Chen *The Journal of Chinese Sociology* (2022) 9:17
https://doi.org/10.1186/s40711-022-00171-4

The Journal of Chinese Sociology

RESEARCH Open Access

Labor order under digital control: research on labor control of take-out platform riders

Long Chen*

*Correspondence:
longc_pku@163.com

College of Humanities and Development Studies, China Agricultural University, Beijing, China

Abstract

Following Marx's analysis of technical control, this article studies the labor process of take-out riders from the perspectives of organizational and scientific technology. On the one hand, by redistributing control power, the platform system (software) and consumers replace the platform company (manager) to manage take-out riders. Although the platform company seems to have given up direct control over riders, it downplays the employer's responsibility and transfers labor conflicts to the platform system and consumers. On the other hand, digital control has changed from physical machines and computer equipment to virtual software and data. The platform system makes labor order possible by subtly collecting and analyzing data from riders and using these data analysis results to manage them. Thus, digital control not only weakens riders' willingness to resist and gradually reduces their autonomy but also "invites" them to participate in an implicit process of self-management. The control methods of capital change not only from autocracy to hegemony but also from physical to virtual.

Keywords: Take-out riders, Labor Order, Control power, Digital control

Introduction

The starting point of labor process theory is the uncertainty of the labor force. The greatest challenge for capital after purchasing labor is how to realize 100 percent of the labor force in products or services. As the process is fraught with uncertainty, capitalists must shift control of the labor process from workers to themselves (Braverman 1979). However, capital in the process of labor control will inevitably sow the seeds of workers' resistance. Therefore, the core issue to be answered by the labor process theory is how capital controls labor and how workers resist, that is, how the labor order is possible. "How capital maintains order on the production site is a fundamental issue in the theoretical interpretation of the labor process" (Wang 2011).

Human society has entered the Internet era from the age of industrial production and from the real economy to the virtual platform economy. The "tentacles" of capital are not satisfied with labor control in the field of production but extend to the field of circulation (such as the work of take-out riders, online car-hailing drivers, and couriers), and so labor process theory should also adapt to changes over time. This research starts from the core topic of labor process theory and focuses on how capital controls labor in

the Internet platform economy. Internet platform workers seem to have much "freedom" and "autonomy" compared with industrial workers. The "Eleme" company pointed out that "work freedom" is important for attracting riders. More than 60% of "hummingbird" riders value free working hours, and nearly 30% of riders agreed that they like the feeling of riding a bike through the city.[1] Researchers have also found that the Internet platform's labor control is very different from that of traditional employment organizations. "Workers take orders on the platform. You can freely determine working hours, locations, rest and vacations and even determine labor supply and salary levels. Workers have labor autonomy" (Wu and Li 2018).

Therefore, can we think that companies in the platform economy have loosened their grip on labor? If the answer is yes, this is contrary to the starting point of the labor process theory. If the answer is no, why do platform workers seem so "free" and have a fair degree of "autonomy" at work? Moreover, compared to the era of industrial production, the scale of platform employment such as "Eleme" and "Meituan" is unprecedented. The official website of "Eleme" has three million registered riders.[2] "Meituan" announced more than 2.7 million people.[3] Such a large group of take-out riders can shuttle through China's large and small cities and towns in an orderly manner every day. Starting from the central concern of labor process theory, this article explores the following: What is the reason for orderly labor under the control of the Internet platform?

Technical control in labor process theory

Technical control in classical labor process theory

Marx revealed two types of technology. One is technology as a material artifact, which refers to the relationship between man and nature, and the other is technology as a social form, which refers to the social relationship between people (Grundmann, 1991). The former refers to applying science and technology in the labor process, and the latter refers to the organizational technology that appears in the labor process. In the capitalist mode of production, technology improves production efficiency, and it is also an important means for capital to control labor. Since Marx, the analysis of technological control has been carried out along the two clues of scientific-technology control and organizational-technology control.

Marx pointed out that "the change of the mode of production takes labor as the starting point in the handicraft industry, and the means of labor in the large-scale industry" (Marx 2004). The two changes in the mode of production refer to the innovation of organizational technology and scientific technology, respectively. First, the handicraft industry has improved the way the labor force is organized. On the one hand, the division of labor increased productivity and created "local workers;" on the other hand, the labor hierarchy system divided workers into skilled and unskilled workers. The division of labor and hierarchy jointly promoted the improvement of productivity but at the same time led to the devaluation of the value of the labor force. Subsequently, industrial production revolutionized production technology,

[1] See the "2018 Take-out Riders Group Insights Report" published internally by "Eleme."

[2] Refer to "Hummingbird" Homepage (https: //fengniao. ele. me).

[3] See the homepage of "Meituan Delivery" (https: //peisong. meituan. com).

transferred labor and materials from workers to machines, and replaced manpower with natural forces. Marx analyzed the direct influence of machine applications on workers in *Capital* and pointed out that replacing workers' physical strength with machines eliminated the difference between workers' gender and age. As women and children join the labor force, capital gains more controllable workers; at the same time, under the unemployment crisis, workers' willingness and ability to resist has also been weakened (Marx 2004).

Following Marx's analysis, Harry Braverman (1979) analyzed the scientific management of Frederick Winslow Taylor. In his view, scientific management has nothing to do with science and technology but develops management methods and labor organizations. The goal of scientific management is to transfer the control of the labor process to the managerial department and accurately implement labor control in every step of the operation. Taylor believed that this goal could be achieved in three steps: first, collect and develop knowledge about each labor process; second, concentrate this knowledge in the management department; third, use the monopoly on knowledge to control every step of the labor process (Braverman 1979). In the end, scientific management will lead to the separation and opposition of workers' hands and brains, and workers' craft knowledge and labor control rights will be deprived of, "they (workers) function as cogs and levers"(Braverman 1979: 124).

Immediately afterward, Braverman analyzed the impact of scientific and technological control on workers. Starting from the control method of the machine's operation, he revealed that "it is in the nature of machinery, and a corollary technical development, that the control over the machine needs no longer be vested in its immediate operator" (Braverman 1979: 172). He also took the "numerical control" of the workshop machinery as an example to illustrate how the machine works step by step according to the digital program, thereby reducing the skill requirements of the machine operators. Compared with the fierce resistance caused by the Taylor system, the technological gap between workers and machines is more likely to make workers succumb to the domination of machines.

Richard Edwards also chose to start with analyzing labor-organization techniques in his *Contested Terrain*. "Control system" is the basis of his analysis. He believed that the control system contains three elements: the direction of the work task, evaluation, and discipline of workers (Edwards 1979). In the stage of competitive capitalism, the control system is completely in the hands of the employer alone, and there have been two nonstructural controls: employer control and hierarchical control. After entering the monopoly stage, nonstructural control exists in small and medium-sized enterprises on the fringe of the economy.

In contrast, monopolistic companies at the economy's core have to adopt new control methods due to the failure of hierarchical control and the emergence of many civilians. The "control system" is embedded in the company's technical structure and organizational structure. The former is called "technical control" (Edwards 1979), and the latter is called "bureaucratic control" (Edwards 1979). Although Edwards directly uses the term "technical control," it mainly refers to the aspect of scientific-technology control; that is, the three elements that control workers (mainly blue-collar workers on the production line) are completely under the control of technology.

For instance, when the manager sets the speed of the assembly line, the foreman is no longer needed to guide the workers. With the introduction of "numerical control" equipment and the application of computers in the workshop, "the computer can send instructions (according to its preprogrammed routine) as to what operations or activities workers are to perform, and upon successful completion of the task, the central computer will receive feedback information that will permit it to send out instructions for the next operation. Through central programming, the computer can follow production through its various stages, controlling the flow of work" (Edwards1979: 123).

"Bureaucratic control" represents the innovation of organizational-technology control. Compared with the arbitrariness of employer control and hierarchical control, bureaucratic control completely entrusts the three elements of controlling workers (mainly office clerical employees) to the rules and regulations and provides detailed regulations on job responsibilities, scope, content, and levels. With the structuring of the control system, the willingness of workers to resist has also been eliminated.

Michael Burawoy did not specifically analyze scientific and technological control in *Manufacturing Consent* (2008). In his view, "machine-tool technology, in its principles at least, has remained relatively constant over the past century" (Burawoy 2008: 64). However, Buroway's contribution is to bring workers' subjectivity into the analytical framework of labor process theory. Compared with the autocratic side of science and technology control presented by Marx, Braverman, and Edwards, Burawoy allows us to see the hegemonic side of science and technology control. In the context of the state's legislative intervention in the labor process, workers have regained control of the machine. The "making out game" allows workers to control their own machines instead of being controlled by them, enhancing their autonomy, so "the game is entered into for its relative satisfactions, or what Herbert Marcuse calls repressive satisfaction… The satisfaction of that need reproduces not only "voluntary servitude" (consent) but also greater material wealth" (Burawoy 2008: 89). In terms of organizational-technology control, the internal labor market fosters competitive individualism, which reduces the conflicts between workers and management while exacerbating internal conflicts among workers, and the return of qualifications ensures workers' loyalty to the enterprise. Collective bargaining and grievance procedures established within the company dissipate workers' solidarity and fighting spirit as a class by nurturing them as industrial citizens with rights and obligations rather than as members of the working class.

Under the capitalist mode of production, the management department has committed to decomposing the labor process mastered by the workers and reorganizing it into the labor process mastered by the managers. New production methods and machines provide an excellent opportunity for this decomposition and reorganization. In terms of organizational-technology innovation, the division and collaboration of labor, the separation of concept and execution, bureaucracy, internal labor market, and internal state continue to erode workers' skills and resistance capacity. In terms of iterations of science and technology, the study of the labor process has revealed the influence of machines, automation, and computer technology on the labor process and labor alienation.

In short, in the era of scientific and technological revolution, the management department has the "ambition" to master the entire labor process and control all its factors without exception. However, "how does the scientific-technical revolution transform the

labor process? No such unitary answer may be given. This is because the scientific and managerial attack upon the labor process over the past century embraces all its aspects" (Braverman 1979: 150). With the rise of the fourth industrial revolution represented by artificial intelligence technology (Tian and Liu 2019), technologies such as the Internet and big data have had a disruptive impact on people's work and life (Jia 2016). From the perspective of Marx's technological control, what impact will the new round of technological changes have on the labor process?

Technical control in the Internet platform

Today, whether in China or abroad, the glory of industrial giants has been overshadowed by various Internet platform companies. Chinese "ATM" (Alibaba, Tencent, and Meituan) and American "FLAG" (Facebook, Amazon, LinkedIn, and Google) are currently the hottest Internet platform companies. The earliest Internet platforms originated from search engines and social media platforms. Pettman (2015) pointed out that the key to the profitability of this type of platform lies in the ability to obtain people's attention; that is, the platform has to divert people's attention to the platform because the more attention the platform receives, the more likely it is to make money through advertising. The emergence of Google and Facebook has subversively changed the profit-making model of purely quantitative attention. They monitor and mine the information left by individuals on the Internet and then obtain the ability to push accurately and provide advertising information to users who need it more. From an extensive attention economy to a precise advertising push, "data" plays a key role. "And since prediction and analysis are so crucial to advertisements, every bit of data, no matter how seemingly trivial, has potential value" (Levy 2009: 108). Therefore, platform companies such as Google, Facebook, and Amazon began to store every user's search, every push, and purchase record. Through the inadvertent data left behind, platforms can better control their users.

In *Uberland: How Algorithms Are Rewriting the Rules of Work*, Alex Rosenblat (2019) revealed how Uber uses algorithms to control its drivers. Uber draws on the methods used by platform companies such as Google and Amazon to manage and manipulate consumers, tracking consumer preferences and content clicked on and then providing so-called personalized and customized products to users with similar preferences. It is just that Uber applies the same strategy to labor management. As a data-driven Internet platform company, Uber quantifies the work habits of drivers by recording all the details of the driver's whereabouts—from the vibration of their mobile phones to the ratings of passengers on each trip. Although Uber has repeatedly promoted so-called hands-off management to give drivers full freedom and autonomy, it is implementing a higher level of monitoring because it will record a series of personal data of the driver, including ratings, order acceptance rate, rejection rate, online time, number of trips, and performance in comparison with other drivers. Rosenblat (2019: 187) pointed out that behind all this, "Uber's algorithms give the company vast leverage over how drivers do their work."

Chinese domestic research on labor process control on Internet platforms is becoming increasingly abundant compared with foreign countries. Qingjun (2018) studied online

ride-hailing drivers from a control perspective. They found that the platform's control over the labor process coexisted with workers' autonomy, significantly different from traditional labor process control. This new employment model and the platform labor process result from the platform's three core mechanisms. The work autonomy mechanism, the salary and incentive mechanism, and the star rating mechanism enable ride-hailing drivers to have a subjective experience of active recognition and passive acceptance of the platform and its rules and finally cooperate with the platform. This research avoids the technical perspective and analyzes the capital control means from the perspective of labor subjectivity.

In a study on couriers for the Internet platform, Jiachi Zhuang (2019) found that Courier companies have continued the factory management model, and courier workers must follow standardized and normalized operations in the labor process. At the same time, the courier company has established a rigorous information monitoring system, which records the logistics information and related persons in charge of the computer by scanning the barcodes of the mailed products for tracking and querying by managers and consumers. The continuation of the factory management model can be regarded as a kind of organizational, technical control, and the information monitoring system centered on the product barcode is the embodiment of science and technology control.

Xiangnan Feng and Jing Zhan's (2019) study on take-out platform riders found that take-out platforms mastered the information source and riders' data and realized real-time dynamic control based on riders' characteristics in the specific labor process. At the same time, the application of AI technology represented by intelligent voice assistants led to the "de-skill" of riders. Ping Sun (2019) also researched take-out riders and pointed out that labor under algorithmic logic has temporal, emotional, and gamification characteristics, and she argues that through the labor practice of the "inverse algorithm," riders realize the reconciliation and confrontation of "human logic" and "algorithmic logic." The two studies explored the scientific and technological control of the Internet platform from the perspectives of artificial intelligence and algorithms.

On the whole, international researchers have pointed out the role of big data and algorithms in the scientific and technological control of the Internet platform. The algorithm is similar to Braverman and Edwards's "numerical control" in the 1980s. The final analysis still involves how data are used in management and therefore constitutes a theoretical continuity. Chinese researchers' emphasis on artificial intelligence, big data, and algorithms has skipped concrete analysis of how technology "permeates into the control of workers' production activities" (Wang 2011) and how artificial intelligence, big data, and algorithms are applied to the labor-management of the Internet platform. Regarding the organizational-technology control of the Internet platform, international and Chinese researchers have reached a consensus in many aspects. For example, it is believed that consumers "perform one of the roles of middle managers because they are responsible for evaluating worker performance" (Rosenblat 2019: 187). However, there is still a lack of theoretical analysis and summary of the above phenomenon.

"Returning to the secret of production, exposing the hidden labor process and production scene to the researchers, is the meaning of labor research" (Wen and Zhou 2007: 29). Following this traditional method of labor process research, the author of this

article joined a team of take-out riders in Zhongguancun, Beijing.[4] From the beginning of March 2018 to mid-August 2018, the author was a team rider,[5] experiencing the rider's labor process first, integrating into the rider's daily work and life while accumulating field data from observations, interviews, and logs. This long-term "immersion" helps the author observe the changing process of the technology control of the take-out food delivery platform company. At the same time, the technical blog regularly published by the technical team of the take-out platform company has also become an important resource for the author to understand the technological world behind the rider. The rider team I joined is one of the first to appear in Beijing and is fairly representative. In the words of the team leader, "Our team can be regarded as the nation's number one take-out team in terms of orders. If we say that the Beijing take-out team is the best nationwide, then our team is the best in Beijing."

Under normal circumstances, team riders have to accept the management of their station (set up by the labor service company/agent), but management is gradually limited to the attendance of the morning meeting and manual order adjustment during the peak period. Therefore, like crowdsourced riders, take-out platform companies hand over the management of team riders (including system dispatch, rider matching, delivery pricing, route planning, customer evaluation, performance rewards, and punishments) to the platform system. The platform system mentioned here refers to the distribution software or application developed by the food take-out platform company responsible for its operation and maintenance. Different users are divided into client ends (consumers), merchant ends (merchants), and delivery ends (take-out riders, station). The platform system undertakes most rider management tasks. Therefore, the key to studying the labor order of the platform is to understand the management of take-out riders by the platform system.

Organizational-technology control: redistribution of control power

The take-out rider's labor process revolves around the platform system from registration to exit. After installing and registering take-out platform software via mobile phones, take-out riders can receive orders through the platform system. Due to differences in rider types, riders receive orders in different ways. Crowdsourced riders need to grab orders on the platform system. In general, experienced crowdsourced riders can determine at a glance the most "cost-effective" order based on weight, distance, price, and other factors of the order and then decisively grab the order. Team riders do not need to grab orders because they do not have the right to pick orders. After being assigned by the platform system, the team rider must accept the delivery task from the platform

[4] The names of people, places, and teams that appear in the article are anonymized.

[5] There have been three modes of employment between take-out riders and take-out platform companies, namely, platform-employed, outsourced, and crowdsourced. Platform-employed riders who have signed labor contracts with take-out platform companies and enjoy the salary and benefits regulated by law, but for cost reasons, the platform companies have gradually outsourced distribution services to third-party labor companies (also known as agent stations), and the platform companies themselves are only responsible for the operation and maintenance of the platform system. The outsourced riders, also known as team riders, work in the name of the platform company, but are recruited and managed by the agent station and do not have a labor relationship with the platform company. Crowdsourced riders are not employed by any unit. They only need to log in to the platform and register an account to grab orders and deliver them. This is a very important social supplement to the take-out delivery platform.

system. However, different types of take-out riders work roughly the same after receiving orders.

(1) Rider's labor process

In terms of time, the rider's labor process is divided into three stages, namely, arriving at the store, picking up the take-out meal, and delivering it; in terms of space, the rider's labor process involves three geographic coordinates, namely, the locations of the order-taker, the merchant shop, and the client. After the rider receives the order, the first step is to find the corresponding merchant/restaurant according to its location, the second step is to pick up the take-out from the front desk or the kitchen of the merchant, and the last step is to deliver the order to the client's location. In this process, the rider needs feedback to the platform system through his mobile phone every time he completes a step. The platform system judges whether the feedback is true according to the GPS location of the rider's mobile phone and the delivery time. Under normal circumstances, the straight-line distance between the rider's GPS location and the location of the merchant or the client cannot exceed 500 m, and the interval between the rider's pickup and delivery should not be less than 5 min. If the platform system determines that the feedback is not true, the rider cannot proceed to the next step.

In addition to supervising the labor process of take-out riders in terms of time and space, the platform system will also provide specific guidance in different distribution links. For example, in the link between receiving an order to it arriving at the store, the rider can check the regional distribution of order demand through the order heatmap displayed on the platform system and then wait for orders or grab orders in areas with high order demand so that the chance of receiving orders is higher. For another example, in the link of picking up a take-out meal at the store, the rider can check the estimated time of an ordered take-out being ready for pickup through the platform system. When there are multiple orders to take, the rider can reasonably plan the sequence of pick-ups according to the expected ready-to-pickup time of the orders. For another example, in the pickup and delivery link, the rider delivers the meal following the meal delivery route and sequence planned by the platform system, which can improve the accuracy and timeliness of the delivery.

While the rider delivers, consumers are also involved. The platform system transmits feedback from the rider to the consumer, such as arriving at the store, take-out picked-up, and on delivery. Consumers can view the rider's trajectory on the take-out platform application in real-time. The platform system presents the rider's whereabouts to consumers through a dynamic map from the moment the rider takes the order. Therefore, whether the rider has delayed or detoured behavior in the delivery process, consumers can know it by checking the dynamic map. The platform system increases the control and predictability of meal delivery by giving consumers this kind of "God's Vision" that overlooks the overall situation. This vision adds considerable invisible pressure to take-out riders because the rider always knows that one or more pairs of eyes are watching. The result is that the rider's flexibility in delivering meals is greatly compromised. The team rider Lao Mei gave an example:

It stands to reason that I should send it to Zhengfang Building first and then go to the Engineering School of Y University. However, the time of the order from the engineering school is tight. If the order to the Zhengfang Building is to be delivered first, the order to the Engineering School will surely be overtime when I arrive there. What do you think I should do? I think there is enough time for the order to the Zhengfang Building, so I went to the Engineering School first, which means I'd deliver the far-away order first and then the close-by order. Who would have thought that when I had just arrived at the Engineering School, the client from the Zhengfang Building called me and asked me why I passed by. I said I went to the engineering school first because it would be overtime and kept telling her that I was going to the Zhengfang Building immediately. However, she did not sound too happy, and she said that it was because she saw me coming on her mobile phone that she kindly went downstairs in advance to save my time. I did not think about it, but I went to another place first, so I was so embarrassed to let her wait for a while.

After the delivery is over, according to the rider's performance in the delivery process and standards such as whether the order is overtime or spilled, the platform system will also ask consumers to evaluate the rider's delivery service, ranging from "very poor" to "average" to "Awesome."

Finally, the platform system will reward or punish riders based on the evaluation given by consumers. There are two forms of rewards and punishments: virtual points or "bee value" and real bonuses. The former is related to the rider's "level."[6] The latter directly relates to the rider's income. Normally, every time the rider completes a delivery, he will obtain a "bee value." Two more "bee values" will be added if it is well received. However, if the delivery is overtime, four "bee values" of the rider will be deducted; if a complaint is received, the deduction of "bee value" will be more. The platform system evaluates the rider's level according to the rider's "bee value"; the more "bee values," the higher the level of the rider. Compared with low-level riders, high-level riders have the privilege of first obtaining orders from the platform system, and each order has more commissions. Taking the delivery team where the author works as an example, the delivery commission for each order for the bronze rider, the lowest-level rider, is 8 *yuan*, and the delivery commission for each order for the king rider, the highest-level rider, is 8.5 *yuan*. In addition, if the rider gets a good review, he will be directly rewarded by the platform system of 1 to 2 *yuan*; if he gets a bad review, he will be fined 10 to 20 *yuan*; if he complains, the penalty amount is higher, generally more than 200 *yuan*.

(2) The redistribution of control

In his book *Contested Terrain*, Edwards analyzes corporate labor organizations in the stage of competitive capitalism and monopoly capitalism. Starting with the "system of control," he proposes that the control system consists of three elements: direct, evaluate, and discipline workers (Edwards 1979). According to Edwards, "Control" is "defined as

[6] Take the take-out platform company where the author worked for example, the rider's levels from low to high are bronze, silver, gold, platinum, diamonds, and kings, and under each level four smaller levels are graded, such as bronze 1, 2, 3 and 4. Along with the rider's accumulation of more and more "bee values," rider's level is also getting higher and higher, but poor evaluation, complaints, absences, and other reasons will continue to cause "bee values" deducted, and therefore rider's grade is constantly changing.

the ability of capitalists and/or managers to obtain desired work behavior from workers" (Edwards 1979: 18). Therefore, the three elements of the control system represent three kinds of control power. In competitive capitalism, most enterprises started from small workshops, and employers also grew up from skilled workers. Because the scale of enterprises is small, employers can supervise all links of production and direct specific production operations, and the control system is completely in the hand of the employer. Edwards referred to this control as "entrepreneurial control" (Edwards 1979). With the expansion of enterprise-scale, a vertical management system has emerged, and each layer controls the next layer. Edwards calls this control "hierarchical control." For workers, the foreman is their superior and controls the system so that "the foremen's great power was largely unsupervised, leading to arbitrariness and favoritism" (Edwards 1979: 63). To suppress the fierce resistance caused by arbitrary personal management, the control system is embedded in the enterprise's technical and organizational structure in the stage of monopoly capitalism. In other words, the control elements are now mastered by a structured technical system and organizational system. As "technical control" and "hierarchical control" make the control system structured and institutionalized, workers' willingness to confront employers has been largely dispelled. For example, after the introduction of assembly-line production, "the conflict (between workers and bosses) was mediated by the production technology itself. Workers had to oppose the pace of the line, not the (direct) tyranny of their bosses" (Edwards 1979: 118).

Looking at the labor process of take-out riders from this perspective, this article finds that the three elements of the control system have undergone redistribution. In the rider's labor process, the platform system is responsible for directing the rider's work, the consumer is responsible for evaluating the rider's work, and the platform system completes the final reward and punishment or disciplinary work for the rider. The result of the above seemingly simple redistribution is directly related to the emergence of the platform system. The platform system can allocate orders to riders in a short time, calculate the estimated delivery time, plan the delivery route to guide the rider's delivery, and provide various technical assistance during the rider's delivery process (such as order heatmap and estimated ready-to-takeout time), thereby improving the overall distribution efficiency. Behind efficiency, improvement is the support of strong computing power because matching the rider, calculating the delivery time, evaluating the performance of the rider (including the number of orders, positive and negative reviews and complaints, attendance rate, accumulated mileage, average speed, and customer satisfaction), and rewarding and punishing riders based on performance are all inseparable from the computation of the platform system. Taking route planning as an example, during the peak period for take-out delivery, the platform system can plan a delivery route for the rider within 0.55 ms.[7] In addition, consumer evaluation of riders is also dependent on the platform system.

On the one hand, the platform system has detailed records of each time node of the entire process. Consumers know when they will receive the food when they place an order and see the specific links of the entire food delivery process from the platform

[7] See "Meituan Take-out: The Road to Logistics Technology Exploration," *2019, Network Economy Service Platform,* (https://news.qichacha.com/postnews-643f925549c86be5fOfec29b2bb8ab4.html).

system. This enhances the predictability of rider delivery and provides consumers with a reference basis for evaluation. On the other hand, because consumers can view the rider's location in real-time through the platform system's dynamic map, they can also monitor the rider's whereabouts. If the rider times out or takes a detour, the consumer can intervene in the delivery process by reminding orders and making phone calls. In summary, the platform system has improved the overall distribution efficiency, made the labor process accurate to a calculable degree, and achieved a high degree of labor control and accurate prediction. Because of this, the platform system undertakes most rider management tasks and makes it possible to redistribute control powers.

(3) Shift of labor–capital conflict and weakening of the labor–capital relationship

After the control power was redistributed, the objects of labor conflicts were first transferred. Since the platform system is responsible for dispatching orders, directing, rewarding, and punishing riders, even if the platform system is not a tangible entity, in the eyes of the rider, it is not virtual and ruthless mobile phone software but a real and affectionate "manager." When there is no order, the take-out rider will keep begging the platform system to send more orders in his heart. Additionally, because the platform system acts as a "manager," the rider will vent his dissatisfaction at work to the platform system, and because the "manager" is invisible, riders often express their dissatisfaction through verbal catharsis. Riders in my WeChat group of take-out delivery teams often complain about the platform system like a real manager.

> *Zhao Xiaohai: order, order, order, why didn't you send me an order?*
> *Li Huahe: How should I say about this system? It separately dispatches order; in one afternoon, it gives me four independent orders to place A, which means I have been "tricked" to ride eight times back and forth.*
> *Mei Zhenmin: I rode until 10 o'clock in the evening yesterday. After 9 o'clock, I said that I could get off work, but suddenly I got an order. I said I was idling all afternoon, then I should go home, and it gave me an order. It was almost 10 o'clock after delivery. However, I must deliver it.*

On the other hand, because consumers are responsible for evaluating the work of riders when consumers give negative reviews or complaints, riders will also vent their dissatisfaction to consumers. In the take-out team where the author works, if a rider receives a negative review or complaint, in addition to deducting the bonus, he will also be required to re-participate in offline training with newcomers.[8] No rider is willing to participate in the half-day offline training because there will be no income during this period. When explaining why he would participate in offline training with a group of

[8] Offline training usually occurs in the off-season of meal delivery. Offline training is a punishment in the eyes of a rider, because participating in the training will occupy one's delivery time. However, in the author's opinion, offline training is also a means of regulating the supply and demand of the rider market, because during the off-season, the demand for riders is small, and the team has a large number of riders. The method of making them participate in offline training in batches can play a role in regulating market supply and demand. In the off-season of March and April, riders are likely to be "invited" to participate in offline training because of two negative reviews a week, and in the peak season of June and July, few people have heard of people participating in offline training.

newcomers, rider Wu expressed his dissatisfaction with consumers who gave him negative reviews.

> *Students of Y University are really bad, and how shameful to be known as proud children of heaven. Two days ago, I delivered milk tea to a female student at Y University. The lid of the milk tea was not tightly closed. When I arrived at Y University, I found that the milk tea was splashing out of the cup a little bit, just a little bit. I told the girl that the milk tea shop did not close the lid tightly when packing, and I was slightly responsible. So I told her that I would compensate her with some money. The female student picked up the cup and looked at it, and said impatiently, "Forget it, it is okay," then turned around and went back. As a result, when I went back, the site called me and said that a customer had just given a negative review to me. I thought I sent only one order in the afternoon, so the girl from Y University certainly gave the negative review.*

Although consumers always have reasons for negative reviews or complaints, riders still want to understand them. In their opinion, what consumers see on their mobile phones is only their movement on the map as a light dot, but they describe the food delivery process as "a life of nine deaths." Since the order must be delivered within the specified time, it is common for them to ride in reverse, run red lights, and speed up. In addition, they also have to suffer from the difficulties of security personnel along the way, watch out for traffic police penalties, and sometimes need to pay for customers' phone bills (such as when customers cannot receive calls due to stopped mobile service), buy cigarettes, and throw garbage. The wage earned by risking their lives and hard work is likely to be in vain because of consumers' negative reviews or complaints.

Therefore, it is not difficult to understand why a respectful rider will record dissatisfaction and resentment on consumers after learning that he has received a negative review or complaint. Because riders always know the evaluation results given by consumers after delivery, they cannot express their dissatisfaction in person. Consumers seem to have the "absolute power" of supervision and evaluation, but unknowingly, as the "manager" role played by the platform system, they have become "scapegoats" for labor conflicts. Ironically, when consumers and riders complained to each other, the food delivery platform company became the "mediator" of the conflict between them because consumers would complain to the company about the rider through the platform system, and riders could only appeal to the company through the platform system.

Another result of the redistribution of control power is the increased difficulty of determining the labor–capital relationship. From the current legal system, the platform employment model does not completely conform to the category of "employment," nor does it fully conform to the category of "independent contract workers" (Wang et al. 2018). In 2015, the California Federal District Court ruled that the relationship between Uber and online car-hailing drivers constituted an employment relationship mainly because the employer is "controlling details of the job" (Wang Tianyu 2016). Therefore, the key to determining an employment relationship is whether the platform company has control over the labor process or acquired the subordination of the rider's labor to the platform's capital (Chang 2016). However, since the platform system and consumers have undertaken the main supervision tasks, the reallocation of control power has

Table 1 Data collection of the platform system in the rider delivery process

Rider delivery	Take orders, park near the merchant/business, arrive at the pickup point, complete the pickup, get on the ride, arrive near the customer, complete the delivery
Motion state	Cycling, walking, parking, walking, cycling, parking/walking
Basic technology	GPS trajectory mining, Wi-Fi and Bluetooth geofencing technology, Mobile phone sensor motion recognition
Data collection	GPS Trajectory data, Wi-Fi and Bluetooth data, rider behavior data, order data

Source: The Practice of Machine Learning in Meituan's Distribution System: Using Technology to Restore the Real World, 2019

(https://tech.meituan.com/2018/12/13/machine-learning-in-distribution-practice.html)

increased the difficulty of determining the employment relationship. Even from the perspective of "work details," it is difficult to see the platform company in the rider's labor process. Therefore, the rider must be disappointed when encountering a work injury and needing to find an employer to come forward. Rider Shen Jun experienced a similar story while working on platform S. He showed the author a 20 cm long scar on the inner side of his calf and said:

> *When I was delivering food on platform S, I was hit by a car on the road once. However, the car owner is insured and is willing to compensate. The insurance company asked me to provide proof of income to calculate the missed work cost. I went to the platform S office in Beijing and asked them to give me an income certificate, but they just refused to give me one, saying that it had nothing to do with them. At that time, I had an income of approximately 10,000 yuan a month. I spent three months in the hospital. I was able to get many missed work payments according to this standard. In the end, platform S didn't give me a certificate. Finally, the insurance company gave me the minimum wage standard in Beijing as my missed work payment. To be honest, after that time, my heart was cold. These companies will not care about us at all.*

If we say, "on construction sites, the relationship between fellow workers and friends exists between workers and bosses, between workers and workers, and between workers and managers. This relationship is like a veil of affection, covering the labor-employment relationship" (Pan Yi et al. 2011: 118). Then, the reallocation of control power in the Internet platform industry makes it easier for platform companies to eliminate labor relations and employer responsibilities.

Scientific-technology control: digital control

(1) Parallel data collection

The platform system is responsible for guidance, rewards, and punishments in the delivery process and continuously collects data through the rider's smartphone and the installed application (as shown in Table 1). When the rider is on delivery outdoors, the platform system tracks the rider's movement through the GPS in the rider's smartphone. When the rider enters a room to pick up or deliver the meal, due to the poor indoor GPS signal, the platform system will continue to track the rider through the smartphone's

Wi-Fi (wireless network) and Bluetooth signals, and according to the information transmitted by the smartphone as a sensor, the rider's behavior in the room is monitored, and the "every move" of the rider in the room is grasped. Therefore, in addition to the rider's movement, the platform system can also identify the rider's motion state, including walking, riding, running, climbing stairs, and taking escalators or elevators. It can also record historical data generated by the rider, including the time of arrival at the business, the length of stay in the business, the customer's address and floor, the time to notify the customer to go downstairs to pick up the meal, and the time to wait for the customer to pick up the meal. Moreover, as more smart devices, namely smart voice headsets, smart helmets, and indoor positioning base stations, are activated, the rider data will also be more accurate and comprehensive.

In fact, in addition to riders, all terminals that install take-out platform software are the source of data collected by the platform system. Therefore, the platform system collects data from merchants and consumers while collecting rider data, such as merchant addresses (including location and floor), meal preparation time, the weight of the order, price, volume, packaging speed at the front desk, and order situation(squeezed or not). Moreover, it collects information such as consumer address information (including whether there is a janitor, building unit number, floor, and apartment number), taste preference, order time, waiting time, tolerance to overtime, and proportion of giving positive reviews, negative reviews, and even complaints in the past.

The data of the platform system have a wide range of sources, and the collection process is very secretive. Platform systems often complete data collection through the smartphone application without the knowledge of riders, consumers, and businesses. Although the application will have privacy protection tips before using it, no one wants to spend time and patience reading the long-form privacy policy, and if you do not agree, you will not be able to use the take-out platform application normally. For example, when a rider or a consumer installs the take-out platform application for the first time, a notification window will pop up on the phone interface, asking the user to agree to share their location information; otherwise, the application will be unavailable. Although the third option between agreeing and disagreeing, the option of sharing location information only when using platform software, has gradually become popular after the platform application is promoted, the moment a rider or a consumer opens the take-out platform application. He or she has inevitably become the object of platform system data collection. There is also evidence that even if the user deletes the platform application on the phone, the platform system may continue to collect user data.[9]

(2) Technical means upgraded: digital control

The purpose of the platform system to collect data is to serve the platform management. After the rider receives the order, the estimated delivery time will be displayed in the order information, such as 35 min, which means that the rider has to deliver the

[9] On April 23, 2017, the "New York Times" published an in-depth report titled "Uber's C.E.O. Plays with Fire." The report pointed out that Apple's engineers discovered that even if users delete Uber's apps on their Apple phones, Uber is still collecting user information. (see https://sspai.com/post/38938).

meal to the consumer within 35 min.[10] This time is the result of calculation by the platform system based on many characteristic dimensions and historical data. For example, the rider's age and height are very important characteristic dimensions as the model calculates the rider's corresponding step length and speed. Regarding consumers' tolerance limits for overtime, the platform system can calculate the consumer's sensitivity to overtime delivery based on the historical records of negative reviews and complaints due to overtime.

Regarding a merchant, the floor of the restaurant, the meal-preparation speed, and the squeezed package of the order will affect the final delivery time of the rider. In addition, the time, road section, and real-time weather conditions in the business district will also affect the delivery. As these characteristic dimensions and historical data are put into the model, when an order with the same delivery scenario appears, the platform system through self-learning can predict the time required (such as 35 min) for the rider to deliver with a certain degree of confidence (such as 95%). It is foreseeable that as the characteristic dimensions and historical data become more comprehensive and refined, the platform system will also calculate a more accurate estimated delivery time.

However, while collecting data, the platform system is also subtly disciplining riders. In calculating the estimated delivery time, the platform system analyzes all the collected data to manage the rider's labor time. In addition, the delivery route planned by the platform system based on the collected road information (such as the number of traffic lights, time, and road congestion) spatially limits the rider's labor process. Because consumers can see the rider's trajectory data through their mobile phones, they can call to urge the rider when they find that the rider is detouring or deviating from their position. When the rider reports to the platform system that the order is delivered, if the straight line distance between the feedback location and the customer's address is greater than 500 m or the rider takes less than 5 min from picking up the order to delivery, the platform system will determine that the rider is "fraudulent." In short, data have become the main basis for the platform system to manage riders, and the "digital control" behind the platform system has begun to emerge.

Compared with the "numerical control" in industrial automation production described by Braverman and Edwards (Braverman 1979; Edwards 1979), the "digital control" of the platform system—that is, the management of riders using data—shows the following differences. First, the "numerical control" in automated production is to make the machine work per the existing digital program, so the object of its control is the machine; the object of the "digital control" of the platform system is people (i.e., riders), not machines. Second, the intermediary of "numerical control," numerical value, has no special meaning in automated production. In contrast, in the context of big data and artificial intelligence, data have analytical value beyond itself, and the platform system uses them in management such as matching riders, estimating time, planning routes, supervising delivery time and space, and evaluating performance.

[10] The actual situation is much more complicated. Riders often deliver several orders at the same time. The delivery time overlaps and the routes are different. The riders have to deliver the food within the specified time of each order. The estimated delivery time given by the platform system must therefore take into account the delivery of multiple orders. Therefore, the data, algorithms and models involved in calculating the estimated delivery time of the platform system are more complicated.

Third, the program used for "numerical control" in automated production is only composed of digital codes. However, the data used by the platform system for "digital control" are ubiquitous, including not only online and offline data but also data about riders, consumers, merchants, time, road sections, and weather conditions, and have become the data basis for maintaining the platform's labor order. Finally, the "numerical control" in automated production is public, but the process of "digital control" of the platform system is secret because collecting data and using data results are secret. The biggest feature of "digital control" is secretly collecting and analyzing data and using it for management, making it intelligent and invisible. Moreover, it is precise because the platform system calculates delivery time, delivery price, and delivery route based on intangible data, algorithms, and models under the banner of technology neutrality, which does not cause riders to question the quantitative control of the platform system. In contrast, riders also regard this quantitative control (that is, estimated time, navigation of the route) as a means of urging and assisting them in completing the delivery task and obtaining the delivery commission.

(3) Rider autonomy under "digital control"

The author saw in the WeChat group of the take-out delivery team:

Li Wei: @Everyone pays attention, the system is upgraded, and you must arrive at the business/restaurant on time in order to report!
Zhao Xiaohai: What do you mean?
Mei Zhenming: What does it mean to arrive at the business/restaurant on time?
Li Wei: Just look at the report for yourself, and you will know.
Qiu Wei: Well then, the order cannot be pended!

The "report" in the rider's words refers to the fact that when delivery work is delayed due to slow meal preparation in the restaurant, the rider can extend the delivery time by "reporting." "Pending orders" is a strategy that the rider "invented" in the process of delivering take-out over the years to deliver more orders. In principle, the rider should go to the restaurant to pick up the take-out immediately after taking the order. However, before the rider sends feedback to the platform system to "confirm the pickup," if the platform system receives a new order from the same destination, it will send it to the same rider. Whether there will be such an order depends entirely on luck, so the rider tries his luck by "pending an order," that is, by delaying feedback to the platform system about "confirming the meal." "Pending orders" is a strategy of delaying the delivery time in exchange for more orders. However, when the rider wants to "pend an order" but does not want to delay the delivery time because of the "pending order," making up for the time loss caused by the "pending order" becomes the most important issue for the rider.

Correspondingly, the way to extend the delivery time is to "report," but "reporting" needs to meet three prerequisites: first, the rider is near the restaurant; second, the rider has been in the restaurant for more than 5 min; third, the restaurant did not get take-out ready at the expected time. For experienced riders, it is easy to meet the prerequisites for "reporting." First, the straight-line distance between the rider's

Table 2 Before and after changes of conditions for riders to "report"

March 2018	June 2018
Conditions for riders to "report"	Conditions for riders to "report"
1. Nearby the restaurant 2. More than 5 min in the restaurant 3. Till 11:36, take-out not ready	1. Arriving before 18:35 2. Nearby the restaurant 3. More than 5 min in the restaurant 4. Till 18 .40 take-out not ready
The default distance of arriving at the restaurant is 500 m	The default distance of arriving at the restaurant is 100 m

order-waiting place and most restaurants is within 500 m (the requirement of "restaurant neighborhood" is that the straight-line distance is within 500 m). Second, since it is within 500 m, the rider can stay in his original place and click "Confirm Arrival" to the restaurant, satisfying the requirement of more than 5 min in the restaurant while "pending the order" at the same time. Finally, in the hectic, even if the restaurant has already got the take-out ready, the rider can still claim that the restaurant has not been ready for take-out within the expected time, or the ordered take-out cannot be found. In the end, the rider can extend the delivery time of the previous order by "reporting" the previous order, which falsely claims that the restaurant is slow to get ready for the take-out rather than a delay caused by his own "pending order."

This "bug" in "reporting" shows that the platform system is not perfect in management, and it is also why platform companies continue to "patch" and upgrade platform systems. Moreover, the "bugs" in platform system management are usually not detected by the platform system but by the "contributions" of riders. Extending the delivery time of the "pending order" through "reporting" is a manifestation of the labor autonomy of the rider. The rider has discovered the "bug" in existing management rules and used it as a window to maximize benefits.

However, during the rider's labor, the platform system continuously collects delivery data from riders. When an increasing number of riders start to use "reporting" to "pend orders," not only will the amount of "reporting" data increase significantly, but riders also cause a significant increase in timeouts, negative reviews, and complaints due to too many "pending orders." This kind of abnormal data will eventually lead the platform system to detect its own "bugs." The result is that the system "bugs" are patched, and the platform system is optimized. The optimization of the platform system, in turn, strengthens digital control as riders' autonomy space is further eroded.

As shown in Table 2, the left column lists the conditions to "report" that the author needed to meet when I was a rider in March 2018, and the right column lists the conditions to "report" in June 2018. Compared with the situation in March, the platform system had increased the specific time requirements for arriving at the restaurant by June, as shown in Table 2 "Arriving at the store before 18:35"; the default distance of arriving at the restaurant had also been changed from the previous 500–100 m. In this way, in actual operation, as long as the new "report" conditions are met, the rider can still "report" to extend delivery time because of the restaurant's delayed take-out, but he cannot extend the delivery time of "pending orders" through the "report." If the rider does not arrive at the restaurant at the specified time, he will not be eligible for "reporting"; if

he arrives at the restaurant at the specified time, the rider will not be eligible for the next order due to the time and distance (less than 100 m) from the restaurant. Riders cannot repeat their tricks and fail to postpone or pend feedback to the platform system for "confirming the pickup" and thus lose the possibility of "pending orders."

Conclusion

According to Nick Srnicek's definition, "platforms are digital infrastructures that enable two or more groups to interact" (Srnicek 2018). Platforms are similar to data terminals, connecting different entities participating in market transactions. These subjects include consumers, merchants (front desk and back kitchen), take-out riders, riders' stations, and platform companies in take-out platforms. If we regard the labor order of the take-out platform economy as a network, then the platform system is the core of the network of order. Merchants, consumers, riders, stations, and platform companies are the nodes of the order network, and take-out riders connect the core and the nodes through their delivery behavior, thus forming this network of order. The rise of Internet platform companies largely depends on Internet technology and new organizational management models. Therefore, along with Marx's technical analysis, this article studies the labor process of take-out platforms from the perspectives of organizational technology and scientific technology. It tries to find the answer to why the labor order of the platform economy is possible, and at the same time, respond to new changes of the core issue of the labor process theory, namely, how capital controls labor in the Internet platform economy.

From the perspective of organizational technology, the redistribution of control power is to a certain extent another feature of the labor organization and management model of the Internet platform after subcontracting (such as the "asset-light operating model," see Liang 2017) and assembly line operations (Zhuang 2019; Wu et al. 2018). First, take-out delivery platform companies have outsourced labor to agents in various regions. The take-out team where the author works is a secondary subcontracting station under a certain logistics company in Tianjin. After subcontracting, the take-out delivery platform company is only responsible for operating and maintaining the platform system, positioning itself as a technology service company rather than a take-out delivery company. Therefore, it does not recognize the existence of an employment relationship with the take-out delivery rider. The agent (i.e., the labor dispatch company) also cleverly avoided the employment relationship by signing a labor dispatch contract with the rider instead of a labor contract. Then, in the specific management after the recruitment of riders, the take-out platform company continued the factory management model, that is, the assembly line operation, and continuously dismantled and standardized the labor process.

For example, the rider's delivery was divided into three stages: arriving at the restaurant, picking up the take-out, delivering to the customer, and requesting riders to give feedback to the platform system after completing each work stage. On the other hand, Internet technology is used to redistribute control power. The platform system is responsible for directing and disciplining riders, and consumers are responsible for supervision and evaluation. The redistribution of control power largely stems from the support of data, algorithms, and models behind the platform system. Because the data,

algorithms, and models are invisible, the reallocation of control power further increases the difficulty of determining the employment relationship.

After the control was redistributed, take-out delivery riders assumed the responsibility of maintaining the relationship between the take-out delivery platform and consumers. Therefore, in addition to physical and mental labor, much emotional labor is inevitable, such as making consumers have a good experience and feeling. However, even if a rider paid extra labor or risked his life, he could still not ensure that he would be well received by consumers every time. Sometimes, the consumer's evaluation may not be objective and fair, making the rider feel aggrieved and unfair. Compared with dissatisfaction with the platform system's order dispatching, guidance, and rewards and punishments, riders' dissatisfaction with consumers is often more intense. This has much to do with the pattern after the redistribution of control power.

Compared with the nonstructural control ("Entrepreneurial Control" and "Hierarchical Control") and structural control ("'Technical Control" and "Bureaucratic Control") classified by Edwards, the organization and management of the rider's labor process are "semi-structured," which includes both the component of "structural control" from the platform system (technology) and the component of "nonstructural control" from consumers. The supervision and evaluation power enjoyed by consumers are highly subjective. Consumers, as concrete individuals, also allow riders to vent their dissatisfaction with a clearer goal. Therefore, conflicts between riders and consumers are often seen in the news. In short, by redistributing control power, platform companies retreated behind the scenes, seemingly abandoning direct labor management but downplaying employers' responsibilities and transferring labor conflicts to platform systems and consumers.

From the perspective of science and technology, the platform system fully manages the rider's labor process with Internet technologies, especially big data and artificial intelligence. Although consumers are also involved in management, their supervision and evaluation power are also realized through the platform system. The platform system's basis for managing the rider comes from the rider's labor process data. In the delivery process, the platform system continuously collects data from riders, consumers, merchants, and business districts, through smartphones and the platform application. It applies these data to the rider's management, such as delivery pricing, rider matching, time estimation, route planning, whole process monitoring, and quantitative assessment. This article puts forward the concept of "digital control" and distinguishes it from the "numerical control" in industrial production proposed by Braverman and Edwards. Digital control" shows that technological control is transforming from physical machines and computer equipment to virtual software and data, changing from tangible form to intangible form. Continuing Marx, Braverman, Edwards, and Burawoy's research, this article attempts to point out two trends in capital control, namely, the transition from: "hard control" (autocratic control) to "soft control" (hegemonic control) and from "obvious control" (physical control) to "hidden control" (virtual control).

The reason why take-out riders feel "free" at work is not only because they are free in terms of time to go to work and get off work but also, to a large extent, because their management has become invisible. Before the rider delivers, the platform system has calculated the estimated delivery time and planned the delivery route; during the rider's delivery process, the platform system will adjust the time and route

according to the actual delivery situation. The rider must follow the platform system's planned route and meet the estimated delivery time. Therefore, the process control of the rider is transformed into result control.

Suppose the rider does not deliver according to the estimated time and route. In that case, the consumer's supervision (through the platform software "reminder" or calling directly to ask the rider about the reason for being late or deviating from the delivery route) will cause the rider to return to the time and space calculated by the platform system. Other riders who work in the established time and space planning will only use quantitative control (estimated time, route navigation) to supervise and assist themselves in completing delivery tasks and obtaining delivery wages. In this sense, invisible control undoubtedly weakens the rider's willingness to resist.

Although the platform system fully manages riders' labor process, it is not impeccable in management, which is why take-out delivery platform companies continue to upgrade platform applications. The "bugs" in the platform system give riders an "opportunity." Experienced riders can always find "bugs" in the system during years of work. Extending the delivery time by "pending orders" through "reporting" is not only the performance of the rider's work autonomy but also the embodiment of the rider's resistance to the "digital control" of the platform system.

However, as more riders followed this method to utilize platform bugs, "reporting" data and abnormal complaint data attracted the platform system's attention, and in the end, the platform system was upgraded to make "pending orders" impossible. Because riders originally discovered the "bugs" of the platform system, they unknowingly participated in its management. Moreover, it is not difficult to predict that the contest between "digital control" and rider autonomy will always end with a "digital control" win through the continuous upgrade. Therefore, "digital control" is also a process in which the rider's autonomy space is constantly eroded.

Finally, although the data used by the platform system to manage riders are objective, there is an interest orientation behind it. Regardless of how much technology leaps, it essentially serves capital (Zuboff 2015). The blind admiration of technical myths often allows us to relax our vigilance against behind-the-scenes operations. Therefore, we should see that the platform system is not an objective and neutral "manager" behind the "digital control." If it is an open secret that the content of social media and shopping websites will be pushed differently according to the preferences and habits of the audience, then we have reason to believe that Internet platform companies are using the data they collect to maximize their benefits. Just as Cathy O'Neil (2018) warned people to stop blindly following big data in the book *Weapons of Math Destruction*, we must be soberly aware that "Some of these choices were no doubt made with the best intentions. Nevertheless, many of these models encoded human prejudice, misunderstanding, and bias into the software systems that increasingly managed our lives" (O'Neill, 2018: V). As various Internet platforms surround people's daily lives, whether consumers or workers, to avoid becoming a "digital refugee" under the Internet platform, they must see the dark side of data and be wary of the capital manipulation behind technology, and through reflection, criticism, and action, resist the data infringement by platform companies.

Acknowledgements
N/A

Author contributions
Chen Long designed the study and conducted research, as well as arranging and analyzing data. The author read and approved the final manuscript.

Funding
This study was supported by the National Social Science Foundation's Youth Project, "Research on Atypical Labor Patterns of Internet Platforms in the Age of Artificial Intelligence" (20CSH047).

Availability of data and materials
This study is based on the author's participatory observation as a take-out rider in Zhongguancun of Beijing from the beginning of March 2018 to mid-August 2018. All of the data and materials were collected from the field research.

Declarations

Competing interests
The author declares that he has no competing interests.

Received: 28 June 2022 Accepted: 16 August 2022
Published online: 03 November 2022

References

Braverman, Harry. 1998. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century translated by Fang Sheng, Zhu Jijun, Wu Yixuan, Chen Wei, Zhang Qipian, Beijing*. The Commercial Press.
Burawoy, Michael. 2008. *"Manufacturing Consent: Changes in the labor process under monopoly capitalism", translated by Li Rongrong*. Beijing: Commercial Press.
Genliang, Jia. 2016. The third industrial revolution and industrial intelligentization. *Social Sciences in China* 6: 87–106.
Grundmann, R. 1991. *Marxism and Ecology*, 139. New York: Oxford University Press.
Jiachi, Zhuang. 2019. Capital regulation and workers' labor autonomy: Taking the labor process of express delivery workers as examples. *Journal of Social Development* 2: 30–31.
Kai, Chang. 2016. Employment or cooperation, what kind of employment relationship does the sharing economy rely on. *Human Resources* 11: 38.
Levy, Steven. 2009. Secret of googlenomcs: data-fueled recipe brews profitability. *Wired Magazine* 17 (2009): 17–06.
Max, Karl, 2004, *Das Kapital*, vol.1, Beijing: People's Publishing House, pp.427;454–464.
Meng, Liang. 2017. Strong control and weak contracts: A study on the employment model of housekeeping business under the influence of internet technology. *Journal of Chinese Women's Studies* 5: 52.
O'Neill, Cathy. 2018. *Weapons of math destruction*. Beijing: CITIC Press.
Pan Yi, Lu., and Zhang Huipeng Huilin. 2011. Class experience and feelings of construction workers under the subcontracting system. *China Studies* 2: 118.
Pettman, D. 2015. *Infinite distraction*, 15. Cambridge: Polity.
Ping, Sun. 2019. Digital Labor under the 'algorithmic logic': a study of take-out delivery servicemen in the platform economy. *Thinking* 6: 50–57.
Zhen, Wu Qingjun Li. 2018. Labor control and work autonomy in the sharing economy. *Sociological Studies* 5: 139–142.
Rosenblat, Alex. 2018. *Uberland: How algorithms are rewriting the rules of work*. University of California Press. https://doi.org/10.1525/9780520970632.
Silu, Tian, and Liu Zhaoguang. 2019. The evolution of labor forms and legal choices in the era of artificial intelligence. *Social Science Front* 2: 212–213.
Srnicek, Nick. 2018. *Platform capitalism, translated by Cheng Shuiying*, 50. Guangzhou: Guangdong People's Publishing House.
Tianyu, Wang. 2016. Confirmation of labor relations based on the provision of labor services on internet platforms-taking judgments of the courts of Beijing, Shanghai and Guangzhou on designated driving service company P 's cases as the starting point. *Law Science* 6: 50.
Wang Qi, Wu., and Yang Weiguo Qingjun. 2018. Study on the nature of labor employment of platform enterprises: a case based on car-hailing platform P. *Human Resources Development of China* 8: 96.
Xiang, Wen, and Zhou Xiao. 2007. Western labor process theory and chinese experience: A critical review. *Social Sciences in China* 3: 129.
Xiangnan, Feng, and Zhan Jing. 2019. Research on the labor process of internet platforms in the era of artificial intelligence—taking platform take-out riders as an example. *Journal of Social Development* 3: 61–83.
Xing, Wang. 2011. The political economy of technology: thinking based on marxist labor process theory. *Chinese Journal of Sociology* 1: 203.
Zuboff, S. 2015. Big other: Surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology Issue* 30: 75.

Publisher's Note