

Work by app: algorithmic management and working conditions of Uber drivers in Brazil

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ABSTRACT

Aiming to contribute to the understanding of how the relationship between autonomy and control is materialised in 'work by app', this article draws on the results of research conducted in the city of São Paulo, Brazil, with Uber drivers. The research aimed to analyse the management practices in 'app' work. Because this survey was conducted in the global South, we also present some considerations about the Brazilian working-class conformation and the conditions under which work by app is being performed in Brazil. We argue that the algorithmic management made possible by adopting apps across labour processes is consolidating a new form of management, organisation and control of labour power, increasing workers' actual subsumption to capital and radicalising forms of work exploitation and domination.

KEY WORDS

work by app, algorithmic management, Uber, Brazil

Introduction

This article aims to analyse how the relationship between autonomy and control is materialised in the work of Uber drivers, using this as a case study to understand the

forms of management, organisation and control used in work by app.¹ Because it is theoretical-empirical research² conducted in the city of São Paulo (Brazil), in this article we will also present some characteristics of the formation of the Brazilian labour market and the operation of this service in this national context, to help understand how labour power management apps may have a different impact on the countries of the global North and South. We start from the hypothesis that the use of platforms in different labour processes is deepening the real subsumption of workers to capital, consolidating a radicalisation of the forms of exploitation and domination of labour.

Because Uber is a worldwide company with similar operations in the different countries in which it operates, there are several similarities between the work by app that drivers do, for example, in Brazil, in the United States of America, in England, in India or in South Africa, since the management practices, based on algorithmic calculations are the same. However, the way this management is materialised in working conditions differs in each country, especially when comparing countries in the global North and South, due to the unique characteristics existing in the formation of the different labour markets and in relation to the respective labour laws. Thus, the objective of this article, besides presenting how algorithmic management acts to organise the workers registered with the company, is to carry out a critical-descriptive analysis of the working conditions in the Brazilian case. By making such a contribution, we seek to contribute to the panorama of research carried out in other countries, to enable us to understand the global consequences of work by app.

We use the term 'work by app' to express the central form of service production under Uberisation. In this form of work, the set of algorithms responsible for the functioning of the app are built in, in order to prescribe how each task should be performed by workers, in line with the contemporary updating of capitalist management. Thus, in this article, the app has a central role, bringing about different consequences on the labour process when the work of Uber drivers is compared with other activities performed digitally and/or virtually.³ Thus, the algorithmic management that structures the app provides the basis for a new horizon of labour exploitation and domination hitherto little known to the working class.

In this sense, we consider that the main specificities of work by app – the factors that distinguish it from other forms of digital work – are: first, that the work process is actuated by the app, which sets in train the series of actions necessary for carrying out

1 The phrase 'work by app' is used in this article as a synonym for 'platform labour'. We use this term because it is the best-known terminology among the Brazilian population. Platforms are privately owned or publicly owned data-driven software and hardware infrastructures that are automated and organised using digital algorithms (Casilli & Posada, 2019), enabling interaction between two or more people or groups (Srnicsek, 2016:43).

2 The data used in this article are the result of 22 interviews, with semi-structured script, conducted with drivers and former drivers who provided services using the Uber application in the metropolitan region of São Paulo, between 2018 and 2019, twelve of which were conducted during the Global App Driver Strike, which took place on May 8, 2019 and brought together approximately 200 drivers in the downtown area.

3 Fuchs & Sandoval (2014) argue that there are 1,728 different possible forms of digital work, ranging from ore mining activities for laptop production to software development, demonstrating the need to create specific nomenclatures when we look at any one of the forms of this work.

the activities; second, that workers are expected to own at least some of the tools used in their work, such as a car and a mobile phone in the case of drivers; and third, the labour contract is marked by intermittence, with workers' compensation completely linked to fluctuations in demand. The combination of these three elements seems to be the key distinguishing dimension of this form of work and, throughout this article, we will critically analyse how each of these factors structures and influences the management practices involved in it.

Brazil: a fertile ground for the proliferation of work by app

It was estimated in 2019 that 4 million Brazilians were 'employed'⁴ by app for companies such as Uber, iFood, 99 and Rappi, constituting some of the largest 'employers' in the country (Putti, 2019). Uber's growth data provide an impressive picture. The corporation started its operations in Brazil in May 2014, in Rio de Janeiro, and by 2019 was providing services in more than 100 cities and had more than 600,000 'partner drivers' (Uber, 2019). In addition, the company had 22 million registered Brazilian users on its platform, 23% of total users, which makes Brazil its second largest world market.

In the city of São Paulo, Uber started up in June 2014 and by 2018 there were estimated to be 150,000 drivers registered to this and other platforms offering taxi services, making it the city with the highest level of app-based ride use in the world (Lewer, 2018). To demonstrate the impact of app transportation in the city, three out of four taxi rides are now hailed using apps, with only a quarter ordered in the traditional way (Lopes & Paulo, 2018). In order to understand this enormous growth of app-based work in Brazil, it is necessary to give a brief historical review of the structural characteristics of the Brazilian labour market, as well as analysing some other recent national phenomena that we conjecture might directly have affected this growth.

For almost four centuries Brazil had an enslaved black population and, in the post-abolition period, the insertion of blacks into wage labour was hampered, since European immigrants served as a labour force with extremely low wages in agriculture, to the detriment of former slaves (Furtado, 2009; Prado Jr., 2012). In the period of expansion of urbanisation and industrialisation, which lasted from 1930 to 1980, there was an increase in the 'reserve army' in urban centres due to the unemployment of a considerable part of this labour power from the countryside. This reserve army, in addition to relying on informality to guarantee its economic and social reproduction, was a determining factor in establishing a model of capital accumulation based on the low value of the minimum wage, aiming at guaranteeing a high rate of profit (Oliveira, 2013). Thus, the structuring characteristics of the Brazilian labour market were informal, leading to a situation in which a considerable part of the population survived from work not regulated by the state, and another important part was concentrated in occupations with guaranteed labour rights, but with low remuneration.

4 We use quotation marks in relation to this term because, formally speaking, such workers are not employees of the companies they work for.

The 1990s marked a transformation in the morphology of the Brazilian working class. Responding to a new international division of labour, there was a decline in the number of jobs in the industrial sector, which had employed most workers in the late twentieth century, and a growth in the service sector (Antunes, 2019:117–123). In addition to this reconfiguration of the productive structure, the then President of the Republic, Luís Inácio ‘Lula’ da Silva, who presided over the country between 2003 and 2010, adopted a policy of ‘formalising’ the labour market. Under his government, about 2.1 million Brazilians had their work portfolios signed, and 59% of these new jobs produced earnings that were only 1.5 times the minimum monthly wage⁵ (Pochmann, 2012:18–20). Based on this policy, the formalisation rate reached 68.1% in 2012, a growth of over 10% in a decade (IBGE, 2012).

However, in 2015, one year after Uber’s arrival in Brazil, there was a strong economic recession that directly impacted the working class.⁶ Whereas in 2014 6.8% of the economically active population were unemployed, by 2016 this number had jumped to 12% and continues to oscillate between 12% and 13% at the time of writing (IBGE, 2019). In 2017, under Michel Temer’s government, the number of workers who were self-employed or in positions without a formal contract again outnumbered those with a formal job (Cury et al., 2018).

Thus, it became a necessity for a considerable portion of the workforce to seek alternative forms of income to guarantee their social and economic reproduction. This condition was recognised even by President Temer, who in his speech promoting a Labour Reform bill, approved in 2017, that modified the current labour laws, linked this to the promise of expanding employment and ‘formalising’ jobs. However, two years after the approval of the reform, these structural characteristics of the labour market had not changed, with the unemployment rate continuing to rise and the creation of formal jobs remaining stable, even when the reform allowed for the formalisation of a wider range of employment contracts (Filgueiras, 2019:34–44).

Thus, unlike European countries with relatively strong welfare states, in Brazil the working class developed under conditions of precariousness. The recent transformations that are taking place in the global North in the ways in which labour is hired, classified as novelties, and giving rise to what is conventionally called the ‘gig economy’ (Friedman, 2014; Gandini, 2018), in the global South signify an updating and consolidation of historical features of working-class conformation, shaped by the informality of labour and the fragility of labour laws, which have been deepened by recent technological innovations. Brazil has proved to be a breeding ground for digital platforms for the exchange or intermediation of services, especially as they have found a mass of *vogelfrei* (‘free as a bird’) workers (Marx, 1982b: 874), seeking alternative

5 For comparison, in 2010 the minimum wage was R\$ 510.00. With the dollar price closing at \$1.66 that year, 1.5 of the minimum wage in 2010 was the equivalent of \$460.80.

6 This Brazilian economic crisis was related to the world economic crisis of 2008, which led to the failure of major banks, declines in profit rates and a worsening in the quality of life of the population, significantly increasing unemployment and eroding the purchasing power of the working class (Chesnais, 2013:22–5). The causes of the seven-year gap between these two crises is not one of the themes of analysis in this article, but we believe it is important to point out the existence of this world economic crisis of 2008, because some of the government policies adopted for its solution had a direct impact on ways of working.

forms of income that can guarantee their subsistence, together with a large contingent population ready to consume low-cost services.

Uber and work by app: a new form of productive restructuring?

In a class-divided society, 'the means of production appear not just as the means for accomplishing work, but as the means for exploiting the labour of others' (Marx, 1982a: 1019). The way in which this exploitation is organised and controlled has changed and continues to be modified over the course of history, and such changes determine the degree of exploitation of existing work. In order to understand the form of work organisation adopted in the relationship between Uber and its drivers, it is important to revisit some of the other transformations that have occurred in the management of work in recent decades and which served as a basis for what is now happening in contemporary labour markets.

During the 20th century, two forms of organisation and control of labour became hegemonic: Taylorism-Fordism and later Toyotism.⁷ Toyotism became widespread as a method of organising production and workforce management in the central countries of capitalism from the 1970s onwards, with one of the main changes implemented in the work processes being the introduction of Information and Communication Technologies (ICTs). The introduction of ICTs made possible a form of control based on 'organisation by dispersion' (Harvey, 1993: 150), a cohesive form of organisation that is centralised, based on the just-in-time principle (Coriat, 1994), and at the same time scattered across different locations, both within a single country and internationally.

It is important to stress that, in our reading, these forms of organisation and control of work cannot be understood as productive models, but as unique products of class struggle in each social formation, which first produce ways of life in and out of work, as analysed by Gramsci (2001), and secondly, are characterised by processes of radicalisation of the exploitation and domination of labour. In this sense, we can observe historically, approximately, that Toyotism does not overcome Taylorism-Fordism paradigmatically. On the contrary, it reproduces it, radicalising its central principles of task prescription, but delegating to the collective worker greater responsibilities, above all, regarding self-discipline, self-management and self-Taylorisation.⁸

In the Brazilian case, the implementation of Taylorism-Fordism had some specific features. Because Brazilian industrialisation, with its greater incidence in the south and southeast region of the country, had its greatest growth during the 1960s and 1970s, the implementation of Taylorism-Fordism occurred at a time when it was already beginning to fall into disuse in core capitalist regions such as North America and Europe. Moreover, we can say that Brazilian Taylorism-Fordism existed only as a managerial form of the work process, since other characteristics of the Fordist way of life, such as mass consumption, the liberal state, the autonomy of unions from states

7 In our analysis, both of these forms of labour management radicalise the real subsumption of workers to capital, with capital expanding its control over work processes and modifying them according to its interests, thus increasing the extraction of surplus value in its relative form.

8 On the subject of self-Taylorisation of work, especially among software developers, see Amorim & Grazia, 2018.

and the Keynesian policies that characterised European welfare states, did not occur in Brazil, with Taylorism-Fordism being driven by an authoritarian and dictatorial state (Ferreira, 1997; Silva, 1991).

Aspects of Toyotism started to be implemented in Brazil in the 1980s and only became widespread in the 1990s, along with the adoption of neoliberal policies. Resulting from a more economically globalised world and the greater integration of Brazil into the world economy, the main trends in Europe were implemented in that country, including the development of leaner and more flexible companies, the just-in-time system and the externalisation of part of the productive chain, mainly via outsourcing.

Like the passage from Taylorism-Fordism to Toyotism, we are arguing that work by app is realising a new stage of labour exploitation through the use of a new category of ICTs – platforms based on algorithmic calculations – in the labour process. What is ‘new’ here is a deepening and radicalisation of the real subsumption of the worker to capital through the use of digital platforms. Such radicalisation arises from the platforms’ ability to manage in real time all the activities performed by the collective of workers subordinated to it, thus increasing capital’s control over the labour process and, consequently, simultaneously updating the typically capitalist production processes. However, this form of workforce management and control continues to reproduce several of the practices of Taylorism-Fordism and Toyotism, as we will demonstrate. Another important fact to highlight is that the productive restructuring marked by the adoption of apps across various work processes now exists in very similar forms in the countries of the global North and South, an indication of greater integration, interdependence and centralisation of the political and economic power of large companies.

One of the hallmarks of this new productive restructuring is the technological arrangement involved in this form of work organisation, with the emergence of ‘app companies’⁹ like Uber. These companies position themselves as mediators between service providers and the consumers who search for their services, charging a fee for bringing this meeting about. In this business model, workers are not hired by them; the companies are only responsible for providing the necessary infrastructure for these workers to be linked to customers and perform their services (Abílio, 2017; Slee, 2017:26).

However, several practices in this type of work demonstrate the existence of a subordination relationship of workers to companies. When connecting to platforms, workers are subject to an external authority that manages customer demand, determines the tasks to be performed, establishes the exchange value of the service and the labour power required, controls the execution of the work and its performance and determines rewards or punishments (Gandini, 2018). Thus, the lack of regulation governing the functioning of these platforms is modifying the functioning of the labour market, consolidating subordinate working conditions and lack of labour rights.

⁹ A feature of app companies is that they are registered as technology companies and not related to the services they provide, allowing the argument that their core activities are not outsourced, a practice that is prohibited in many countries. For example, in its terms of use (Uber, 2017), Uber do Brasil Tecnologia LTDA defines itself as a technology company responsible for maintaining a platform that allows users to request or provide transportation services, with this service being performed by independent third-party providers.

The subordination practices of these companies are based on the algorithmic management performed by the app. The introduction of this new ICT modality makes it possible to increase the flexibility of work processes and to transform the relationships of app companies with workers, customers and other companies, thus implementing a new form of workforce management to recover the rates of profit that have been falling since the 2008 economic crisis (Srnicek, 2017). The ultimate purpose of these platforms is to 'alter the relationship between living versus dead labour by restoring the relationship of capitalist domination objectively' (Cingolani, 2016:42–3). In other words, it provides another way to incorporate the workers' know-how into the machines (in this case, the software), increasing the controlling power of capital and, thus, the real subsumption of the work.

This new form of management acts to increase labour productivity and reduce the autonomy of work and this becomes apparent when we analyse what workers do individually and collectively. At the level of the individual worker, the impact of the app implementation on the way of working can be understood by comparing an activity with similar functions performed without the use of this technology, such as comparing the work of Uber drivers with that of taxi drivers. In making such a comparison, it becomes clear that forms of knowledge that were previously produced by taxi drivers, such as the shortest routes, the least congested roads and the regions with the most potential customers, become datified (Mejias & Couldry, 2019), organised in an automated manner through algorithmic calculations and informed by the app, thus reducing drivers' ability to make decisions about their work.¹⁰

However, managerial changes implemented by the use of the app do not only affect individual workers' productivity, since drivers do not act as dispersed and isolated individuals, but rather form a social productive force, a collective worker, with each worker being an integral part of 'a "working organism" through which his capacity to work acquires new social powers' (Rosdolsky, 1977:236), that is, reproducing the logic of cooperative organisation that capital appropriates at no cost.¹¹ Thus, algorithmic management makes for a larger organisation of the collective worker, through its huge ability to retain and analyse data, allowing 3 million drivers around the world to have their work coordinated. This rationalises the service more effectively and, as a result, produces an increase in productivity above the mere sum of what is extracted from each individual worker.

Autonomy versus control in the work by app

One of the characteristics of the work of Uber drivers is the intermittent nature of the service, with the company not stipulating the working hours or the workplace. Behind the apparent freedom given to drivers to decide where, when and for how long they will

¹⁰ Highlighting how apps incorporate workers' know-how corroborates Braverman's (1981) thesis on capital's tendency to (re)qualify, disqualify and degrade work.

¹¹ Returning to Srnicek's (2017) arguments once again, it becomes apparent that the huge amount of data retained by large platforms allows them to control a larger number of workers, and the more people networked generating data, the greater the value of the platform, a process that favours the creation of monopolies.

be driving, there are very subtle control mechanisms. These are hard to discern because they are performed in an automated manner and without direct contact between the company and the workers and, at the same time, persuasive and efficient. Thus, a form of work is created that is constantly monitored, controlled and modulated, ensuring that the service is provided continuously, intensely and with guarantees of profit.

For us, the relationship between autonomy and control is related to the degree of task prescription, as presented by Marx (1982b). In these terms, capitalist production is marked by the separation between elaboration and execution, a division that is deepened with the introduction of machinery into labour processes, since 'even the lightening of the labour becomes an instrument of torture, since the machine does not free the worker from the work, but rather deprives the work itself of all content [. . .] for reinforcing the separation between the intellectual forces of the production process and manual labour' (Marx, 1982b: 548). Following this argument, we examine whether work by app radicalises this separation, analysing this by studying the management's role in the planning of tasks performed by workers.

We do this by presenting the hierarchical forms of control exercised by the company over the drivers. For this purpose, we divide Uber's management practices into four axes: first, control of the intensity and duration of the work; second, the ideological control over the work; third, the algorithmic management of the work; and fourth, the quality control, acknowledging that all these forms of control coexist during the provision of the service.

To understand 'the control over the intensity and duration of work', it is essential to look at the remuneration model used in this work relationship. Uber drivers' compensation is composed only of a variable portion, the amount determined by a calculation performed by the app itself at the end of each ride, based on distance, time travelled and the relationship between driver supply and demand in the region in which the order was placed. Of this total, an average of 25% is retained by Uber¹² and 75% is passed on to its 'partners'.

In its terms of use (Uber, 2017), the company seeks to create an apparent relationship in which the value of the ride is paid directly by the user to the worker, with the company receiving a percentage of this value for performing the intermediation that enabled the service. Viewed from the worker's perspective, this proposition can be reformulated to show that Uber pays drivers about 75% of the amount received for providing the service, setting up an employment and salary relationship. What allows us to perform this inversion is the very way in which the service is organised, since it is Uber that triggers the driver to provide the service and it is the app that calculates the fare and receives the payment made by the user (normally taken from the credit card registered by the user on the platform) a portion of which is then passed on to the 'partner'.¹³

12 This percentage varies with each ride, it being the sole decision of the company how much will be retained. In our interviews, drivers reported that in some rides this rate could be as high as 50% of the total amount.

13 Uber allows different ways to pay for the ride in each country where the service is provided. In the Brazilian case, for example, Uber allows cash payment, which is not the case in other countries, due to the large percentage of the population without credit card access (Oliveira et al., 2019:20).

In this sense, it is possible to conceive drivers as a type of salaried work, paid a 'piece wage'.¹⁴ If a driver receives a portion of the payment per ride performed, we can make a parallel with the form of piece wage, where the amount received varies according to what is produced instead of being a fixed amount periodically passed on to the worker.

When a piece wage is adopted, 'the lengthening of the working day is now in the personal interest of the worker, since with it his daily or weekly wages rise' (Marx, 1982b: 696). Since one of the key features of work by app is flexibility in the time and place where it is performed, this form of remuneration thus guarantees the intensification of the labour process, by making it in the workers' interest that their working day should be as long as possible.

Our interviews demonstrate the effectiveness of this form of organisation in implementing self-management of workers, since their working day is typically well over the eight hours a day foreseen by Brazilian legislation. Strenuous working days are a common practice for drivers, as we can see in the following account:

Usually I turn on the app around 4 or 5 am, work until 10 am and stop. I go home, I have lunch, do my chores, because I also have, say, home chores, still being responsible for home chores. Then I'll be back at 2 pm and then I'll go sometimes 1am, midnight. [. . .] I do it every day, just not on Thursday, which is the day my vehicle rotates¹⁵ [and I work as a cleaner]. But I also do Saturdays and Sundays, which are the main days. (Interview 9, female, 54 years old, April 2019)

From the workers' own reports, it is common to have an average of 10 to 12 working hours a day, often six days a week, taking a rest only on the days when the vehicle is rotated. However, drivers often report working days longer than 20 hours, which is a common practice in this sector, especially in times of greater financial need. Research carried out by Kalil (2019), who interviewed more than 100 Uber drivers in São Paulo, yielded a similar result, with more than half of the workers claiming to work more than ten hours a day.¹⁶

As regards compensation, drivers calculate that working from 10 to 12 hours daily generates, on average, gross earnings of R\$ 250.00 (approximately US\$ 62.5). However, once the cost of fuel is subtracted, this leaves a net value that is closer to R\$ 150.00

14 Although not becoming hegemonic in the capitalist mode of production, the piece wage was one of the principles of Taylorism (Taylor, 1990:88–9). Although the adoption of the conveyor belt has solved the problem of the pace of production in some industrial branches, the piece wage continues to be used as an instrument for increasing labour productivity. Some studies on the textile industry (Abreu & Sorj, 1993:51–2) and the sugarcane agribusiness (Tavares & Trindade de Lima, 2009: 173), for example, have demonstrated how this form of piece wage in Brazil is an important method for control of work and productivity, although often classified as a form of pay that can increase workers' freedom.

15 In order to reduce vehicle traffic during peak hours, the city of São Paulo has implemented, since 1996, the rotation of vehicles. Under this rotation system, each car cannot travel around the city centre one day a week, and with a scale organised by the final plate number (plates with endings 1 and 2 not being able to circulate on Mondays, 3 and 4 on Tuesdays and so on)

16 Hall and Krueger (2016) conducted a survey with Uber drivers in the USA and reported that 55% of respondents work as drivers for only 1 to 15 hours per week and that 60% of drivers do not have Uber as their primary source of income. The differences between these data and driver surveys in Brazil make it important to conduct a larger survey on the impacts of app companies on ways of working in a country in the global South.

(US\$ 37.5). Thus, apparently, the remuneration paid to drivers is higher than the Brazilian minimum wage, which is R\$ 4.54 per hour. However, since work tools such as mobile phones and cars are the responsibility of drivers, understanding their depreciation values becomes a major challenge in accurately calculating the net remuneration received.¹⁷

This information brings into question the flexibility of schedules present in this type of work. Although Uber advertises the ability of drivers to have more flexible hours than in work regulated by Brazilian law, in practice the only flexibility that exists is in relation to the time when the service is provided, as the total working day is often greater than that which prevails in formal occupations.¹⁸ The perverse effects of this form of remuneration are illustrated in another interviewee's report:

The downside is that if something unexpected happens, you take a lot of damage. If they steal your cell phone, your car, you have to invest in car insurance, etc. My insurance ended up getting more expensive because I said it was Uber. They put a tracker in the car, so if it gets stolen you know where it is. And because you invest more in it, you end up having to make more money and it becomes a vicious cycle, it looks like a little game and suddenly you're Uber-crazy, wanting to make money, money, money. (Interview 6, female, 29 years old, March 2019)

Working as an app driver increases vehicle maintenance costs, requiring the worker to spend more hours driving to cover these expenses. Driving longer hours makes the worker invest even more in the vehicle, thus increasing the need for financial gain. Work more, earn more, spend more: a vicious cycle that drives thousands of Brazilians out of their homes every day to drive long hours in search of a living wage to ensure their survival.

The second form of control we studied in the platform-driver relationship concerns 'ideological control over work'. On the company's official homepage, we find terms such as 'partners', 'trust', 'connection' and others that create the image of an apparently horizontal relationship between all participants in the Uber 'community'. However, by mobilising such ideas, the company promotes concrete consequences in the way drivers experience their work.

The question 'Do you work for company x?' could easily be answered by Taylorist-Fordist and even Toyotist workers. However, when we put this question to people working for app-companies workers, we received a range of different answers. 'I am self-employed'; 'I am a kind of liberal professional'; 'I am an Uber cooperador'; 'I work for Uber'; 'I work with Uber'; 'Uber is my intermediary'; 'Uber works for me'. These are

17 An important feature of Uber drivers in the city of São Paulo is that 22% of these workers, according to the company, use a rented vehicle. The average rental price of a vehicle in São Paulo is R\$ 400.00 per week, another factor that should be considered in the calculation of the net salaries of these workers.

18 We can say it is being consolidated by the workers just in time (Abílio, 2017; De Stefano, 2016; Oliveira, 2002:16). These workers are available for work 24 hours a day, rendering all existing time as potential working time, since remuneration is only for the hours actually worked. This makes the entire time frame a possibility for increasing incomes. In addition, the term *just in time* accurately describes how these workers are activated to perform their duties, being completely conditional on fluctuations in demand and the requirement to respond immediately to any work request.

just a few of the answers we got, and the variety of views in them demonstrates the complexity of classifying this work.

For us, this complexity comes from the way in which the coercion versus consent relationship is promoted by the company. By postulating that its workers are ‘partners’ of the company, what is sought by Uber is to mystify the exploitation relationship existing in this work and identify this activity as promoting an ideal of freedom, with workers being solely responsible for their working conditions. This illusory freedom is quite clearly expressed in the speech of this worker:

I prefer to work the way I'm working, nobody rules me. I don't like people bossing me. [. . .] I don't work for Uber, I work for myself. Uber is just an app that's giving opportunity to millions, but I don't work for them, I work for myself [. . .] Uber doesn't boss anyone, Uber doesn't boss any of the drivers. [. . .] You work when you want and the time you want, so they don't rule us. (Interview 5, male, 31 years old, March 2019)

As pointed out by Lima (2010:188), many of the workers subjected to precarious work contracts, threatened daily by the instability in their employment, absorb an entrepreneurial logic to explain and justify their condition, holding themselves responsible for staying in this job. These are people who find themselves in everlasting need of increasing their ‘human capital’¹⁹ as if they were a company with a constant capacity for self-worth. The way in which entrepreneurship constitutes the app driver’s way of life can be illustrated by the following account:

Why am I an entrepreneur? Entrepreneurship is in the following: make the most of the situation; you are not afraid to be responsible for your results; you run after productivity and not salary and the result of work is money. You understand this? These are entrepreneurial visions. I'm not afraid of unemployment because I create jobs, I create work. If today I don't have Uber, tomorrow I'll clean up and make money and survive. This is entrepreneurship and so I think I'm an enterprising person. A little crazy, but that's how I am. (Interview 10, female, 36 years old, May 2019)

Thus, the discourse promoted by the company is in line with the way that informal work was conceived in the past and is now conceptualised as entrepreneurship. The figure of the entrepreneur is seen as illustrative of the possibility that individual actions can overcome social problems, such as unemployment, and understanding themselves as part of those struggling to break away from structural adversity contributes to a positive self-valuation. Thus, entrepreneurship results in ‘making each person feel solely responsible for their situation’ (Campos & Soeiro, 2016:10). In our view, such discourse acts to mystify the enormous degree of precariousness that exists in the labour market. This is why we do not understand drivers as microentrepreneurs seeking to seize market opportunities, but as workers subject to a high degree of exploitation and risk in their activity.

¹⁹ The theory of human capital, developed primarily by the Chicago economist Theodore Schultz (1973), impels workers to continually invest in their acquired capacities in order to increase their market value.

A third form of control is 'algorithmic management of work', supervisory practices, governance and control driven by software which are exercised over the collective worker (Möhlmann & Zalmanson, 2017:4) and which determine the degree of autonomy allowed to drivers to organise 'how to work'. From the moment they turn on their apps, drivers and passengers are profiled and various algorithmic calculations modulate and anticipate their behaviour. From the analysis of these data, Uber adopts several procedures to ensure that the service is provided in accordance with its interests.²⁰

Some of the most obvious manifestations of algorithmic management are blind passenger acceptance, dynamic pricing and promotions developed by the company. We will describe how these mechanisms work to analyse the hierarchical relationships between the company and drivers.

Upon receiving a ride request on the telephone display screen, the driver has access only to the location, name and score of the person requesting the service. Other information that would be important for drivers to decide whether to accept or decline the order, such as the destination, is available only when drivers start providing the service. Uber has implemented this blind passenger acceptance mechanism to avoid discrimination by destination, placing itself as a mere intermediary between drivers and passengers, but this measure is criticised by drivers for directly interfering with their earnings (Rosenblat & Stark, 2016:3762).

In some interviews this theme was criticised by drivers. For them, blind passenger acceptance makes drivers perform rides in which the distance travelled to reach the passenger is greater than the route itself. As the mileage travelled to the user is unpaid, these trips are not advantageous, and the omission of the customer's final destination upon receipt of the call prevents drivers from using their judgement in making the decision.

Another manifestation of the company's algorithmic control of work is in the price tariffs. Fares are charged using the dynamic pricing method, a calculation made by the app, where places with the highest demand for rides have an increase in the amount charged in order to attract more drivers to the region and shorten the wait time to get a car. An analysis by Diakopoulos (2015) shows how the dynamic pricing works by redistributing drivers who are working on city streets, reducing waiting times in some regions and increasing them in others. Thus, this mechanism is configured as a company action aimed at coordinating drivers, leading them to work in the places indicated by it.

One last mechanism we will discuss involving the company's algorithmic control is the promotions offered to drivers. It is quite common for Uber to give financial incentives to 'partners' by paying extra if they run a certain number of rides over a specified period of time or by giving bonuses to rides at some high flow

20 Authors such as Woodcock & Johnson (2018) and Deterding et al. (2011) define as gamification some of the mechanisms performed by Uber to ensure the continuous provision of the service. Gamification would be the use of game design techniques in non-playful contexts to motivate the activity and loyalty of people in different activities. Through studies on the mechanics of gamers, platforms seek to develop procedures aimed at increasing user engagement in various platforms.

events from potential consumers. Promotions are not made with predefined regularities and the numbers involved in each promotion are also variable. Drivers understand this company action as a measure to direct and intensify the work, but the increase in remuneration nevertheless makes these trips advantageous, as shown by this interviewee:

Uber directs my work, for example, by promoting. Monday has a promotion from 3 am to 9 am, they direct me to work at the time they want me to work, probably because they know they will need more drivers at that time. Is it a profit of mine? It is! But it's directed. . . (Interview 3, male, 34 years old, February 2019)

From the analysis of these three Uber work management mechanisms – blind passenger acceptance, dynamic pricing and promotions – we seek to demonstrate how the relationship between Uber and its drivers is consolidated as a form of digital factory despotism, with the company not being a mere intermediary between the driver and the nearest consumer interested in the service. The way in which work is organised allows the forms of control to become automated and naturalised, and at the same time, renders them broader, deeper and more intense, since they are forms of control that not only act on individual workers during their activities, but organise the collective worker that composes the company. In this way, the platforms incorporate the management functions of companies, ensuring that all work is performed according to criteria of efficiency and productive effectiveness, increasing the subordination of workers to the interests of the corporation.

The fourth form of work management we consider in relation to Uber concerns 'quality control over work'. In the period marked by the app companies, all quality control is completely disassociated from the companies, becoming the full responsibility of the workers and consumers of the service. Because the company only labels itself as responsible for mediating between consumers of services and workers available to offer them, it is not committed to responsibility for what happens during their work, creating greater risks and constraints for workers in the performance of their activities.

In the case of Uber, quality control is exercised by using a bi-classification star system. In this system, passengers classify drivers and vice versa, and drivers and passengers with a grade lower than the value set by the company are banned from the service database.²¹ The impact of the evaluation system on work patterns is described as follows by a driver:

There are many people who assign a grade without thinking about it. Don't really rate the driver. Also, there's no way we can't say that we are not worried about the grade, because there is a large percentage that gives 5 stars to everyone because it is the first one that appears there, gives 5 stars and leaves, and there are

21 The minimum grade for the driver's disengagement from the platform varies according to the city in which the service is provided. In São Paulo the minimum grade allowed by the company is 4.65, and in other Brazilian cities this number ranges between 4.6 and 4.7.

also people who evaluate us, and sometimes give us one star and we end up with a punishing grade. . . understood? So we become a slave to the stars. It's kind of Black Mirror (Interview 7, female, 36 years old, March 2019)

The credibility of the star system for ensuring the safety and quality of work is quite questionable.²² Drivers are unanimous in classifying this system as flawed and insufficient, saying they rarely look at passenger scores to accept rides and have never declined to provide a ride based on the user's rating. The main criticism raised by drivers is the difficulty of knowing what is evaluated by each passenger, and often some of the issues analysed do not concern the work or the driver.

There are people, for example, who say they were evaluated well because there is candy in the car, understand? So this evaluation doesn't exactly pass for the quality of the guy driving, the car, but more the things he can offer to the person. A candy, a water, a magazine. . . There are people who evaluate you because of that, which I think is wrong. This should not be included in the passenger assessment. (Interview 8, male, 55 years, April 2019)

The creation of Uber-defined criteria for drivers to be suspended from the platform is a key issue in the debate about the asymmetry that exists in this relationship, because if the company is a mere intermediary and drivers are not considered as its employees, it is controversial whether they could or should be disconnected from the service. However, the absence of quality control mechanisms increases the security risks involved in an unknown person getting into someone else's vehicle. To ensure that this essential part of the service can be carried out safely, the company creates a vigilant crowd (Abilio, 2017), leaving the worker under constant scrutiny, a method that is proving to be quite effective in securing company control over work productivity and how it is provided.

Based on the managerial work practices we have described Uber ensures that work is extremely highly controlled even while it appears to be an autonomous activity, since the control is not based on the physical presence of a company representative. The control exercised by the operation of the app and its algorithmic calculations accompanies every movement of drivers in cities, and the data gathered by means of this monitoring (seeking to increase company revenues) shape and anticipate the future behaviours of workers, creating what Zuboff (2015) has called 'surveillance capitalism'.²³ Furthermore, this algorithmic control is allied with the watchful eyes of the crowd of consumers. Globally, 93 million people are observing many aspects of the service that the application cannot capture, helping the algorithmic management to supervise the workers.

22 One of the main demands of those attending the global strike of drivers by app in the city of São Paulo concerned safety. To illustrate the seriousness of the issue, data released by the Public Security Bureau show that in 2017 there were 3,952 cases of robberies of drivers while performing their activity. In the first quarter of 2018 this number was already 18.5% higher than the same period the previous year (Alcoverde & Perroni, 2018). A survey by drivers themselves shows that 55 workers have been killed in the state in the last three years. Importantly, in most of these cases the action was performed by passengers using fake accounts registered on the platforms.

23 Venco (2003:67) compares business software with the architectural figure of the panopticon (Foucault, 1999), as it serves to control all minor movements of workers, placing them in a conscious state of permanent visibility and automating hierarchical forms of power.

Conclusion

We stated at the beginning of this article that one of the specificities of working by app is that workers are required to own at least some of the tools (means of production) used in their work, such as the car and the mobile phone. From the demystification of the existing managerial practices in this working relationship, we can now conclude that what allows the control of work by the app companies is not the car or the mobile phone used in this work, but the app. It is the private ownership by the company of this technological means of production that ensures control over labour processes and how workers are managed, thereby radicalising historical processes of work subsumption.

Marx (1982a:1019–38) demonstrated how the passage of different forms of organisation of the production process resulted in the greater subordination of workers to machines, with constant capital incorporating the know-how of the labour power. In *Capital* (Marx, 1982b), the passage cooperation → manufacture → machinery → big industry serves as an example of the objectification of the productive process, and it is possible to understand the subsequent productive restructurings that deepened this tendency. The concentration of constant capital is intended to ensure that control over what is done passes to management, severely reducing the autonomy of workers to make decisions about their activity.

When we look at the work of Uber drivers, we need to look at what means of production are needed to ensure workers' control of capital. If the company abdicates the possession of vehicles and cell phones, it is only because it is not through the mediation of these elements that control over the service provided is guaranteed. For us, one of the characteristics of this work is the command of the process through the app, which is the means of production responsible for the management of drivers by the company.

It is through the app that the driver finds the passenger to be transported, which are the city streets with the lowest flow of vehicles, the time consumed during the trip, the reliability of the person who will get into the vehicle and the total value of the ride.²⁴ Thus, it is from the possession of these data that the company has the power and ability to organise the work of millions of drivers around the world, making it unnecessary to invest in buying cars or other means of production.

We argue, therefore, that in this form of work the app is the central productive force and the one that allows the collective worker to be subordinated to capital. Playing the same role that the machine tool carried out for capitalism in the eighteenth and nineteenth centuries, the app presents itself as a central component of the digital platform-based service industry, that is, the central means of production by which management ensures how the work should be performed. The app, while summarising the algorithmic instructions that allow it to function, updates the notion of task, accurately and in real time prescribing how drivers' activity should be performed. In this way, the app tool, as a machine tool metaphor, radicalises management to the

24 When we compare the work done by drivers by app and taxi drivers, we see that the functions performed bear several similarities. However, all this information quoted as being organised by the application in the work of Uber drivers is, in the case of taxi drivers, derived from their own experience as a worker, demonstrating how the adoption of algorithmic management acts to concretely modify the labour processes.

extent that it is expressed immediately. Thus, app and machine tool, each in its historical moment, make it possible for work to be carried out with productive efficiency and effectiveness, in a controlled and profit-assured manner while reproducing and deepening the subsumption of labour to capital.

From this, we understand that the notion of industry should not be restricted to so-called material production, since work in the service sector maintains the logic of value production existing in the production of material goods. On the contrary, such work should be classified as productive. The production performed in the work by app is also marked by the detailed control over the labour process, performing in an organised manner, based on the possession of the means of production: the exploitation of the collective worker. So we understand work by app as an update rather than a break with traditional industry and the typically capitalist work organisation, because it follows the search for the production of surplus value from the exploitation of the collective worker. From the point of view of capital, it does not matter whether this appreciation is anchored in the production of a tangible or intangible commodity.

Returning to the debate on how the relationship between autonomy and control is materialised in the work of Uber drivers, the findings of our study demonstrate how work by app is based on an apparent freedom, but is actually rooted in a separation between elaboration, planning and execution. The algorithmic management that really subordinates the worker, both individual and collective, acts as a controller of times and movements, according to Taylor (1990), leaving less and less scope for workers to plan their activities. Thus, we contend that work by app follows the historical tendency of capitalism to increase the company's control over the labour process, to the extent that in the app the platforms and their algorithmic calculations synthesise the capitalist order over the workers, now constantly and virtually updated.

This new form of work control is carried out in conjunction with very old ways of organising work and production, such as the requirement that workers own some of the tools used, aiming to reduce the costs of capital on that activity (Marx, 1982b: 480). In this way, Uber manages to unify, in order to carry out its exploration, the most advanced technological innovations, such as algorithmic calculations, with very old working practices that go back to the manufacturing period, which underlie a radicalisation of the forms of exploitation and domination of work in contemporary times.

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