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Brave New Digital Work? New Forms of Performance Control in Crowdwork

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Brave new digital work? New forms of performance control in crowdwork

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Abstract

The term “crowdwork” describes a new form of digital work that is organised and regulated by internet-based platforms. This article examines how crowdwork platforms ensure their virtual workforce’s commitment and control its performance despite its high mobility, anonymity and dispersion. The findings are based on a case study analysis of 15 microtask and macrotask platforms, encompassing 32 interviews with representatives of crowdwork platforms and crowdworkers, as well as an analysis of the platforms’ homepages and community spaces. The article shows that performance control on crowd platforms relies on a combination of direct control, reputation systems and community building, which have until now been studied in isolation or entirely ignored. Moreover, the findings suggest that while all three elements can be found on both microtask and macrotask platforms, their functionality and purpose differ. Overall, the findings highlight that platforms are no neutral intermediaries but organisations that adopt an active role in structuring the digital labour process and in shaping working conditions. Their managerial structures are coded and objectified into seemingly neutral technological infrastructures, whereby the underlying power relations between capital and labour become obscured.

Keywords: algorithms, control, crowdwork, labour process, performance regulation, platform economy, reputation, Taylorism

1. Introduction

Within the context of digitalisation discourses, the world of work has received renewed attention. In particular the “platform economy” (Kenney and Zysman, 2016; Langley and Leyshon, 2016) and on-demand “gig work” (Kässi and Lehdonvirta, 2016; Smith, 2016), representing new business and work models, seem to be fundamentally disrupting traditional work relations.¹ A special form of on-demand gig work is “crowdwork”. Crowdwork can be defined as paid and flexible short-term jobs that are distributed, performed and managed entirely via the internet through online platforms (Irani, 2015a, 2015b; Lehdonvirta, 2016). The crowd is self-employed; crowdworkers do not have a common physical worksite and there are no supervisors and colleagues who can generate commitment or control the execution of work. At the same time, it is a dependent form of self-employment, as the working conditions are decisively shaped by the platforms: they convert a client’s order into a concrete work process, typically define the task size and payment mode, coordinate the allocation and distribution of tasks, organise quality control and determine communication channels. Platforms are, therefore, not merely online sites to which market relations between clients and freelancers have shifted. Instead, the article argues that platforms possess agency in their role as coordinating intermediary between crowd and clients.

The basic assumption of this article is that, like traditional companies, crowdwork platforms need to mobilise the voluntary engagement and creativity of crowdworkers. This problem of the indeterminacy of labour characterises the traditional employment relationship and is the starting point for labour process analysis (Thompson, 1989; Smith, 2006). For online platforms,

¹ There are different terms used for the outsourcing of labor via internet platforms. The often used terms “online labour”, “on-demand work” or “gig work” include all types of work organised by online platforms. In contrast to these concepts, we use the term crowdwork to refer to work organised by internet platforms and conducted online – this excludes activities mediated by internet platforms but conducted “offline”, such as taxi driving, food delivery and many others.

this indeterminacy poses even more of a challenge: while the crowd is characterised by its replaceability, crowdworkers can register on several platforms and shift their activity from one to the other. The result is particularly high labour mobility, which can potentially constitute a source of bargaining power for workers (Smith, 2006). This challenges the platforms to find ways to retain crowdworkers.

Given the absence of traditional forms of performance regulation, the central question of this article is how control of work and performance is organised on crowdwork platforms. This includes both *direct control* through coercion and surveillance and *indirect control* that strives for consent.

Two lines of discussion can be identified within the existing research. On the one hand, research has focused on the standardisation and technical algorithmic control of platform-based labour processes (Lehdonvirta, 2016; Irani 2015a, 2015b). A number of authors have described this as a newly emerging “digital Taylorism” (Huws, 2014; Kittur et al., 2013; Brown et al., 2010). On the other hand, research has increasingly focused on rankings and reputation as new ways of influencing work behaviour by generating incentives, recognition and trust (Gandini, 2016; Hearn, 2010).

One could argue that both characterisations refer to platforms with different skill requirements. Studies that emphasise the concept of digital Taylorism have mostly focused on low-skill online work (microtasks), while studies on the reputation economy have mostly investigated high-skill online platforms (macrotasks). This paper compares both forms of crowdwork and identifies three mechanisms of control present in both: direct digital control, indirect control through ranking and reputation systems and indirect control through community building – the last of which has been largely ignored by research so far. These mechanisms are, as will be shown, interconnected. The findings also suggest that indirect control becomes more important with increasing task complexity.

What is new about crowdwork, and platform-based work more generally, is that these management concepts and the corresponding power relations are objectified as technological infrastructure. Control is transferred into seemingly neutral and indisputable interfaces and algorithms. The social relations among crowd, client and platform management are obscured. Power lies in the order of things: the platform that can order the digital space, command the interfaces and administer access is the one that governs.

2. State of the research

Crowdwork as a new work model

Many scholars define online platforms as a new type of firm that organises distributed production by providing “digital infrastructures that enable two or more groups to interact” (Srnicsek, 2017: 43). Kornberger et al. (2017: 79) suggest that platform organisations do not claim direct control over the value creation process; “[r]ather [their] value-add is to provide an interface for interaction and controlling mechanisms for transactions between [...] buyers and sellers who might never meet in person”. In the case of crowdwork, the sellers are crowdworkers, who are registered as freelancers. Therefore, crowdwork platforms also try to position themselves as nothing more than a hyper-potent intermediary rather than as an employer. Such notions overlook, however, the central role of crowdwork platforms not only in coordinating buyers and sellers but also in organizing work processes. Unlike the famous cases of Uber and Deliveroo, crowdwork is mostly performed online and is not bound to a particular location. The individuals performing these jobs can potentially be dispersed across the globe. Similar to Uber and Deliveroo, however, the labour process is organised and structured through online platforms and their digital interfaces.

Research on crowdwork indicates that platforms assume a central role in structuring and controlling the work processes, and that power relations between capital and labour are enshrined in the platforms' terms and conditions as well as in their digital infrastructures and algorithms (Fieseler et al., 2017; Srnicek, 2016; De Stefano, 2015; Irani, 2015a;). Kittur et al. (2013: 1302) argue that crowdwork constitutes a “socio-technical work system” with a triangular relationship among clients (both companies and individuals), crowd and platform. The research literature points to three central functions of platforms (Irani 2015a, 2015b; Zogaj and Brettschneider, 2014; Kittur et al., 2013). First, platforms translate a client's order, which can range from tagging thousands of photos to solving a medical problem, into a structured labour process: they break the order down into single task units, define the mode of competition, organise the quality control and payment. Second, on the basis of the information accumulated and centralised within the platform, they allocate tasks to the crowd: either through open calls whose visibility is, however, determined by the platform, or through filtered direct invitations. Third, they establish sanctions and incentive structures, often in connection with gamification mechanisms.

In order to classify the various tasks organised on crowdwork platforms, the distinction between microtasks and macrotasks has become common (Cheng et al., 2015; Kuek et al., 2015;). This distinction is based on the complexity of skills needed to complete the tasks, which in turn shapes the way how platforms structure the labour process (Leimeister et al. 2016).

Microtasks have received most attention in research (Lehdonvirta, 2016; Irani, 2015a/b; Aytes, 2012). They are highly standardised routine tasks (e.g. picture classification, verification of lead data, short audio transcriptions) or tasks that do not require specific professional knowledge (e.g. surveys, app testing, writing short texts). The nature of these tasks allows them to be disassembled into short, highly standardised units with clearly defined outputs and that can be completed within a few seconds or minutes. Each subtask is tailored in such a way that it can

be performed independently by one worker, anytime and anywhere, from a computer, tablet or smartphone (Zogaj and Brettschneider, 2014).

Macrotasks, conversely, are more complex and require a higher degree of creativity and specific, often professional knowledge (e.g. design, software programming, medical diagnosis). Such tasks cannot be broken down into pieces and are therefore organised as multi-day or multi-week projects. Moreover, quality matters rather than quantity: usually the goal is to crowdsource the best solutions among many good ones.

Due to these very different logics, the competition and remuneration modes differ greatly. Microtasks are usually remunerated piece by piece for a few cents or euros/dollars. Competition is time-based: instead of individual skills or subjective criteria, that crowdworker who comes first gets the job. Macrotasks are, in comparison, much better paid in order to attract and activate (highly) qualified persons. In return, competition is fiercer und highly subjective. On so-called “marketplace” platforms (e.g. Upwork, Fiverr), clients usually select the crowdworker directly and upfront and negotiate the payment bilaterally. Depending on the job and length of the project, it can vary from a few hundred to thousands of euros/dollars. On so-called “contest platforms” (e.g. 99designs, Jovoto) hundreds of crowdworkers submit their solutions (e.g. designs, product concepts, etc.), and the client, the platform or the crowd itself selects the winning contributions. The prize money can range from a few hundred (especially in the relatively standardised design competitions) up to the higher tens of thousands of euros/dollars. Remuneration is, however, entirely unreliable as only one or a few contributions receive prize money. In order to retain high-performing crowdworkers, a number of microtask and macrotask platforms have decided to offer hourly payment models for selected individuals. There is hardly any reliable data on the number of crowdworkers. A World Bank study (Kuek et al., 2015) based on data from the three biggest platforms (Upwork, CrowdFlower, Amazon Mechanical Turk) named the U.S., India and the Philippines as the countries with by far the largest numbers

of online workers. Compared to the US, people in Europe seem to make less frequent use of crowdwork and other forms of online work.

Research has highlighted the tremendous heterogeneity of the crowdworkers' socioeconomic backgrounds and motives. Studies in sub-Saharan Africa and Southeast Asia suggest that, in particular, microwork constitutes a growing source of primary income in low-income countries (Graham et al., 2017; Gupta et al., 2014; Gawade et al., 2012). In the U.S. and Western Europe, conversely, crowdwork seems to constitute either a source of additional income alongside a primary dependent job, or a means of gaining experience in a certain profession or an opportunity for freelancers to get through periods when they have little other work (Smith, 2016). Crowdwork can also provide an opportunity for people who are excluded from the labour market due to geographical remoteness, social exclusion (due to having a police record, a disability, or household and parenting duties), because it can be done from home (Kittur et al., 2013; Boes et al., 2014; Zyskowski et al., 2015).

Control on crowdwork platforms

For a long time, the public and research debate has focused on direct and technological control as the major mechanisms used by crowdwork platforms to organise the work process (Graham et al., 2017; Lehdonvirta, 2016; Irani, 2015a, 2015b; Bergvall-Kåreborn and Howcroft, 2014; Aytes, 2012). This reflects developments in microtask platforms such as Amazon Mechanical Turk (AMT). The extreme standardisation of work and fragmentation into discrete task units with clearly defined outputs is said to allow for tight, technological performance monitoring and direct control, both up front via the task design as well as through post-hoc output control (Kittur et al., 2013). Authors like Kittur et al. (2013) or Boes et al. (2016) have called such systems a digital rebirth of Taylorism. Studies on the U.S. platform Upwork indicate the potential scope of technological surveillance. Performance is directly and closely controlled

through a so-called work diary: a software tool periodically takes snapshots of the workers' computer screens or counts the keystrokes (Kittur et al., 2013).

Little empirical evidence exists, however, indicating how exactly the control of work results is organised, to what extent it can be automated and when human cognition is still required. We lack systematic comparisons of platforms organizing different types of tasks – a research gap which this article aims to close.

Literature provides indications that platforms also try to develop mechanisms intended to direct behaviour and to engineer self-entrepreneurial identities. The studies by Rosenblat and Stark (2016) or Lee et al. (2015) on the ridesharing apps Uber and Lyft demonstrate the use of client ratings and performance feedback to influence the behaviour of drivers. In the case of crowdwork platforms, studies by Pongratz (2018), Schörpf et al. (2017), Graham et al. (2017), Kornberger et al. (2017) and Gandini (2016) emphasise the importance of reputation and ranking systems. As Graham et al. (2017: 5) describe, reputation systems are based on “a score that a worker receives [...] after completing a task”; this score is often combined with other performance metrics such as work history or activity that intend to rank crowdworkers and to “algorithmically filter more tasks towards the highest ranked workers”. Studies on AMT claim that rating systems reflect platforms' power imbalances: crowdworkers are permanently rated but cannot rate clients or the platform; moreover, complaints can affect the overall ranking and thus access to future tasks.

The existing research tends to describe ranking and reputation systems as a powerful system of labour control. Gandini et al. (2016) argue in an empirical study on the macrotask platform then called Elance (now known as Upwork) that digital reputation has become a networking asset more important than job and education titles and has created a reputation “fetishism” (32, 40). Reputation and ranking mechanisms seem to provide visibility and recognition in a context of highly competitive and short-lived employment relations, thus producing narcissistic

“entrepreneurial selves” or “entreployees” (Pongratz, 2018). Kornberger et al. (2017) describe review, ranking and reputation systems as “evaluative infrastructures” which constitute a governing apparatus that decentralizes control and establishes disciplinary power in the Foucauldian sense.

Systematic comparisons of reputation systems in different types of crowdwork platforms are, however, lacking. It is unclear to what extent the role of these systems is influenced by the type of tasks organised by the platform. Our article aims to close this gap by comparing reputation systems on microtask and macrotask platforms. While we expect that reputation systems on macrotask platforms might function as “evaluative infrastructures” (Kornberger et al., 2017), we are less convinced that they work in the same way on microtask platforms, which are characterised by the highly tedious nature of the work. Building on a study on call centres by Sallaz (2015), we suggest that reputation and ranking systems on microtask platforms are instead meant to create “learning games”: workers have to permanently master minor challenges in order to receive better tasks, which in return generates motivation despite dissatisfaction with the work (Sallaz, 2015).

Crowd, community and social engineering

The studies of reputation and ranking systems on crowdwork platforms emphasise the role of competition and distinction as incentive mechanisms. What is neglected, however, by existing research is the role of “social engineering” mechanisms (Thompson and Findlay, 1999) aimed at creating social bonds among crowdworkers and a kind of organisational identity. One common notion characterises crowdworkers as isolated and anonymised (Irani, 2015a, 2015b; Irani and Silberman, 2013; Aytes, 2012). However, management literature early on highlighted companies’ and platforms’ interest in crowd collaboration as sources of innovative ideas (Boudreau and Lakhani, 2013).

A number of organisation studies used the concepts of “normative control” (Kunda, 1992), “social control” (O’Reilly and Chatman, 1996) and “socio-ideological control” (Alvesson and Kärreman, 2004) to describe managerial strategies aiming to create commitment and motivation by shaping social identities, creating a “we” feeling, offering “responsible autonomy” (Ackroyd and Thompson, 1999) and fostering the internalisation of managerial rules and goals. Studies in the tradition of labour process theory have adopted these concepts but emphasise two important points (Thompson and Findlay, 1999; McKinlay and Taylor 2014). First, they argue that the impact of “normative control” strongly depends on how well it is linked with direct control and with material incentives and constraints in the workplace. Second, they show that workers are not passive objects of “normative control”, instead developing their own identities and culture. For both reasons, many strategies of normative control fail to produce the desired behaviours and in fact provoke a lack of compliance and cynicism (Ackroyd and Thompson, 1999).

In the case of crowdwork, strategies of normative control face the additional problem that crowdworkers are formally independent freelancers working in geographically distant places with no face-to-face interaction. Our analysis will show that even under these conditions, platforms engage in social engineering activities. These activities are, however, less focused on creating a strong organisational culture than on promoting the emergence of a community (Zogaj and Brettschneider, 2014).

We understand the term community, which is adopted from platform managements themselves, in a “minimalist fashion”, as Adler (2015) calls it, which was developed in the analysis of modern occupational, technical and online communities (Jones, 1995; O’Mahony and Lakhani, 2011; Haythornwaite, 2012). Communities share common goals and a well-defined field of action and are committed to one another. However, they are often geographically dispersed and do not have to develop strong common identities and values, as implied in classical theories (e.g., Tönnies, 1957; Ouchi, 1980).

One of our core arguments in the following analysis is that platforms see their community building strategies as an important functional equivalent of the social bonds which develop in traditional workplaces to promote activity and commitment. This community building cannot be organised by the customers of the platforms – the platforms must themselves become active agents organizing communities. There is, however, hardly any systematic research on the functioning of community-building strategies by crowdwork platforms – a gap we are aiming to close.

3. Data and methods

The article is based on case studies of 15 platforms. The approach adopted in the research is exploratory, not least because the platforms are a moving target and constitute a field of experimentation.

The selection of the platforms was based on a mix of theoretical and practical considerations. Given that we expected to find important differences in the labour control regimes based on the nature of the tasks organised by the platforms and on country-specific factors, we tried to include, on the one hand, the same number of microtask and macrotask platforms and, on the other hand, platforms operating under different institutional regimes (in particular Germany and the U.S.). The initial expectation that institutional differences between both countries would influence work organisation and performance regulation on the platforms was, however, not confirmed, and we will not investigate this aspect in any more detail.

In order to select relevant platforms, we first created a list of all platforms in Germany and in selected metropolitan areas in the U.S. (Bay Area, Boston, Chicago, New York) based on internet sources. We identified almost 60 platforms, which we contacted via phone and email, sometimes several times. The sample analysed in this article consists of all the platforms that responded.

The analysis of control regimes on the selected platforms consisted of several steps. In the first step, the platforms’ homepages, work interfaces, profiles and publicly available material were studied. Second, a total of 32 interviews with platform representatives and crowdworkers active on them were conducted. Third, a non-participatory observation of the community forums of five platforms was conducted (Hewson, 2017). To access the community areas and work interfaces, one of the authors signed up with a number of platforms.

Table 1 gives an overview of the interviews with platform representatives. All platform case studies can be categorised as start-ups, with staff numbers ranging from fewer than ten to about 100 employees. When approaching the platforms, we asked for interviews with upper management or lead engineers who could provide us an informed, in-depth overview of the development and functioning of the platform. A total of 18 one- to two-hour interviews were conducted with one or more platform representatives, chiefly with the employees most responsible for community management, sales or operations. Some interviewees, especially from the smaller platforms, were also the CEOs and founders. The interviews were semi-structured, and the guiding questions focused on the forms of work organisation and performance regulation (e.g. “How do you organise the quality control?”, “How do you determine remuneration?” or “Do you have a digital reputation system, and how do you rank your crowd?”).

Table 1: Key figures of platforms interviewed

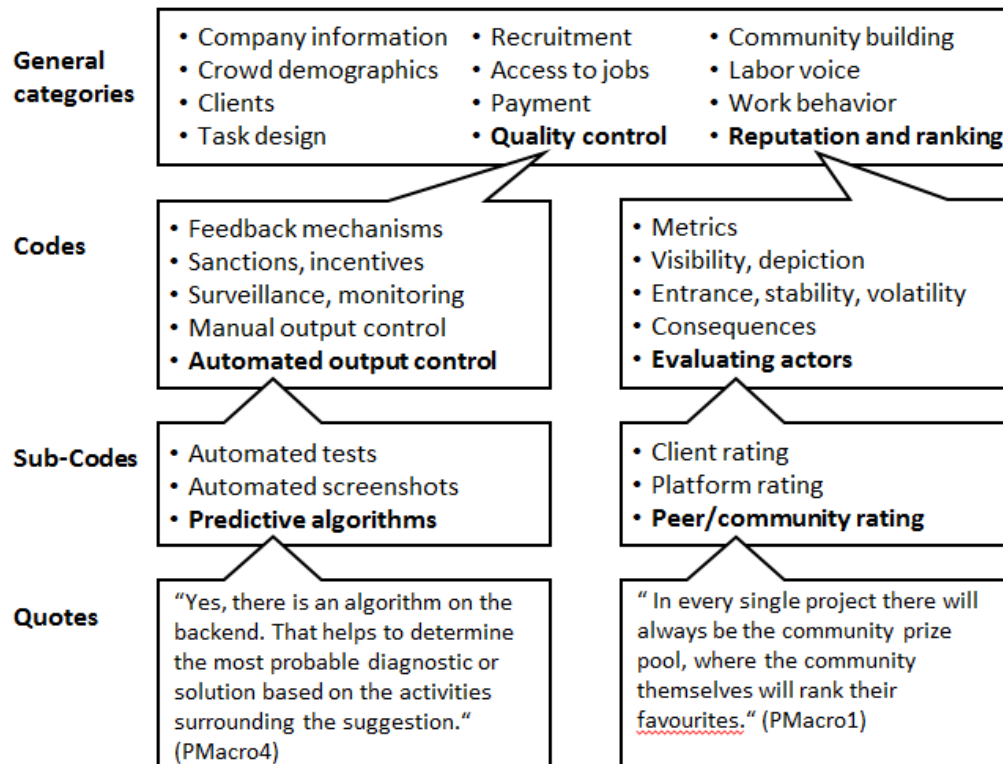
Platform	Country	Year founded	Staff size	Registered crowdworkers	Number of interviews
Pmicro1	Germany	2005–2010	10–50	1,000,000+	1
Pmicro2	Germany	2005–2010	20–50	30-40,000	2

Pmicro3	Germany	2010–2015	20–50	20-30,000	1
Pmicro4	USA	2010–2015	20–50	<1,000	1
Pmicro5	USA*	2005–2010	-	20-30,000	1
Pmicro6	Germany	2010–2015	20–50	20-30,000	2
Pmicro7	USA	2010–2015	below 10	30-40,000	1
Pmacro1	Germany	2005–2010	20–50	80-90,000	1
Pmacro2	Germany	2010–2015	below 10	5-10,000	2
Pmacro3	Germany*	2005–2010	below 10	80-90,000	1
Pmacro4	USA	2010–2015	below 10	20-30,000	2
Pmacro5	USA*	2010–2015	-	1,000,000+	1
Pmacro6	USA	2010–2015	above 100	1,000,000+	1
Pmacro7	USA	2005–2010	50–100	3-5,000,000	1
Pmacro8	USA	2005–2010	above 100	1,000,000+	1

** Platforms that also have headquarters in other countries.*

All interviews (about 30 hours of material) were transcribed and coded (Basis, 2003). We started with general categories such as task design, payment and control, which we derived from literature and supplemented with categories emerging from the pilot interviews (for instance, community building). On the basis of the empirical material, codes and sub-codes were developed for each category. Figure 1 illustrates this coding process with two examples.

Figure 1: Two examples of the coding concept



Source: Authors.

In addition, interviews were conducted with 14 crowdworkers in order to understand how they perceive the working conditions on the platforms. The interviews were semi-structured and focused on the motives and routines of crowdwork (e.g. "Why do you work on the platform?", "How active are you?", "What type of tasks do you prefer?") as well as on the mechanisms of performance regulation and coping strategies (e.g. "Is it difficult to build up a good reputation?", "How do you articulate grievances, and what have you already complained about to the platform?") Again, all interviews were transcribed, coded and analysed.

Table 2 provides an overview of the interviewees' backgrounds. Interviews usually lasted between one and two hours and took place in person or by telephone. Interviewees received compensation of 13 euros/15 dollars per hour. Contact was established either on the platforms or through the platforms' forums or social media channels (Facebook, LinkedIn). To ensure

anonymity, the interviews were classified as *CWmicro1* to *CWmicro8* and *CWmacro1* to *CWmacro6*.

Table 2: Key figures of crowdworkers interviewed

Type of platforms	Age	Nationality	Sex	Activity
Microtask platforms: 8	Under 30: 4	German: 7	Female*: 8	4 registered on 1 platform
Macrotask platforms: 6	30-50: 7	Other European: 3	Male*: 6	10 registered on 2 or more platforms
	Over 50: 3	Non-European: 4		

Because the size and characteristics of the full crowd population are unknown, our aim was not to collect a “representative” sample of crowdworker interviews, but rather to cover the major platform-related and demographic factors that we expected to be relevant. In particular, these criteria included task complexity (micro/macro), ranking and reputation systems (simple versus complex metrics and algorithms) and the community-building strategies of the platforms on which the workers were registered (strong versus weak community-building). The sample also includes persons of different ages, genders and nationalities (Global North and Global South).

In addition, a non-participatory observation of the community forums was conducted on Pmicro1, Pmicro5, Pmacro1, Pmacro6 and Pmacro8 (see Table 1). This provides another perspective on how the working conditions are perceived, what the biggest sources of complaints are, and to what degree and for what purposes social interaction is taking place within the globally dispersed crowd. The choice of platforms was based on the interviews: we selected platforms that claimed they invested considerable effort into restoring some kind of organisational bond through “community building”. Again, the sample includes microtask and macrotask platforms, as well as German and U.S. platforms. The community forums were analysed manually, as automated data readouts are prohibited. To this end, all active threads

from August 2017 were counted, varying from only a handful of threads on Pmicro5 to almost 2000 threads on Pmacro6. Moreover, we analysed threads that discussed relevant aspects of the working conditions (e.g. payment, rankings, task rejection) or that emerged as interesting broader discussions (e.g. motivation, background) in more depth by following the course of discussion and posts. In order to check for the reproducibility of our findings, we conducted a second similar analysis in February 2018.

4. Empirical findings: varieties of control within crowdwork

4.1. Direct control

Microtask platforms

On microtask platforms, one might not expect quality control to pose a particular challenge, as the tasks are standardised and broken down into small parts. Our case studies show, however, that technology-based performance control is only feasible for the simplest of microtasks. For instance, in picture categorisation, a common microtask in which crowdworkers sort products by colours or other characteristics, there are a number of technological control mechanisms: pre-programmed tests are placed before or mixed with “real” tasks, pictures are sent out to two or more crowdworkers to compare the results and automatically chose the majority answer (iterative approach), control sets are used when the same categorisation is chosen many times in a row (attention checks) (Pmicro1, Pmicro2).

In some cases, automation is used to identify which work results need to be flagged for human reviewers. Pmicro5, for instance, has software that automatically identifies problems in texts. As explained by the platform staff:

“We can see through an algorithm [...] some missing punctuation or that there is a missing number [...]. Then this gets flagged up to a human that can do a deeper investigation. But

by having these algorithmic processes in place, it lessens the burden that we have on actual humans doing the labour.” (Pmicro5).

This illustrates that even in the case of only slightly more complex tasks, such as writing short product descriptions or searching and verifying company data for databases, technological surveillance and automated control are no longer possible. In those cases, microtask platforms organise the assessment and control of work performed by the client, the crowd and/or the platform. While all platforms offer clients the chance to rate the quality of the work results, none of the platforms in our sample relied solely on customer control. For one, platforms often strive to prevent low-quality work from reaching customers in the first place. Moreover, the problems of a purely client-based mode of performance control have become particularly visible on AMT; clients can arbitrarily reject work results and not pay for them, while at the same time retaining the rights to the work itself. The crowdworkers have little leeway to complain, because access to further tasks depends on receiving positive rankings from the client (Irani and Silberman, 2013). One platform stated that it had initially had the exact same model as AMT but quickly realised that this was not beneficial for the crowd or for the platform:

“So we have found that it didn’t work very well, because the incentives were just all wrong. [...]. It allowed for a lot of people to come and run one-off tests and not pay. So we don’t make money, but the testers also don’t make money.” (Pmicro7)

This is why microtasks are usually either checked by platform staff (Pmicro2, Pmicro3, Pmicro7), by specifically assigned crowdworkers who are qualified for the work (Pmicro1, Pmicro4, Pmicro6) or via community flagging (Pmicro7). Peer control is thus a central form of control within crowdwork. Only testing platforms check *every* result manually (Pmicro6, Pmicro7). Usually, human reviews take place at automated intervals, depending on the past performance and experience as captured in the digital reputation.

The interviews with crowdworkers showed the problems that emerge from a peer-review approach in a competitive environment: although microtasks are not organised as direct, personalised competition, there is still some competition in terms of availability of tasks, as remuneration is not fixed. First, crowdworkers complained of a lack of feedback from qualified people and criticised the arbitrariness of their assessment. Second, direct control by peers seems to introduce a certain degree of unpredictability, since the individual doing the checking changes for each task. The following quote is illustrative of this situation:

“This is where I miss a proper job; feedback from someone who I know can reliably judge it. [...] But if you have every Tom, Dick and Harry criticizing my work, then you do not have credible feedback. [...] It is like having a new supervisor every day; sometimes they are competent, sometimes they are completely incompetent [...] [t]here is nothing you can adapt to or prepare for. [...] You cannot even talk to them”. (CWmicro1)

One important consequence of a work result being accepted or rejected is the question of whether or not the crowdworker is paid for the work done. The only platforms where we encountered this relatively frequently were platforms that organise software tests. Here, peer review is particularly problematic, since the decision to accept or reject a bug reported by a crowdworker is a decision about whether to pay the worker or not (Pmicro6, Pmicro7). Often, testers work many hours for nothing. All other microtask platforms in our sample seem to pay even when the work ultimately fails to pass the quality control.

Nonetheless, the question of control is essential. On most platforms, if a task is rejected, the crowdworker must correct the errors or redo the task entirely. Extra time must be spent, and it is unpaid. On platforms where corrections are frequent, because grammar or spelling mistakes occur easily, this systematically depresses the hourly wage (in particular Pmicro1, Pmicro2, Pmicro5). Rejections may also limit access to tasks, because they affect the reputation ranking. The tasks shown to workers on their personal dashboards are filtered by the reputation system, and, for better-paid tasks, a certain rating is usually required.

Macrotask platforms

For macrotasks such as design tasks, the development of product concepts or software programming, there is usually no standard and clear right (or wrong) solution. The possibilities for using automatic controls are particularly limited. Some platforms are working on sophisticated technological approaches. For instance, one platform that provides medical advice is working on prediction algorithms to identify the most likely best or correct contribution from the crowd (Pmacro4).

As in the case of microtasks, however, the majority of performance monitoring and output control is done by humans. On platforms with stronger marketplace logic such as Pmacro5 and Pmacro6, where clients also directly hire freelancers for a particular job up front, output control is done entirely by the client. Contest-based macrotask platforms, conversely, usually involve the client, the community and sometimes even expert juries chosen by the client and/or the platform to evaluate a specific submission and select the winner(s) (Pmacro1, Pmacro2, Pmacro4, Pmacro7).

The crowd plays a central role in direct control on contest-based macrotask platforms: it reports problematic briefings, incorrect contributions, and plagiarism or spam and assesses performance through likes and comments. Many platforms use community voting to identify the best among many possible solutions (Pmacro1, Pmacro2, Pmacro4, Pmacro7). This frequently causes conflict and complaints:

“The public voting is a jungle. Here it is important to be liked, to have friends. Everyone may give your design a high score and then change it in the last 2 minutes, so the overall score may drop considerably. Everyone wants the community prize, and what happens with the public voting is ugly most of the time.” (CWmacro3)

As many macrotask platforms use competitions based on the “winner take all” principle, using crowd community voting as a control mechanism can lead to flawed dynamics (Bolton et al., 2013; Horton and Golden, 2015). Therefore, only a few platforms *exclusively* rely on crowd voting to select a winner (Pmacro7). On most platforms, it functions as a complementary indicator to a jury or the client. Some platforms only allow crowd community voting outside a running project to avoid gaming or influencing the client (Pmacro3, Pmacro8).

Overall, we see that, despite some complementary technological solutions, the actual monitoring and assessment of most micro- and macrotasks is still largely performed by humans. Moreover, performance control in the narrow sense of output control remains important, but it has its limits. For microtasks, the sheer size of the tasks renders manual control alone unfeasible. For macrotasks, control is even more difficult, as there is typically no standard solution. In both models, novel mechanisms have therefore emerged as central elements of performance regulation: so-called digital reputations and rankings.

4.2. Control through reputation and ranking systems

Microtask platforms

On microtask platforms, rankings have a very functional purpose: they are used to quantify and compare performance and to regulate which crowdworkers need to be checked and how often in the future. In addition, they serve as job allocation or “matching” mechanisms: they limit access to tasks and stratify the crowd according to performance quality, experience and activity. A certain ranking (“advanced”), percentage (minimum 85%) or star rating (four out of five stars) is typically required to access or view more demanding and higher paid tasks on the dashboard, such as writing longer or more complex texts. In addition, some platforms build into their infrastructures obligatory and automatic entrance or qualification tests as control barriers (Pmicro1, Pmicro2, Pmicro5).

In order to efficiently allocate jobs and workers, reputation and ranking systems are organised by algorithms:

“We profile and rank our testers and monitor their work to make sure that it is high enough quality [...] so we can segment the testers and get the right people to the right test, so it is a kind of matchmaking, really. Where we use the technology is in managing the community, in the filtering, in the ranking, even in the matching.” (Pmicro7).

The ranking thus has direct material effects: high reputation rewards workers by giving them more income-earning opportunities, while low reputation punishes them by limiting their access to income, to the point where they might no longer see any jobs on the dashboard – this is described as being “fired by the algorithm” (Kobie, 2016).

At its core, ranking systems on microtask platforms consist of the sum of ratings for completed jobs in the past. For newcomers, this means that they have to work their way up to pass certain thresholds and reach more lucrative jobs. Client rating is always possible but mostly voluntary, and often insufficient. According to many platforms, clients often do not take the time to complete such reviews; they can be subjective or fail to accurately assess the quality, for instance in the case of translations. Usually, rating goes hand in hand with direct output control, which, as described above, is organised by promoting crowdworkers with high rankings and qualification tests to this position (Pmicro1, Pmicro4, Pmicro6), or by platform staff (Pmicro2, Pmicro3, Pmicro7) and in rare cases by the open community (Pmicro7).

Only one platform uses an algorithmic system to calculate a score on the basis of mistakes found by the corrector. Accordingly:

“[*The corrector*] reviews the job using a quality scoring system [...] which automatically calculates a job score based on error count, error type, error severity and word count. Scores range from 0 (lowest) to 10 (highest), and you are expected to achieve minimum scores of 7 at Standard level and 8 at Pro level jobs.” (Pmicro5)

The reputation and ranking systems are, however, more than just the sum of the ratings for completed tasks. Platforms also monitor numerous other variables – most of which are undisclosed – to profile the crowd. Experience is a common variable: instead of qualification tests, some platforms require crowdworkers to have completed a certain number of tasks or hours of work to rise to the next level (e.g. Pmicro4, Pmicro7). The testing platform Pmicro7, which organises direct control through non-remunerated community flagging, provides reputation points for this kind of community engagement; this highlights how direct control and reputation systems are intertwined.

An important tendency on microtask platforms is to connect reputation to activity. A number of platforms monitor aspects such as hours spent on the platform, hours the crowdworker is normally active and logged into the platform to do work, work speed and level of activity (Pmicro1, Pmicro5, Pmicro6, Pmicro7). Several platforms weight recent work results more heavily than older ones (Pmicro6) or only include the performance results of the last 20 or 60 days in the digital reputation (Pmicro1, Pmicro5). On Pmicro6, moreover, the rating falls if a user is not active for several days or weeks or does not actively respond to job offers:

“You do not lose points when you actively decline a job, you even get points for it. But points decline over time if you don’t do anything, so also if you don’t decline tests. After a month you will have a lot less points then. For instance, let’s say for a low bug, 10 points, they expire after 30 days.” (Pmicro6).

Such activity-based systems can impose constant pressure to prove one’s abilities and to participate in platform activities. According to one crowdworker active on Pmicro6:

“If you get an invitation and you just let it be [...] this is no good for the tester. You must [...] accept and work on it or reject and tell the reason why you are rejecting. It affects the rating. [...] It is pressure.” (CWmicro7).

This undermines the promise of flexibility and self-determined organisation of working time. We found, however, that crowdworkers sometimes knew strikingly little about the rankings. Most were aware of certain, seemingly objective barriers to jobs (the required number of completed tasks, qualification tests), but many believed that their digital reputation did not matter much, aside from providing recognition. All emphasised that they did not really understand these reputation and matching systems. Some did not even know what their reputation was or where they could find it. This quote is illustrative:

“The system is very intransparent and I don’t understand how you move up the ranking. At the beginning, it was an orientation and also something like an appreciation for the work done. [...] But at the moment I do not really care about this. For me it is important to earn something there, and then it does not matter what your position is in the ranking. [...] I have not noticed yet that the ranking matters for the tasks you get.” (CWmicro4)

The indifference expressed by almost all interviewed crowdworkers suggests that, because the metrics and their use are not transparent, workers perceive them as arbitrary and may not accept them as credible feedback, let alone as a reference point for personal performance (Lee et al., 2015). This indicates that reputation and algorithmic matching systems are not iron cages, and that there is still room for agency and subversive strategies.

Macrotask platforms

Just as on microtask platforms, the reputation and ranking systems on macrotask platforms primarily serve to regulate access to projects and competitions; a high reputation is the precondition for being invited to join special and better paid projects and, ultimately, to have more secure prospective income on the platform.

Also, on macrotask platforms, an individual’s reputation is first and foremost the average of past ratings: on high-skill marketplaces with upfront selection of a crowdworker, usually only

the client rates the work result; on contest platforms with post-hoc selection of a winner, very often both the client and the crowd community can rate and comment on submissions. On this basis, the most popular among many possible solutions can be identified. Hence, while rating on microtask platforms is more an act of control, it is almost a collaborative and playful act on many contest-based macrotask platforms: the client and community openly interact, comment, discuss improvements and vote on their favourites.

Similar to the findings for microtask platforms, we found client and peer ratings on macrotask platforms to be problematic. Ratings can be biased, either due to subjective tastes or, worse, to human prejudices toward what is believed to be known about the background of the crowdworker (age, gender, nationality, cultural reputation). Design platforms in particular reported discriminatory attitudes of clients towards Southeast Asian freelancers (Pmacro3, Pmacro8, Pmacro7). Some platforms also reported that clients were overwhelmed by having to judge too many good and often complex contributions and tended to give relatively good ratings to everyone. Ratings may also depend on external circumstances (e.g. mood, personality) and especially when peer-rating systems are used, they can be flawed due to tactical behaviour in a competitive environment (for instance “I rate you well so you will rate me well”) (Horton and Golden, 2015).

For these reasons, and because the complex nature of jobs requires more than just a rough stratification as occurs for microtasks, but also often very specific filtering and matching, macrotask platforms monitor many other variables as well, in order to efficiently determine who will be suited for what project. In fact, complex algorithms were found in all macrotask cases:

“We have nine years of data around briefs, the history of a client, the history of the designer, designers that are similar to this designer because they are involved in similar contests, etc. We are in the midst of doing R&D around this to use all this data to predict, for any given contest, two or ten most likely people that would win this contest. And then say, ‘All right,

let's at least start with recommending them', see if they will enter, and if they enter, see how good our predictions are. And if we are pretty good at that, then we can start actually then limiting the size and saying, 'You don't need a million designers, we actually know the ten that are perfect for you'." (Pmacro8)

One platform stated that they take more than 30 aspects of someone's profile into consideration in the algorithm; however, none of the platforms disclosed all their variables. Frequently mentioned factors are experience on the platform and language skills. Because the client has a more central role within competitions, most reputation systems also include how actively freelancers communicate with the client. Moreover, in all cases, professional qualifications, licensed skills and work experience outside the platform are considered.

The reputation system on macrotask platforms thus clearly favours professionals. However, the fact that this model strongly relies on many submissions and community voting requires the participation of the whole crowd and not just potential winners. Therefore, macrotask platforms also award reputation points and even give prizes for participating in competitions (Pmacro1, Pmacro2, Pmacro3) as well as for community activity and interaction (Pmacro1, Pmacro2, Pmacro4, Pmacro7, Pmacro8). This includes factors such as: how long have you been on the platform, how active are you in commenting and ranking the contributions of peers, how much do you communicate with peers, how much do you engage in flagging spam and plagiarism or in reporting flawed project briefings. On Pmacro4, non-professionals can collect points by rating submissions. When they frequently predict winners, these community members can move up to a point where they can submit their own suggestions. Despite their lower professional performance level, their engagement is useful, as it helps the prediction algorithm to identify the likely best suggestion. Some platforms even attribute reputation points for producing and submitting proposals together (Pmacro1) or for promoting a project on social media (Pmacro1, Pmacro7). All of these activities are unpaid work (Aytes, 2012).

Moreover, the public visibility of reputation and rankings to clients and community, and often even to unregistered users, is centrally important and specific to macrotask platforms due to the subjective mode of competition. They are not only made visible through status titles (“pro”, “platinum” or “top rated”) but also through awards and badges, short personal stories and lists of top professionals.

These differences in the composition and visualisation of the reputation and ranking systems can be attributed to the motives for developing reputation systems. On microtask platforms, they are mostly functional and serve to regulate access to tasks up front and to organise output control ex post. On macrotask platforms, in addition to this functional purpose, they serve as incentive systems. For freelancers, reputation becomes their social capital, the mechanism through which the market regulates their value (Gandini, 2016). The profile of the crowdworker is upgraded to a personal portfolio; individual visibility and self-marketing improve an individual’s chances of being selected for a project or of winning a competition.

4.3. Community as Control

Microtask platforms

On microtask platforms, community building means that crowdworkers can articulate questions, problems or feedback not only directly to the platform but also to the crowd through chat programs (Pmicro4, Pmicro6) and forums (Pmicro1, Pmicro2, Pmicro5). There are also many independent forums and support groups (e.g. Turker Nation, Facebook and WhatsApp groups, Reddit) (Yin et al., 2016). This article, however, focuses exclusively on the official platform forums in order to understand their role within the managerial control and governance regime. In our sample, only one platform (Pmicro7), a smaller testing platform whose founder and CEO has a largely technical background, had focused on technically optimizing the platform in order to avoid the need for interaction with the crowd.

While chat programs only allow for communication within certain projects and are thus restricted in content, the community forums of Pmicro1 and Pmicro5 are especially interesting; they represent a many-to-many discussion space in which crowdworkers can seek help when facing a problem and exchange information or tips (e.g. “How to pass entry test”, “Recurring issues with reviewers” or “Why am I not seeing any jobs”). The forum of Pmicro1 was found to be the most lively and open communication space: here, a non-participatory observation revealed that crowdworkers also frequently voice complaints and grievances (e.g. “Sudden drop in rating”) or talk about non-work related topics (e.g. “What hobbies do you have?”).

The communication paths enabled by the technical design of the platform heavily impact the working conditions and possibilities for voice:

“For me the biggest problem I found on those platforms is the feedback. When you don’t get feedback, it’s hard to work, because you get stuck. [...] I had a few times that this happened to me. I just had to stop, because no feedback, nobody helped me – there is no community to help each other. [*Platform concealed*] is great, because there, if a project manager does not answer, you have a chat, you can talk to other testers. And many times they are nice and help you out.” (CWmicro7)

Microtask platforms stated that the primary purpose of such community interaction was to enable self-help and self-regulation among the crowd, which is a very effective way to reduce costs and the need for the platform to employ more staff: platform staff members provide useful information to several crowdworkers at a time, the community helps each other with questions and problems, experienced crowdworkers pass on their experience and thereby train newcomers. Moreover, while these forums provide some room for labour voice so that problems and complaints can be articulated; they also help platforms identify and deal with sources of conflict early on. As formulated by a staff member of Pmicro1:

“After the forum was launched, the number of queries to our support staff decreased. [...] We see a lot of activity and interaction in the forum, which is nice because it relieves us a bit, because the amount of questions that come to us separately and repeatedly decreases. If someone has a problem, he goes to the forum and looks if someone else had the same question before [...] instead of us receiving five or twenty emails about the same problem which we have to reply to individually.” (Pmicro1)

Community interaction is largely voluntary. Except for Pmicro7, which organises direct control through community flagging, none of the microtask platforms observed provides incentives to stimulate activity within these community spaces: reputation points or specific prizes are not awarded for community activity, and community activity is not connected with work on the actual platform site.

Macrotask platforms

On macrotask platforms, in addition to direct emails to platform staff and private chat systems, two types of crowd community spaces were observed. Some platforms promote crowd interaction on separate online forums that follow self-help and self-regulation logic similar to those found on microtask platforms (Pmacro5, Pmacro6 and Pmacro8). However, the fact that these platforms attract mostly professional freelancers is reflected in the more extensive use of the forums: in the period of observation, 418 active threads were counted on Pmacro8 and 1497 active threads on Pmacro6 (as compared to 73 active threads on Pmicro1 and 5 threads on Pmicro5).

Particularly interesting are the platforms Pmacro1, Pmacro2, Pmacro3, Pmacro4 and Pmacro7: here, crowdworkers can communicate in discussion threads within ongoing projects and contests, underneath single submissions and on one another’s individual profiles; moreover, they can also simply like each other’s work. Some of these community spaces are fairly sophisticated and resemble social media networks such as Facebook:

“We have integrated a lot more social features on the site again: have connections, like you can do on LinkedIn, newsfeed, you can share your projects, things that are on your mind. If someone has won a contest s/he can share the winning design on the newsfeed, and other community members can like it, react to it, comment on it. It’s like Facebook. We are building a whole community around it.” (Pmacro3)

This reflects the centrality of the community for crowd competitions. Through the given technical infrastructure, crowd interaction is directed toward goals that are functional for the platforms: assessing the quality of other’s works, promoting collaboration in projects and providing visibility and recognition as incentives for activity, despite uncertain income opportunities. Thus, on contest-based platforms, the crowd community is a necessary complement that indirectly controls performance and makes the reputation and ranking systems work.

The importance of visibility is also reflected in the sophisticated profiles found on all macrotask platforms. These serve as personal portfolios: they display work status, skills, education, experience, successes, customer reviews, customer repeat rates, response scores and even hobbies and other self-descriptions. People can share their own submissions on their profiles and follow peers’ profiles. As Pmacro1 illustrates, referring to the profile of one active creative:

“Here you have your badges. Here you see that [name concealed] has been invited and can access the top, the private layer. And [she] has also been recognised for outstanding ideas. A lot of other creatives can also connect with [her] and see, ‘Oh, that’s somebody I want to be more in contact with’. [She] is extremely active in giving other creatives feedback and constantly encouraging people. [...] That is kind of boosting social status on the platform. [She] is earning [points] for each interaction, so when [she] is giving feedback on an idea, ranking an idea, submitting ideas or creating a team.” (Pmacro1)

There is of course a danger that competition may come to prevail within the community. Competition, however, does not always produce the desired effects for a platform. One platform identified the lack of community interaction as the biggest current problem:

“The idea was that one can comment, and then with ten likes we know that the comment was important. [...] The problem is that the liking of others’ comments does not seem to work as an incentive [...]. People prefer to submit their own ideas, but few spend time on others’ ideas. [...] In most of the cases, it is a dialogue between us and them; there is little dialogue within [*the crowd*]. We work with the University of [*name concealed*] where we do a bit of behavioural economic testing to see how we can set incentives.” (Pmacro2)

Contest-based platforms thus often try to create incentives for community interaction. One platform even provides direct financial incentives by awarding a separate prize for collaborative submissions (Pmacro1). Most platforms award reputation points for community interaction that can boost one’s status on the platform and enable access to more tasks. This shows the connection between reputation and ranking systems and community building as mechanisms to influence crowdworker behaviour and indirectly control performance. Finally, gamification elements that cost nothing, such as badges, likes, trophies or collaborative missions, are also used to stimulate interaction, ambition and recognition within the virtual community (Blohm and Leimeister, 2013).

In summary, the construction of a virtual community within the dispersed digital cloud can thus be identified as another novel mechanism used by platforms to control performance. It is the community managers who engage in the forum discussions who become the faces of the platform. As suggested by a crowdworker active on Pmicro1 and Pmicro2, this can increase the commitment to the platform and perhaps create a kind of organisational identity in the long run:

“Through the forum [...] people are involved in the platform. [...] I would not have stayed long if there had been complete anonymity. [...] With [*staff name*] I had a lot of interaction especially at the beginning. They don’t hide behind the platform and say, ‘We are an online

platform, you cannot reach us'. [...] Of course they are only humans and fallible too. But they don't say, 'Take it or leave'." (CWmicro3)

Discussion and Conclusions

This article shows that crowdwork platforms are far from being neutral technological mediators of market relationships. The findings highlight the platforms' agency and suggest that they represent a new form of labour organisation with complex managerial structures.

Existing research focuses either on the direct, technological and almost despotic control of microwork (e.g. Kittur et al., 2013) or, conversely, on performance regulation through ranking and reputation systems (e.g. Gandini 2016). Research into offline gig work, in particular on Uber, highlights the interplay of direct algorithmic surveillance and control and of rating and gamification systems (e.g. Rosenblat and Stark, 2016).

The article contributes to existing research on crowdwork by mapping out more systematically, and across different task complexities, the various facets of performance control. The results suggest that, independent of the task type (micro or macro), the systems of performance control involve interactions between direct output control, reputation systems and – woefully overlooked by research to date – community building.

First, all platforms engage in the *direct control* of performed work. Though the dominant research debate suggests otherwise (e.g. Lehdonvirta, 2016; Irani, 2015a), the majority of output control is done manually, even on most microtask platforms, and mostly through peers. Although all platforms use some kind of automation, it is mainly assistive.

Second, due to the limits of direct control, platforms have developed mechanisms to stratify the crowd in order to regulate the crowdworkers' access to tasks and put them into competition. The core mechanism for this is *ranking and reputation systems*. Corresponding to previous findings, our study found reputation systems on both microtask and macrotask platforms (e.g.

Graham et al., 2017; Gandini, 2016; Vakharia and Lease, 2015). We find, however, that these systems vary strongly in complexity and sophistication. Microtask platforms mainly use algorithms to keep track of past job ratings and activity. This is because rankings are predominantly used to define access to tasks, to select crowdworkers to monitor their peers and to determine how often a crowdworker is monitored. Macrotask platforms, conversely, rely on complex and often predictive algorithms that track everything from past successes and experience levels to professional qualifications, personal information, activity levels and community interaction. This reflects a different purpose: they serve not only to control access to jobs but also to provide visibility and to incentivise workers to perform well.

Third, the article contributes novel insights into the importance of *community building* as a central management strategy of crowdwork platforms. Microtask platforms typically provide nothing more than a technological infrastructure for crowdworkers to support and regulate themselves. Macrotask platforms invest particularly high effort in community building, which corresponds to their need to mobilise creative and higher-skilled professionals, often with uncertain income prospects. Performance control is achieved here by significantly blurring the boundaries between production and game, between work and non-work. As we showed, reputation systems would be impossible without *building a community* of crowdworkers.

In addition to showing the interdependencies between direct control, reputation systems and community building strategies, this article shows the differences between the approaches of microtask and macrotask platforms. We suggest that reputation and community-building systems on microtask platforms work similarly to the “learning games” described by Sallaz (2015) in the case of call centers. These games aim to create motivation in a context of low pay and harsh working conditions. The concepts used by macrotask platforms are better understood as “evaluative infrastructures” that aim to create competition and distinction-based incentives and establish power by decentralizing control (Kornberger et al., 2017).

What is also novel and important for existing labour process debates is that these direct and indirect forms of performance control present themselves to the individual as seemingly neutral technology. Control is codified – and thereby objectified – as algorithms and digital infrastructures.

Finally, it is important to highlight that the findings also provide the first indication of the contradictions and limits of performance regulation in crowdwork. Crowd communities do not exert the type of “normative control” described in high-tech companies (Kunda, 1992). Platforms are not iron cages: acceptance problems were observed regarding the ranking and reputation systems, and crowdworkers decided autonomously whether to invest extra time in social interaction with the community. Research commonly paints crowd labour as a weak actor due to the isolation and technological control of crowdworkers and potential global competition. Future research should, however, shed light on how crowdworkers interact with these managerial systems, on the opportunity for misbehaviour and conflict, and on the power resources the crowdworkers possess.

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