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Foodora and Deliveroo: The App as a Boss?

Control and Autonomy in App-Based Management –
The Case of Food Delivery Riders

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Abstract

The rise of digitally-mediated labor requires a deeper understanding of algorithmic management in work environments. The discourse surrounding the gig economy portrays platforms as lean, flexible and efficient. Gig-work companies promise autonomy and flexibility to their workers regardless of the contractual relationship between them. Platforms also often position themselves as providers of a neutral technological infrastructure and as an impartial intermediary.

The paper explores the interplay between autonomy and control in the app-based management of food-delivery platforms from an interdisciplinary perspective. We set out to understand how much autonomy is given to food-delivery workers and how platforms attempt to increase their control through technologies. We also ask what this socio-technical reality tells us about the contractual status of self-employed gig-workers. Using a qualitative comparative research design, we explored how app-based management is constituted in the case of the self-employment model used by Deliveroo and the employment model used by Foodora.

Despite significant differences in the contractual models these two platforms use, we found that spheres of autonomy granted to the rides overlap. Both platforms delegate autonomy over time scheduling, zone choice and a route of delivery. Our results show, however, that platforms use specific app-based techniques of control in order to influence riders' choices and behavior. Platforms exert control over workers through statistical-based internal competition for shifts and bonus systems, informational asymmetries, and automated messaging system. We conclude that the autonomy promised to the riders is granted to them only when they meet the performance standards set by the companies. We also suggest that the integration of a worker in the app-based management structure could be considered a suitable legal criterion for defining the scope of labor law provisions in the gig economy.

Introduction

Did you ever wonder why so many 'pink bikers' are riding around Berlin? Well, we know why! They all love to have a super flexible job, earn good money and be their own boss, which is exactly why they already joined the Foodora network.

Foodora recruitment website¹

You decide when to work. Working with Deliveroo gives you flexibility and independence. And by being self-employed, you enjoy the advantages of working to your own availability.

Deliveroo recruitment website²

In just a few years, food delivery platforms have gained popularity among urban dwellers in Berlin and hundreds of other major cities around the world. When you don't have time to cook you can simply reach for your phone, choose from a wide variety of local restaurants and enjoy your favorite dish in less than an hour. Technological change didn't create the need for city inhabitants to eat, but new technologies have made satisfying these needs cheap and convenient.

The business model of food-delivery companies such as Deliveroo, Foodora and Uber Eats has sparked an interest in researchers, as it has created new marketplaces connecting hungry customers with the restaurants supplying their food. This new model has also radically altered the employment relationships of the delivery drivers, who are no longer paid for their service by the restaurant or the customer, but rather by the food-delivery platforms. In this study we focus on two companies currently operating in Berlin – Deliveroo and Foodora.

Deliveroo deploys a model of workforce management which places it clearly in line with other so called 'gig-economy' platforms – such as Uber or Helpling — which rely on self-employed contractors. These digital labor platforms offer the labor of “humans as a service” (Prassl, 2018) to their end users, the customers. As Schmidt (2017) has noted, many economists see the digital platforms to be a promising alternative to traditional forms of employment, because they promise lean, flexible and efficient management of a workforce. The platforms themselves mirror the 'celebratory rhetoric' of the on-demand economy (Malin & Chandler, 2017), claiming that digital platforms nurture autonomous micro-

1 www.appjobs.com/berlin/foodora (Last accessed on 11 September 2018).

2 <https://deliveroo.de/en/apply> (Last accessed on 11 September 2018).

entrepreneurs who can determine the nature of their work independently.

Other scholars criticize the use of self-employment for allowing the platforms to evade responsibility towards workers and leaving them without social protection. The management model based on self-employment is seen by many scholars as a stark example of the neoliberalization of the economy over the past four decades, fueled by digitization (van Doorn, 2017; Srnicek, 2017), precarization of labor relations in the aftermath of the recent financial crisis (Hill, 2015), and evasion of labor and social security regulation.

Against this backdrop, the case of Foodora in Berlin is particularly interesting. While the work performed by bicycle riders is almost identical to those of Deliveroo, the majority of them are actual employees. This model is less common, although it is also used by other platforms such as Book-a-Tiger. What remains common to the two food-delivery platforms is that in order to earn money, riders need to own a smartphone and download a mobile application (app), which assigns and controls the entire delivery process.

Indeed, it is the use of a proprietary mobile app designed specifically for the purpose of workforce management, which connects the business models of the two companies, but also the working experiences of the Deliveroo contractors and Foodora employees. According to the discourse promoted by the platforms themselves, this technological solution is a source of flexibility and autonomy for those performing the job. It is 'the app' which allows you to 'be your own boss'.

Gig-economy platforms often discursively position themselves as providers of an app, usually portrayed as a neutral technology infrastructure. To claim that the technology is "open, impartial, and non-interventionist" is, however, to mystify its nature (Gillespie, 2017, p. 4). In fact, the functions of these apps go beyond mere mediation, as they exert control over gig-workers (Chan & Humphreys, 2018; Lee, Kusbit, Metsky, & Dabbish, 2015; Mohlmann & Zalmanson, 2017; Rosenblat & Stark, 2016; De Stefano, 2015; Shapiro, 2017). To put it simply: for the humans working for these firms, the platform – materialized in the app – is the 'boss'.

We believe that understanding how strategies of managerial control have evolved — with the advent of new technological solutions — is the key to understanding the future of labor relations. The application-based model deployed by both Foodora and Deliveroo can give us insights into wider dynamics of technology in the workplace. In particular, by listening to the experience of workers who are regular users of these technologies, we can decipher the changing norms that are embedded in them.

Our first aim in this article is to ask how much autonomy is actually given to gig-workers and what mechanisms these platforms utilize in order to control labor. More specifically, we choose to focus on the manifold role of the app in this infrastructure of autonomy and control. The second goal of the article is to provide insights into the connection between questions of app-based managerial control and the legal construction of the employment relationship.

To ground our research in theory, we developed an interdisciplinary theoretical framework, which accounts for the relationship between autonomy, control and technology in app-based management, from a sociological and a legal perspective. We selected three research puzzles and used comparative research methods to inform our understanding of them.

The data we collected in our empirical research helped us discover that despite the differences in the contractual relationships, both companies grant riders similar levels of autonomy at work. We also gained a detailed understanding of the specific app-based techniques of control through which platforms aim to influence riders' behavior. In particular, we found out that these platforms exert control over workers through automated messaging, information asymmetries, internal competition for shifts and monetary incentives.

After presenting the empirical results, we discuss our findings in light of the research questions. Specifically, we analyze what might be the reasons behind management granting autonomy to riders, how is this autonomy controlled through technologies, and what is the role of the app. Finally, based on the sociological analysis, we concentrate on the question whether the relationship between platforms and riders could be defined as independent in the strict legal sense.

Interdisciplinary Perspective on Application-based Management

Both social scientists and legal scholars have paid great attention to labor control by management. It is surprising though, that there is little scholarship on the topic combining these two disciplines. Here we propose a theoretical framework that takes into consideration how the legal realities of self-employment and employment by a company are interrelated with the configuration and changing of mechanisms of labor control and management.

First, we discuss broadly the roles of labor control, spheres of autonomy and technologies at work. We introduce a differentiation between two ideal-type situations of control: control in an organization, and control by the market; and emphasize the legal circumstances associated with each of these types. We then focus on the characteristics of app-based management by briefly summarizing the literature on the topic. Finally, we provide a frame for understanding the relevance of autonomy and control in app-based management for the legal assessment of the contractual relationship between platforms and gig-workers.

Relationship between technology, control and spheres of autonomy

As Hyman (1987) pointed out, while in orthodox management literature the question of labor control is often neglected completely, the most critical literature “perceives nothing else” but control (p. 34). The wide range of management activity and processes of surplus-value production certainly cannot be reduced to issues of labor control; however, control is an indispensable element of any workplace regime, since “division of labor requires mechanisms to set goals, allocate responsibilities and evaluate the effectiveness of performance” (Thompson & McHigh, 1995, p. 104).

The so-called ‘control imperative’ stems from the fact that owners’ profit is dependent on the labor performed by the workers. Control refers to all ways of management trying to “convert labor power into actual profitable work” (Thompson, 2010, p. 10). Two ideal types of control situations can be differentiated: managerial control in an organization setting, and control by the market (Hensel, Koch, Kocher, & Schwarz, 2016).

We will first discuss control in an organizational setting. Since industrialization times, workers selling their labor power had to be integrated in an organizational structure. As company's revenue depends on workers' labor performance, capital owners need to ensure that this performance is maximized. Since labor market mechanisms alone cannot exercise control over the work process (Smith, 2015), workers are integrated into organizations, where their work is planned and controlled by management.

The legal form of employment relationship which guarantees the employer's directional powers (§ 106 GewO) has been modelled on these forms of control. Labor law and social security regulation attempt to compensate for the lack of equal bargaining power in an organizational form where one party (the employer) may command the other party (the employee) (Kocher, 2015; Davidov, Freedland, & Kountouris, 2015).

A vast amount of literature has accumulated on the varieties of control strategies adopted by management (Braverman, 1974; Edwards, 1979; Friedman, 1977; Buraway, 1985; Barley & Kunda, 1992; Kärreman & Alvesson, 2004). Research has shown that there is no uniform historical shift from one mode of control to another; every organization relies on a mixture of control techniques, which don't necessarily exist in pure and mutually exclusive forms (Thomson & McHigh, 1995). Further, it is not debatable if these techniques and structures are the result of a deliberative and purposeful strategy by management to control labor (Hyman, 1978). Here we adopt a rather specific definition of control: the way in which management tries to influence when, where and how workers perform their labor.

If control in an organizational setting is one side of the spectrum, on the other side we have control by the market. In contrast to the first type, it does not rely on the 'command and directional power' of management to assign tasks, give orders and directives to workers. The 'control' element here relates to the market forces of supply and demand, which influence the remuneration, but may also have an effect on working time and effort. As Huws (2014) argues in relation to market control: "unless what they have to offer is exceptionally sought-after, self-employed workers and independent producers have little choice but to offer what their customers want, at the price they are prepared to pay, in the face of competition which, in many industries, is increasingly global" (p. 120).

Market-mediated labor relations have been called 'open' employment relationships because "they are based on free market forces and competition" (Kalleberg, 2011, p. 83). Kalleberg (2011) emphasizes that these 'marketized' relations can be internalized within the organization, or externalized beyond the boundaries of the company. A contractual legal re-

relationship that only relies on market mechanisms, where management does not retain any directional powers, will be constructed as “self-employment”, i.e. a non-employment civil law contract. Autonomy in this sense means the absence of directional power over working time, working place and execution of tasks (§ 611a para. 1 BGB, § 84 para. 1 HGB) (Davidov et al, 2015).

It is commonly understood that market mechanisms alone cannot exercise effective control over the performance of workers and reduce the indeterminacy of labor. By indeterminacy of labor, we refer to the idea that companies relying on a self-employed workforce cannot ‘fix’ or know in advance the exact amount of labor effort given by workers, nor can they fix or know in advance the labor time the workforce will elect to work (Smith, 2006). Thus, the imperative of control does not disappear in the context of market labor relations, but operates in a profoundly different way. As Fleming (2017) points out, ‘radical responsabilization’ in a workplace, “whereby responsibility for all the costs and benefits associated with being an economic actor are solely his or hers” (p. 693), requires more, not less, management and control. As a result, companies implement more subtle and indirect mechanisms of control in order to manage a self-employed workforce, and to structure imbalanced power relations in their favor.

Although the law thinks of control by organizations (directional power) and market mechanisms as mutually exclusive, these two types might actually co-exist in different combinations. In other words: companies can utilize control by market mechanisms on their employees, and exert organizational control on self-employed workers. Furthermore, in particular management regimes, workers can be granted certain levels of discretion over the ‘when, where and how’ aspects of work.

When we speak of spheres of autonomy here, we mean those aspects of the work process, which are left to the worker to determine. These spheres can have different functions. They provide a space for creativity and cooperation for labor, which is needed for the improvement of work processes (Thompson & Newsome, 2004). They draw on workers’ knowledge and creativity in order to “keep the wheel of capitalism turning” (Huws, 2014, p. 30). Furthermore, granting autonomy to employees could be used as a managerial strategy of indirect control, which aims to increase motivation and performance. With the promise of “autonomy, self-realization, and non-alienated work” (Bröckling, 2015, p. 8) workers are expected increasingly to self-manage their work. Studies have revealed how autonomy might actually even increase control over workers (Ezzamel and Willmott, 1998, Sewell, 1998). Finally, spheres of autonomy might have been introduced so as to meet all legal

criteria for a worker to be recognized as an independent contractor (Däubler, 2010).

As there are different reasons why management would introduce spheres of autonomy, their relationship with strategies of control is a particularly interesting subject of investigation. Our study does not only focus on possible contradictions between a drive for autonomy and a need to control; we also seek to understand how the technology used can contribute to controlling autonomy.

Now to focus on the role of technology: in contrast to a body of literature which assumes that the effects of technology at work are neutral, we side with those theories that emphasize that technologies are created and implemented within social relations (Moore, Upchurch & Whitaker, 2018). They embody the values and goals of their creators, they have historically served multiple purposes, and their relevance to organizational profit is not reducible to control of labor.

Technologies can be integrated in a system of control. They can serve as tools of command and control, as providers of spheres of autonomy, and as means for controlling autonomy. Technology is not a control strategy per se (e.g., Edwards' technical control), but rather is open to integrating various control strategies (Hall, 2010). With the expansion of digital technologies in the workplace (or 'digital despotism') technology can combine bureaucratic (computers), physical (machinery) and bodily (wearable devices) control (Pfeiffer, 2017). Technology can also expand control functions to new territories, such as emotional labor and workers' tacit knowledge (Hall, 2010). In the social-scientific literature on the deployment of information and communication technology (ICT) at work there has been a special focus on call-centers (Thomson & Broek, 2010). The so-called 'call center debate' provokes images of an "electronic panopticon" (Bain & Taylor, 2000) and centers around the role of ICT in controlling labor.

Technology might enhance workers' autonomy by allowing individuals to determine when, where and how they work. It can also lead to intensified self-control: the 'autonomy paradox' identified by Mazmanian, Orlikowski, and Yates (2013) points to the fact that digital technologies provide more flexibility and autonomy to workers and also blur temporal boundaries and increase stress, as workers self-restrict their autonomy due to the internalization of norms.

Here we want to focus most on if and how technologies are used to establish spheres of autonomy and strategies of control within a particular management regime. We will scrutinize how technologies are embedded within infrastructure where organizational-based and market-based management regimes are mixed. We will also engage with the

question of what the usage of technological control in market-based relationships tells us about the legal status of self-employed workers.

Characteristics of app-based management

Digital platforms that use different workforce management models provide a fertile ground for exploring these themes. Both organizational and market control exist among on-demand platforms. Furthermore, as Heiland (2018) emphasizes, gig-work platforms themselves represent a “specific mixture” of market mechanisms and more traditional control regimes.

Irrespective of their employment status, gig workers perform their work out of the direct sight of supervisors. Like all mobile workers (Bakewell et al, 2018; Levy, 2015), they typically have a remote relation with managers, which grants them relative independence in their work. The identifying characteristic of gig-work management is the lack of physical manifestation of supervision; all supervision is up to ‘the app’ (Rosenblat & Stark, 2016; Waters & Woodcock, 2017). They prove what Edwards (1979) has already shown: technical control may displace direct control and result in less physical contact between workers and managers. As much of the supervisory functions are delegated to the app, workers do not need to communicate with human supervisors.

Moreover, gig-work platforms promise a significant level of flexibility in deciding when, where and how one works. In this sense, the design of the Uber, Lyft, Deliveroo and Helping apps should embody the spheres of autonomy. Platforms, however, are faced with the challenge to organizing and controlling the labor process of dispersed workers in such a way that a maximal labor performance can be achieved. Scholarship has elucidated the technical means of controlling gig-workers, giving rise to the concept of ‘algorithmic management’ (Lee et al, 2015).

Here we adopt the notion of application-based management instead of algorithmic management, as we want to focus on the distinctiveness of working with a mobile application — alone — in the absence of any physical presence of a human supervisor. While algorithms operate in various work contexts, what appears to be truly exceptional about the location-based gig-economy is that the app is the main, if not the only, management tool. Hence, workers perform their labor activities almost exclusively through the app. App-based management is also a more encompassing term. It points to all aspects related to working with an app, from logging in and out to generating a constant flow of data to platforms’ servers.

Literature on algorithm management in the gig economy identifies five functions relating to which technology can support managerial control: surveillance of the labor process, collection of data for performance evaluation, automatic decision-making, automated messaging systems and digital choice architecture.

Firstly, by applying tracking software that “F.W. Taylor could only have dreamed of” (Thompson & Briken, 2017, p. 251) platforms can thoroughly monitor the labor process. As Waters and Woodcock (2017) observe in their study on Deliveroo, an ‘algorithmic Panopticon’ provides a God-like view over the workers’ behavior through a combination of Taylorism and panopticism.

This constant tracking allows platforms, secondly, to collect an enormous amount of data. Part of this data can be used for an automatic evaluation of gig-workers’ performance (Möhlmann and Zalmanson, 2017). Data has become a ‘form of social knowledge’ facilitating the concentration of information in the hands of the platforms and exertion of power over workers (Chan & Humphreys, 2018). Furthermore, ‘metric power’ might enable market-like relationships to emerge between workers and therefore might foster competition (Beer, 2016).

Thirdly, and probably most obviously, the directional effect of algorithms is manifested in their ability to implement decisions automatically, based on existing data. Automatic order assignment is a classic example of algorithmic management (Lee et al., 2015; Hanrahan, Ma, & Yuan, 2018). The credibility of these decisions is based in the computational authority of algorithms, which are perceived as an autonomous and objective force (Gillespie, 2014).

The fourth characteristic relates to data-driven automated messaging systems. Attempting to influence workers’ behavior through pop-ups, reminders, and prompts is one of the key aspects of algorithmic control (von Doorn, 2017). Munn (2017) refers to this characteristic of algorithmic management as the “Partner-Management-Messaging machine”, which aims to shape the workers’ behavior through “motivational messaging techniques” (p. 12). Uber, for example, has been found to persuade drivers into working longer (Scheiber, 2017) and changing their work location (Rosenblat & Stark, 2016) through push notifications.

Finally, algorithmic management is related to the construction of a digital ‘choice architecture’ (Sunstein, 2015). On the one hand, platforms rely on pre-programmed paths of action, where the unwanted and impermissible alternatives are excluded from its design; a form of control which Aneesh (2009) termed ‘algocracy’. On the other hand, in cases when app users are actually given the choice between different paths of action, platforms have control over the way these choices are presented.

The operation of a specific choice architecture is interrelated with the questions of digital nudging as “user-interface design elements” can be used “to guide people’s behavior in digital choice environments” (Weinmann, Schneider, & vom Brocke, 2016, p. 433). Both the information given by the app as well as its visual design are tools for guiding choice in app-based management.

These five elements certainly do not exhaust all characteristics of algorithmic management. They are also mutually dependent and do not have clear-cut borders: data collection cannot exist without digital monitoring and automated decision-making cannot function without a constant data flow. They inform us, however, that platforms have a variety of tools in their box to influence workers’ behavior. We do not adopt these analytical categories as a rigid framework in which we try to fit our empirical data. Rather, once we have reconstructed the operation of app-based management we come back to them in order to illuminate our findings in respect to the existing literature.

Legal consequences of app-based management

Both organizational and market control exist on on-demand platforms. However, the legal consequences of organizational command and control differ from those related to control by market mechanisms.

Employment relationships are the main legal path for workers to access rights and benefits provided by labor law and social security (Kocher, 2015). Differences within the contractual design and risk distribution between self-employed and employed workers are huge. Generally, labor protection regulations such as social security, protection against unfair dismissal, minimum wage, holidays legislation, continued payment of remuneration in the event of illness, etc. only apply to employees. Where the relationship between workers and companies is contractually constructed as self-employment, workers themselves bear the responsibility for their social security and the risks of their activities.

Digital platforms of the gig-economy often describe themselves merely as a ‘market-place’ for workers that mediates between clients and workers. In the case of crowdworking platforms this evaluation often leads to the negation of an employee status (Lingemann & Otto, 2015; Däubler & Klebe, 2015; Günther & Böglmüller, 2015), meaning that employment law protection instruments are largely inapplicable. In this same vein, Deliveroo does not operate through “employment contracts”,

but uses self-employed workers who perform their labor as independent contractors, with Deliveroo being legally understood as their client.

However, research on management control has questioned if gig-economy platforms are really restricted to a role of mere market mediation. In many cases, workers are coordinated and organized by the platforms in a way that employer coordinates employees. In the legal debate, the issue is about disclosing false self-employment (*Scheinselbstständigkeit*) (Prassl & Risak, 2015; Risak & Lutz, 2017; Kocher & Hensel, 2016; examples of this issue in US court cases: Cherry, 2015).

The question of false self-employment arises because the legal analyses, instead of examining the contracts, analyzes the actual implementation of the contractual relationship in order to determine if a worker is considered an employee (“primacy of facts”: Hensel, 2017; Kocher & Hensel, 2016; Davidov et al., 2015; Prassl & Risak, 2015). The legal evaluation of the relationship has to be made on a case-by-case basis and is oriented towards the traditional criteria for the concept of an employer: personal dependency based on the employer’s right to give instruction, being integrated into the work organization and bound by directions of the employer.

The jurisprudential discourse is still in the process of legal classification of gig-economy work. What makes this task harder is precisely the way new technological tools blur the boundaries between organizational and market instruments of control.

On the other hand, the digital platforms maybe deliberately using legal strategies to construct their relationship with riders (Däubler, 2010). Circumventing labor law by contracting self-employed workforce may enable organizations to save on labor costs, such as benefits and insurance, training costs, maintenance cost and investments costs (Srnicek, 2017).

But this comes with the price of the law influencing management tools – only by renouncing directional powers, will it be possible to persuade courts to accept the legal construction of self-employment. Companies relying on self-employed workers need to provide a certain level of on-job autonomy in order to “reap the benefits from the independent contractor designation” (Shapiro, 2017, p. 2). To adhere to legal standards, companies might allow workers to decide when, where and how to work – creating the uncertainties and challenges that come with not being able to foresee and plan in advance workers’ behavior and choices.

While the academic focus on algorithmic management has been centered on platforms relying on self-employed workers, little attention has been given to platforms that hire employees. This is why our comparison between Deliveroo and Foodora is of particular interest, since the two

companies use different contract and employment models. At the same time, they both work with app-based algorithmic management and coordinate similar work processes.

Research Design

Research puzzles

By studying in depth two companies deploying app-based management, we set out to explore the following research puzzles:

- a. *What is the role of autonomy in the app-based management of food-delivery workers?* Autonomy at work is one of the key promises that gig-work platforms make to their workers. What does this autonomy look like in practice? We hope to identify the spheres of autonomy delegated to the riders and to examine the rationale behind them: how they function and what purposes they serve.
- b. *How is management trying to increase its control of autonomy through technologies?* This puzzle concentrates on the managerial strategies of control. While platforms might provide spheres of autonomy to their workers they still want to have all orders delivered on time with minimal staff costs. We will look at the specific technologies through which companies try to maintain control over riders' autonomy.
- c. *To what extent is the workforce model based on self-employment used in app-based management compatible with existing legal frameworks?* The interplay between managerial strategies also provokes legal questions. How does management construct self-employment and at the same time exercise control over riders? Is this legal construction successful in meeting the preconditions set in German law? What options could be considered to improve the protection of the self-employed contractors?

Research methods

In order to investigate app-based management, we selected two companies based in Berlin which use technology as the core of the food-delivery system and workforce management: Deliveroo and Foodora. The firms deploy two starkly contrasting employment models in the same legal, institutional and political context of Germany. This difference allows us to study the reflection of legal regulation in management models and vice versa. We therefore decided to apply a comparative case-study research design in order to capture the differences between these two companies.

During the research period from February 2017 to August 2018, we conducted 19 in-depth, semi-structured interviews with the riders; all of

them lasted at least an hour long and were recorded. While our sample can hardly be considered representative of all the riders working in Berlin, we did our best to include a diverse set of viewpoints and experiences. We have talked with 12 people working as self-employed riders at Deliveroo and with 7 Foodora employees, riders who belong to unions and those who have never participated in any collective action, riders who are critical of the platforms and those who are favorable to them, former riders, newly hired ones and even some who have been riding for the companies since they launched in Berlin.

Besides the questions aimed at establishing personal histories and motivations, the interview questions generally fell into three categories. First, we asked the riders how the platforms structure and organize the work process; second, we focused on the role the app plays in their work experience; and finally, we asked about their viewpoints on existing collective actions by other workers, or other avenues of improving the existing management model.

We also conducted three interviews with company representatives charged with different aspects of workforce management – a dispatcher, a rider community manager and a customer service representative. Moreover, additional interviews with union representatives gave us insights into the causes and dynamics of collective action in Berlin and beyond.

In addition to the interviews, we conducted participant observation of trade union-meetings, riders' protests and other events organized by the rider community in Berlin. We accompanied the riders while performing their work and joined them at some of the social after-work activities.

In order to understand how the platforms communicate with the riders, we reviewed emails and newsletters sent by both companies. We also analyzed job offers' descriptions in order to get familiar with the organizational structure of the companies, as well as analyzing the tasks and responsibilities of people working in different roles. To assess the socio-legal reality of app-based work, we also examined the contracts between self-employed riders and Deliveroo.

Through analyzing these data sources, we aimed to re-construct the way app-based management is constituted in the socio-technical and socio-legal reality. By studying the apps, reading the newsletters and looking at the contracts, we attempted to understand what the 'rules of the game' are. Interviews and observations served not so much as a fact-finding method but gave us an idea how the participants in the game perceive it and what they act upon. The principles of the grounded theory approach guided the coding and analytical strategy. While in this article, we focus our attention predominantly on understanding how app-

based management is arranged; future research will be devoted to an in-depth analysis of riders' interpretations and practices.

We attempted to capture the experiences of workers during a ten-month long timeframe in the most consistent way possible, but we quickly became aware that their working conditions are constantly evolving. From minor modifications of the app design to drastic changes in the shift-booking system, the platforms seemed to be in a constant process of innovation and experimentation. This was one of the biggest challenges of our research, since we had to constantly adapt our interview questions to the specifics of the ever-evolving app. On the other hand, it gave us a unique opportunity to observe riders' reaction to these changes as well as collective actions organized in response to them.

Empirical Findings

‘Ride with us’: Working for Foodora and Deliveroo in Berlin

Working as a Foodora or Deliveroo rider involves picking up food from a restaurant and delivering it to the customer who ordered it. All you need to do this job is a bike and a smartphone. The riders confirm that it is “easy and quick to get the job” (P6) by applying online. No knowledge of German is necessary. The workforce is hence made up of riders with various backgrounds – immigrants, German nationals, students, people with and without higher education. We found that for some of them, it is a side gig and for others a main source of income. It is “a fantastically heterogeneous staff” (P20) as one rider puts it.

All work processes are coordinated through an app, which riders need to install on their phones in order to work. Deliveroo uses the *Rider App* and Foodora uses the *Road Runner App*. Their main function is identical – it gives information about the deliveries and assists riders with the workflow. The workflow is broken into small steps: accepting an order, riding to the restaurant, taking the food and packing it in the delivery bag, riding to the customer, and handing over the food.

At each one of these steps the rider confirms with a click in the app that a step was completed. Almost all communication between the platform and the workers happens through the app. If everything runs smoothly the waiting time at the restaurant and the interaction with the customer are short and impersonal. Much of the working time is spent riding alone on a bike. Lack of communication with a boss, colleagues or customers is often mentioned as the biggest advantage of the job: “You don’t have to communicate with somebody that puts you down” (P3) as one rider states.

Although both companies use an app to coordinate the workflow, there is a fundamental difference between the working conditions of these two groups of riders. As an employer, Foodora is obliged to guarantee the German minimum wage to its riders, but riders actually earn 9 € per hour — a little bit more than the minimum wage (2018: 8,84 €/hour, § 1 para. 2 MiLoG). Riders working for more than a year in the company get additional 50 cents per hour. There are mini-jobs (450€ per month), midi-jobs (minimum 16 hours per week) and full time contracts (minimum 30 hours per week). While riders need to bring their own bikes and phone, the company provides them with work clothes and delivery bags. It also recently started paying them 25 cents per working hour for bike repairs. Foodora riders are not allowed to decline shifts. If a

rider does not show up to a shift, the absence is marked as a 'strike'. After three strikes a worker could be dismissed.

In contrast, the majority of Deliveroo riders in Berlin are self-employed contractors. The company used to offer part-time contracts in the past, but has gradually phased them out in favor of self-employment contractors. Riders are paid 5 € per delivery. They also pay a deposit for using the working equipment and in addition, a small monthly fee for the use of the Rider App. Self-employed riders can reject orders at the beginning of the delivery process and in the restaurants.

Deliveroo riders are free to stop working for an unlimited period of time without any notice or consequences. They can also cancel shifts that they have booked, log-in late and log-off before the shifts have finished. According to what the riders say, the monthly income may vary greatly between Deliveroo riders – those who are able to identify and book the right shifts can make as much as 20 € per hour. In extreme cases, however, there can be not a single order during a whole shift and the worker does not earn any money at all.

'Be your own boss': The role of autonomy in app-based management

'Super-flexible job', 'independence', 'working to your own availability', and finally, 'being your own boss' are all carefully chosen codes to attract a specific type of a potential worker – a rider who consciously values his or her autonomy. The promise of autonomy is a crucial element of both management models. In the interviews, most riders from both companies stated that in principle, they have considerable autonomy in deciding when and where to work on any given day. They are also free to decide how to complete an order – meaning which route to take and how fast to ride. In this section, we will examine what exactly are the spheres of autonomy granted to Foodora and Deliveroo riders.

First of all, the riders can choose the shifts that fit them best. Deliveroo shift-booking system is integrated in the Rider App. Foodora has a separate shift-booking app called Rooster. A single shift lasts one hour and riders can pick up several shifts in a row. Riders from both companies log into a shift-booking app and see all the shifts still available. Riders can log-in at any moment to check if there are any shifts available for the next week – for example a shift on Monday afternoon or on Friday night. In principle, they are free to distribute their working hours according to their time preferences.

This option corresponds to the way many riders understand autonomy – as the ability to manage time in a flexible way. The reluctance to work regular shifts can stem from a personal preference or the need to combine work with studying or other professional activities. In this sphere of autonomy, Deliveroo riders are even more flexible, because they can cancel shifts 24 hours in advance or take longer times without working at all.

Second of all, the riders can choose where they work during any given shift. When logging into the app, they see shifts available in a specific zone, which correspond roughly to Berlin city districts. Riders value this type of autonomy for two reasons. One of them is the convenience of choosing a neighborhood, which is closer to home or more familiar. The other reason is that with a little knowledge of which zones are busier, a rider can try to optimize his or her income.

In the case of self-employed Deliveroo riders, the freedom to choose the time and place of work prompts a behavior of guessing which zones and which times of the week are most likely to yield the most orders, and thus increase the average earnings per shift. On a busy Friday night in the lively Friedrichshain a rider can make as much as 20 € per hour, whereas on a Monday morning in residential Moabit – maybe 8 € per hour or less, sometimes even nothing. Another way to make additional income is to work on the weekends – both companies give a bonus for opting to take weekend shifts.

Finally, the riders in both companies are given significant autonomy as to how the delivery is completed – they can choose which route to take and how fast to ride. Once a rider accepts the order, the app suggests a recommended path to the restaurant, but the rider can choose an alternative path without any consequences. Crucially, the riders explained that the final destination of the customer is revealed only when the order is picked up at the restaurant – it is only at this point that the rider can assess how long the whole delivery process will take.

Surprisingly, the company does not specify to the riders how fast the order should get to the customer. They are expected to complete a delivery within a “reasonable timeframe”, as stated in the contracts of both the self-employed and part-time employed riders. There was no indication of a recommended speed or a strict speed standard. In principle, the riders seem to be free to ride the bike as slow or as fast as they want, taking into consideration their physical ability, traffic on the path and their own safety.

Means of controlling autonomy in app-based management

Since the riders are given significant autonomy, the platform has to deal with certain levels of unpredictability in organizing the workforce: How to ensure that orders are delivered fast enough when there are no speed standards? How to ensure efficient staffing if self-employed workers can give away shifts at the last moment? How to make sure that there would be enough riders working at the busiest times when workers can self-schedule? How to safeguard attendance of remote workers? In other words, how do these platforms attempt to increase their control over the 'when, where and how' dimensions of workers' autonomy? We found that the platforms deal with the challenges posed by riders' autonomy by using the app as a replacement for managerial control of a human supervisor. In the following sections, we will demonstrate four features of the app, which correspond to four different ways of controlling autonomy in this type of management regime.

First, the app tracks the rider's activity through their clicks and GPS location, which enables automated notifications. This data is then used for calculating their earnings – the basis of a system of monetary incentives. The same data is also used to compile personal 'statistics', which give some riders a priority in choosing the best shifts but penalize others. While workers feed an enormous amount of data to a system designed to control their behavior, they are also deprived of information that would be key for rational decision-making. It is through control over the design of the app, particularly this information asymmetry, that platforms impoverish the decision-making process of the riders and ultimately retain control over their autonomy.

'Go to the closest log-in point': Control through automated notifications

The workflow of Foodora and Deliveroo riders is broken into small pre-programmed steps which allow the platforms to collect copious amounts of data. For example, Deliveroo riders need to swipe 'Accept' to accept an order, 'Arrived' when they are in the restaurant, 'Collected' once they have the food, 'Arrived' again when they get to the customer's address and 'Delivered' when they hand them the food. The data provided by the riders themselves is combined with constant GPS tracking which allows platforms to track their riders' movement in the city and the time between each of the steps.

The automatic data-collection system allows the platforms to monitor the performance of the riders in real time. If there is any irregularity in what the app considers “normal” workflow, a rider receives an automated notification in the app. For example, the Deliveroo rider receives a notification if she or he accepts an order, but is actually not moving. Moreover, the app sends reminders to riders before their shift starts, and push notification to log-in again if a rider has logged out before the shift has finished.

The content is rather simple and commanding: “go to the closest log-in point”, “contact the dispatcher”, “end your order”, “log in again”, etc. In contrast to other gig-work apps like Uber, the food-delivery platforms studied here do not employ positive persuasion techniques. Uber drivers, for example, can receive the following message when they attempt to log out, “Are you sure you want to go offline? Demand is high in your area. Make more money, don’t stop now!” (Rosenblat & Stark, 2016, p. 3768). In contrast, Deliveroo notifications do not try to appeal to riders’ logic and emotions – they do not point to the positive or negative consequences of following the pre-programmed path of action.

Foodora also uses automated notifications – for example, if it takes more than the average amount of time for a rider to deliver the food to the customer, the app displays a message “Please, end your order or contact the dispatcher”. Similar notifications appear if the rider is too slow in accepting an order or waits too long at the restaurant. The platform also sends messages asking the rider to proceed to the zone center after completing a delivery in order to quickly receive a new order.

In both cases the automated notifications replace the function of supervisors giving orders and guiding workers’ behavior. There is a fundamental difference in the legal meaning of these notifications stemming from the contrasting employment models used by the two platforms. In the case of Foodora, the messaging system rather represents directions from an employer than mere nudging. Not complying with the app’s commands might have legal consequences. Since Deliveroo is not an employer, the messages sent by the platform are simply nudges to inform and influence riders’ behavior.

In fact, in both cases the riders perceive the automated notifications as less controlling than a human supervisor. They are consistent with the idea of working without a boss. As riders put it: “You don’t have anyone telling you what you are to do. Of course, somehow the app [does it], but I don’t have the feeling that the app gives me orders or controls me or somehow restricts me” (P5). It is told that it is easier to distance yourself from the app than from a supervisor in “office jobs where the boss is looking over your shoulders” (P6). It appears that to at least

some riders, the fact that riders “do everything through the app” can indeed provide a sense of anonymity and freedom (P7).

We did find, however, that a ‘human in the loop’ of this automated system plays a significant role. Companies employ ‘dispatchers’, also referred to as ‘Riders Support’, whose role is to monitor riders and orders in real-time and help solve ‘issues’. According to a Foodora dispatcher: “Any delay, any waiting issue at the restaurant, at the customer, at accepting ... there is a schedule and when this schedule is not respected you get ‘an issue’” (P12). When automated messages are not enough to solve the issue, the dispatcher contacts the rider by phone or text message. Dispatchers are there to help riders when needed but also to supervise their working behavior – as one of the dispatchers puts it, they have a “tight control over riders” (P12). As a dispatcher revealed, his exact role in the system of managerial control is however not completely disclosed to him. For example, dispatchers are not informed how their reporting about riders is used by the platform or what the consequences of their actions are. Further investigation into this topic, including interviews with higher levels of management, would be required to fully assess the importance of remote human supervisors in this managerial regime.

‘Earn good money’: Control through monetary incentives

“Boost your income” and “earn great money” are part of the marketing recruiting slogans of the companies. In both cases, the data collected through the app automatically records how many shifts and orders riders completed and calculates their earnings. Although the way the riders are remunerated depends on the legal employment model used by the two platforms, both collect detailed statistics in order to incentivize attendance and speed of the riders.

In contrast to Foodora riders who are paid per hour, self-employed Deliveroo riders are paid per delivery (‘drop’). In this way, the company does not pay for the waiting time in-between orders and at restaurants but only for a completed gig. Payment per order does not only save money, it also exerts control over speed, routes, and shift choices. It is very much in riders’ interests to complete their deliveries as fast as possible in order to make the most out of their shift: “There are moments when I feel tired or lazy but it’s busy so I am pushing because I’m getting more money. And if they pay you per hour, I’d probably be pushing less”

(P10). In this sense, the payment per order system aligns to some extent the workers' and companies' interests.

The payment scheme at Deliveroo means they the platform has not to care about incentivizing speed – ensuring riders will ride fast, pack the food quickly, and bring the food promptly upstairs to the client. Similarly, they would try to find the shortest and quickest route. But payment per order also influences riders' choices of when and where to work. There are zones and times of the day/week, where there are more orders than others. When asked if she feels free as a free-lancer to decide when to work, a rider answered: "I mean, if I want to work, if I only want to work without earning money, then I can choose. But if I want to earn money then I have to work weekends, in the evenings, and so on" (P2).

At Foodora riders are guaranteed an hourly salary, and, legally, the company would be able to use direct commands to assign shifts. This legal power, however, is not used by the platforms. Instead, a bonus system is in place that combines two necessities – to control weekend attendance and to control speed. To qualify for a monthly bonus, a rider needs to complete six weekend shifts in a month and reach an average of at least 2.2 deliveries per hour. Although such a target average is not established at Deliveroo, they are also awarded bonuses for picking up extra weekend shifts and completing more orders during busy times. If you pick up at least one shift on three consecutive weekends and deliver at least 50 orders you receive a 50 € bonus. If during weekend shifts you deliver at least 100 orders, the bonus is 100 €.

As we can see, both companies use monetary rewards to incentivize good attendance and speed, thus securing that enough riders will be present during busy shifts. Indeed, speed lies at the heart of what food-delivery is all about. Work pace is a locus of control since industrialization (Edwards, 1979) and as our analysis demonstrates, it remains a core concern of management. Platforms cannot directly dictate the pace and rhythm of work but they target workers' motivations in order to regulate the intensity of their labor. A possibility for quantitative labor intensification is introduced by platforms' ability to digitally monitor workers' behavior (Green, 2004) and by the monopoly they have over workers' data.

This type of control over behavior through monetary incentives is strengthened by revealing the statistics to the riders. For example, the Foodora riders receive a monthly newsletter which says: "The analytics of your last month's work are just in [...] Thanks for the hard work, keep pushing and see you in the Top 25 % next week?". What follows is a detailed report broken down into the following metrics: no shows, average weekly hours, number of weekend shifts, experience, late log-ins and orders/hours deviation. It also gives a nudge by stating: "Improve your

UTR by focusing on these metrics” naming speed, time at customer, and reaction time. While the way the statistics are measured is explained in detail, it is unclear what UTR is and how exactly this evaluation impacts the employees.³

In addition to providing the riders with monetary incentives, statistics perform an additional function. They provide quantifiable metrics for self-measuring one’s own work performance. It is unclear what the motivational impact of these statistics is, but we did find that self-measuring is a source of satisfaction for at least some of the riders. The ones who self-identify as passionate bikers even use an additional application called Strava, used by runners’ and cyclists’, to track and analyze their performance, to share it with other cyclists, to “compete with a global community”⁴ and to explore new paths. As a rider explains, “you can see even more what you have accomplished” (P7). Not surprisingly, Deliveroo promoted this application in a Newsletter and there is even a separate group for Deliveroo riders within the Strava App.

The self-tracking culture promoted by these platforms and embraced by some riders indicates that the workplace discipline partly relies on riders’ adoption of an imperative to perform and compete. Through calculation and comparison the ‘quantified self’ seeks a feeling of accomplishment and improvement (Moore & Robinson, 2016). We did not, however, find evidence that this self-quantification holds workers back from ‘building direct connections among each other, recognizing deep conditions, and relying on the community’ (Moore & Robinson, 2016, p. 9).

In our interviews we found that one and the same rider might self-quantify their work performance, while also engaging in collective action and oppositional practices. The need for appreciation and a feeling of accomplishment at work is not at conflict with the possibility of resistance. As Belanger and Thuderoz (2010) emphasize, contrary to arguments found in both management and academic discourse, commitment to one’s work and opposition to workplace regimes can go hand in hand.

3 “KPIs are calculated on the last 28 days. Your Ranking: How you rank in comparison to the other partner couriers in your city. Top/Bottom x %: How do you compare to other partner couriers? If you are in the top 20%, 80% of the riders in your city perform worse than you. No-shows: Missing a shift in breach to your contractual obligations. Orders per hour deviation: The orders you delivered per hour compared to other partner couriers [...] Experience: How long we’ve been dating. In weeks. We only count weeks in which you were active with at least 1 shift. Accepted absences included. No ghosting.” (Foodora Newsletter, April 2018)

4 www.strava.com/ features (Last accessed on 11 September 2018).

‘Super flexible job’: Control through internal competition for shifts

We have already demonstrated that collecting data about riders is used for automated notifications and automated calculation of monetary incentives, which have an indirect effect on their behavior. However, we have also discovered that the automated data processing is used to establish disciplinary measures for unsatisfactory performance or poor attendance. The disciplinary function operates through the shift-booking system used by the riders, which is partly based on this data collected about rider performance and behavior.

In theory, the riders can log-in to their app, see what shifts are available and pick the ones that best fit their schedule. In practice, the shifts that are available to pick from depend on the group they were assigned to, which is based on their individual statistics. In both companies the riders are automatically sorted into three categories called ‘badges’.

The ‘rules’ of the shift-booking system presented here are based on information given to us by the riders. The best performers at Foodora can see on Monday the shift schedule for the next week and pick up the shifts they want. Second badge riders are allowed to choose shifts on Tuesday, and third badge riders not until Wednesday. In the case of Deliveroo, all ranks of riders book their shifts on Monday; however the best performers can book shifts at 11am, second rank riders at 1pm and third rank riders at 5pm. Hence, riders in the lowest group might not have the chance to work when and where they prefer as their preferred shifts could be already fully-booked.

We have already established that the ability to choose when to work is an essential sphere of autonomy for attracting and retaining the right workforce. Also, the choice of the right shift has a direct impact on the rider’s earnings. Logically, removing this ability would constitute the most painful punishment that can be introduced in this type of management regime. To put it simply, the worst performers have hardly any choice of working time at all.

Based on an email that the company sent to him, a rider told us that Foodora uses a mix of six metrics to sort riders into groups: weekend shifts after 8pm (30%), average weekly hours (25%), no-shows (25%), percent late log-ins (5%), orders hour deviation (10%), experience working with the company (5%). According to the Rider App, Deliveroo’s automated sorting system is based on only two statistics: no-shows and late log-ins (defined as cancelling your shift within less than 24 hours, and logging-in for work more than 15 minutes late, respectively). It appears that Foodora uses the shift-booking system to control mainly at-

tendance misbehavior, working times and speed; while Deliveroo focuses only on attendance misbehavior.

The riders perceive this as punitive measures which limit the autonomy to self-schedule according to one's preferences: "There is this thing about the statistics, if they go down you lose the chances to get every week like the schedule times for next week and we don't have so much chances to get the hours that we want" (R15). As another rider describes it: "In the third group, it is the last one, you have no chance to get [shifts]. So it is really hard and that is the problem, because you are struggling. When you are in the third group it is not easy and you don't have so much work" (R15). In addition to being punished by not having access to good shifts or flexibility to plan, those in the last category are given the impression of possibly not having the chance to get enough work. Essentially, these riders lose the sphere of autonomy that was fundamental to their sense of control over their time, income and satisfaction.

For Foodora riders, who are employees, this system is particularly problematic and risky. If you are supposedly in the third badge and there are no shifts left, shift may even be assigned. As one rider experienced it: "You cannot tell the company any more, I cannot work those days. If you do not have the minimum hours, then they just give you something. I remember a colleague said '*Yeah, I cannot do this anymore, I have to quit because they always assign me those shifts that I cannot work then. So anyways I get the "no shows" and after three "no shows" they will kick me out*' (P18)." This type of sorting has the potential to unleash a vicious cycle, where riders in the third group have a difficult time climbing back up the badge system, and become likely to quit on their own accord.

Deliveroo seems to have intensified the internal competition for shifts by overstaffing. As a Deliveroo representative told us, around the end of 2016 the company increased massively the budget of the recruiting team: "We spent insane, insane amount of money just for rider marketing and to recruit new people" with the "very foreseeable result that at some point we will have so many riders that nobody would earn anything anymore" (P19). According to him, this overstaffing strategy resulted in increased security for the company that all shifts would be sufficiently filled, but it also meant that more riders were competing for shifts.

We conclude that both platforms integrated a powerful automated reward/punish mechanism into the app-based management regime. The riders struggle to understand how exactly the sorting system works, what metrics are used and how to improve one's standing. As a rider complains, the system "is not really transparent. We don't really know how it works. We just have a board with our statistics and sometimes you go to

the shifts and it's going down and sometimes you don't go and it's going up" (P16). The shift-booking system, like most automated decision-making, seems to be quite opaque to the riders and an important measure to control their autonomy.

'The App will give you all the information': Control through information asymmetry

At first glance, notwithstanding the before-mentioned measures, the riders appear to have significant autonomy. Do I need a flexible job to fit my unpredictable university schedule? No problem, each week I choose shifts that work best for me. Do I need extra money this month? I'll just pick up a couple of additional evening shifts in a busy neighborhood, ride a little faster to complete more orders and collect extra bonuses and tips. Do I hate being controlled by a boss? No worries, the app will give me all the information I need.

What many features of the software related to workforce management have in common is that they are based on information asymmetry. These decisions, coded into the backbone of the app, give the company means of directly controlling the scope of decisions which can be made by riders. The most glaring example of this asymmetry is the fact that Deliveroo riders do not know the address of the customer when they are deciding whether to accept or reject an order.

This decision can however only be based on their judgment of the restaurant being too far away or typically having long wait times. The key piece of information — how far away the customer lives from the restaurant — is withheld from the riders throughout their decision-making process. Thus, a rider cannot really estimate how fast or long the complete delivery will be and whether a particular order is profitable or not. If the final destination of the customer was known, "It would probably change a bit the decision of making when I accept or reject an order. It would play a role... if you see the address of the customer it is going to be easy I think if they live out of the zone and takes more time. You think 'Oh, this one is going to be long. Ok, I reject and I see the next one'" (P9). This information asymmetry effectively disables the ability of a rider to make rational decisions.

There are other examples of this asymmetry – the riders do not know what are the exact borders of the zones, how many riders are allowed to work in a particular shift, or how big the 'badges' are that they are sorted into by the shift booking system. In fact, by design the riders can never garner sufficient information to make decisions that are optimal to them.

In addition to withholding pieces of information important to the riders' daily workflow, the workers have also little insight into how the automated data collection and processing works. Through the newsletter Deliveroo has revealed to the riders that the orders are assigned by an algorithm, but do little to explain how it actually works. The information presented on the website is not very helpful: "You're online. You can see other riders on the road too. You're offered an order – but why? Meet Frank! Frank is our super smart algorithm that decides which rider to offer which order"⁵.

In case of Foodora, there is even less information available to the riders about the algorithm used for assignment of orders, even though this automated decision has an enormous influence on riders' labor. The intransparency also gives rise to questions about the fairness of the algorithms – whether they are calibrated to distribute shifts equally among all available riders, thus evening out their earnings. As is often the case with gig-workers, their choice operates in a pre-programmed environment, where gigs are algorithmically allocated according to a rule that remains unknown (Lee et al., 2015).

5 <https://roocommunity.com/tech-round-up-how-and-why-am-i-offered-specific-orders/>
(Last accessed on 26 November 2018)

Discussion of Findings

Why create spheres of autonomy? A comparison

Our findings demonstrate that although Deliveroo and Foodora have different contractual relationships with their workers, the management models of both platforms provide similar spheres of autonomy. Riders have flexibility over time-scheduling, can decide in which zones they want to work, and are free to determine the route and speed of delivery. In addition to these spheres of autonomy, self-employed riders can enjoy a greater discretion over their job as they are allowed to reject orders, hire substitutes, cancel shifts, and not work for unlimited periods of time. Here we will concentrate on the question of why these spheres of autonomy are so central to the functioning of app-based management and what role the app has in their operation.

As shown above, autonomy in legal terms is defined indirectly in order to distinguish employees from self-employed contractors. In German law as well as in other legal orders, to be considered self-employed, or truly independent from employers, one needs to have control over when, where and how one works. In other words one must have control of the place, the time and the implementation of the assigned tasks. Deliveroo, which builds its workforce model on self-employed contractors, has to adhere to these legal standards. Conversely, Foodora is legally an employer and in principle, could exercise greater control over its riders. Despite this, it relies on an almost identical management model and also draws on and promotes the discourse of 'being your own boss'. What advantages do these companies hope to accrue by granting this type of autonomy to the riders? Why is it so crucial to the proper functioning of this particular app-based management? Why are exactly the same spheres of autonomy that are afforded to 'self-employed' Deliveroo riders also granted to contractual employees of Foodora?

The first explanation is that offering autonomy to riders helps to attract and retain staff. This would explain why Foodora uses the same discursive strategy towards its employees as any other platform employer, "speaking of promoting freedom, flexibility and independence" (Newlands, Lutz, & Fieseler, 2017, p. 25). As the company competes with Deliveroo, it needs to provide similar 'attractive' working conditions in order to get its share of potential riders. It appears that these spheres of autonomy are crucial to the riders themselves. They have specific functions – to give the ability to plan according to individual needs, give the ability to increase income by choosing the most profitable time and place to

work, and to provide a sense of satisfaction from choosing the best and fastest route.

Another explanation has to do with the proposition that giving discretion over routes and speed might actually lead to better performance levels as riders will align their goals with those of the organization. Autonomy can be used strategically in management to maintain an overall control (Edwards, 1979). It seems that the ability to choose the route and speed are important sources of agency to some riders – who turn each delivery into a ‘challenge’. Finding the best route through the city and delivering the food promptly might give a sense of accomplishment and enthrallment, which immerses riders in the working process. Riding fast “macht Spaß” (“is fun”, P7). As one rider describes it: “It is like when you play sport or football ... You have this adrenaline, like a challenge. You have the goal and you make your best to achieve the goal. So in this one, the goal is to make as many orders as possible” (P9). Indeed, a simple task of riding from A to B is transformed into a game-like experience (Munn, 2017; Malin & Chandler, 2017).

Moreover, freedom to choose the route enables companies to exploit riders’ urban knowledge related to short-cuts, traffic, road conditions and road maintenance. “Somehow you get to know the streets in time, which roads are good to drive, which are bad. Where is somehow cobblestones, where I can drive well, and where not” (P5). Autonomy permits platforms to draw on workers’ knowledge and experience in order to improve the work process (Huws, 2014).

Regarding shift planning, a plausible explanation for granting autonomy has to do with the fact that companies do not know in advance how many riders they need for a shift. As a rider captain of Foodora pointed out: “this job inherently requires flexible people”, because “you can’t plan this job more than a week in advance basically” (P20). As the number of riders per shift changes according to weather forecast, holidays and many other criteria, it is in the platform’s interest to have a flexible workforce. Management tries to develop a system where the dynamics of the market conditions are integrated into the shift planning. The demand for orders is supposed to regulate the supply of riders. This illustrates how in the age of ‘market rationalism’, organizations try to “internalize the new dictates of the market” (Kunda & Ailon-Souday, 2005, p. 202). Yet in doing so, they destabilize working conditions as they become dependent on a flexible workforce.

The study highlights the role of the app as a provider of autonomy in two senses. First, the spheres of autonomy related to the ‘when, where and how’ aspects of work are integrated in the design of the app. They are embodied in those features of the app that allows riders to pick up

shifts at the times that suit them, and to reject orders. The app also doesn't display any speed standards, leaving this to the riders' discretion.

In a second sense, digitally mediated labor means laboring without the physical presence of a 'boss'. The fact that certain organizational functions previously performed by managers are now executed by the app (Strube, 2016) means that workers interact with a system rather than human beings. This freedom of "not having someone behind your shoulder" (P4) and not having to "make jokes and make everything look pleasant" (P13) are themes that appeared on numerous occasions in the interviews.

Other scholars have observed the same experience of autonomy by gig-workers (Waters & Woodcock, 2017; Das Acevado, 2018) and remote workers (Sewell & Taskin, 2015). In relation to Uber drivers, Das Acevedo (2018) notes that "perhaps the salience of this limited vision of freedom means that it is uniquely disempowering to have a fellow person order us about" (p.15). Furthermore, in the case of Deliveroo and Foodora, not having to perform emotional labor in front of supervisors, colleagues and customers might enhance the feeling of independence at work.

App-based management could remove all immaterial labor involved in communicating and getting along with supervisors and bosses. Other studies suggest, however, that since gig workers interact with a 'system' rather than humans, they feel isolated, and deprived of opportunities for social exchange with colleagues and discussion with supervisors about managerial decisions (Wood, Graham, Lehdonvirta, & Hjorth, 2018; Mohlmann & Zalmanson, 2017). A future avenue of research would be to dig deeper into riders' interpretations and experiences of working with an app instead of human beings.

How is control achieved?

As Shapiro (2017) points out, adhering to workers' autonomy "comes with its own set of costs" (p. 2). Smaller profits and higher customer dissatisfaction might be the results of flexible scheduling and granting the ability to reject orders. Platforms therefore employ what he calls 'strategies of arbitrage' in order to simultaneously provide autonomy, but also to exert control over workers' choices and behavior.

We found that platforms use information asymmetries, performance-based pay and bonuses, internal competition for shifts, and automated notification systems to influence the choices that are, in principle, dele-

gated to autonomous riders. These findings put into question the assumption that market mechanisms are the only regulatory forces operating between platforms and self-employed gig-workers.

Returning to the characteristics of app-based management introduced earlier, several conclusions can be drawn. To begin with, other authors have emphasized GPS tracking as the main source of monitoring (Möhlmann & Zalmanson, 2017). It appears, however, that platforms also rely on tracking workers' behavior via the mobile app. What is known as 'user experience research' – the way users interact with an app – appears to be a vital source of information in app-based management. It seems the vast amounts of information collected on how riders interact with the app is primarily used to advance the control and disciplinary strategies of the platforms aimed at the riders, rather than improving the end-user experience'. While part of this data is indeed used for surveillance purposes by the dispatchers, its other main function is to enable automated algorithmic processes. The first automated process we identified is the real-time messaging system, which through notifications and reminders tries to influence riders' behavior. We discovered that both platforms actually do not use sophisticated persuasive technologies in order to nudge riders. Compared to Uber and Lyft (Scheiber, 2017), the messaging system of the food-delivery companies appears to be rather simple. In the case of Foodora, the reason why their messages have a more commanding than persuasive tone can be explained by the fact that as an employer the company has directional power over its workers. Another explanation relates to the fact that platforms have already found a better mechanism to control workers' behavior and choices – through data-driven performance analytics which fuel the automated pay system and sorting used for the shift-booking system.

These data-fueled systems, based on different metrics (such as speed, performance, attendance and shift-choice) result in a hierarchy between different groups of riders. Interestingly, performance-based techniques of control are usually coupled with payment schemes. On top of the monetary incentives, there is an additional carrot for high performers: Riders can enhance one of the gig-economy's main selling points — their work-shift flexibility and self-determination in scheduling.

Autonomy over scheduling here is not fully delegated but a disciplinary incentive. It is a reward to be won if riders are successful in self-controlling their working behavior. The finding reminds us that "what management or managerial discourse says it is doing is too often taken as synonymous with effects and effectiveness" (Thompson & McHugh, 1998, p. 131). Our study thus illuminates the disparities between the dis-

cursive strategies of gig work platforms and the actual functioning of its management regime.

The other control mechanisms facilitated by the data sent via app is the performance-based pay in the case of Deliveroo. Through workers' interaction with the app platforms track the amount of orders completed per shift and afterwards calculate riders' income. We found out that the payment per order scheme exerts control over rider's labor performance and influences their shift choices. Piece-work wage is a longstanding method of managerial control aiming to elicit effort from workers and to incentivize self-monitoring. In some sense, payment per order enables platform to partly 'outsource' the control imperative to workers themselves. It also allows platforms to couple 'fate of workers with market risks' (Dörre, 2015, p. 98), where market insecurity and uncertainty is transferred to workers.

Finally, in relation to the choice architecture established by the app, we discovered that a powerful information asymmetry thrives in the app-based management of food-delivery platforms. In similar veins to the other on-demand platforms, Deliveroo's "access to information coupled with control of design" of the app (Calo & Rosenblat, 2017, p. 1670) permits the platforms to narrow the choices of its self-employed workforce. By selecting and restricting the information riders have access to, the platform inhibits workers from making informed choices about the shifts and delivery orders they decide to take. As Graham and Woodcock (2018) emphasize, information asymmetries "facilitate and exacerbate existing inequalities in the digital workplace" (p. 244).

Many similarities could be observed between the management models of other gig-work platforms, such as Uber, and the ones we studied. Information asymmetry, ranking systems, and nudging seem to be common features of app-based management. In contrast to other platforms, rankings used by food-delivery platforms are not customer-driven, but based on the riders' speed performance, attendance behavior and shift-choices. Furthermore, these ratings do not determine the possibility of receiving a new gig, but workers' access to flexible scheduling and chances of receiving a bonus.

While the study's main focus is on the socio-technical reality of control, what does it teach us about the normative mechanism of control? The theme of normative control, defined as "control directed towards engagement with and intended transformation of employee values, identity or emotions" (Thomson & Broek, 2010, p. 6), runs through the literature on the gig economy. We found little evidence of control devices designed to target riders' beliefs, values, emotions and norms. From the two companies studied, Deliveroo appears to be the one that, at least in

the past, invested more in attempts to enlist internal commitment and identification with the company's goals and culture. A community management team was responsible for circulating regular newsletters and organizing meetings where riders and company representatives could meet over a drink. With time, however, the company changed its policy and less money has been invested into community management. According to a customer service representative, it is the employees working in the office rather than the riders who are invited to take part in a "start-up culture" (P21) of fun, informality, and Friday beers.

It is worth noting though that as Kärreman and Alvesson (2004) have shown, the controlling effects of technocratic tools might have non-obvious or unexpected socio-ideological aspects. In the future, we plan to look more in depth into workers' experience of app-based management to explore the nuances of normative aspects of control. However, in a context of an oversupply of potential riders and high turnover, it seems logical that these companies do not need to rely on this type of control, and can focus their efforts elsewhere.

Self-employment and the socio-legal reality

The role of the app in this management regime is twofold – it grants certain spheres of autonomy to the workers and at the same time enables several managerial control techniques. We now turn to our last research question in this paper: What are the legal consequences of this socio-technical reality unveiled in our empirical research? Specifically, is there enough evidence that the conditions of the Deliveroo riders in Berlin correspond to their self-employed status as defined in the German law? If not, what legal status would be more adequate to protect their rights?

The wide range of contractual and factual conditions of the riders, which are subject to constant change, seem to impede a generalized legal analysis. However, as our study has shown, some features of the control regime remain constant even over different contractual models. The platforms' contractual choices seem to suggest that either one of the legal models – employment or self-employment – could be legally acceptable. Such a conclusion would be highly problematic. The consequences would be that the law gives the decision on the application of employment law and social security in the hand of the contractual parties; and as it is the platforms drawing up the contracts, they would have a choice as to the employment models they choose (Däubler, 2010). This is why the "primacy of facts" has been established: Instead of fo-

ocusing on the wording of the contract, a look at the handling and execution of the contract is necessary to determine legal classification.

While the classification as “employee” (in the case of Foodora) does therefore not provoke further legal analysis, the self-employment model used by Deliveroo has to be questioned as to its admissibility. European Tribunals have come to diverging results respectively: In the UK, the Central Arbitration Committee in London ruled on 14th of November 2017 that a group of Deliveroo riders in the Camden zone cannot be recognized as ‘workers’.⁶ Meanwhile in Spain, the Valencia labor court ruled in June 2018 that Deliveroo had to respect employment law when dismissing a rider, because he had to be considered as an employee.⁷

The main legal test in this classification exercise is the test of “personal dependency”. In Germany and other countries, personal dependency has mainly been understood as being based on the directional power of the employer over the employee, i.e. the situation of being bound by instructions on time, duration, place and execution of work.

It would seem that the Deliveroo riders are not bound by instructions, since they can reject an incoming order without any consequences. This starkly contrasts with the model employed by Uber, whose drivers are penalized for rejecting orders or not following detailed guidelines provided by complex feedback and rating systems; a fact that supports the as-sertation that they are employees (De Stefano, 2015; Däubler, 2016; Cherry, 2015). We have found no evidence for a similar punitive mechanism in the case of Deliveroo.

The fact that Deliveroo riders are allowed to work for other companies, also contradicts a classification as “personally dependent”. Indeed, their contracts do grant them the right to appoint a substitute (§ 613 BGB). On the other hand, the app-based management makes availing of this right to substitution nearly impossible – the rider would have to hand over their smartphone or the log-in access to the substitute. As a result, they would rather cancel on short notice while risking their statistics being hurt (see also Dullinger, 2017).

Although the search for “instructions” and “directions” in the legal sense may be without success, it is indisputable that this platform also exercises control, through incentives, through feedback systems, etc. Statistics-based sorting has “possible consequences for the prospects of

6 CAC Case Number: TUR1/985(2016), 14.11.2017, <https://iwgbunion.files.wordpress.com/2017/11/17-11-14-final-version-deliveroo-acceptance-decision.pdf>.

7 Labor Court Valencia, SJS nº 6 de Valencia, 1 de junio de 2018, núm. 244/2018; Reuters, Spanish court rules Deliveroo rider is employee, not self-employed, 4.6.2018, <https://uk.reuters.com/article/spain-deliveroo/spanish-court-rules-deliveroo-rider-is-employee-not-self-employed-idUKL5N1T62QS> (Last accessed on 26 November 2018).

concluding future contracts” and therefore controls workers’ behavior. However, this is not what a legally binding direction in the sense of “personal dependence” is about. The dynamics that control riders’ behavior are not of a formally binding character; they are economic dynamics arising out of market dynamics that have been organized by the platform via the app.

German employment law explicitly differentiates between personal dependence and economic dependence – economically dependent persons may be considered “employee-like persons” with a specific status in employment law (§ 12a TVG). This status is connected to a variety of employment rights such as holidays, protection at work, antidiscrimination legislation, data protection, access to labor courts and collective agreements – but without social security protection, right to the minimum wage or equal dismissal protection.

The economic dependency created by the app is, however, just one of the lesser indicators pointing in the direction of economic dependency. However, economic dependence in the legal sense will only be accepted if riders receive at least half of their income from Deliveroo (Kocher 2015; Klebe & Heuschmid, 2016; Waas et al., 2017). Although our research suggests that this is the case at least for some Deliveroo riders in Berlin, the evaluation would have to be done on a case-by-case basis and require further investigation (see Degner & Kocher 2018 on the right to collective bargaining).

The question of how the specific control regimes of digital platform work can be captured in legal terms, is the object of an on-going legal debate, not only in Germany but also on the European and international level (e.g. Risak, 2017; internationally Heeks, 2017).

One important line of thinking tries to re-conceptualize the concept of “employee”. Some scholars argue that the question of “personal dependence”, the distinction between employees and freelancers, should not be based on directional power, but on the question whether workers have the opportunity to make their own business decisions under their own responsibility with their own goals and risk on the market (Wank, 2016). Contrary to a common understanding in legal doctrine, this line of thinking does not look for economic dependence, but for independent access to the markets (Wank 2017). It is therefore compatible with the idea that personal dependence is closely connected to an integration of the workers in the organization. While in Fordist work organizations, organizational integration used to be exercised by direct commands and directions, modern forms of coordinating work rely on other forms of organizational integration, which should nevertheless be treated as employment relationships.

For the legal classification of digital platform work, looking for criteria and indicators for organizational integration could prove far more useful than looking for directional power. At first glance, one may think that the work of the Deliveroo riders does not meet the criteria of integration into the work organization because they do not work in one and the same physical location and have to provide at least part of their own equipment, namely a bike and a smartphone. Deliveroo riders even have to pay a very small licensing fee for the use of the Rider App. Defining the app as just a service provided by the platform makes it consistent with conditions for self-employment (Lingemann & Otte, 2016).

However, the (partial) use of one's own equipment does not necessarily mean that the riders are not employees (Däubler, 2016), particularly if one considers the fact that the riders are given working clothes and bags by the platform which conform to the corporate design of Deliveroo (they only pay a deposit for them). There are other indicators suggesting an integration in the organization, which bars riders from an independent access to markets: As the platform withholds information on how the automated decision-making systems work, and the metrics they use from the riders, evaluating market risks is impossible for Deliveroo drivers. The fact that the final destination of the customer is withheld from the rider is just the tip of the iceberg of information that the company has, which would allow riders to make better-informed rational business decisions. People who are deliberately kept in the dark about how the market works can hardly be considered entrepreneurs. Another challenge to the entrepreneurial freedom arises from the automated sorting used by the shift-booking system based on personalized statistics.

As a conclusion, it can be argued that the integration into the app amounts to the integration into the work organization (Degner & Kocher, 2018). The features of the app that enable intense coordination and control are the work organization in this case. Thus, the use of the app undermines the conditions required for self-employment and points to an integration in the platform's organization – the same direction as suggested by Dullinger (2017), who argues that the Foodora riders in Austria are integrated into the work organization by using the app, and who considers Deliveroo works as “employees” under Austrian law (which makes the employment model to one of “false self-employment” (Scheinselbstständigkeit)). The hypothesis is evidenced by the fact that the managerial models of Foodora and Deliveroo hardly differ, while at the same time corresponding to different contractual models. Even Deliveroo itself used to work with employment contracts and freelances at the same time, with similar management models. Notwithstanding these analyses, the present situation creates legal insecurity for all actors. De-

liveroo runs great risks with its employment model evidenced by the fact that in Germany, some Customs Offices (Zollamt) seem to have already controlled rider contracts in view of possible social security obligations.

As a policy option, some legal scholars have argued that integrating self-employed contractors into a specific technical and communicative infrastructure should be explicitly added as a basis for establishing personal dependency (Kilian, Borsum, & Hoffmeister, 1987; Linnenkohl, 1998; Risak, 2015). Others call for broadening the concept of an employer (Prassl & Risak, 2015; Bücker, 2016) or of extending the personal and objective scope of only some specific norms (Leist, Hießl, & Schlachter, 2017, 49f; Kocher, 2015), at the risk of further reducing the number of fully protected workers (Risak 2015; De Stefano, 2016). One such option would be extending social security laws to self-employed persons.

Conclusion

In this paper, we focused on the characteristic of app-based management in the case of Foodora and Deliveroo in Berlin. We found evidence that these apps embody simultaneously the spheres of control delegated to the riders and the strategies of control. We hope that the preliminary findings presented in this paper inform future research endeavors, as well as provide useful information for lawmakers, trade unions, as well as companies and workers.

Certain features of app-based design, such as information asymmetry, automated performance evaluations and automated sorting into hierarchical groups are increasingly present in other technologically mediated workplaces, even if they do not use mobile apps, but for example desktop-based solutions. In the future, we therefore plan to compare and contrast our findings with other workplaces, for example crowd-working platforms or multichannel contact centers.

We also hope to be able to explore in detail if and how digital work platforms engages its workforce in the design of the work process and the app. The process of collectivization of interests of riders working for the platforms is still in its early stages. We already have collected evidence that will allow us to draw conclusions about the consequences of app-based management for mobilizing collective action.

To this date, the riders who organize with the support of trade unions, such as NGG in Cologne and FAU in Berlin, focus their demands on economic and legal aspects rather than technological ones. Our interviews also reveal that there is limited communication with the riders about their experience of using the technology. It would, however, seem worthwhile, to consider innovative methods for co-designing technological solutions which improve working conditions in platforms. As Glöss et al's (2016) study demonstrates, designing a labor platform app means also designing labor relations. Programming and computing should therefore also "engage with the issue of designing for labor – taking labor more directly into our concerns in HCI [Human-Computer Interaction]" (Glöss, McGregor, & Brown, 2016, p. 9).

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The rise of digital platforms requires a deeper understanding of the structural role of algorithmic management in work environments. In this interdisciplinary study, we examine how digital platforms, which offer food delivery service, use a mobile application for management of their workforce. Drawing on interviews with self-employed riders at Deliveroo and employed riders at Foodora, we compare how the app affects the interplay between autonomy and control of riders, and how the app-based management relates to different contractual models.
