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# Why does unpaid labour vary among digital labour platforms? Exploring socio-technical platform regimes of worker autonomy

human relations

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## Abstract

Digital platforms provide many workers with vital income and offer the promise of flexible work, and yet also contribute to experiences of precariousness and exploitation, particularly with regard to pressures to undertake unpaid work. This article explores *why* unpaid labour is necessary and *what* drives its extent and form among diverse types of digital platforms. We theorize two ideal types of 'open' and 'closed' socio-technical platform regimes of worker autonomy, building on sociological insights about socio-technical systems, management control over worker autonomy and labour market segmentation by skill. In principle, 'open' ('closed') platform regimes grant relatively high (low) worker autonomy in terms of access to the platform, paid work and control over work tasks. Analysing five case studies, illustrative of 'open' and 'closed' regimes, we

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investigate unpaid labour in low-skill locational (i.e. food delivery) platforms and medium/high-skill online (i.e. freelancing) platforms. In brief, digital freelancers exhibit a lower extent of unpaid labour within relatively 'open' regimes, owing to greater autonomy over access to, and control over, platform work in a sector requiring medium/high skills. Conversely, 'closed' regimes mitigate unpaid labour for food-delivery platforms by providing market shelter for workers, who are easily replaced in an overcrowded sector requiring few skills.

### Keywords

algorithm technology, autonomy, platform, skill, socio-technical, unpaid labour

## Introduction

Unpaid labour is a major feature of digital labour platforms (Berg et al., 2018; Pulignano and Mará, 2021; Rani et al., 2021), also described as digital 'free labour' or 'ghost work' (Gray and Siddarth, 2019; Terranova, 2000). It exists in a proximate relationship with paid work (unlike unpaid domestic work or care work, for example) and is defined as unremunerated working time that contributes directly to the completion of platform tasks (D'Cruz and Noronha, 2016). Research already demonstrates that such proximate unpaid labour is often a gateway to access paid work on a digital platform (Wood et al., 2019). It can be instrumental in enabling the worker to conform with algorithmic performance metrics that require workers to spend time undertaking qualification tests, searching for tasks or researching clients, for example (Casilli and Posada, 2019). As such, regular unpaid labour is a key feature of platform workers' experience of 'algorithm insecurity' (Wood and Lehdonvirta, 2022), damaging their income security in particular. What is less well understood, however, is *why* and *how* unpaid labour varies among different types of digital labour platforms.

This article approaches this issue by building on sociological insights about socio-technical systems, management control over worker autonomy and labour market segmentation by skill in an attempt to shed light on potentially differentiated experiences of unpaid labour. The human relations tradition of socio-technical systems (Trist and Bamford, 1951; recently, see Guest et al., 2022) emphasizes the role of organizational choice in shaping a specific mode of work organization for a given technology. This approach usefully opens up the analytical possibility of human-centric versus techno-centric applications of digital algorithms in different platforms, which reflects varied forms of automated or semi-automated management decision making (Wood, 2021). A central characteristic of work organization is the degree of management control over worker autonomy (De Sitter et al., 1997), as highlighted by sociological labour process enquiry (Burawoy, 1985). By drawing together these insights, along likely segmentation effects by level of skill required by a job (Gallie et al., 2012), this article investigates *why* unpaid labour is necessary and *what* drives its extent and form in different platforms.

We develop two theoretically informed, ideal types of 'open' and 'closed' socio-technical platform regimes of worker autonomy (building on Sørensen and Kalleberg, 1981),

presented as a ‘theoretical abstraction’ (Weber, 1904: 90 in Doty and Glick, 1994: 233) to explain how and why unpaid labour unfolds by reflecting platform differences in the mode of work organization for a given digital technology and level of skill. ‘Ideal types’ are helpful in representing a unique combination of those organizational attributes believed to shape the relevant outcome(s) (Mintzberg, 1979). In principle, ‘open’ (‘closed’) platform regimes grant high (low) worker autonomy – in terms of access to the platform, to paid work and to control over work tasks. Analysing detailed case-study evidence from five selected platforms, we investigate how diverse ‘open’ and ‘closed’ regimes influence unpaid work in low-skill locational (i.e. food delivery) and medium/high-skill online (i.e. freelancing) platforms. The former provide services through apps that require physical assets (vehicles and personal interactions), while the latter provide services that do not require physical assets and exhibit a higher level of digitization of the technology applied to digital services (Joshi et al., 2022). As we illustrate, ‘open’ regimes, while in principle granting a high degree of worker autonomy, do not necessarily yield more favourable conditions regarding unpaid labour, and vice versa.

Our intended theoretical and empirical contributions to the literature are threefold. The first concerns the theoretical relevance of ‘open’ and ‘closed’ socio-technical platform regimes of worker autonomy for understanding unpaid labour on digital platforms. The empirical evidence counters assumptions of technological determinism in future of work debates. Rather than assuming workers undertake unpaid labour in direct response to algorithmic metrics, we find that differences in ‘open’ and ‘closed’ regimes provide a more compelling explanation of unpaid labour in varied platform contexts. These differences suggest that aspects of worker autonomy within digital platforms are on the one hand conditioned by the socio-technical application of platform algorithms and, on the other, reinforced (or diminished) by workers depending on the skill requirements of the platform. Our evidence shows that platform autonomy generated by ‘open’ regimes for high-skill workers has significantly different implications for unpaid labour than for low-skill workers. The second contribution is to reinforce already extensive evidence that the application of universal digital technologies may yet retain a ‘human element’, which in turn shapes the form and consequences of pressures by algorithmic performance metrics on workers. Our findings lend support to theoretical approaches to understanding the ‘socio-technical systems’ of digital technologies (Guest et al., 2022; Gandini, 2019 on ‘social embeddedness’). In particular, we focus on aspects of management mediation that may cushion some of the techno-centric performance consequences of algorithmic technologies (e.g. Gegenhuber et al., 2021; Tirapani and Willmott, 2023). In so doing, we highlight the enduring influence of the (much maligned) employment relationship within a ‘contested relational structure’ (Schüßler et al., 2021) where digital social ties persist among workers and their quasi-employers (managers, clients). Third, the article contributes empirical evidence of the precarity of digital labour by highlighting the adverse consequences of unpaid labour, highlighting how ‘open’ and ‘closed’ regimes shape insecurities over pay and irregular access to paid work (Schor et al., 2021).

The article proceeds with a critical review of the literature on platform work. The focus is on unpaid labour, algorithm technologies and worker autonomy, with the objective of developing the theoretical, ideal types of ‘open’ and ‘closed’ socio-technical

regimes of worker autonomy. After the research methodology and main findings, we review the findings by highlighting the theoretical contributions, and conclude.

## Unpaid labour

Labour can be paid or unpaid. Paid labour may be organized within an employment relationship, with a definable employer, or as self-employment. Unpaid labour is typically undertaken in the private sphere – for example, childcare or household work – but may also be associated with extreme labour exploitation, such as slavery. It may also be undertaken in close proximity to paid work. Forms of ‘proximate unpaid labour’ are the focus of this article. Examples include unpaid time travelling between client locations (e.g. care work, McCann, 2016), unpaid client networking time (e.g. creative work, Lee, 2011) and unpaid professional developmental time (e.g. architects’ work, Gardner, 2019). Importantly, the flexibilization of employment organization, the fissuring of work systems and employer use of short-term employment contracts are likely antecedents of proximate unpaid labour (Rubery et al., 2018; Weil, 2014). Moreover, its close proximity with paid labour means earnings are diluted and attributes of performance rendered invisible. Proximate unpaid labour is integral to the sense of accountability and contractual independence of self-employed workers (Boltanski and Chiappello, 2005). By fostering self-employment, digital platforms have therefore boosted opportunities for exploiting ‘free labour’ (Terranova, 2000), defined here as unpaid activities that contribute directly to completion of platform tasks. Workers retain some autonomy over the conduct of these activities, but they cannot control the boundaries between paid and unpaid platform labour. For example, commuting time is not ordinarily paid, but what if the employer changes the workplace location from one day to the next with implications for the worker’s distance of commute? Also, job search time is not usually paid to a self-employed person (since unemployment benefits are mostly confined to employees), but what if a job is configured as a discrete 15-minute task and the selection of a worker for each task requires dedicated search time?

Research on platform work has indeed uncovered a variety of forms of proximate unpaid labour, relating to waiting time, task search time, dispute resolution time, breaks, sick leave and holiday leave, and travel time (between jobs), among others, each associated with different platform types (Berg et al., 2018; Pulignano and Mará, 2021; Rani et al., 2021). This suggests that unpaid labour interlocks with a variety of platform algorithmic systems of control over how workers build performance ratings and reputation (Gandini, 2019; Guest et al., 2022). A worker’s reputation results from the evaluative, platform infrastructure of algorithmic management (Kornberger et al., 2017). It involves a peculiar kind of ‘cybernetic control’ since performance measurements and client reviews are algorithmically translated into calculating devices that circulate through feedback loops also involving the platform operator (Diab, 2017). Unpaid labour is at the heart of this process as it is typically required for platform workers to build and defend their reputation, serving as a gateway to access digital tasks and secure income (Shapiro, 2020; Wood et al., 2019). There is nevertheless a need for greater understanding of the inter-relationship between algorithmic control and ‘temporal control’ over work (Heiland, 2022), and how and why there is variation in the extent and form of unpaid labour. Extant

research highlights intersections with worker strategies of building reputation. However, what is lacking is theorization that can capture the variety of forms of unpaid labour in differentiated platform environments, attentive to socio-technical systems, worker autonomy and skill segmentation.

## Algorithm technologies and socio-technical systems

The design of sophisticated algorithm technologies, which manipulate big data, is one of the hallmarks of platforms' apparent competitive market success. Nevertheless, an overly techno-centric approach to their use is associated with problems of social bias, imprecise signalling and failure to value workers' tacit knowledge, generating interest in more human-centred approaches to platform work organization involving management mediation.

Platforms are 'multi-sided markets' (Eisenmann et al., 2006), which enable the purchase and sale of labour-intensive services by matching clients (or users) and workers (or service providers) as 'digital intermediaries' (Lehdonvirta et al., 2014). The ability to match clients directly with workers offers a key advantage, but it also poses challenges for platforms. Information asymmetry reduces trust between providers and users and the lack of quality information about the expertise of potential providers to deliver a quality service prior to the purchase decision constrains platforms' capacity to ensure service quality for users (Rosenblat and Stark, 2016). Moreover, fragmentation of tasks among geographically dispersed providers, who operate outside of a standard employment relationship of mutual commitment, increases the difficulty for platforms to monitor and control their services (Kässi and Lehdonvirta, 2018).

Platforms attempt to alleviate these problems by operating as the 'invisible hand' (Goldman, 2011). Their ostensible aim is to organize a large population of individual providers (workers) using a system of rewards and sanctions, typically involving a system of ratings, aggregated by algorithm technologies that include clients' reviews of completed tasks and/or automated tracking of worker performance, such as location availability. The precise method differs across platforms. Many deploy a five-star rating scale, against which clients review worker performance (e.g. price, quality, client satisfaction) (Maffie, 2022). While such evaluations are not unique to platform work (employers use customer reviews in non-digital services, Korczynski, 2009), their impact is likely intensified by platforms since worker ratings are analysed by an algorithmic, big data control system, which directly informs task assignments and worker retention (Griesbach et al., 2019).

In applying such algorithm technologies to work organization, platforms create incentives for workers to act in accordance with company objectives, especially to maximize economic transactions. In ride-hailing platforms, for example, drivers who fall below a certain rating are removed from the platform (Rosenblat and Stark, 2016). In this way, ratings stimulate workers to defend and improve their performance, which in turn reinforces those behaviours aligned with platform objectives to deliver high service quality. What this means for our study is that strong interlinkages between ratings, employability and income generate significant pressures to undertake proximate unpaid labour. As Gandini (2016) explains, 'the idea of embarking into unpaid commissions appears to be instrumental to start the loop of reputation construction and functions as a gate to other employment'.

Nevertheless, there is a need for more detailed examination of the role of platforms' potentially differentiated strategies that shape the pressures on platform workers. When platforms adopt a strongly techno-centric strategy, workers are likely to be subject not only to extensive algorithmic performance metrics, but also to a high risk of metric bias that favours certain behaviours over others, as well as lack of clarity over the mapping of certain signals with requisite behaviours. For example, worker reputation may be diminished by evidence of a discontinuous history of work when aggregated client data indicate an average preference for a continuously developed portfolio of past tasks (Leung, 2014). Also, there may be information gaps in the way clients are matched with workers via algorithms. Platforms control the data for this process and the ratings inform workers' access to tasks and earnings. The problem is that workers (and managers) may not know how these criteria are calculated, generating potentially misleading incentives about the relevance and impact of key activities, including whether or not to undertake unpaid labour (Veen et al., 2019). Consequently, in platforms with strongly techno-centric algorithmic systems, workers are likely to experience diminished capacity to influence their work portfolio and measure of work success.

Alternative approaches to algorithmic management may be described as 'human-centred'. In particular, this study draws on recent calls to revitalize the human relations tradition of 'socio-technical systems'. This considers technology as non-deterministic and highlights the shaping role of organizational choice and the socio-economic context into which organizations introduce technology. As such, organizations are considered socio-technical systems; as Trist and Bamforth argue, for a given technology there is a choice of social organization, which enables optimization of both the social and the technical system (Trist and Bamforth, 1951, cited in Guest et al., 2022: 1462). In other words, the social aspects of the employment relationship endure, no matter how much they are reconfigured by advanced digital technologies. Research on platforms indeed highlights the 'malleability' of digital technologies (Schüßler et al., 2021), as platforms design and remodel their strategies depending on context (Vallas and Schor, 2020). Moreover, recent studies of the application of digital algorithm technologies suggest that management mediation can still play a significant role, for example, in creating 'communication spaces' that incentivize 'crowd interaction' by lessening the socio-technical isolation of the 'crowd' (e.g. Gerber, 2021). At the same time, however, platforms may abide with a strongly techno-centric approach by opting to regulate the time and activities of workers stringently via 'algorithmic despotism' (Griesbach et al., 2019: 1).

The organizational and socio-economic context therefore shapes differences in platform strategies of work organization, reflecting distinctive social relationships of control (Tubaro, 2021), and operational modes by platform type (Frenken and Fuenfschilling, 2020). As such, to examine *why* unpaid labour is necessary and *what* drives its extent and form across diverse platforms, we need to investigate how ostensibly similar algorithm technologies are implemented by platforms alongside varied choices of work organization. These diverse 'socio-technical systems' are likely to have significant effects in shaping pressures on workers to undertake unpaid labour. To advance this proposition, we need to explain the different circumstances when workers can exercise autonomy over their work conduct.

## The socio-technical shaping of worker autonomy for diverse levels of skill

In advancing our thinking about organizational choice, our analysis of algorithm technologies also builds on a rich sociological tradition that recognizes that ‘technology is not neutral’ (Bélanger and Edwards, 2007: 717), such that it ‘offers a more or less favourable ground for job autonomy, control over work, and power’ (Bélanger, 2006: 336). Patterns of management control, worker effort and workplace conflict are tied to the labour process (Burawoy, 1985). Moreover, varied forms of control, constituted by the ‘technical and the human organization of work’ (Thompson, 1989: 19), reflect and reconstitute patterns of skill segmentation (Smith, 2015). This provides a deeper understanding of workers’ heterogeneous experiences of autonomy and the alienating conditions of their work (Blauner, 1964). Tying this perspective with the socio-technical systems approach (above), we anticipate two insights. First, the design and implementation of a given algorithm technology is likely to shape the balance of coercion and legitimation embodied in diverse management choices of work organization. Second, workers in jobs requiring different levels of skill are likely to experience variety in work organization (particularly autonomy).

Advocates of work design theory in traditional work settings consider autonomy as the freedom and discretion someone has in scheduling the work and in determining the procedures to be used in carrying it out (Hackman and Oldham, 1976: 258). Research on digitalization shows that the way platforms foreclose worker discretion and autonomy through the design and application of algorithm technologies is key to understanding platform control (Maffie, 2020). While platform workers may be considered ‘technically free’ to choose their schedule or switch platforms, intense competition for tasks means that it is often customer demand that dictates a worker’s schedule (Shapiro, 2020). For example, Uber drivers receive nudge messages that encourage them to work at the platform’s pace (Gandini, 2019). Moreover, the algorithms that determine client/worker matching and task compensation potentially reduce workers’ autonomy to accept or reject work assignments owing to information asymmetries (Woodcock, 2020). While individual use of digital technical devices offers the worker flexibility, it has also intensified user expectations of their availability, and thus reduced workers’ ability to exercise discretion over work tasks.

This ‘autonomy paradox’ is evidenced for different skill levels required of different digital labour platforms – for example, for knowledge professionals (e.g. Mazmanian et al., 2013) or for delivery workers (e.g. Shibata, 2020). The potentially varied consequences for workers in platform jobs requiring different levels of skill can be anticipated given the rich tradition of research investigating non-digital work organization, worker autonomy and worker skills. Traditional sociological thinking anchors low worker autonomy to the nature of skills – for example, higher skilled workers experience ‘responsible autonomy’ (Friedman, 1977) and those with fewer skills face direct control by management. Furthermore, Vidal (2013) explains how the form of managerial authority associated with the expansion of low-skilled service sectors has entailed a higher proportion of low-wage/low-autonomy jobs. Such patterns are moreover likely to be

dynamic, since modes of worker autonomy can be expected to interact with the potential for skill change via a range of mediating variables, including the type of platform and the design and implementation of algorithm technologies, as we detail below.

## **‘Open’ and ‘closed’ socio-technical regimes of worker autonomy**

Building on these interlocking theoretical ideas, our study was designed to interrogate potentially distinctive patterns of worker autonomy and unpaid labour observed among platforms’ varied operationalization of socio-technical systems. Two further insights were especially helpful in bringing together the eclectic analytical scaffolding for our study. These are Burawoy’s (1985) concept of a workplace ‘regime’, grounded upon a diverse set of socio-technical relationships organized around production and a management concern for labour control and autonomy, and Sørensen and Kalleberg’s (1981) notion of ‘open’ and ‘closed’ workplace systems of control and autonomy.

In their analysis of non-digital workplaces, Sørensen and Kalleberg (1981) distinguish between ‘open’ and ‘closed’ relationships on the basis of two aspects of worker autonomy related to job access and control over job activities. Their classification reflects more or less structured ‘entry channels’, which inter-relate with skills. For workers with relatively high skills, the more intense is the competition for entry the more open is the job access and the more positive aspects of worker autonomy experienced. The contrary is true for workers with fewer skills: a closed relationship is associated with structured entry channels, which shelter workers from competition with other workers (Maurice et al., 1982). Unlike non-digital workplaces, however, where management typically exercises close physical supervisory control over worker performance, platform workers must respond to management control strategies via algorithm technologies. Thus, we argue that the notion of worker autonomy needs to recognize three components: access to the platform (including freedom to sign up to other platforms without sanction and/or seek other jobs in the labour market); access to paid tasks once on the platform; and control over work conduct. The latter concerns control over working time, choice of task (especially the (im)possibility of task rejection) and how to do the work.

Similar to Sørensen and Kalleberg (1981), we posit that two ideal types of ‘open’ and ‘closed’ platform regimes are theoretically possible given the opportunities for distinctive management choices in work organization accompanying the operationalization of algorithm technologies. Open socio-technical regimes are associated with relatively high worker autonomy for each of the three components – platform access, task access and task control. As indicated above, recent studies also suggest there may be a potentially important fourth component that shapes worker autonomy: access to management mediation. Worker access to platform managers, who are assigned the task of mediating or softening algorithm decisions, can potentially alter the balance between algorithmic control and worker autonomy with consequences for the extent and form of unpaid labour. This kind of management role is theoretically feasible in both ‘open’ and ‘closed’ systems. Overall, each ideal-type socio-technical platform regime of worker autonomy is characterized by a set of interlocking relationships between platform choice of work organization, which shapes the boundaries to worker autonomy, and the application of



algorithm technologies. What remains to be empirically investigated is the significance of ‘open’ and ‘closed’ regimes in illuminating the different causes of unpaid labour, and the varied effects for workers in platform jobs requiring different levels of skill.

## Research design and case selection

We chose a comparative qualitative case-study research design (Eisenhardt and Graebner, 2007; Yin, 2014), consisting of narrative interviews and work diaries collected on five platforms (as the main unit of analysis) in Belgium, the Netherlands and France, to gain insights into the functioning of ‘open’ and ‘closed’ platform regimes and consequences for unpaid labour. The online appendix reports details for country selection. At the outset of our study, we targeted food-delivery and freelancing platforms where previous research had identified the presence of unpaid labour (see above) and from which we might observe variety among jobs requiring different levels of skill. Drawing on secondary materials, such as publicly available data, platform-dedicated websites and newspaper articles, we identified several potentially interesting platforms that were discussed during semi-structured expert interviews (N=15) with policy makers, trade unions, academics and platform management (Online Appendix Table 1).

This initial strategy allowed us to generate a purposive sample of platforms that could be used to generalize not to a population but to a theory (Strauss and Corbin, 1998) of ideal-type socio-technical platform regimes of worker autonomy. The ideal types are largely deduced from theory, as described above. We define an ‘open’ (or ‘closed’) platform regime as featuring open (exclusive) access to the platform, open (restricted) access to paid tasks and high (low) control over task content. The possibility for further human mediation in the guise of management mediation of otherwise techno-centric algorithm decisions (e.g. relating to worker–task allocation) provides further nuance to our operationalization of the ideal-type ‘open’ and ‘closed’ socio-technical platform regimes (see also Griesbach et al., 2019). We also sought to select a mix of platforms requiring workers with low and medium/high skills (Vallas, 2019).

Hence, we selected two food-delivery platforms to feature jobs or tasks requiring relatively few skills with examples of techno-centric (‘algorithm locational availability’ at Deliveroo) and human-centric approaches (‘management-mediated performance metrics’ at Takeaway) and two online freelancing platforms requiring higher skills, involving examples of techno-centric (‘algorithmic client-led performance metrics’ at Upwork and Malt) and human-centric approaches (‘management-mediated non-platform specific portfolio’ at Jellow) (Table 1; see Online Appendix for details). Expert interviews and documentary evidence enabled us to construct a preliminary impression of worker autonomy (platform access, task access, task control). Table 1 categorizes each platform into one of the two ideal-type regimes. Deliveroo and Jellow are conceptualized as ‘open’ regimes. In both platforms, their socio-technical systems establish a regime of worker autonomy in which (in principle) worker access to (and exit from) the platform is free, personal profiles can be kept open without the need to be regularly active on the platform and, again in principle, workers can control their working time, pay, choice of tasks. Takeaway and Upwork/Malt are described as ‘closed’ socio-technical regimes. Worker access to platform is not free, the worker cannot access paid work flexibly and the platform (not the worker) controls working time, task deployment and pay.

**Table 1.** Socio-technical systems in the five case-study platforms, their regimes and component of worker autonomy.

|               | Regime type | Platform access   | Task access   | Task control   | Management mediation of algorithm decisions  |
|---------------|-------------|---|---|--|--|
| Deliveroo     | Open        | Free login system with free entry and exit  | Algorithmic allocation using 'best order-to-rider fit' and worker availability – 'on the right spot at the right time'  | Workers decide start/finish times, but not the number of orders and pay per delivery; workers can decline orders, but if cancellation occurs during delivery then not compensated  | <i>Techno-centric</i><br>Algorithmic locational performance metrics                    |
| Jellow        | Open        | Free with free entry and exit; no sanctions for working off platform                            | Algorithm matches freelancers' reputation profiles with tasks based on database informed by client reviews and freelancer portfolio-building on and off the platform; freelancers receive personal help and guidance from platform managers | Freelancers can control their working time, pay and task development; they can also keep their profiles open without the need to be active   | <i>Human-centric</i><br>Management-mediated, non-platform-specific performance metrics |
| Takeaway      | Closed      | Regulated by shift assignment by the platform   | Metrics and assessment by middle-range management govern worker access to tasks   | Platform controls working time, the deployment and the timing of tasks, and pay; workers are paid per hour and are formally employed by either the platform or an employment agency  | <i>Human-centric</i><br>Algorithmic management-mediated performance metrics            |
| Upwork & Malt | Closed      | Requires payment of fees; sanctions for working off-platform and penalties to reputation scores | Governed by client-led performance metrics and facilitated through purchase of platform currency (e.g. 'connects' on Upwork)  | Platform-specific badges and clients' ratings determine task conduct; ratings are based on speed, response rate, task completion, communication, job complexity and availability, to keep high scores and avoid deactivation, freelancers need to log in frequently and regularly accept assignments | <i>Techno-centric</i><br>Algorithmic client-led performance metrics                    |

Source: Expert interviews and secondary documentary data as described in the text.

## Data collection

The primary method of data collection was narrative interviews. Work diaries were the secondary method, complementing the interviews by validating them and giving further analytical insights (Morse and Niehaus, 2009). Narratives are recognized here as the way people imbue their experiences with meaning (Cinque et al., 2021). We used narrative interviews to focus on the workers' lived experiences of autonomy (i.e. in relation to the workers' overall work and life situation), that is to indicate how a worker 'makes sense' of his/her own autonomy over the conduct of work and life by shedding light on the capacity to order among specific events within a medium-long term perspective (Riessman, 1993). In the narrative part, interviewees were given time to tell a story of their life–work experiences, and in the semi-structured part they were asked about unpaid labour, their work conditions and the autonomy they had in accessing the platform, in accessing work on the platform and beyond, and over the conduct of their work. Work diaries, collected alongside narrative interviews, consisted of audio recording of work experiences for 10 successive working days, with a similar focus on autonomy over platform access, platform tasks and control over task activities, as well as forms of proximate unpaid labour.

Primary data collection included 76 narrative interviews with workers in the five platforms – 34 with food delivery couriers (15 in Belgium, 10 in The Netherlands, 9 in France) and 42 with freelancers (13 in Belgium, 15 in The Netherlands, 14 in France). We purposefully selected freelancers associated with different occupations (IT, graphic design, translation, copywriting) across different countries and platforms to pick up a range of high skill types. For freelance platforms, we used platforms' search engines to identify potential respondents, who were then contacted via LinkedIn or Facebook. Respondents on food-delivery platforms were recruited via snowball sampling, grass-roots and trade unions. They reported different employment statuses (student self-employed, self-employed, employed via temporary employment agency, employed directly by the platform) and (have) work(ed) on one or several platforms. While some respondents (N=42) consented only to an interview, others (N=34) consented to both a narrative interview and a work diary (Online Appendix Table 2). The audio format for the diaries was chosen as it was easier to handle by respondents than a written diary (Harvey, 2011) and we expected the oral account to be spontaneous and rich (Crozier and Cassell, 2016).

## Data analysis

We used thematic analysis to interpret the interview and diary data. Data analysis proceeded in three sequential steps: (1) open coding of interviews and diaries, where the analysis of the narrative part provided the interpretative structure for the analysis of the semi-structured part of interviews; (2) selective coding of interviews and diaries, where the prevalence of each code was identified in the diary data; and (3) comparative analysis of both data sources, moving from codes through themes to concepts (Online Appendix Table 3). The first step involved open coding (Glaser and Strauss, 1967) of the interviews and diaries using NVivo 12. All interviews and diaries were attributed an acronym, which

was constructed in the following way: the first two letters indicate the country where the interview was conducted, the second two letters are the initials of the interviewee (anonymous for reasons of privacy), and the number indicates the chronological order of interviews in each country.

For both food-delivery and online freelancing, we examined the paid and unpaid labour activities by creating codes indicating two dimensions of worker autonomy: (1) control over access to work; and (2) control over work activities. Within access to work we distinguished between access to the platform, access to other platforms and the wider labour market, and access to paid work. Within control over work activities, we distinguished between control over work time, how to do the job and task rejection. Concerning unpaid labour activities, six forms were identified for food delivery and seven for freelancing platforms. The second step comprised selective coding (Glaser and Strauss, 1967) of interviews and diaries. For diaries, we mapped each code (forms of unpaid labour, autonomy over platform access, job access and task control) within the data and explored whether they suggested differences across the five platforms. We used the codes developed in step 1 to detail how often each respondent reported in their work diaries engagement in work, or experiences of autonomy. Tables 2 and 3 show per platform the percentage of days each respondent reported a particular form of autonomy or unpaid labour, respectively. Each percentage was calculated by dividing the number of days a form of autonomy or unpaid labour was reported by the total number of working days each individual worker engaged on the platform. The third step included an analysis of narrative interviews and diaries to reveal how platforms' socio-technical application of algorithms and the interaction with worker autonomy affected unpaid labour. From the emerging codes we linked to our theoretical constructs of 'open' and 'closed' regimes of worker autonomy by focusing on the main themes of socio-technical algorithmic control over worker autonomy, its interaction with different levels of worker skill (afforded by the selection of mixed platform types) and the consequences for proximate unpaid labour.

## **'Open' socio-technical platform regimes of worker autonomy: Deliveroo and Jellow**

### *Access to the platform and to paid work*

One feature of openness concerns workers' autonomy to enter and exit the platform: 'We are free to move in and out at will' (NLMF01). Another is workers being free to decide when to start and finish the job as they can log in easily via apps (e.g. 'If you have a bike and a phone you can start immediately' (NLMF01)). The relatively open regime also enables workers to decide their own routes (38% of Deliveroo respondents) and combine rides with work elsewhere: 'When there are no deliveries on Deliveroo, I work for UberEats' (NLLV12). Diaries confirm workers log in and off in 86% (Deliveroo) and 96% (Jellow) of working days. Neither commissions nor sanctions are imposed on workers when they decline tasks (51% Deliveroo) or work outside the platform (47% Jellow): 'I can always access the app, there's no restrictions' (FRCM21) (Table 2).

However, open access to the platform does not always correspond to having open access to paid work as not all workers who 'log in' are assigned an order immediately; in

**Table 2.** Measures of worker autonomy in the five case-study platforms (% of working days).

| Platform type  | Measures of autonomy                      | Example quote  | Percentage of working days the form of autonomy was mentioned by workers (%)                                      |                     |    |
|--|---|--|---|---------------------|----|
|  |   |  | Open regimes  | Closed regimes      |    |
| Food-delivery labour platforms   | Access to platform and task               | Autonomy related to access to work outside the platform  | Deliveroo<br>13   | Takeaway<br>13      |    |
|  |   | Autonomy related to access to platform (login/logoff or open shifts)   |   |                     |    |
|  | Task control activities                   | Autonomy related to access to paid work on the platform  | 'I can choose myself when I log in, when I log out' (BECM09)  | 86                  | 2  |
|  |   | Autonomy related to control over work time: what to do or when to take a break   | 'I am always paid by hour – more or less around 11 per hour-gross' (BECM17)                                       | 10                  | 90 |
|  |   | Autonomy related to control over how to do the job   | 'If you have nothing to do in between orders, then you can quickly go to a waiting space' (NLMF02)                | 0                   | 30 |
| Freelancing labour platforms   | Access to platform and task               | Autonomy related to task rejection   | 51  | 2                   |    |
|  |   | Autonomy related to access to work outside the platform  | Jellow<br>57  | Upwork & Malt<br>13 |    |
|  | Task control                              | Autonomy related to access to platform (login/logoff)  | 'I worked from home for my regular job' (NLMF08)  | 96                  | 73 |
|  |   | Autonomy related to access to paid work (no fees to apply for tasks; control over contacts with clients; few reputation tasks) | 'I spent lots of time on the platform applying for jobs and checking whether anyone answered' (NLMR08)            | 92                  | 11 |
|  |   | Autonomy related to control over work time (predictable working hours)   | 'I have sent material to the clients via e-mail. (. . .) That is more or less half an hour of paid work' (NLMF10) | 71                  | 21 |
| Autonomy related to control over how to do the job (what tasks to do for whom on the platform and how to do these tasks) | 'I was free to choose my routes' (NLMR02) | 47   | 29  |                     |    |

Source: Own elaboration. The sample size included: 80 working days in Upwork, 50 working days in Jellow, 70 working days in Deliveroo, 80 working days in Takeaway.

**Table 3.** Measures of unpaid labour in the five case-study platforms (% of person-days).

| Sector                         | Forms of unpaid labour   | Example quote  | Percentage of days this form of unpaid labour was mentioned by workers (%) |                 |
|--------------------------------|--|--|--|-----------------|
|                                |  |  | Open regimes   | Closed regimes  |
| Food-delivery labour platforms |  |  | <i>Deliveroo</i>   | <i>Takeaway</i> |
|                                | 1. Waiting time because of a lack of orders                      | 'In a period of 15 minutes it can be that there aren't any orders and then you're just waiting' (BEMF16)   | 64   | 0               |
|                                | 2. Searching time in case of errors and delays at restaurant     | 'I had to wait four times for 10 minutes in different restaurants. That is waiting time you are not paid for' (BEMF40)   | 47   | 2               |
|                                | 3. Travel time: to and from work                                 | 'I got an order and then cycled from the customer's house back to the centre waiting for an order. After that I cycled home, which was also unpaid' (NLMR02)                   | 39   | 12              |
|                                | 4. Travel time between orders                                    | 'Between the orders I always had to wait for about 10 minutes for a new order. That is also unpaid' (BEMF38)   | 23   | 0               |
|                                | 5. Time invested in dealing with conflicts (restaurants/clients) | 'I tried to call the customer but he did not answer. I then contacted the platform with the chat. After 5 minutes they answered but they could not reach them either' (BEMF16) | 11   | 0               |
|                                | 6. Compulsory unpaid breaks and shortening of the shifts         | 'It was a bit frustrating that they made me finish my shift earlier than I should. Which is something that they constantly do' (NLMR05)  | 2  | 44              |

*(Continued)*

**Table 3.** (Continued)

| Sector                               | Forms of unpaid labour   | Example quote   | Percentage of days this form of unpaid labour was mentioned by workers (%) |                |
|--------------------------------------|--|---|--|----------------|
|                                      |  |   | Open regimes   | Closed regimes |
| Freelancing labour platforms         |  |   | Jellow   | Upwork & Malt  |
|                                      | 1. Communication with clients  | 'I received a message from my English client, he wanted me to do a transcription of a video. We talked for an hour and then he changed his mind. He didn't give me this job' (FRCM16) | 8  | 94             |
|                                      | 2. Buying platform currency to bid for tasks   | 'What bothers me is buying the currency, paying the commission fees and covering the transaction costs, like the exchange rate' (FRCM16)  | 0  | 2              |
|                                      | 3. Job searching and applications  | 'All the work I've carried out today was not paid for. It was just searching for jobs and applying for transcription and translation jobs. Nothing came out of it' (NLLMR08)          | 0  | 36             |
|                                      | 4. Sending free samples of work  | 'They ask you to send things and then they actually use parts of the texts that I have written without paying me anything' (NLLV01)   | 0  | 5              |
|                                      | 5. Compulsory unpaid breaks  | 'Today I had to work for four hours without a break because the client was in a great hurry' (FRCM16)   | 49   | 97             |
|                                      | 6. Doing extra jobs to keep clients satisfied  | 'I am scared to say "no" to the client as that may close some doors for the future' (FRCM13)  | 9  | 33             |
| 7. Investment in reputation building | 'I keep adding things to my website, my Instagram, doing a bit of marketing, a bit of connecting with people. I wrote a bit for my blog, which I hope will be paid for one day' (BEMFI3) | 8   | 30   |                |

Source: Own elaboration. The sample size included: 80 working days in Upwork, 50 working days in Malt, 60 working days in Jellow, 70 working days in Deliveroo, 80 working days in Takeaway.

Deliveroo, diaries illustrate a huge discrepancy between workers accessing paid work (10% of working days) versus accessing the platform (86%) (Table 2). Once logged in, Deliveroo workers are inactive on the platform until they receive an order. This is because the algorithm ('FRANK') monitors workers' performance and assigns orders on the basis of the temporal and spatial efficiency of each delivery; being 'on the right spot at the right time' (FRCM14) is therefore important to receive an order. The algorithm calculates the optimal delivery distance using data collected from restaurants, workers and clients so that 'there is always a worker waiting and ready to take an order' (FRCM21). As we explore below, Deliveroo workers thus seek to collect as many orders as possible in a row – through 'frequent log in and avoiding cancelling orders' (BEMF35) – so as to reduce unpaid waiting time between orders.

Jellow also offers free platform access to workers – mentioned on 96% of working days (Table 2). Freelancers register via the app without paying any fees or commissions, and they are able to include their portfolios, which show their competences and/or clients, and can contact clients on and off the platform without being charged a fee when searching for tasks. Unlike Deliveroo, diaries report freelancers accessing paid work for a very high proportion of working days (92%). In addition, Jellow clients pay a monthly fee to access freelancers' profiles: 'we choose not to earn money through freelancers, but businesses' (NLMF11). Therefore, freelancers use self-promotion, social-media presence, networking, communication and cultivation of good relationships with Jellow clients who review their work knowing this can develop a good portfolio by repeated collaboration: 'I really invest a lot of time in personal contact with my clients and it pays off' (NLLV07). Working on Jellow enhances competitiveness overall – namely, in the platform, other platforms and in the wider labour market: 'I did really good translating jobs and that was because I stood out' (NLLV09).

### *Autonomy to select tasks*

An open socio-technical platform regime may be associated with either techno-centric or human-centric operationalization of algorithms (see above). Indeed, while Deliveroo displays a strongly techno-centric approach, Jellow demonstrates how proactive human intervention by managers employed directly by Jellow can support and adjust the algorithmic matching process. The evidence suggests this aspect reinforces the high degree of Jellow freelancers' autonomy over their working time and work conduct, as well as their capacity to shape their task portfolio. Diaries demonstrate Jellow freelancers exercise autonomy over when to work (71% of working days) and how to work (47%) (Table 2). Jellow freelancers also enjoy relatively high autonomy to build their portfolio by moving on and off the platform; they report that 57% of working days are spent undertaking tasks outside the platform (Table 2). Clients usually choose to whom they prefer to commission the task based on the freelancer's portfolio: 'A profile on Jellow is your business card' (BEMF10).

By contrast, Deliveroo diaries report that workers experience autonomy over working time on 0% of working days, so that 'it is impossible to use Deliveroo as a main source of income' (NLMF01). Paying workers a piece rate allows the platform to cut unit labour costs while relying on a 'reserve army' of labour to undertake tasks requiring few skills



by using the ‘free log-in’ system: ‘everyone can connect any time’ (FRCM14), ‘including no checks of visa or work permit’ (BEMF39). The ‘free log-in’ system encourages workers to compete for orders according to their locational availability, which is calculated and imposed on them by the algorithm. Deliveroo seeks to beat competitors by targeting fast and fully tracked deliveries, which respond quickly to fluctuations in demand. Moreover, the ‘free log-in’ system, with workers paid directly by clients, allows the platform to legitimize the use of self-employment status insofar as workers can claim to have freedom over accepting or cancelling orders based on the information they have about the client’s location. In Belgium, however, workers have information on the client’s location only when they accept an order or arrive at the restaurant. In so doing, the platform prevents them enacting discretion in choosing only short-distance deliveries, which are more profitable as the pay per delivery is fixed for these workers and no distance-based fees apply: ‘We can’t see clients’ address so we cannot check the restaurant and pick the order if it’s good’ (BEMF36). In France and the Netherlands, Deliveroo discloses information about the client and the restaurant’s locations to workers as distance-based fees apply (see Online Appendix). While Deliveroo workers experience autonomy over task rejection for 51% of working days, autonomy over the conduct of their work is only 38% (Table 2). Workers also often live in the suburbs and it takes them up to ‘an hour of cycling to reach the city centre, where they can check in and start working’ (BEMF38). Thus, when someone works s/he earns ‘[j]ust little money considering how long you have to wait before receiving an order [. . .] and in between orders [. . .] or how long you have to cycle to reach the point you need to be’ (BEMF39).

## **‘Closed’ socio-technical platform regimes of worker autonomy: Takeaway and Upwork/Malt**

### *Access to the platform and to paid work*

A closed platform regime refers to the socio-technical features that restrict workers’ autonomy to access the platform, to undertake paid tasks and to exercise control over tasks. Workers’ access to the platform is conditioned by the assignment of shifts at Takeaway and the payment of a commission at Upwork and Malt. Takeaway workers rarely experience autonomy to access the platform (2% of working days). Once on the platform, however, Takeaway workers report very high autonomy in accessing paid work (90% of working days). Workers are guaranteed a minimum of two shifts of three hours each per week, which also grants some control to workers over when to take a break (30% of days). By contrast, freelancers on Upwork and Malt struggle to access paid work (11%) owing to platform restrictions (contacts with clients off platform are sanctioned) and the need to pay platform fees. They are discouraged from exiting the platform owing to penalties imposed by algorithmic metrics systems, essential to access tasks (Table 2).

As workers are hourly paid, Takeaway assigns as many orders as possible to them, and requires orders delivered within workers’ paid time: ‘At the very moment you’ve delivered an order, bam, you get a new one’ (BEMF18). The human-centred character of its algorithmic system is evident. Workers depend on both good statistics and a good relationship with supervisors, so tend not to refuse assigned tasks (just 2% of working

days). Those who are slower or who regularly reject orders risk sanctions, as a supervisor explained:

If a rider keeps getting less than two deliveries per hour, s/he'll receive a warning from me, we'll talk [ . . . ] If the worker carries on along this path there will be another warning and eventually s/he will be kicked out. (NLMF03)

Together, Takeaway supervisors ('captains' and 'coordinators') can be contacted directly when workers experience problems or accidents, avoiding sanctions for events beyond their control: 'Once I fell during my shift and my bike broke down. I took the screenshots and sent to the hub, explaining what happened. In this way I avoided bad statistics' (BEGIGMF19).

Access to Upwork and Malt is limited by the payment of a fee once the task is concluded. Task assignment depends on client-led performance metrics – which in Upwork is conditional on freelancers paying for 'connects' to increase their chances to win paid tasks; freelancers who contact clients off the platform are sanctioned by fines or deactivation. Freelancers need to be visible, active and continuously available for their performance to be rated: 'All I want is to put myself offline sometimes but if I do that, I'll lose my competitiveness and it'll take me three weeks to gain it back' (FRCM15). Freelancer ratings are based on speed (response and task completion), communication, complexity of the job and availability. These criteria are pre-defined by the algorithm, generating a five-star rating. Failure to achieve five stars 'puts my future income at stake' (BECM02). The Upwork algorithm calculates a 'job success score' based on each freelancer's activity within the last 24 months. It decreases when freelancers cancel tasks assigned to them with no opportunity for human mediation. Likewise, the statistics Malt gathers on freelancers' performance contribute to a 'point-based' system of badge assignment, enabling the platform to rate worker performance.

### *Autonomy to select tasks*

Takeaway workers are granted working hours in line with their individual metrics and availability: 'You have statistics that allow you to reserve your shifts. People with the best statistics go first' (BEMF16). Workers rarely reject orders (just 2%) because they would be penalized by the platform. Performance metrics include: worker availability; on-time delivery; 'food-in-bag time' (the time between picking up food at the restaurant and delivery); and 'wrong app usage' (late pick-up of food).

Nevertheless, as noted above, worker performance on Takeaway is measured through a combination of algorithmic statistics based on clients' reviews and supervisors' evaluations based on daily face-to-face contact with workers. This means there is space for negotiation to contest bad statistics and avoid sanctions. As reported by a Takeaway manager:

We have the data generated by the app and captains on site actually conduct the evaluations with the couriers face-to-face. When a worker scores poorly on the app, the captain may still say that this person is doing well. Then it's up to the coordinator to do the final evaluation. (BEMF45)

On the basis of this human-centred algorithmic appraisal, decisions are made about the type of contract, pay rise, promotion or dismissal. Workers performing best are rewarded a pay increase of €0.50 per hour every three months. This means that high-performing workers after a year of platform work can increase their pay from around €10/hour to €12/hour (BEMF17; BEMF18; FRCM25; BEMF04). Good statistics are also rewarded by prolonging the contract. In Belgium, Takeaway upgrades workers ‘from daily to weekly, and thereafter monthly contracts’ (BEMF18). Workers with good statistics can move up the career ladder ‘from rider through to captain who delivers food and supervises workers’ (BECM09), while workers with bad statistics are addressed with a ‘warning’, followed by a ‘performance talk’ and ‘re-training’ (BECM09).

Freelancers on Upwork and Malt earn performance badges, such as ‘Top Rated’ and ‘Rising Star’ badges on Upwork and ‘Super Malter’ on Malt, which are essential to access tasks. Clients choose freelancers based on their badges and ratings are continuously adjusted by the platform algorithm to reflect clients’ reviews. Reaching the ‘top rated status is the only thing that matters’ (NLLV01) with the goal of accessing more clients and tasks by beating competitors on price and quality. Badges are difficult to win but easy to lose as ratings can be lowered if workers are not regularly available:

It’s the replying speed that makes your profile highlighted. As soon as I have a request, I feel stressed because I know it needs to be answered. Malt also sends us messages: ‘you haven’t replied yet’. So sometimes it’s a Friday evening, 7 p.m., you are making dinner for your kids and you have a request from Malt. (FRCM05)

Whereas Upwork decreases fees from 20% to 10% once the freelancer earns above a specific income threshold, Malt decreases fees when the work with a client is prolonged. The constant need to be available and active makes it difficult to take time off: ‘I can’t remember the last time I took a holiday’ (FRCM02). Thus, Upwork and Malt freelancers experience relatively low autonomy over working time and work conduct (21% and 29% of working days) (Table 2).

## **Unpaid labour in ‘open’ and ‘closed’ socio-technical regimes of worker autonomy**

### *Comparing food-delivery platforms: Deliveroo and Takeaway*

Despite its relatively open regime, the capacity to access paid work is much lower in Deliveroo (10%) than in Takeaway (90%). This engenders greater uncertainty for Deliveroo workers and drives them to engage in more unpaid labour: ‘You don’t have any control over your pay. You don’t know how long you’d wait for an order. Restaurants are often busy so you might end up doing just two deliveries an hour, which means €7 before tax’ (NLLV12). Deliveroo workers spend considerably more unpaid time waiting to access paid tasks than Takeaway workers (64% and 0%, respectively) (Table 3). As one Deliveroo worker reported: ‘Often you have to wait and when you wait, you earn nothing. Then you don’t know how much you’re going to make by the end of the day’ (BEMF39). While both Deliveroo and Takeaway workers report working outside the

platform (13% of working days in both cases), this represents the need to compensate lost income at Deliveroo compared with the opportunity to top up their income at Takeaway (since the guaranteed shifts are not always sufficient).

One exception to the Deliveroo–Takeaway pattern of unpaid labour concerns the fact that Takeaway workers experienced a greater percentage of unpaid compulsory breaks than Deliveroo workers (44% and 2%, respectively). The explanation is that Deliveroo workers choose to skip unpaid breaks whenever possible owing to workers being paid per piece. Unpaid search time in case of errors and delays at restaurants occurs more often in Deliveroo (47%) than Takeaway (2%). Unpaid time spent addressing conflicts (both with restaurants and clients) only prevailed among Deliveroo workers (11%) (Table 3). Unsurprisingly, given the higher presence of unpaid labour, Deliveroo workers report higher income insecurity than Takeaway workers. Moreover, because the platform adjusts the per-delivery pay according to customer demand, the pay is unpredictable: ‘We never know how much we’d earn. We depend on the number of people logged in and the rates that they offer and on the clients’ (FRCM21). While average net income per working day (as reported in diaries) on Takeaway is €70.89, on Deliveroo it is only €38.71. Deliveroo workers said they could not plan their incomes, which perpetuated insecurity:

I can go to work this lunchtime and earn €5, €10 maybe €15 for two or three hours. And then the next day, there won’t be many deliveries and I will maybe earn half. So, it’s really hard to predict. (FRCM21)

On Takeaway, proximate unpaid labour is overall less frequent and more predictable income meant workers could calculate their earnings on the basis of the number of scheduled working hours: ‘I got a contract for 15 hours a week. I saw the salary, which is average, like for 15 hours they give us €605 per month, as a gross salary’ (FRCM22). Moreover, the Takeaway captain and hub coordinators were reported to be accessible and helpful in ensuring some workers received pay rises and avoided sanctions: ‘You get assistance for every problem. For instance, [when] people who ordered the food are not there, you contact the dispatchers and they advise you what to do’ (BECM09).

### *Comparing freelancing platforms: Jellow and Upwork/Malt*

Platform algorithms on Jellow involve a degree of management mediation in their application. Jellow freelancers receive personal support for task availability, client search, charge fees and improving profiles. Freelancers learn about what a client needs at the start of a transaction by seeking advice from Jellow supervisors. This results in a significantly lower incidence of unpaid work, especially with respect to client communication and job search and making applications (Table 3). The transparency of the transaction is key: ‘Following the advice of Jellow management I have developed my Jellow profile and now I see it really pays off’ (BEMF03). Moreover, the relatively open platform regime means freelancers do not incur entry restrictions or fees. They compete by developing their portfolios, which grants access to work: ‘Jellow is a part of my freelance network. All I publish on other sites, I publish also here. All I achieve elsewhere, I put on

Jellow as well. It's all connected, which increases my visibility to my potential clients' (BEMF10). The one exception concerns compulsory unpaid breaks, which Jellow freelancers consider a 'normal feature of freelancing', knowing they are more likely to be compensated with better paid work in the near future.

Conversely, freelancers in Upwork and Malt register a higher incidence of unpaid labour – especially client communications (94% of days) and compulsory unpaid breaks (97%). Freelancers keep clients happy as 'reputation is crucial and even one bad feedback can ruin your profile' (FRCM02). Moreover, Upwork and Malt only retain successful freelancers. In the case of inactivity or a low job success score, freelancers are asked to improve: 'If you are non-active, they contact you. If you don't react, you get expelled' (NLLV01). The threat of sanctions, makes freelancers 'scared to say "no" to clients as that may close doors for future work' (FRCM13). By contrast, samples of previous work are included in Jellow freelancers' profiles, available to clients and constructed with advice from managers: 'Jellow are very good at suggesting how to improve things' (NLLV05).

Moreover, the techno-centric, client-led algorithmic metrics deployed by Upwork and Malt meant freelancers were far more likely to spend time on additional unpaid tasks for clients (33% versus 9% at Jellow) (Table 3). The threat of being downgraded keeps freelancers in 'the whirl of competition and unpaid' (FRCM05). To build reputation on Upwork and Malt, freelancers often agreed to unfavourable working conditions, including underbidding, partial payment and unpaid labour: 'While you're building reputation, you can work for next to nothing! You charge the bare minimum, you work your ass off because you need those five stars' (FRCM02). The pressure to receive good ratings thus creates a power imbalance between freelancers and clients. Clients recognize the power of their reviews and they attempt to trade their five stars for extra tasks:

There are some tasks for a ridiculously low price, where the clients say: if you do this, I will give you five stars [. . .] so in the end you keep doing things for free, just for the sake of getting good reviews. (FRCM02)

The average net income per working day on Upwork and Malt was €71.54, compared with €143.36 on Jellow. When we relate the lower pay to the higher incidence of unpaid work, it is easy to appreciate Upwork and Malt freelancers struggle to make ends meet:

I work a lot just to pay my bills and buy my food [. . .] Working eleven hours today I must have made €50, if I count how much I get for completing my missions minus the Malt fees and the contributions. (FRCM13)

Because they have invested in platform-specific reputations, Upwork and Malt freelancers are tied to the closed platform regimes. Conversely, reputation is not platform-specific in Jellow's relatively open regime, which allows freelancers to leave the platform without any consequences and to combine on-platform and off-platform work as they wish. This reduces platform dependency and accounts in part for the lower incidence of unpaid labour.

## Discussion

Drawing on theoretical insights about socio-technical systems, management control over worker autonomy and labour market segmentation by skill, this article investigated the antecedents of unpaid labour in diverse types of digital platforms. Our findings suggest that differences in what we constructed as ‘open’ and ‘closed’ socio-technical platform regimes of worker autonomy contribute to explaining the extent and forms of unpaid labour by revealing specific constellations of worker autonomy, skill requirements and management mediation of algorithmic decisions. We discuss three theoretical and empirical contributions to our understanding of digital platforms and proximate forms of unpaid labour.

The first contribution concerns the theoretical significance of ‘open’ and ‘closed’ socio-technical regimes of worker autonomy for understanding aspects of work organization (more generally), including proximate unpaid labour (specifically). While current literature already documents the variety of forms of unpaid labour resulting from algorithmic performance pressures (Berg et al., 2018; Gandini, 2016; Schor, 2020; Shapiro, 2020) and the associated insecurities faced by workers (e.g. Wood and Lehdonvirta, 2022), studies do not theorize the antecedents shaping the potential variety of relationships between unpaid labour and worker autonomy. Our contrasting, albeit complementary, approach of theorizing ideal-type ‘open’ and ‘closed’ socio-technical regimes of worker autonomy brings to the foreground neglected theoretical insights from sociology. These consider management control strategies as resulting from technical and work organization choices (notably Bélanger, 2006; Burawoy, 1985; Smith, 2016) with the potential for ‘open’ and ‘closed’ systems of worker autonomy in labour markets and workplaces (Sørensen and Kalleberg, 1981) and theoretically uneven implications for workers segmented by level of skill (Maurice et al., 1982; Vidal, 2013). Accordingly, the ideal-type regimes capture differences in platforms’ operationalization of algorithm technologies that set varied limits on workers’ autonomy to control access to the platform and access to platform tasks, as well as to control various aspects of the conduct of their work: an ‘open’ regime allows workers to freely enter and exit the platform (including to remain inactive on the platform without incurring sanctions or fees), to control access to tasks and exercise autonomy over task conduct; conversely, a ‘closed’ regime restricts workers’ autonomy to access the platform and paid tasks, as well as to exercise control over work conduct. These are ideal-type regimes, which do not map neatly onto the five case-study platforms. Nevertheless, they provide a valuable heuristic tool for theoretically distinguishing key antecedents that shape the relationship between worker autonomy and unpaid labour.

Our evidence demonstrates significant differences between ‘open’ and ‘closed’ regimes in the extent and form of unpaid labour. For food-delivery platforms, ‘closed’ regimes (Takeaway) are better at mitigating unpaid labour than ‘open’ regimes (Deliveroo). Conversely, platform freelancers perform significantly less unpaid labour in ‘open’ regimes (Jellow) than in ‘closed’ regimes (Upwork and Malt). The differentiated regime effects can be explained as follows. For food-delivery platforms, while relatively ‘closed’ regimes lessen the degree of worker autonomy, they in fact provide market shelter for workers by reducing the risk they face of being easily and frequently replaced in a

relatively overcrowded sector that requires few skills, given high numbers of people able to undertake platform tasks requiring limited training or experience. Conversely, freelancers are better off in relatively ‘open’ platform regimes because they exercise greater autonomy over when and how to undertake their work, in a sector requiring medium/high skills. These findings support our theoretical contention – building on Frenken and Fuenfschilling (2020), Tubaro (2021) and Vallas and Schor (2020) – that the platform type (in our study, low-skill locational versus medium/high-skill online) matters in appreciating the complex relationship between algorithm technologies, worker autonomy and unpaid labour. In particular, our study emphasizes the need to foreground skill and its relationship with both labour market power and a worker’s ability to leverage opportunities for worker autonomy. As such, our theoretical framing contributes to a renewed interest across the social sciences in understanding the varied implications of digital technologies for jobs and workers with different skills (replacing, augmenting and re-allocating skills) (e.g. Cirillo et al., 2021; Reljic et al., 2021), thus advancing knowledge about the inter-relationship between new technologies, skills and work organization.

A further critical ingredient for our theoretical explanation, and a second key contribution of our study, relates to the persistence of the ‘human element’ in shaping the operationalization of control pressures on workers. Two of the five case studies (Takeaway and Jellow) display examples of management-mediated operationalization of platform technologies, which generate further differentiation within ‘open’ and ‘closed’ socio-technical platform regimes of worker autonomy. By examining the influence of ‘techno-centric’ versus ‘human-centric’ algorithmic decisions, our analysis contributes to recent conceptualizations of platforms as ‘contested relational structures’ (Schüßler et al., 2021) by revealing the socio-technical conditions (following Guest et al., 2022), which structure the relationship between worker autonomy and unpaid labour. Other studies highlight the ‘subordinated’ nature of worker agency in platform work (Wood and Lehdonvirta, 2021), such that ‘self-organization’ largely reflects workers coping with the rationalized, techno-centric work system of platforms (Gerber, 2021). Our theorization of ‘open’ and ‘closed’ platform regimes provides a means to analyse systematically how the embedded technologies function and how aspects of management mediation add further explanatory power for the resulting variation in unpaid labour. In so doing, our evidence demonstrates that the ‘social structure’, namely the employment relationship, within which digital technologies are embedded is still a significant force in shaping the strategic ‘economic action’ of platforms (Vallas and Schor, 2020). Social ties, albeit in digital form, persist among platform workers and their quasi employers (platform managers). Drawing on Holford’s (2019) theoretical contribution, this finding may be explained by managers’ recognition of the tacit, non-codifiable features of the employment relationship, problems related to the one-sided algorithmic information exchange and the likely organizational benefits of nurturing a degree of worker coordination. In our more human-centric case studies (Takeaway and Jellow), the proxy employment relationship enhanced worker autonomy and mitigated pressures on workers to undertake unpaid labour.

The third contribution concerns the implications for precarious work. Unpaid labour is a prominent characteristic of precarious working conditions as it affects the capacity of workers to make a living in terms of both the pathway to paid work it opens up and

the opportunity costs associated with having to spend time accomplishing unpaid tasks on platforms. Our evidence of precarious work illustrates how platforms exercise agency by moulding a worker's platform dependency around unpaid work. We argue that 'open' and 'closed' socio-technical worker autonomy regimes structure workers' dependency on platform income by enabling platforms to exploit workers' unpaid labour. Thus, we challenge a binary representation of worker dependency by demonstrating how the management-mediated element of the socio-technical regime may help workers gain a greater degree of autonomy, despite the over-riding power of algorithm technologies of worker control.

Overall, the theoretical insights from our study lead us to argue that no simple correspondence exists between unpaid labour and worker autonomy within platforms. By explaining how unpaid labour unfolds from the design and application of algorithm technologies, our theoretical constructs of 'open' and 'closed' regimes add to studies that emphasize that while platforms are uniformly responsible for the design of digitalized means of 'laundrying control' (Maffie, 2022), since they partly delegate to clients the practices of performance management and monitoring of platform workers (Kellogg et al., 2020), they are also highly differentiated in the skill complexity of tasks and in the design and application of algorithm technologies, especially regarding opportunities for management mediation (Vallas and Schor, 2020). Our examination of the relationship between unpaid labour and worker autonomy, operationalizing 'open' and 'closed' socio-technical platform regimes, enables us to bridge a gap in theorization, as it offers a means to account for inter-platform variation in workers' experiences of autonomy and unpaid labour. Thus, we strengthen recent arguments about the importance of better understanding organizational choices regarding technology and work organization for varied platform types and workforce skills (Gandini, 2019; Vallas and Schor, 2020) by showing how differences in 'open' and 'closed' platform regimes reveal the situated nature of unpaid labour and help explain what drives its extent and form among diverse platform types.

These theoretical insights imply certain considerations for policy and practice also. For platforms, while the potential to leverage high volumes of unpaid work may be attractive, a more sustainable strategy recognizes the capacity to shape how algorithmic technologies are operationalized and the organizational value of establishing channels for worker engagement with platform managers, reducing dependence on unpaid work. For workers, it is vital to recognize the pros and cons of 'open' and 'closed' platform regimes: the promise of worker autonomy on platforms requiring low skills is likely to translate into high levels of unpaid labour while the reverse is true for platforms requiring high skills, such as freelance labour. This study underscores the false promise of flexibility in the realm of digital labour for relatively low-skilled work.

## **Conclusion**

This article has demonstrated the value of a novel analytical construct – open/closed socio-technical platform regimes of worker autonomy – to add depth and complexity to a critical investigation of the relationship between algorithm technologies, workers' experience of autonomy and variation in the extent and form of proximate unpaid labour.



In recognizing the important variety of workers' daily experiences of autonomy within the socio-technical platform regime, our findings do not imply the demise of management control, far from it. Instead, gaining further insights into how worker autonomy is shaped through the social organization of work in different platform and country contexts can enable us to engage in more critical analysis of the management of the algorithm (see Krzywdzinski and Gerber, 2021) and scrutinize the more subtle socio-technical and organization/employment boundaries that affect working conditions of platform workers with the aim of re-addressing the evident digital power imbalances.

Work organization is also institutionally constructed and our research supports this insight. Therefore, our future comparative institutional research will explore the significance of regulatory differences in platform workers' employment status – for example, in shaping their experiences of autonomy within the same platform across different countries. Our theoretical framework may also be extended to future research in other platform settings, beyond the freelancing and food-delivery platform types. This would further theoretical insights to our understanding of the relationship between algorithm technologies, worker experiences of management control and autonomy, the extent and forms of unpaid labour, and other working conditions. This may be fruitful in light of contemporary understanding of the more diverse and complex systems underpinning the management of algorithms within 'triadic' platform–client–worker relationships (Gerber, 2021). Further exploration of worker autonomy as a theoretical construct within platform work would extend critical understanding of how and the extent to which 'open' and 'closed' regimes are analytically constituted as dichotomous types or as opposing ends of a continuum. Our study qualifies the 'open' and 'closed' regime type by pointing to the diversity of the relationships among the identified dimensions (i.e. access to platform, access to task, control of task, management mediation) between the two types. As such, it does not address whether a mix of open and closed characteristics may prevail among the four components within each type. Further research could usefully examine the nuances concerning each worker autonomy regime, for example by looking at situations where only one dimension is 'partially' met, and by examining what this implies for the configuration of the 'open' and 'closed' ideal typology. Research could also examine this typology as part of the social and institutional organization of work, and how it shapes the subjectivities of work and workers' scope for action (Edwards, 1986).

We conclude by noting the limitations of our study. We do not claim generalizability of findings given the focus on five platforms, selected for reasons of analytical fit with our prepared theoretical construct of 'open' and 'closed' regimes, rather than representativeness. Also, lack of access to the complete details of the technical workings of each platform's algorithm, beyond the stylized characteristics presented here, means that we make no claim to capturing the totality of these digital algorithms' power in shaping work, only a fraction.

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## Supplemental material

Supplemental material for this article is available online.

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