

Introduction. Digital labor and crisis of the wage labor system*

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Abstract

In this introduction the editors of the Special Issue of *Sociologia del lavoro* devoted to digital labor and the crisis of the wage-labor system, analyse recent trends in the scholarship of platform capitalism in the aftermath of the pandemic outbreak. Platforms are not only a type of business model – they have become a crucial infrastructure around which society reorganizes itself. They extract value not only from traditional labor activities, but also from the social cooperation. Their operations permeate even private spaces and turn social ties such as kinship, friendship, and sexuality into complex monetization schemes. This process represents a departure from the salary institution, where identity was mostly linked to the position occupied by each individual with respect to work and wages. Ultimately, the hidden dimension of digital capitalism is represented by automation which, contrary to the prevailing opinion, does not mark the decline of human labor. A huge amount of data, and data work, is required to deploy platforms' algorithms. Such work is performed by under- and micro-paid remote providers, often residing in low-income countries. Even if platform capitalism appears stronger since the Covid-19 outbreak, it is far from mastering the global challenges it triggers. As its contradic-

* This special issue of *Sociologia del lavoro* features the outcomes of the research projects HUSH “The Human Supply Chain Behind Smart Technologies” funded by the French National Research Agency (Project ANR-19-CE10-0012) and PLUS “Platform Labor in Urban Spaces”, part of the H2020 Research Programme (H2020-SC6-TRANSFORMATIONS-2018, Grant Agreement No 822638). When indicated, authors of this special issue have partaken in the work packages of these projects. In the interest of full disclosure, editors of the present special issue have been serving as senior researcher (ed. 1), researcher (ed. 2) and principal investigator (ed. 3) for said projects.

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Sociologia del lavoro, n. 163/2022. ISSN 0392-5048. ISSNe 1972-554X.

DOI: 10.3280/SL2022-163003oa



tions become apparent, new struggles of digital workers become more visible and better organized.

Keywords: Digital labor, Infrastructures, Platforms, Salary institution

1. Elements of pandemic capitalism

Covid-19 has marked the first global health and economic crisis that have taken place within platform capitalism. Despite the risks associated with years of disruption of global supply chains and lower consumption, digital platforms exponentially thrived in the pandemic's aftermath. This is obvious for messaging apps like WeChat and WhatsApp, social media such as TikTok or Facebook, and online content providers like YouTube and Spotify. Pandemic sociability, and its accompanying discourse of "online migration", has in fact been the only mode of social interaction for long stretches of time during lockdowns and periods of social distancing.

However, the necessity to prevent the spread of the virus has also drastically accelerated the common narratives about the potential that digital technologies have to rethink labor normality and to increase its productivity. Workplace closure measures have been put in place in countries where 93% of the global workforce reside, exposing workers to a series of unprecedented challenges. Firstly, ILO estimates working-hour losses to 255 million full-time jobs as of the first year of pandemic, which is four times greater than during the 2009 subprime crisis (ILOSTAT, 2021). Secondly, the labor market is the subject of a "great work-from-home experiment" (Berg *et al.*, 2021) that puts pressure on workers while increasing their instability. Remote work, "home office", telework or "smart working": the phenomenon has gone by different monikers in different countries. With this we designate the condition of the working person under pandemic capitalism, relying on a digital infrastructures to pursue productive activities remotely. New tools like Zoom and Teams, as well as ad-hoc solution for employee monitoring such as Staffcop and Time Doctor couple the non-flexible work schedules characteristic of dependent work, with expectations of higher productivity and balance between personal and professional life typical of self-employment.

The generalisation of the pre-existing trend towards algorithmic management (Adams-Prassl, 2019) could not be reduced to the adoption of data-driven HR solutions and "people analytics" system by conventional organisations. It also means the rise of a new economic paradigm whose basic tenet is, unsurprisingly, platformisation (Casilli & Posada, 2019).

For an ever-growing number of businesses and households, most of the activities requiring living labor take place within services that are created, offered and coordinated by the digital interfaces of the platforms. Especially labor-mediating platforms can be viewed as digital ecosystems capturing the value produced by users coordinating diverse economic actors via algorithmic matching. As these algorithms are fuelled by data and based on breaking complex processes into smaller tasks, the type of labor that is proper to digital platforms can be defined as a taskified and datafied activity. In this special issue of *Sociologia del lavoro* we employ a typology of digital labor initially developed by Casilli (2019). The three main types of activities taking place on platforms are: on-demand labor (geographically sticky services on ride-hailing apps like Uber, food delivery on Glovo, and maintenance work on TaskRabbit), micro-work (crowdsourced remote work to annotate data and sort information on platforms like Appen and Amazon Mechanical Turk), and socially networked labor (paid or unpaid labor to produce content and metadata on social media). Each type of digital labor exhibits a different degree of simplification and compensation, spanning from longer missions carried out by relatively well paid freelancers and self-employed professionals, to browsing random websites from remote click farms where piecework can be remunerated less than a cent.

We argue that the neoliberal capitalist model has found in this type of socio-economic process a way to reshape its mode of accumulation and appropriation of value moving beyond traditional salary institution. The study of the emergent forms of labor mediated by digital infrastructures has profoundly remodelled our understanding of labor and industrial relations, as well as the institutional dynamics we were used to. This, in our opinion, is due to factors related to the new economic and social urgencies that have arisen in the last two decades, and that the pandemic has exacerbated. The first of these is originated by the delusional belief that platforms could constitute a new technological framework for an emerging participatory culture established at the beginning of the twenty-first century. The conceptual label usually employed to describe this culture is “sharing economy” (Schor, 2021). The promise of a participatory revolution subverting economic and institutional practices, turned out to be a ruse of the market ideology aiming to convince organised workers and labor advocates to drop their guard in the face of the growing invasiveness of new digital practices of control and orientation of social conducts.

Another fundamental element concerns the way in which platforms prioritise and sort out social issues, imposing their own frames on public debate and on policymaking processes. The digital infrastructure of our cities, for example, as well as data privacy, algorithmic discrimination, digital lit-

eracy, sustainable digital technologies, the governance of IT, are issues that have to be addressed without delay, especially in the context of a progressive endemization of the epidemic.

The last and most apparent feature of pandemic capitalism is the rise of global inequalities. That is not only a matter of economic differentials across social strata. Although since the Covid-19 crisis the fortunes of world's 25 richest billionaires on the Forbes list has increased by \$255 billions, this should not overshadow the new inequalities emerging alongside the old ones. Discriminations by class, gender, sexuality, race, disability, education, residency, social and economic capital now appear together with differentials in access to networks, use of devices, consumption of content, programming ability with specific software, as well as production of quality data (Robinson *et al.*, 2020a, 2020b, 2020c).

The pandemic crisis seems to naturalise the culture and the corporate interests of platforms, as the production of data and information incessantly infuses the very fabric of our society. The increasing influence and invasiveness of platforms affects how public values and interest are defined, legitimized, and therefore practiced. An example of the increasing overlap between the private and public spheres is the agreement that Amazon signed with over six hundred American police departments to deploy the video surveillance solution Ring. This system allows the police to access, without a warrant, the surveillance videos taken in private properties. «Surveillance capabilities once governed by the courts are now offered in the Apple App Store and promoted by local police. As media scholar Tung-Hui Hu observes, by using these apps ‘we become self-employed in the service of the state security apparatus’» (Crawford, 2021, p. 227).

2. From the salary institution to digital labor

More than simply a digital translation of working activities, digital labor has become a general paradigm of transformations that have followed the spread of information technologies. Instead of the “end of work” and the rise of automation, as it has often been predicted, what we are witnessing is a radical reconfiguration of its fundamental characteristics often resulting in a lack of social protection for workers. The possibilities provided by digital technologies to deeply transform labor process are making human labor increasingly invisible at the eyes of justice courts, policymakers or traditional unions, as well as of workers themselves (Aloisi and De Stefano, 2022). It is for this reason that the rise of digital labor has often been considered a further step in precarisation processes (Graham, Hjorth, Lehdonvirta,

2017), once more highlighting the irreversible stage the crises of traditional salary institution has reached (Chicchi, 2020).

Indeed, it is not the first time that we are witnessing the rise of new labor regime and of more effective forms of exploitation. The closest ancestor of digital labor may be found in that complex of contradictions and transformations named as cognitive labor (Vercellone, 2006; Moulier-Boutang, 2012). Usually this is referred to as a qualitative transformation that has invested capital's logics of value over the last decades. More than the material production that has characterized the Fordist labor regime, it is knowledge and other immaterial asset that have gained a central role in the dynamics of valorisation. However, this has not necessarily corresponded to an emancipation of workers from the traditional restrictions they have faced in the Fordist age, neither to an improvement of working and living conditions of the so-called "knowledge workers". The decline of hourly wages, the reversal of autonomy and flexibility into insecurity and poverty and the rise of new devices of labor control based on the interiorization of discipline, as well as on a moral orthopaedics finalized in producing more docile and productive subjectivities, are some of the "logics of exploitation" (Chicchi, Leonardi, Lucarelli, 2016) that can be encountered in both cognitive and digital labor.

Nonetheless, we interpret the crisis of salary institutions not simply as a change in the working regime, but as a more general transformation affecting the social and politic sphere. The debate around precarity has probably been the most significant effort to analyse this ambivalence. The rise of precarity is not simply a matter of temporary workers, but results from deeply rooted economic and political reasons that have spread insecurity alongside the growth of "flexible" employments (Standing, 2011). However, the different labor regimes emerged in the last decades should not be distinguished simply for their formal status. As Dardot and Laval (2014, p. 8) have highlighted, neoliberalism affects both "the conduct of governors and of those who have been governed". On one hand, this is the case of neoliberal public policies that during the 1990s have reformed labor markets and have undermined traditional welfare state, pushing an increasing number of individuals to accept "gigs" without any social protection (Friedman, 2014). On the other, a crucial role has been played by, the rise of new subjectivities, such as the entreprecarariat (Lorusso, 2020) or the auto-entrepreneurship (Arreola *et al.*, 2017), denoting labor market actors devoted to competition and to the imperative of productivity that has been the culture broth from where digital labor has surfaced (Graham and Woodcock, 2019).

Highlighting such continuities does not mean that digital labor is not conveying anything new. Yet, to focus on its discontinuities it is necessary

to expand our view beyond the Global North. Both precarity and cognitive labor can be criticized as providing a distinct western-centric view of the transformations of our labor regimes, one that is not adequate to the challenges digital labor is bringing on a planetary level. By considering the point of view of the world/global history, insecurity, poverty, and lack of awareness usually associated to precarity are constant factors throughout human past. As Neilson and Rossiter (2008) highlight, the social protection and the political consciousness that workers reached in the Fordist era were the real exception in the history of labor. What is new, then, it is the way in which digital technologies are used to reconcile poverty, insecurity, and exploitation touching the vast majority of the global workforce. Digital labor does not solely designate the riders delivering food and the drivers of ride-hailing apps operating in cities like London, Paris or New York, but also those we see riding in the streets of Buenos Aires, Beijing or Nairobi (Anwar and Graham, 2021; Graham and Anwar, 2019). It encompasses workers in the click farms we see sprouting in Africa and Asia, that often provide services for multinational corporations located in Europe or North America. Through innovation, this reignites centuries-old colonial dependencies (Coudry and Mejias, 2019). In a broader sense, the labor performed on digital platforms is the continuation by other means of the toil of workers extracting “blood minerals” like lithium, cobalt, and nickel that are necessary to build smartphones, batteries, microprocessors (Hockenberry, 2021). As Fuchs (2014) highlights, this is a “collective workforce” that is essential to provide the services and artefacts composing digital capitalism.

Accordingly, the key role digital platforms play today is predicated on the work of individuals scattered around the globe, enduring different forms of exploitation, adjusting to disparate modes of production. The notion of digital labor has the merit of making visible the ties that bind these workers. It follows the thread which connects the riders in our cities to the miners of coltan in Central Africa, to those performing microtasks from remote locations to the “prosumers” volunteering data on social media. These diverse occupations are not only invested by the same accumulation dynamics. They are all framed by labor regimes spanning from self-employment and unpaid work, piecework and unfree labor—virtually all occurring outside the salary institution.

3. A “world at home”: platforms, logistics, and the city

The Covid-19 outbreak has further increased the visibility and the social relevance of delivery platforms such as Amazon or Deliveroo. Especially

during the dramatic days of lockdown, they played a crucial role in avoiding the risk of contagion by worldwide delivering goods. It is not surprising then that companies which did not even exist ten years ago have now reached the status of “essential services”. From this perspective, the health crisis seems to have definitively realized the ideal of the “world at home” economy, where technological innovation allows to deliver all kinds of goods and services at one’s doorstep (Borghi, 2021). This means that digital platforms are not only participating in the so-called “logistic revolution of capital” (Bonachich and Wilson, 2008), they aim to radically transform the way in which we work, consume and conduct our everyday life.

More than simply allowing business as usual, platforms have seized the opportunity provided by the pandemic crises to extend their influence (van Doorn, Mos, and Bosma, 2020). This is exemplified by the promises of a fully automated delivery, spread by Amazon since the mid-2010 and revived in the aftermath of the pandemic. Bezos’s company has been registering patents for robot delivering drinks or food directly at our sit while we are watching our favourite football team, as well as for drones able to transport goods 24/7 to any location (Delfanti, 2021). Although still far from being realized, such solutions already feed the social imaginary of the “world at home” economy that is essential to economically leverage the pandemic crisis and turn yet another disaster into an opportunity for global capitalism (Klein, 2008).

However, reality looks different to a more cautious eye. In this special issue, Bonifacio and De Benedittis (2022) show how digital technologies more than substituting labor or automating labor processes, increase labor exploitation. As they highlight in their case study on food delivery platforms, not only workers are called to intensify their working performance, but they are forced to accept the risks and the costs of being “entrepreneurs”. They are pushed to invest on both material and immaterial capital: buying new and more efficient bikes, improving their skills, reducing knowledge asymmetries or expanding their (paid and unpaid) working time. Thus, despite the common narrative of delivery work as something that can be done “by everyone owning a smartphone and a bike”, digital labor results in increasing and diversifying human contribution to production, without providing recognition. Put differently, the ways in which platforms use digital technologies allow them to reduce labor costs and increase exploitation ratio (Jarrett, 2022a). However, the “exit” from traditional salary institution do not simply provide cheap labor but establish a hidden labor regime where ranking, rating, and other indicators of performance immerse workers into a tense flow of delivery tasks. In this context, not only the flexibility and autonomy promised by platforms are denied by the impact of

uncodified dynamics, but logics of inclusion and exclusion of the active workforce are getting redefined. Those accepting the “entrepreneurial” dimension then, are rewarded with bonuses and a relative autonomy, while those who do not comply with platform standards are marginalized or expelled when they become too conflictive.

However, such use of technology by delivery platforms is not surprising. It has long been known that the distribution of goods represents a fundamental moment of production (Marazzi, 2015). This means that delivery workers are exposed to the same impact that technological innovation historically had on industrial production. A crucial factor at play in this process is labor control, that digital platforms seem to have expanded to an unprecedented level (Huws, 2020). Initially that was achieved by expanding it to sectors that were once excluded like food delivery, domestic work, and short-term rentals, that historically belonged to the informal economy (Marrone, 2019). On these grounds, platforms such as Deliveroo or Glovo – but also Airbnb and Helpling – have not invented a new sector but absorbed activities that once were considered marginal, making them appealing to global financial investors. Subsequently, labor control is carried out by making workers’ surveillance pervasive and effective well beyond traditional employment standards (Zuboff, 2019). Delivery workers produce data while riding a bike. These data are collected by platforms, processed and managed in ways that increase their value both as a monetary and an information asset. In other words, delivery workers are not simply service providers, but also knowledge producers, and this is a fundamental reason why human labor is still essential for digital capitalism.

However, labor control is not the only function where capitalism employ digital technologies to leap forwards. As Musiani highlights in her essay, the dialogue between digital and STS studies – especially those concerning the social relevance of infrastructures – can be of great help to understand the algorithmic governance of platforms. This does not only radically transform labor, but the whole society in ways that are functional to platform productive needs. The extractivity platforms are responsible for making them not simply a hegemonic actor in the market, but meta-infrastructure working as «a pervasive system that serves as a ubiquitous backdrop to everyday life» as Musiani points out (2022, p. 85). Put differently, the relationship between the rise of digital labor and the crisis of the salary institution is not limited to the spread of exploitation to individuals providing services within digital platforms, but also to all those interacting with them, irrespective of their status—customers, other delivery workers, restaurant managers etc. Digital platforms are in fact able to extract value not only from traditional working activities, but also from the social coop-

eration they give impetus to. This means that regardless of their role, whatever activity users conduct via digital platforms – whether it be delivery, online teaching or simply chatting with their significant other – participates in the value process. At the same time, the more users interact on platforms, the more digital infrastructures become socially relevant and able to influence their behaviour and shape their social structures. Which is why, platforms are not simply a new type of business model. They have become the crucial infrastructure around which society is organizing.

This is particularly evident if we look at the impact platforms have on our cities. Cities are, in fact, the places where digital platforms metaphorically “hit the ground”, show their extractive tendencies and contradictions. This means that cities provide the necessary material and immaterial resources that allow platforms to exist. In turn, platforms tend to radically transform the local context in which they operate. A clear example of such dialectic is the case of Bologna’s brand of “City of food” analysed by Pirina in this Special Issue (2022). First and foremost, City of Food is a strategy of territorial marketing aiming to turn the Italian city into a gastronomic hub for tourism, thus establishing the perfect conditions for the success of food delivery platforms within the city. At the same time, platforms have pushed further such transformation, prompting an exponential growth in the number of bars and restaurants. This boils down to the creation of a myriad of contingent “student jobs”. This has ignited the grievances of platform workers and forced the local administration to take action in regulating platforms. The case study shows how a city is not simply a passive scenario where these processes just happen. It is also the main ground where struggles for the government of digital infrastructure take place.

As another author of this Special Issue, Pirone, highlights in his essay, cities do not play a background role in the effort to tame delivery platforms (2022). More than governing bodies at other levels, cities have been the testing ground for a range of tactics designed by activists and local officials to hamper the unregulated growth of digital platforms. From informal unionism to local initiatives of regulation, to platform cooperativism: cities have been the linchpin for all these attempts to counteract the power of platforms.

Both Pirina and Pirone’s contributions show how the relationship between platforms, logistics and the city is significant not only for the growth that delivery platforms have experienced in the times of pandemic, but also for its qualitative dimension. The Covid-19 crisis has made visible not only the pivotal role delivery platforms have achieved, but also many of the contradiction they were not able to hide anymore. While acting as infrastructures, (Plantin, Lagoze, Edwards, Sandvig, 2016), platforms normalize the

exploitation they are directly and indirectly responsible for. It is for this reason that “sorting things out” (Bowker and Star, 1999), as these essays have done, is not a merely an analytical endeavour, but also a political one meant to influence behaviors, to transform the regulatory environment, and to oppose the social inequalities platform spawn by their very operations (Mezzadra and Neilson, 2020). New struggles of digital workers become more visible and better organized. Since the beginning of the pandemic, courts all over Europe and the US have delivered historic sentences upholding the rights of platform workers. Successful strikes have targeted against delivery apps in South America, Iran, and several Gulf Countries. Even if platforms appear stronger since the Covid-19 outbreak, they are far from mastering their social and political environment.

4. New subjectivities at work: from commodification to assetization

The society shaped by digital platforms produces an intense and continuous redefinition of the perimeter of capitalism. The lines between the inside and the outside of capital are blurred, as the map of the spaces where value was produced in the industrial society has been dramatically transformed. The salary institution seems to no longer function as a fundamental mediation space, a solid ground to expound the labor-capital relationship. Meanwhile, new ways of organizing professional activities centred on the governance of human capital surface (Feher, 2007). Their perspective postulates that working time tends to expand beyond measure, eventually absorbing the entire life. Even relational, affective, communicative activities, that used to be considered “unproductive”, provide opportunities for the creation and capture of value. The post-wage scenarios workers face today calls into question the traditional subordination of the sphere of social reproduction to the sphere of economic production (Chicchi, Leonardi, Lucarelli, 2016).

Digital platforms are certainly the main tools of the subsumption under capital of the value produced within the sphere of social reproduction. They represent the new infrastructure of this emerging and pervasive appropriation of the value produced by every human activity. But that is not all. The spread of information technologies also tracks the central place of finance in supporting both development and accounting of accumulation processes. Financial markets spearhead capital dynamics. The basis on which value is constituted and counted today differs radically from the one adopted in traditional industrial and manufacturing economies. The process can be described, in a nutshell, by Carlo Vercellone notion of “the turning of profit

into rent” (Vercellone, 2009). This process alters the temporality through which value is extracted. The very quality of the time involved in the measurement of value changes. Now time is not solely defined by the processes of commodification of the workforce and by the exploitation of workers during the phase of production. A new site of valorisation opens up within the ever-expanding working time, by virtue of the social centrality of finance, between the moment of credit and the moment of debt. The cornerstone of this temporality is the openness to future expectations. On a social and subjective level, the unprecedented normative schemes of this time are arranged according to the new algorithmic governmentality that Rouvroy and Berns investigate (2013).

To understand how this extended working time operates, it is therefore necessary to focus on those processes that have been described as assetization of the economy¹. When production and social reproduction tend to become an indeterminate site of valorisation, mechanisms of social hierarchization are disrupted. The mechanisms that, in the industrial society were mostly linked to the position occupied by each individual with respect to work and wages, seem to have vanished. The key element that governs today’s inequality is whether or not one is able to buy assets that appreciate at a faster rate than both inflation and wages. We can say that «asset appreciation has been engendered by a specific institutional nexus that has fundamentally redrawn the social structure – such that asset ownership is now becoming more important than employment as a determinant of class position» (Adkins, Cooper, Konings, 2020, p. 10).

Assetization impacts both the valorisation strategies implemented by capital and the resistance practices put in place by workers to counter them. Once again, the Covid-19 pandemic has been an extraordinary catalyst for these phenomena, mainly because it has exacerbated social inequalities. The health crisis has also dramatically changed the survival strategies that new generations of contingent workers adopted to counter the “continuous crisis” of contemporary capitalism.

From an economic point of view, digital platforms certainly work according to an asset logic rather than a logic of mere market profit. Especially at their inception, investors and venture capitalists bankroll the development of “non-repayable” platforms, i.e. they do not worry about immediate profits. This approach mirrors the funding of traditional infrastructures like bridges, roads, ports, etc. The new social infrastructure subsidized by digi-

1. In contrast to commodities, assets are resources that can generate recurring earnings. «I conceptualize assetization as a process in which value is constituted by the management of value and valuation, especially as they relate to organizational entities and their capacities» (Birch, 2017, p. 470).

tal capitalists creates the necessary conditions for workers to earn an income from their own future activities.

To generate recurring return (assets) platforms must invest in creating the social conditions for their future functioning. Marketing, advertisement, research and development are a few examples of these expenses. To organize future social structures in a predictable way, platforms must build real “productive ecologies” capable of orienting individual assets. Assets, on the other hand, are not new. Already Thorstein Veblen (1908) referred to the capitalization process as a «transformation of something into property that yields an income stream (and not a commodity for sale). The difference between commodities and assets is best illustrated with an example; an asset is something like music copyright, while a commodity is more like a CD or downloadable song» (Birch, 2017, p. 468).

Kylie Jarret’s contribution on the workers of the OnlyFans online platform, featured in this Special Issue of *Sociologia del lavoro*, insists on these fundamental issues. As the author clearly explains in her compelling text, the assetization observed from the point of view of work shows how the construction of profitable relationships depends on the so-called self-branding. To build a desirable yet accessible profile with whom followers can interact, the creators and influencers on OnlyFans have to execute a considerable amount of online tasks: «to be successful, then, all kinds of influencers and creators must invest energy in identifying, developing, enhancing, and performing appropriate personality traits, aesthetic sensibilities, and / or embodied expressions of sexuality and / or genders. They must invest in growing their subjective human capital or, especially for OnlyFans sex workers, what Hakim calls their erotic capital» (Jarrett, 2022b, p. 98).

5. Cloudwork, crowdwork, and the hidden variable of automation

The recessionary effects of the pandemic crisis have highlighted the role of automation as both a capitalist tool to mitigate health and economic risks and a field of social and political tensions. In 2020, Oxford economist Carl Benedikt Frey publicly stated that automation would allow the production to continue, despite the lockdown and the risks associated to the Covid-19 outbreak (Williams, 2020). This would finally fulfil the prophecy of mass automation of almost half of all existing jobs, initially featured in a controversial working paper co-authored by Frey. “The Future of Employment” stated that 47% of existing jobs in the US were ripe to be replaced by machine learning processes and mobile robots over the following decade (Frey and Osborne, 2013). Despite being cited in countless publications, the

study has been the target of fierce criticism for its methodology. Its results were challenged, among others, by Arntz *et al.* (2016), who estimated the risk of job loss in OECD countries to a mere 9%.

Indeed, the pandemic crisis revived the rhetoric of the “great replacement” of human workers by automated processes, which problematically echoes the watchwords of contemporary right-wing and white supremacist milieus. The political undertones of this stance become all the more worrying when we ascertain that the pandemic-induced economic disruption has been followed by a “jobless recovery” (Jaimovich and Siu, 2020). Indeed, job losses have occurred mainly in sectors characterised by occupations viewed as easy to automate, such as economic activities that do not qualify as high-skilled or high added-value. However, this does not prove the hypothesis of labor displacement by automation.

Innovation is not an inevitable linear progression. It is the result of complex decision making occurring within organisations. Some of these decisions are easier to make in times of economic or social turmoil. This is a phenomenon that economists dub “automation forcing”: in labor markets where demand surpasses supply, instead of raising wages, corporations tend to adopt innovations that potentially compensate the labor shortage. Jobless recovery and automation forcing go hand in hand. Even in the absence of exogenous shocks like the Covid-19, the employment growth that global societies experienced until 2019 was not destined to last. The increasing number of persons working from home, urban de-densification, and employment concentration in large firms were bound to hamper it (Autor and Reynolds, 2020). These three factors also encouraged the development of big multinational platforms that operate through cloud infrastructures.

In the present pandemic capitalism, the forced march towards automation cuts through territories dominated by digital platforms. To what extent, therefore, this “replacement” is actually driven by AI-systems and intelligent solutions? To what degree it is less a matter of business process automation and more a case of business process outsourcing? By focusing on the actual modes of automation, one uncovers the material conditions and the living labor necessary to produce artificial intelligence. Since the 1990s, companies have outsourced strategic functions to regions where labor cost was much lower. In the following decades, the adoption of cloud solutions like PaaS (Platform-as-a-Service) and of crowdsourcing services made externalisation easier and cheaper (Apte and Mason, 1995; Motahari-Nezhad *et al.*, 2009; Sandkuhl *et al.*, 2016). Even the development of intelligent technologies is now made possible by specialised freelancing platforms where companies can easily access labor pools of both high-level professionals (interface designers, software engineers, data scientists) and hired

hands in charge with data annotation, debugging of a few lines of code, usability testing, etc. Fresh empirical evidence about the role of human-in-the-loop of machine learning have led recent scholarship to explore the germane notions of “heteromation” (Ekbia and Nardi, 2017), “automation’s last mile” (Gray and Suri, 2019) or “AI as a service” (Newlands, 2021).

We can see the same mechanisms at play in Marà and Pulignano’s comparative study of four online freelancing platforms. Digital labor arbitrage on platforms manifests in a very tangible way, through workers’ competition which in turn engages a race to the bottom and determines practices tantamount to wage theft. «Marketization strategies embedded in platforms’ organizational models and supported by deregulated national self-employment regimes produce a mechanism that pushes workers to “beat down the price” of their projects to be competitive and access work; since price reduction does not entail a decrease in workload, many work activities within the paid employment remain unpaid» (Marà and Pulignano, 2022, p. 143).

If the situation of the highly skilled European freelancers surveyed by the authors between 2020 and 2021 was dire, the extent to which they are able to negotiate “missions” and “gigs” necessarily differ from crowdworkers performing smaller tasks, who are sometimes paid just a few cents on platforms like Microworkers or Clickworker. Their role as actual builders of the databases used to train algorithms is constantly downplayed. The rapidity with which they verify the outcomes of automated process is glossed over. The ingenuity they exercise while impersonating defective AI tools goes unmentioned. Although disregarded, training, verifying, and impersonating are three essential human inputs to intelligent technologies (Tubaro *et al.*, 2020).

In her contribution to this issue, Tubaro analyses the case of Venezuelan micro-workers involved in these complex arrangements. The data produced by unemployed mothers and impoverished workers on makeshift computers are consolidated in databases to test and validate machine learning models. Even so, the social value of their work is not appreciated. The author underscore two main factors determining this misrecognition. The first one is the contractual relationship between workers and platforms, which is not one of employment but rather of simple use of service. The second, is the lack of recognition of workers’ learning outcomes from the client companies, which is at the root of the mismatch between wages and education. Workers performing microtasks display levels of qualification that consistently exceed those of the general population by several orders of magnitude. It is only a decision by platform owners and client company manage-

ment to describe what they do as “unskilled” labor and to contrast it with those of equally qualified developers or designers.

“The fact that workers themselves often take the rhetoric of simple tasks at face value and admit the complexities of their activity and their learning process only upon reflection, is indicative of their experience of disrespect, due to widespread misrecognition” (Tubaro 2022, p. 126).

Here’s where we realise that workers need more than the human capital expressed through self-branding and assetization. The subjectivities that emerge on digital labor markets also require their social capital. This notion hints at workers’ embeddedness in networks of trust and active solidarity. While studying online workers in low-income countries, several authors have pointed out the ambivalence of platform labor. On the one hand, it negatively affects workers by preventing them to access the benefits and social protection usually associated with formal employment; on the other, it puts them in touch with other workers and creates for them horizontal networks of collaboration (Wood *et al.*, 2019). These networks weaved by friendship and kinship don’t necessarily outweigh the disembeddedness caused by market forces. At the very most, they create situations of “deep embeddedness” where workers can earn higher rewards while at the same time being subject to stronger constraints (Tubaro, 2021).

Indeed, it still uncertain how the pandemic context has reconfigured the power balance between capital and labor. The latter is increasingly mediated by digital platforms, yet this mediation is bound to undergo major changes in the foreseeable future. We trust, however, that the contributions featured in this special issue will allow us to explore some of the main trends in this regard.

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