

How can millions of Chinese food delivery riders be managed in an orderly way: Based on the labor process theory

Xiqing Xu¹ and Tianhe Jiang²

¹School of Marxism, Hohai University, 210098 Nanjing, China

²School of Public Administration, Hohai University, 211100 Nanjing, China

Abstract. Ordering food through smartphones brings millions of laborers into a new occupation - food delivery rider. To date, insufficient research has focused on this group of population in platform economy. This paper examines the management mechanism of Chinese food delivery industry based on Marxist labor process theory and its extensions. Three main findings are revealed. First, the food delivery platform strictly set online and off-line institutions to manage food delivery riders; second, riders are involved in an illusion of flexitime but indeed provide more labor forces; third, riders are not free as they are constantly monitored by platform's algorithm driven by big data. Given this, the conclusion suggests that all platform enterprises should abide professional ethnics and undertake social responsibility and to liberate food delivery riders' nature.

1 Introduction

Along with the development of Internet technology and the pace of the Fourth Industrial Revolution, the popularization of smartphones in China has largely promoted development of online food delivery industry. One of the new occupations, food delivery rider (hereinafter called "rider"), is recently emerged and rapidly expanding in urban and suburban regions. Riders generally accept retail tasks through online platform, and literally ride electric bicycles to deliver freshly-cooked food to anywhere within a set distance, including families, offices, outdoor locations, etc.

Considering the number of registered platform accounts in 2019, there were more than 10 million full-time or part-time riders in China and nearly 40% of them work for Meituan ([1]), China's largest unicorn company specializing in take-out industry. This high-volume occupation absorbs vast young labor forces, and effectively promotes daily life service, employment structure and urbanization transformation. China's Ministry of Human Resources and Social Security even defined riders as "new infrastructure" of modern life.

Given the huge number of riders in food delivery industry, many relevant research questions are thereby aroused. Among them, a new and unsettled question is that, how can a food delivery platform well organize the registered riders, reduce employment disputes and form a methodical labor order? To date, some scholars analyzed this issue politically and economically. However, only a few of them conducts theoretical research on labor process from the perspectives of institutions and technological transitions.

To address this gap, Karl Marx's labor process theory

has been employed as a theoretical tool in this work to clarify labor process of riders and underlying mechanism. This theory links the inter-correlation between production system and formation of technology through a lens of labor politics ([2]) and points out the mechanism of capitalism labor control. Nanjing, a metropolis in southeast China is selected as the research area as it has a prosperous foundation of food delivery industry.

In the reminder of this paper, a brief review of Marx's labor theory and its application is provided in section 2. The section 3 is the research method. Through interview and analysis, we draw our findings in section 4. Finally, conclusions and suggestions are remarked in section 5.

2 Literature Review

The labor process theory was put forward by Marx and has been improved or modified by Braverman, Friedman, Edwards, Brower et al. in their contributive works.

Marx pointed out that labor force produces value far beyond the productivity itself under the control of capital, and that is surplus value ([3]). Modern technology promotes mechanization and routinization of the labor process. Through the division and cooperation of labor, separation of concept and implementation, bureaucracy, internal labor market and internal state, labors' skills and resistance ability are constantly eroded ([4]).

Following Marx's labor process theory, Braverman ([5]) indicated that "control" (including labor control and capitalist control) is central to any management system. In Braverman's view, workers were disobedient, but their struggles against management control were not taken into account. Thereafter, Friedman ([6]) proposed two management strategies, direct control and responsibility

* Xiqing Xu: 244842241@qq.com

autonomy, which plus “tension” analysis into labor control theory. Based on this, the famous “three elements” of control system were proposed by Edwards ([7]). Guiding, evaluating and rewarding/punishing became a threefold mechanism that widely used in Western countries. In pace of practices, subjectivity of labor was highlighted in subsequent studies on laborer identification ([8]).

The classical theories above-mentioned have been employed in empirical research in China. First, the control of Internet platform economic pattern over labor process is fragmented and invisible compared with traditional labor process control, but the outcomes of labor control become more effective. Platform economy is virtual rather than substantial as it is built on big data and algorithm that decompose orders. However, intangible platforms make riders manageable. Although riders seemingly possess a certain degree of autonomy, once they log on to the platform and be ready to take orders, the instructions and regulations over their work process are all-pervasive ([9]).

Second, the development of big data technology has led to more “initiative” participations of riders. Given the digital and precise management, riders unconsciously participate in management of his own labor process ([10]). To raise efficiency of riders, platform companies also create a flexible working field and effective incentive working mechanisms such as “order grabbing” and “order postponing” so that riders would be more initiative during their working hours. Such substantive control over labor process create more recognition than dissatisfaction, more cooperation than resistance, so as to realize capital reproduction ([11]).

Last, there is an appeal of ethical examination for food delivery platforms. As other algorithm-based technology, platform economy is supposed to promote true freedom rather than an instrumentalist space to profiteering ([12]).

In summary, although there has been some contributory knowledge, it is still of value to excavate the essence of Marx’s labor process theory to carry out further research. This evergreen theory would enrich the understanding of fragmentation, invisibility, refinement and self-consciousness over the labor process in new research settings

3 Methods

Interviews, logs, and direct observation were adopted in this research. Considering the differences of the interviewees’ understanding and cooperation, the authors mainly used semi-structured interview which was divided into five topics: demographical information; employment process; operation pattern; income levels and personal opinions.

The interview followed three basic principles. Firstly, daily management and operation of the site were understood from details of the work and life of riders, and overall characteristics of platforms were explored from part to whole. Secondly, adhering to true reflection of the interview content, the authors pay attention to riders’ self-statement, and deeply understand the key information hidden in the dialogue. Thirdly, the authors construct the proposition of superficial freedom by means of grounded

theory and tries to enrich the theory.

All fieldworks were conducted during January 2021 in Nanjing. Nanjing is an ideal research area as it has maintained a remarkable speed of economic development and a leading edge in science and technology innovation in recent years. Its GDP in 2020 was about 1,482 billion RMB, and the Internet penetration rate of Nanjing reached 65.2% by 2019, and mobile phones usage rate of these netizens was almost 99%. Moreover, platform economy and the amount of riders are developing rapidly in Nanjing. Therefore, choosing Nanjing’s riders as research objects can reflect labor characteristics of the industry in a more comprehensive way.

Totally 120 riders were randomly interviewed in three sample sub-districts of Nanjing, including the most prosperous Xijiekou (XJK) pedestrian zone in downtown, Xianlin (XL) university town in suburban area and Zhongyangmen (ZYM) sub district which was the secondary center before a decade. The interview time for each rider lasted about 10 minutes.

Table 1. Sample features (N=120)

Features	Classification	Proportion
Sample area	Downtown area (XJK)	35.0%
	Old-city area (ZYM)	32.5%
	Suburban area (XL)	32.5%
Gender	Male	87.5%
	Female	12.5%
Age	≤25	16.7%
	26-35	62.5%
	36-45	16.7%
	≥46	4.1%
Education background	Junior school or below	10.0%
	High School	45.8%
	Junior College	39.2%
	Bachelor or higher	5.0%
Birth place	Local	5.0%
	Non-local	95.0%

NVivo software was used to sort out the qualitative materials and investigation logs, SPSS was used to calculate the quantitative data. All the interviewees were informed of intention of the interview, and their full names were hidden for privacy protection.

4 Results and discussions

According to our survey, the management mechanism of platform companies over the labor process of food delivery riders shows three representative characteristics: integrated management of online and offline, flexitime system and big data monitoring.

4.1 Integrated management of online and offline

Take-out platforms adopt a comprehensive online and offline pattern to manage, motivate and restrain riders

(Fig.1). Online management is based on the interactions among multi agents while offline management is attached on sites and stations throughout cities.

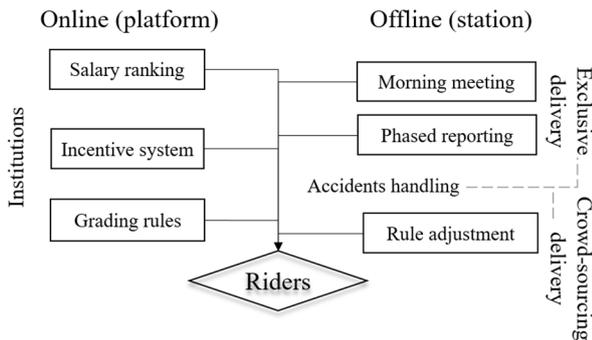


Fig. 1. Platform management chart

In online management section, food delivery platforms formulate a series of institutions to manage and constrain every rider, so that they can identify with the platform and its rules and voluntarily be controlled by the system management of platforms.

For a food delivery platform, a rider’s professional background, educational background or hometown of them are not that important. The vital aspect is whether they can accept the management pattern of the platform. This could be reflect on the recruitment process. The relative low threshold attracts laborers from different sources, including rural-urban migrants, unemployed or professional workers, or college students, etc. The commitment to obey the arrangement as well as the acceptance to criticism and punishment are key element during their entry interviews.

In fact, candidates only need to meet the three conditions of good health, being able to ride an electric car and use a smart phone. The key is to express loyalty and obey management in the interview. Thus they can enter the job. (Online recruiter, LN1210105)

Grading rules, salary ranking and incentive system are formulated. The higher level of riders, the better orders are dispatched by platform systems, and more bonus per order would be delivered. This institution makes riders feel that the growth of labor returns is not linear, but cumulative. Therefore, riders actively participate in the labor process, especially for new low-level riders. It has generated considerable driving force.

The unit price of order delivery made by my site is 6 RMB, and 50 RMB is deducted for a complaint. This is fixed. But the amount of the reward depends largely on level of the rider. (Rider, YSS210201)

Offline management of platforms adopts station management. There are two basic ways of order management: exclusive delivery and crowd-sourcing delivery. Under exclusive delivery pattern, the station conducts direct management on riders, including holding morning meetings, reporting on personal work in each month or quarter, etc. In crowd-sourcing pattern, station implements indirect management on riders, which includes analyzing riders’ running order data and timely adjusting labor rules to formulating delivery unit price. Handling accidents or abnormal orders are intersection in both two offline management pattern.

Crowd-sourcing delivery is not directly responsible for riders, but indirectly manages them. The duty of the station is to analyze the data of riders’ running orders in the region and adjust the labor rules in time, such as unit price of orders, delivery time, reward and punishment mechanism and so on. (Rider, GL210131)

In the sense of labor process, there is no significant difference in the degree of labor freedom as riders are all subject to the interest-first management philosophy. That is to say, both online and offline management are essentially based on “three elements” for labor control that were proposed by Edwards ([7]) in *The Field Full of Struggle*. The only change is the emerging platform economy provides new forms for specific control patterns.

4.2 Flextime system

In platform economy, timeliness is an important basis for food delivery platforms to provide high-quality services. ([12]) Therefore, platform companies have formed a performance appraisal system around Key Performance Indicators (KPI). Platform corporations usually adopt a working time system that combines compulsory and flextime. The all-day market demand allows riders to choose to participate in the labor process at any time. Theoretically, a rider can work 24 hours a day if he is willing to do so ([11]).

Generally speaking, those riders try their best to pick up orders for 10 hours a day, get familiar with the road conditions, and are not afraid of wind, rain and traffic peak. Their monthly income can reach 8000-10000 RMB. (Rider, JN210202)

Superficially, riders seem to have the freedom to control their working hours in flextime system for food delivery. When this flexibility becomes tense, the average monthly salary of a hardworking rider (working more than 10 hours a day) is about 8600 RMB, which is nearly twice the average monthly salary of 4600 RMB in Nanjing. According to the respondents who are willing to disclose their income, the nexus between working time and income is drawn in Fig.2.

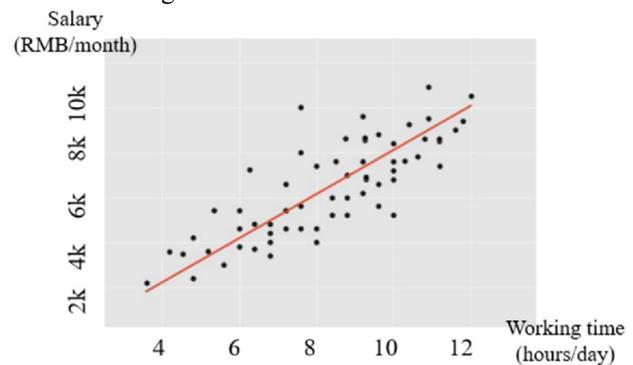


Fig. 2. Scatter plot of working time and income (N=64)

Ideally, flextime make riders rationally arrange their working and rest time. Some riders might tend to spend time with their family at the expense of squeezing their working hours. It means that they can adjust the relationship between salaries and consumption relatively freely in the labor process through flextime system, so as

to obtain a more balanced work and life arrangement.

However, the boundary between the riders' working time and life time becomes blurred in this flexitime system. Both working time and leisure time of riders can be turned into working hours. Therefore, under the seemingly free flexitime system, a 24-hour work system that transcends the boundary between working time and life time is produced. In the name of giving riders freedom to work, the platform seems to provide riders with more job opportunities on the individual level, but they have obtained more labor for capital operation on the overall level.

Marx once analyzed industrial labor time in *Das Kapital*, and regarded labor time as an important element to reveal the capitalists' exploitation of workers' surplus value. However, 24-hour market needs ever-bright city in the post electric power era. Smart phones and ordering platforms become more and more popular in the era of big data. It makes 24-hour flexitime system become a new, well-packaged method of labor control and labor exploitation. Because of the convenient flow of information today, this method has been rapidly improved. Constructed quantitative and standardized system makes the food delivery riders become executors of external labor instructions. Their subjective factors gradually disappear, and the labor becomes more and more objective. Riders are potentially alienated into labor machines in the process of objective labor ([5]).

4.3 Big data monitoring

Through big data technology, platforms carry out real-time monitoring and data collection on the labor process of food delivery riders, forming labor control under accurate calculation.

To be specific (see Fig.3), platform system keeps track of food pick-up and delivery through the Global Positioning System in smart phone carried by each rider, which can cover the whole process of indoor food pick-up and outdoor food delivery. What is more, platform are connected with the movement recording module of the rider's smart phone, so that the age, height, weight and other characteristics can be easily obtained. These data can be combined with traffic, weather and other data to form a black box of precise calculation. Calculation results of the black box (including delivery order of recommended meals, specific routes, latest delivery time, parking points and traffic safety reminders, etc.) are directly instructing millions of riders. These figures are calculated to regulate labor process of riders in time and space. Riders' flexibility in space and time is greatly limited. If riders adjust the route on his own and suffer a complaint from consumer, rider will take the main responsibility and face the punishment from the platform. On the contrary, if food delivery is carried out completely according to the results of the platforms, the platform will give a certain degree of tolerance to delivery mistakes. More riders have no choice but to accept the platforms big data control due to the cost of time occupation, the domino effect (which affects the delivery of the next order), and the loyalty crisis of defying data control.

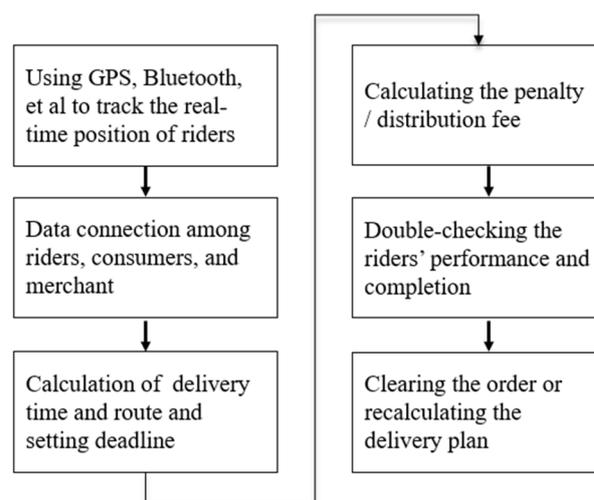


Fig. 3. Flow chart of riders' labor process under digital control

Different from the numerical control in industrial automation production, the platform system uses data to realize the digital control of the riders. The characteristics of digital control are as follows. First, the object of digital control is the rider. Second, data has the value of analysis that exceeds itself in the context of big data and Internet plus. The analysis results are applied to the management of matching, time estimate, route planning, space and time supervision and so on. Third, the data of digital control exists everywhere. Riders, consumers, merchants, road sections, weather, etc. have all become the data basis for maintaining the labor order. Finally, the digital control process is secret. Platforms secretly collect and analyzes data and uses it to manage food delivery riders so that the control of the labor process is hidden and intelligent.

5 Conclusion

With the promotion of the platform economy, labor control of capital has extended to new industries, such as food delivery services. Huge and orderly delivery system is convenient for consumers, but prosperity is based on the unreasonable control of capital over laborers. Based on Marx's labor process theory and related research results, this paper conducts an empirical study on the labor process of millions of Chinese food delivery workers.

This research finds that the platform combines online and offline comprehensive management, flexitime system and big data monitoring to manage millions of drivers work in order. External manifestation of these management is to assist and guide the food delivery work, but it is actually the invisibility of labor control management. It not only weakens riders' willingness to resist, strengthens subordinate degree of workers to the platform, and even makes the food delivery riders misunderstand freedom.

The ultimate value of the Marxism's labor process theory is the realization of the free and comprehensive development of human beings. Therefore, we need to further explore that under the platform economy. Technological development should avoid making humans become machines and even slaves of capitals.

Furthermore, platform companies should actively assume social responsibilities and pay attention to honesty and moral integrity.

The authors suggest that platform companies should be people-oriented and take social responsibilities in system construction and technology application. To realize the fairness and justice of the system based on the interests of hired laborers, they should have the quality of integrity and do the right thing. Therefore, platforms must observe social integrity, enhance business ethics, eliminate technological alienation and deprivation to realize the real freedom of millions of food delivery riders might

References

1. Nan C. How many takeaway riders are there in the country? http://www.zhihu.com/question/378118441/answer/1068312420?ivk_sa=1024320u. Accessed 5 June 2021 (In Chinese)
2. Wang X. Thinking of the Original intention of the philosophical theory of technology on the labor process theory. *Social* **31**, 01 (2011) (In Chinese)
3. Marx. *Capital*. (People's Publishing House, Beijing, 2004)
4. You Z. Managerial Control and Workers Resistance. *Social. Stud.* **04** (2006)
5. H. Braverman, *Labor and Monopoly Capital*. (New York: Monthly Review Press, 1979)
6. M. Friedman, *Industry and Labor*. (London & Basingstoke: Macmillan Press, 1977)
7. R. Edwards, *Contested Terrain: The Transformation of the Workplace in the Twentieth Century*. (New York: Basic books, 1981)
8. M. Brower, *Manufacturing consent- Changes in the labor process of monopoly capitalism*. (Beijing: Commercial Press, 2008)
9. Wu Q, Li Z. Labor Process Control and Job Autonomy in Sharing Economy: A Case Study of Online Car-hailing Drivers' Work. *Social. Stud.* **33**, 04 (2018) (In Chinese)
10. Chen L. Labor Order under Digital Control: A Study on the Labor Control of Take-out Platform Riders. *Social. Stud.* **35**, 06 (2020) (In Chinese)
11. Li S, Jiang L. A New Mode of Labor Time Control and Fake Experience of Freedom – A Study on the Labor Process of Take-out Platform Riders. *Social. Stud.* **35**, 06 (2020) (In Chinese)
12. Sun P. Digital Labor within the Logic of Algorithms: A Study of Food Delivery Workers in Platform Economy. *Thinking.* **45**, 06 (2019) (In Chinese)