actual functions that platforms exercise, redefining the concept of an employee based on the level of economic dependency of the worker, creating an intermediary category between employee and self-employed, or equating platform work to existing figures that regulate three-party employment relationships such as temporary agency work. The first two options underline the fact that definitions of workers and employers differ across legislations, making it difficult to make generalizations (Forde et al, 2017[132]). Critics of the third option point out that intermediate categories could still differ across legislations, creating gray zones that lead to increases in arbitrage and litigation (De Stefano, 2016).

Sieker (2021) proposes bridging the labor protection gap by integrating platform work into existing industrial relations systems and reclassifying platform workers as employees. He argues that legislations that already provide high levels of protection to non-permanent workers would likely opt for the first, while those on the opposite end of the spectrum would prefer the second. Interestingly, the recently proposed EU Directive on Improving Working Conditions in Platform Work, appears to validate the second of these approaches by proposing a framework to address the "misclassification" of platform workers based the principle of the primacy of facts and the contestable presumption that there exists an employment relationship.

3.3 Skills demands and career prospects

The study of platform work skills is still in its infancy. Empirical studies have concentrated on a narrow set of platforms such as Amazon Mechanical Turk and Upwork that broker the delivery of online services (CEDEFOP, 2020, 2021). By contrast, skills in

[132] Chris Forde, Mark Stuart, Simon Joyce, Liz Oliver, Danat Valizade, Gabriella Alberti, Kate Hardy, Vera Trappmann, Charles Umney, Calum Carson, 2017. The Social Protection of Workers in the Platform Economy. European Parliament, 2017.

the context of in-person services, platform vendors, and content creators have been rarely discussed, or only in the context of workers' ability to game the algorithm (Shapiro, 2018; Rosenblat and Stark, 2016; Wood et al, 2018).

The literature's concentration on only a narrow set of platforms is particularly constraining when it comes to understanding platform skills because these vary dramatically depending on the type of work performed. For instance, Upwork workers tend to have complex cognitive (formal) skills in areas such as foreign languages and translation, legal advice, or software and technology development (CEDEFOP, 2020[133]). By contrast, Uber drivers require little more than a driver's license and a certain level of digital literacy (Rosenblat and Stark, 2016). The need for non-cognitive skills, or capabilities that do not rely on structured learning processes (Wagner, 2014[134]), such as communication, learning to learn, adaptability, agility, absorbing knowledge fast, creativity, curiosity, and imagination, also vary drastically for different types of platform work (CEDEFOP 2021[135]).

These variations are important because they translate into important differences in terms of the frequency, costs, and pathways workers pursue to develop their skills (CEDEFOP, 2020). Complex cognitive skills such as software development, require significant analytical capacity, they take time to develop, usually through formal, structured educational programs, and they evolve quickly, requiring a constant investment in updates. By contrast, less complex cognitive skills such as driving, or conducting simple, routine tasks such as those required for Amazon Turk workers, necessitate some

[133] CEDEFOP. 2020. Developing and matching skills in the online platform economy Findings on new forms of digital work and learning from Cedefop's Crowd Learn study. Cedefop reference series 116 Luxembourg: Publications Office of the European Union, 2020.
[134] Wagner, T. (2014). The global achievement gap: why even our best schools don't teach the new survival skills our children need-and what we can do about it. UK: Basic Books/Hachette. https://www.basicbooks.com/titles/tonywagner/the-global-achievement-gap/9780465055968/
[135] CEDEFOP, 2021. Skill development in the platform economy. Comparing microwork and online freelancing. Luxembourg: Publications Office of the European Union. Cedefop research paper; No 81

but not much prior formal training or regular updating, and non-cognitive skills such as communication, or raising one's profile on a platform are often learnt through experience (FEDEFOP, 2021).

Despite these differences, there are three important aspects of the context for skill development that are both common across types of platform work and different from work in conventional settings. First, while employers normally provide training that enable employees to maintain their skills, platforms do not assume responsibility for their workers' learning and skill development (Margaryan, 2019[136]). Some scholars argue that individualized training practices may lead to lower skills levels and lack of worker autonomy across the workforces of advanced economies (Fleming, 2017[137]). However, recent empirical analyses (CEDEFOP, 2020, 2021) show that platform workers are regularly involved in skill development, although they focus on just-in-time skill development rather than formal, longer-duration educational programs associated with the development of overarching skills, such as critical thinking, and they favor informal and often free learning resources such as online communities, feedback from clients, or YouTube videos (CEDEFOP, 2020). As the share of platform work over total work continues to grow, the impact of these over the overall skills of national workforces will need to be explored although the overall effect is uncertain because is not uncommon for platform workers to have some form of tertiary education (ILO, 2021; de Groen et al, 2021), or to pursue a university degree while engaged in platform work (Wood et al, 2018).

[136] Margaryan, A. 2020. Comparing crowdworkers' and conventional knowledge workers self-regulated learning strategies in the workplace. Human Computation. 6 (1): 83-97.
[137] Fleming, P. 2017. The Human Capital Hoax: Work, Debt and Insecurity in the Era of Uberization. Organization Studies 2017, Vol. 38(5) 691–709.

While platforms do not assume responsibility for skill development, they do provide signals to workers as to the types of skills that are in higher demand. For instance, Upwork publishes periodical lists of top skills on their website. Platforms also facilitate skill development through certification programs, or by connecting experienced workers with others who seek to develop their skills (CEDEFOP, 2021). Kässi and Lehdonvirta (2019[138]) find that these certifications may not necessarily contribute to cognitive skill development, but they help workers without established reputations validate their competences.

A second important contextual aspect is the substitution of human managers for algorithms (Lee et al, 2015). The absence of formal, human appraisal procedures, the opacity of algorithmic rating weighing (Rosenblat and Stark, 2016; Shapiro, 2018; Kellogg, 2020), and the volatility and contradictions inherent to customer ratings based on personal views (Orlikowski and Scott, 2014), mean that whereas platforms gather a steam of live data about workers and their performance, such data does not necessarily translate into actionable information for skill development. Instead, workers are forced to self-regulate, that is, to develop their own strategic career goals, identify skills gaps and create plans to develop them and evaluate their achievements (Zimmerman and Kitsantas, 2005[139]). This, by itself, involves a combination of non-cognitive skills, such as self-reflection, strategic planning, and self-management, that are inherently hard to develop.

Algorithmic management has been linked to negative effects on workers' motivation (Tomprou and Lee, 2022; Lee et al, 2015), short-term thinking (CEDEFOP, 2021), and high levels of employee turnover (Rosenblat and Stark, 2016). Exploring the connection

[138] Kässi, O. and Vili Lehdonvirta, V. 2019. Do Digital Skill Certificates Help New Workers Enter the Market? Evidence from an Online Labour Platform. CESIFO Working Papers. 7810, August, 2019.

[139] Zimmerman, B.J.; Kitsantas, A. (2005). The hidden dimension of personal competence: self-regulated learning and practice. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of Competence and Motivation* (pp. 509–526). New York: Guilford Publications.

between algorithmic management and workers' ability to develop long-term career enhancing strategies could be a fruitful line of inquiry. As platform work continues to grow, the ability of workers to develop and implement long-term career plans for themselves will be critical in assessing the quality of platform work.

Finally, the recognition of workers' skills, experience and reputations are connected to the individual platforms for which they work. As workers seek to operate across platforms, or move up toward more specialized types of work, including offline work, skills portability becomes an important issue. CEDEFOP (2020) identifies four main barriers to skills portability: platforms' lack of incentives, the absence of broadly accepted skills standards, technical challenges that would require data sharing across platforms and ambiguity in existing data protection regulation. Research into the types of skills that might be useful for platform workers will be necessary prior to the introduction of policies aimed at skill development.

In respect to platform-organized markets, skills will be sectoral and it seems unlikely that formal training will provide significant advantage. For some genres of platform work, skills and their portability take on entirely new meanings. For a ride sharing driver, skill portability seems fairly simple and may be reduced to learning how to manage and game the algorithms. In other cases, significant skills may be developed. For example, successful influencers or platform-based sellers may manage multiple platforms and entire staffs of contractors or even employees.

The notion of skill formation has typically been conceptualized as a function of formal training or, at least, apprenticeships through which a set of skills that match a fairly stable market are created. However, because the platform itself is constantly endeavoring to absorb more of the entire value in the transaction it intermediates, those skills may be transient. To illustrate, until quite recently, Uber pursued autonomous

vehicles in the hopes of disintermediating drivers. Similarly, initially Amazon sellers did their own fulfillment. However, when Amazon introduced its fulfillment services, it also discouraged Marketplace sellers from self-fulfillment. Thus, the skills developed by sellers were made obsolete. In such dynamic environments, the most general skill of an ability to adapt to changes may be of greatest importance.

Career formation for platform work varies markedly depending on the type of work performed. However, it should be stipulated, beyond the benefits of longevity as a possible incentive to the buyer, platforms provide little additional compensation to long time users. In ridesharing, to speak of a career is almost meaningless. There is no advantage to seniority or learning. For influencers and sellers, career formation is possible. In the sense, that success can create viable businesses that may be long-term.

4. Conclusion

The rise and maturation of the platform economy has brought new forms of work, reorganized existing work, and changed the activities involved. Little wonder that assessment of the impact of platforms on work remains uncertain. Indeed, the labels themselves are tossed up in the air, raising the question of what we call work, who is a worker, and how we measure and count workers. Policy makers, as a consequence, will face the challenge of formulating, and reformulating the targets and the categories of their policies as they seek to adapt modern social protections and labor market regulations to this new era.

The increasing intermediation of platforms into all types of industries makes them become ever more important to large sectors of the economy, posing problems for policy makers and firms. Consider as we conclude, two examples. First, Uber began a discussion of sharing and gig work. Analysts started looking at gig workers and counted Uber drivers. But if Uber drivers are not employees, a legal designation, should we count them as workers? Or,

in fact, if they are contractors, are the simply “petite bourgeois”? As important, the objective of the work does not change, but the rules and the work process have changed -- an Uber driver does not need to know the city, they just follow the computer-generated instructions. As we argued here, the debate about categories matters precisely because different rules apply to the several categories—employees, contractors and gig workers, independent entrepreneurs are all labels we apply to those doing work in, on, and around platforms. A second perspective is provided by businesses formed in the pre-platform era that now find themselves intermediated with their customers through a platform. As Steve Barley (2015) showed us, the work of the car salesman has changed profoundly and requires new skills. Or, for example, already prior to the Covid-19 pandemic, restaurants were becoming dependent upon platform rating firms such as Yelp and Google Reviews -- to secure customers, even those specifically searching for their restaurant, had to purchase advertisements to preempt potential competitors. With the pandemic, restaurants became dependent upon the delivery platforms that were able to charge extortionate rates even as they were able to redirect customers to competitors including ghost kitchens (Kenney et al. 2022). This illustrates the increasing ambit of these platform firms and the subtle ways that they transform competition and work in existing industries.

The previous concentration by policy-makers and researchers on ride-sharing and other types of platform-mediated, in-person and remote service provision when discussing labor effects has given way to an understanding that platform-mediated sales and content creation are likely to be incredibly impactful, in economic terms, as entire industries and the work and workers in them are reconfigured. Thus, the effects of decisions made regarding competition or even regulatory decisions about the legality of certain terms and conditions in contracts between the platform and its users can have significant implications on the conditions under which complementors work and earn income.

If one accepts that platforms are a new institutional form through which what Pfeiffer (2022) terms "distribution" operates and that this is likely irreversible suggests that the categories or "mental models" of employment and jobs, derived from the past, may no longer describe the arrangements by which an increasing number of people secure income. We are not suggesting that traditional employment will disappear, as the platform firms themselves have regular employees, merely that an increasing proportion of all transactions will be done over platforms. This will have a profound effect upon the conditions for work and how labor is organized and motivated. Self-exploitation in terms of working hours and conditions may be exacerbated and even become the norm as management is increasingly algorithm driven and these drive the work pace in an environment of mass surveillance that realizes Bentham's vision of a panopticon.

As this critical review has shown, the continuing subsumption of work as an activity and labor as a process, into a world dominated by platforms and algorithmic management is a vital topic for labor and management scholars.

Bibliography

Abraham, K.G., Haltiwanger, J.C., Sandusky, K., Spletzer, J.R. 2019. Measuring the gig economy: Current knowledge and open issues. Working Paper 24950 http://www.nber.org/papers/w24950

Ajunwa, I., and Greene, D. 2019. Platforms at work: Automated hiring platforms and other new intermediaries in the organization of work. In Work and Labor in the Digital Age:61–91. Bingley, UK: Emerald Publishing Limited.

Au-Eyung, A. 2021. Technology Employees Warn: Companies Should Expect More Uprisings in 2022. Forbes. (December 29) Accessed February 14, 2022. https://www.forbes.com/sites/angelauyeung/2021/12/29/technology-employees-warn-companies-should-expect-more-uprisings-in-2022/?sh=2177d2537154

Australian Competition & Consumer Commission, 2021. Digital Advertising Services Inquiry: Final Report. (August). https://www.accc.gov.au/focus-areas/inquiries-ongoing/digital-advertising-services-inquiry/interim-report.

Autor, D. H., Dorn, D., and Hanson, G.H. 2015, 'Untangling trade and technology: Evidence from local labour markets,' Economic Journal, 125(584), 621–646.

Barley, S. R. 2015. Why the internet makes buying a car less loathsome: How technologies change role relations. Academy of Management Discoveries, 1:5-35.

Bearson, D., Kenney, M., and Zysman, J. 2021. Measuring the impacts of labor in the platform economy: new work created, old work reorganized, and value creation reconfigured. Industrial and Corporate Change, 30(3), 536–563.

Behrendt, C., and Nguyen, Q. A. 2019. Ensuring universal social protection for the future of work. Transfer, 25(2), 205–219. https://doi.org/10.1177/1024258919857031

Benkler, Y. (2006). The wealth of networks: How social production transforms markets and freedom. Yale University Press: New Haven, Conn., USA and London, UK.

Berg J. 2016. Income security in the on-demand economy: findings and policy lessons from a survey of crowdworkers. Comparative Labor Law & Policy Journal 37(3): 543–576

Berg, J., and Johnston, H. 2019. Too good to be true? A comment on Hall and Krueger's analysis of the labor market for Uber's driver-partners. ILR Review, 72(1), 39-68.

Bourreau, M., Caffarra, Chen, Z., Choe, C., C., Crawford, G., Duso, T., Genakos, C., Heudues, P., Peitz, M., Rønde, T, Schnitzer, M, Schutz, N., Sovinsky, M., Spagnolo, G., Toivanen, O., Valletti, T., & Vergé (2020). Google/Fitbit will monetise health data and harm consumers. CEPR Policy Insights No. 107. https://euagenda.eu/upload/publications/policyinsight107.pdf.pdf.

Caffarra, C., and Valletti, T. 2020. Google/Fitbit review: Privacy IS a competition issue. Vox EU/CEPR. 4 March. https://voxeu.org/content/googlefitbit-review-privacy-competition-issue.

Cameron, L. D., and Rahman, H. 2022. Expanding the locus of resistance: Understanding the co-constitution of control and resistance in the gig economy. Organization Science, 33(1), 38-58.

Cappelli, P., and Keller, J. R. 2013. Classifying work in the new economy. Academy of Management Review, 38, 575–596.

Carpentier, M., and Van Hoye, G. 2020. Managing organizational attractiveness after a negative employer review: Company response strategies and review consensus. European Journal of Work and Organizational Psychology, 1–18.

Carpentier, M., Van Hoye, G., & Weijters, B. (2019a). Attracting applicants through the organization's social media page: Signaling employer brand personality. Journal of Vocational Behavior, 115, Article 103326.

Catlin, T., Lorenz, J. T., Nandan, J., Sharma, S., & Waschto, A. 2018. Insurance beyond digital: The rise of ecosystems and platforms. McKinsey & Company.

CEDEFOP, 2021. Skill development in the platform economy. Comparing microwork and online freelancing. Luxembourg: Publications Office of the European Union. Cedefop research paper; No 81

CEDEFOP. 2020. Developing and matching skills in the online platform economy Findings on new forms of digital work and learning from Cedefop's Crowd Learn study. Cedefop reference series 116 Luxembourg: Publications Office of the European Union, 2020.

Cenamor, J., Johan Frishammar, J. 2021. Openness in platform ecosystems: Innovation strategies for complementary products. Research Policy 50 (2021) 104-148.

Cirillo, V., Guarascio, D., & Parolin, Z. 2021. Platform work and economic insecurity: Evidence from Italian survey data (No. 2021/13). LEM Working Paper Series. https://www.econstor.eu/handle/10419/243509

Curchod, C., Patriotta, G., Cohen, L., & Neysen, N. 2020. Working for an algorithm: Power asymmetries and agency in online work settings. Administrative Science Quarterly, 65(3), 644-676.

Cusumano, M. A., Gawer, A., & Yoffie, D. B. 2019. The Business of Platforms. New York: Harper Business.

Cutolo, D. and Kenney, M. 2021. Platform-dependent entrepreneurs: Power asymmetries, risks, and strategies in the Platform Economy. Academy of Management Perspectives. 35(4) https://doi.org/10.5465/amp.2019.0103

De Groen, W.P. Kilhoffer, Z., Westhoff, L., Postica, D., and Shamsfakhr, F. 2021. Digital labour platforms in the EU. Mapping and business models. prepared by CEPS for the European Commission, Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL). Brussels: European Commission.

Dubois, C. 2021. How do lawyers engineer and develop legal tech projects? A Story of Opportunities, Platforms, Creative Rationalities, and Strategies. Law, Technology, and Humans 3(1) https://doi.org/10.5204/lthj.v3i1.1558

Fleming, P. 2017. The Human Capital Hoax: Work, Debt and Insecurity in the Era of Uberization. Organization Studies 2017, Vol. 38(5) 691–709.

Forbrukerrådet. 2018. Deceived by design. Oslo. https://fil.forbrukerradet.no/wp-content/uploads/2018/06/2018-06-27-deceived-by-design-final.pdf.

Forde, C. Stuart, M., Joyce, S., Oliver, L., Valizade, D., Alberti, G., Hardy, K., Trappmann, V. Charles Umney, Carson, C. 2017. The Social Protection of Workers in the Platform Economy. European Parliament, 2017.

Gawer, A. 2021. Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. Long Range Planning 54,5, 1, 2-45

Gawer, A. 2021. Digital platforms and ecosystems: remarks on the dominant organizational forms of the digital age. Innovation: Organization and Management 1-15.

Gawer, A. 2014. 'Bridging differing perspectives on technological platforms: toward an integrative framework,' Research Policy, 43(7), 1239–1249

Gillespie, T. 2018. Custodians of the Internet. New Haven: Yale University Press.

Goos, M., Manning, A., and Salomons, A. 2014, 'Explaining job polarization: routine-biased technological change and offshoring,' American Economic Review, 104(8), 2509–2526.

Graham, M., Hjorth, I., and Lehdonvirta, V. 2017. Digital labour and development: Impacts of global digital labour platforms and the gig economy on worker livelihoods. Transfer: European Review of Labour and Research, 23(2): 135–162.

Grygiel, J. and Lysak, S. 2021. Police Social Media and Broadcast News: An Investigation into the Impact of Police Use of Facebook on Journalists' Gatekeeping Role, Journalism Practice, 15:7, 994-1011, DOI: 10.1080/17512786.2020.17591

Hicks M. 2018. The long story behind the Google walkout. Verge. (November 9), Accessed February 14, 2022. https://www.theverge.com/2018/11/9/18078664/google-walkout-history-tech-strikes-labor-organizing

Hodgson, C. and Kuchler, H. 2018. Financial Times. Published November 1, 2018, accessed February 14, 2022. https://www.ft.com/content/7f70c53c-ddcd-11e8-8f50-cbae5495d92b

Howcroft, D. and B. Bergvall-Kareborn (2019), 'A typology of crowdwork platforms,' Work, Employment and Society, 33(1), 21–38.

Huws, U. 2017. Where did online platforms come from? The virtualization of work organization and the new policy challenges it raises. In Meil, P. and Kirov, V. 2017. Policy implications of virtual work. E-book. Palgrave Macmillan.

Huws, U. 2014, Labor in the Global Digital Economy: The Cybertariat Comes of Age. NYU Press: New York

Huws, U. 2009, 'The making of a cybertariat? Virtual work in a real world,' Socialist Register, 37, 1–23.

Hyman, L. 2018. Temp: How American Work, American Business, and the American Dream Became Temporary. Penguin Random House: New York

International Labor Organization. 2021. World Employment and Social Outlook. The Role of Digital Labor Platforms in Transforming the World of Work. Geneva: International Labor Organization.

Ivanova, M., Bronowicka, J., Kocher, E., and Degner, A. 2018. The App as a Boss? Control and Autonomy in Application-Based Management. Arbeit | Grenze | Fluss - Work in Progress interdisziplinärer Arbeitsforschung Nr. 2, Frankfurt (Oder): Viadrina, doi:10.11584/Arbeit-Grenze

Jabagi, N., Croteau, A.-M. Audebrand, L.K., Marsan, J. 2019. Gig-workers' motivation: thinking beyond carrots and sticks. Journal of Managerial Psychology. 34(4), 192-213

Jacobides, M. G., C. Cennamo and A. Gawer. 2018, 'Towards a theory of ecosystems,' Strategic Management Journal, 39(8), 2255–2276.

Joyce, S., Stuart, M., Forde, C., and Valizade, D. 2020. Work and social protection in the platform economy in Europe. Advances in Industrial and Labor Relations. 25: 153-184.

Kässi, O. and Vili Lehdonvirta, V. 2019. Do Digital Skill Certificates Help New Workers Enter the Market? Evidence from an Online Labour Platform. CESIFO Working Papers. 7810, August, 2019.

Kalleberg, A. L. 2018. Precarious Lives: Job Insecurity and Well-Being in Rich Democracies. Cambridge: Polity Press.

Kalleberg, A. L. and Dunn, M. 2016, 'Good jobs, bad jobs in the gig economy,' Perspectives on Work, accessed at http://lerachapters.org/OJS/ojs-2.4.4-1/index.php/PFL/article/viewFile/3112/3087 on February, 8, 2022.

Kalleberg, A. L. 2009. Precarious work, insecure workers: Employment relations in transition. American sociological review 74, 1 (2009), 1–22.

Kellogg K.C., Valentine M. and Christin A. 2020. Algorithms at Work: The New Contested Terrain of Control. Academy of Management Annals 14(1): 366–410.

Kempton S.D., Connolly Ahern C. 2021. Mastering Metrics: The Impact of Social Media on the Routines and Values of Broadcast Journalists. Electronic News, 15(3-4):109-122. doi:10.1177/19312431211050050

Kenney, M., Bearson, D. and Zysman, J. 2021. The platform economy matures: measuring pervasiveness and exploring power. Socio-Economic Review, 2021, Vol. 00, No. 0, 1–33

Kenney, M. and J. Zysman. 2016. The rise of the Platform Economy. Issues in Science and Technology 32 (3): 61-69.

Koblin, J. and Sperling, N. 2021. Netflix employees walk out to protest Dave Chappelle's special. New York Times. (October 25), accessed February 14, 2022. https://www.nytimes.com/2021/10/20/business/media/netflix-protest-dave-chappelle.html

Kuhn, K. M., and Maleki, A. 2017. Micro-entrepreneurs, dependent contractors, and instaserfs: Understanding online labor platform workforces. Academy of Management Perspectives, 31(3), 183-200.

Kilhoffer, Z., de Groen, W.P., Lenaerts, K. Smits, I., Hauben, H., Waeyaert, W., Giacumacatos, E., Jean- Lhernould, P., Robin-Olivier, S. 2020. Study to gather evidence on the working conditions of platform workers. Brussels: European Commission.

Lanier, J. 2018. Ten arguments for deleting your social media accounts right now. Random House.

Lehdonvirta. V. 2018. Flexibility in the gig economy: managing time on three online piecework platforms. New Technology, Work and Employment 33:1 ISSN 1468-005X

Maffie, M. D. 2022. The perils of laundering control through customers: A study of control and resistance in the ride-hail industry. ILR Review, 75(2), 348-372.

Manyika, J., S. Lund, J. Bughin, K. Robinson, J. Mischke and Mahajan, D. 2016. 'Independent work: choice, necessity and the gig economy,' McKinsey Global Institute, accessed at https://www.mckinsey.com/featured-insights/employment-and-growth/independent-work-choice-necessity-and-the-gig-economy on March 21, 2019.

Margaryan, A. 2020. Comparing crowdworkers' and conventional knowledge workers self-regulated learning strategies in the workplace. Human Computation. 6 (1): 83-97.

Marsden, P., and Podszun, R. 2020. Restoring balance to digital competition – Sensible rules, effective enforcement. Konrad Adenauer Stiftung. https://www.kas.de/en/single-title/-/content/restoring-balance-to-digital-competition-sensible-rules-effective-enforcement.

Mateescu, A. and Nguyen, A. 2019. Explainer Algorithmic Management in the Workplace. New York: Data & Society.

Mazmanian, M., Orlikowski, W. J., & Yates, J. 2013. The autonomy paradox: The implications of mobile email devices for knowledge professionals. Organization Science, 24(5), 1337-1357.

McAfee, A., & Brynjolfsson, E. 2017. Machine, Platform, Crowd: Harnessing Our Digital Future. New York: W. W. Norton.

McGee, P. 2021. Amazon settlement with labour board paves way for workers' union. Financial Times. Published December 23, 2021, accessed February 14, 2022. https://www.ft.com/content/507707bd-376f-4cd6-a327-87ed80efedb5

McPeak, A. 2019. The Internet Made Me Do It: Reconciling Social Media and Professional Norms for Lawyers, Judges, and Law Professors, 55 Idaho Law Review 205

Mellado, C. and Alfaro, A. 2020. Platforms, Journalists and Their Digital Selves, Digital Journalism, 8:10, 1258-1279, DOI: 10.1080/21670811.2020.1817763

Morris, J. W. 2020. Music platforms and the optimization of culture. Social Media+ Society, 6(3), 2056305120940690.

Nordgård, D. 2017. Assessing music streaming and industry disruptions. In P. Meil, V. Kirov (eds.), Policy Implications of Virtual Work, Dynamics of Virtual Work. Palgrave Macmillan. DOI 10.1007/978-3-319-52057-5_6.

OECD. 2016. ‘New forms of work in the digital economy,’ OECD Digital Economy Papers, No. 260, OECD Publishing: Paris, France

Orlikowski, W. J. and Scott S.V. 2014. Exploring Apparatuses of Valuation in the Travel Sector. Organization Science 25(3), pp. 868–891

Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. 2016. Platform revolution: How networked markets are transforming the economy and how to make them work for you. New York: WW Norton & Company.

Parker, G. G. Van Alstyne, M W. 2005. Two-Sided Network Effects: A Theory of Information Product Design. Management Science 51 (10): 1494–1504.

Perry, A.M., Kinder, M., Stateler,L., and Romer,C. 2021. Brookings. Published March 16, 2021, accessed February 14, 2022. https://www.brookings.edu/blog/the-avenue/2021/03/16/the-amazon-union-battle-in-bessemer-is-about-dignity-racial-justice-and-the-future-of-the-american-worker/

Pesole, A., Urzı Brancati, M. C., Fernandez-Macıas, E., Biagi, F., and Gonzalez Vazquez, I. 2018, ‘Platform workers in Europe,’ JRC Science for Policy Report, European Commission: Brussels.

Petit,,N. and Teece, D. J. 2021. Innovating Big Tech firms and competition policy: favoring dynamic over static competition. Industrial and Corporate Change. 30(5), 1168–1198.

Pfeiffer, S. 2022. Digital Capitalism and Distributive Forces. Bielefeld: Transcript Verlag: Bielefeld, Germany.

Piasna, A., Zwysen, W. and Drahokoupil, J. 2022. The platform economy in Europe: Results from the second ETUI Internet and Platform Work Survey. European Trade Union Institute Working Paper 2022-5.

Powell, W.W. 1990. Neither Market nor Hierarchy: Network Forms of Organization. Research in Organizational Behavior. Vol 12, pp 295-336.

Prassl, J. and Risak, M. 2017. The legal protection of crowdworkers: Four avenues for worker's rights in the virtual realm. In Meil, P. and Kirov, V. 2017. Policy implications of virtual work. E-book. Palgrave Macmillan.

Rahman, K. S. and Thelen, K. 2019. The Rise of the Platform Business Model and the Transformation of Twenty-First-Century Capitalism. Politics & Society 47(2) 177– 204

Ritzer, G. and Jurgenson, N. 2010. Production, consumption, prosumption: the nature of capitalism in the age of the digital 'prosumer,' Journal of Consumer Culture, 10(1), 13–36.

Rosenblat, A., E.C. Levy, K. E. C., Barocas, S., and Hwang, T. 2017. Discriminating Tastes: Uber's Customer Ratings as Vehicles for Workplace Discrimination: Customer Ratings and Workplace Discrimination. Policy and Internet (9) 3: 256-279.

Rosenblat, A. and Stark, L. 2016. Algorithmic Labor and Information Asymmetries: A Case Study of Uber's Drivers. International Journal of Communication 10, 3758–3784.

Salehi, N., McCabe, A., Valentine, M., & Bernstein, M. 2017. Huddler: Convening stable and familiar crowd teams despite unpredictable availability. Paper presented at the Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing.

Schaarschmidt, M., Walsh, G. and Ivens, S. 2021. Digital war for talent: How profile reputations on company rating platforms drive job seekers' application intentions. Journal of Vocational Behavior. 131 103644.

Schneider, D. and Harknett, K. 2019. Consequences of routine work schedule instability for worker health and well-being. American Sociological Review 84, 1 (2019), 82–114

Schor, J. 2016. Debating the sharing economy. Journal of Self-Governance and Management Economics, 4(3), 7-22.

Scott Morton, F., Bouvier, P., Ezrachi, A., Jullien, B., Katz, R., Kimmelman, G., Melamed, D., and Morgenstern, J. 2019. 'The Stigler report'. Committee for the study of digital Platforms, market structure and antitrust subcommittee, Stigler Center for the Study of the Economy and the State. https://www.publicknowledge.org/wp-content/uploads/2019/09/Stigler-Committee-on-Digital-Platforms-Final-report.pdf/.

Scott, S. V. and. Orlikowski, W. J. 2012, 'Reconfiguring relations of accountability: materialization of social media in the travel sector,' Accounting, Organizations and Society, 37(1), 26–40.

Shevchuk, A., Strebkov, D., & Davis, S. N. 2019. The autonomy paradox: How night work undermines subjective well-being of internet-based freelancers. ILR Review, 72(1), 75-100.

Sieker, F. 2021. Platform work and access to social protection across major European countries. Hertie School of Governance.

Spasova, S., Bouget, D., Ghailani, D., and Vanherchke, B. 2019. Self-employment and social protection: Understanding variations between welfare regimes. Journal of Poverty and Social Justice, 27(2) 157-175

Srnicek, N. 2020. Paths Forward for the Study of the Digital Economy. In James Muldoon, Will Stronge, eds. Platforming Equality: Policy Challenges for the Digital Economy. London: Autonomy.

Srnicek, N. 2017, Platform Capitalism. John Wiley & Sons: Hoboken, NJ.

Statista, April 2021. https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-capitalization/ Accessed February 6, 2022.

Stefano, V. D. 2016. The rise of the “Just-in-time workforce: On-demand work, crowdwork, and labor protection in the ‘gig-economy.” Comparative Labor Law and Policy Journal. Vol. 37:471

Stone, K. V. 2006. Legal protections for atypical employees: Employment law for workers without workplaces and employees without employers. Berkeley Journal of Employment and Labor Law, 27, 251–286

Teece, D. and Henry J. Kahwaty. 2021. Is the Proposed Digital Markets Act the Cure for Europe’s Platform Ills? Paper prepared for the Prepared for the Computer & Communications Industry Association. https://media.thinkbrg.com/wp-content/uploads/2021/04/11215103/Is-the-DMA-the-Cure_Teece_Kahwaty.pdf Accessed January 31, 2022.

Tomprou, M. and Min, K. L. 2022. Employment relationships in algorithmic management: A psychological contract perspective. Computers in Human Behavior 126 106997.

Urzi Brancati, M.C., Pesole, A., Fernández-Macías, E. 2020. New evidence on platform workers in Europe. Results from the second COLLEEM survey. European Commission, JRC Science for Policy Report. Luxembourg: Publications Office of the European Union.

Valentine, M. A., Retelny, D., To, A., Rahmati, N., Doshi, T., & Bernstein, M. S. 2017. Flash organizations: Crowdsourcing complex work by structuring crowds as organizations. Paper presented at the Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems.

Vallas, S. P. 2019. Platform capitalism: What’s at stake for workers? New Labor Forum, 28(1): 48–59.

Vallas, S. P., and Kovalainen, A. 2019. Taking stock of the digital revolution, work and labor in the digital age:1–12. Bingley, UK: Emerald Publishing Limited.

Van Dijck, J., Poell, T., and de Waal, M. 2018. The Platform Society. London: Oxford University Press.

Veen, A., Barratt, T., Caleb Goods, C. 2020. Platform-Capital's 'App-etite' for Control: A Labour Process Analysis of Food-Delivery Work in Australia. Work, Employment and Society 2020, Vol. 34(3) 388–406

Wagner, T. 2014. The global achievement gap: why even our best schools don't teach the new survival skills our children need-and what we can do about it. UK: Basic Books/Hachette. https://www.basicbooks.com/titles/tonywagner/the-global-achievement-gap/9780465055968/

Weil, D. 2014. The Fissured Workplace. Harvard University Press: Cambridge, MA.

Wen, W., and Zhu, F. 2019. Threat of platform-owner entry and complementor responses: Evidence from the mobile app market. Strategic Management Journal, 40(9), 1336-1367.

Wexler, R. 2018. The Odds of Justice: Code of Silence: How private companies hide flaws in the software that governments use to decide who goes to prison and who gets out, Chance, 31:3, 67-72

Williamson, O. E. 1996. The Mechanisms of Governance. Oxford: Oxford University Press.

Williamson, O. E. 1975. Markets and Hierarchies, New York: Free Press.

Wood, A.J. 2021. Algorithmic Management Consequences for Work Organisation and Working Conditions. JRC Working Papers Series on Labour, Education and Technology 2021/07.

Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. 2019. Good gig, bad gig: autonomy and algorithmic control in the global gig economy. Work, Employment and Society, 33(1), 56-75.

Yao, Y. 2020. Uberizing the legal profession? Lawyer autonomy and status in the digital legal market. British Journal of Industrial Relations, 58(3), 483-506.

Zhu, F., and Liu, Q. 2018. Competing with complementors: An empirical look at Amazon. com. Strategic Management Journal, 39(10), 2618-2642.

Zimmerman, B.J.; Kitsantas, A. 2005. The hidden dimension of personal competence: self-regulated learning and practice. In A. J. Elliot & C. S. Dweck (Eds.), Handbook of Competence and Motivation (pp. 509–526). New York: Guilford Publications.

Zuboff, S. 2015. Big other: Surveillance capitalism and the prospects of an information civilization. Journal of Information Technology, 30, 75-89.

Zuboff, S. 2019. The age of surveillance capitalism: The fight for a human future at the new frontier of power. London: Profile Books.

Zuboff, S. 2019. Surveillance Capitalism and the Challenge of Collective Action. New Labor Forum 28(1): 10–29