

Inequality issues faced by food delivery riders from the "time-space" framework

Ziqing Xu

Kunming Rain Town School, Kunming, China

xzqxuziqing2025@163.com

Abstract. Food delivery riders are one of the main representatives of the gig economy group. To safeguard their basic rights and interests, an in-depth study of the inequality issues they encounter is an important prerequisite. In current relevant research, discussions on the overall "time-space" framework for food delivery riders are still insufficient. This paper takes food delivery riders from two major platforms, Meituan and Ele.me, as the main research objects, and systematically explores the time and spatial inequality issues faced by food delivery riders. By subdividing the two overall frameworks into different small dimensions, this paper conducts an in-depth discussion and research combined with the method of case analysis. From the perspective of time and space, this paper elaborates on the various inequality issues encountered by food delivery riders and constructs a "time-space" analytical framework.

Keywords: food delivery riders, time dominance, spatial constraint, labor inequality

1. Introduction

With the rise of the digital platform economy, the demand for delivery services has increased, making food delivery riders a popular choice in the current gig industry. Its characteristics such as flexible working hours, low entry threshold, and short-term salary payment methods have provided a reliable source of income for migrant workers, flexible employees, and rural migrant workers. The unique way of economic gain has led to the growing scale of the food delivery rider group, thus triggering a series of problems. Relevant research is increasingly improving. However, in-depth discussions are still needed on the time and spatial inequality issues faced by food delivery riders, such as the compression of riders' rest and delivery time by platform algorithms, the insufficient gathering and resting space for food delivery riders in cities, and the low accessibility of delivery space. Most food delivery riders are people with low educational levels, rural migrant workers, and those in need of flexible employment. As an important part of the city, food delivery riders are in a marginal position in urban space. In addition, the unreasonable governance and arrangements of platforms have also compressed the already limited time and space of riders. These factors will also lead to the lack of psychological space for food delivery riders, making it impossible for them to integrate into society, which further exacerbates their marginal position, thus forming a closed loop that is difficult to break. Against this background, this paper is committed to building a "time-space" analytical framework to explore the time and spatial inequality experienced by flexible workers represented by food delivery riders, the impact of these inequality issues on the riders themselves and society, and to find strategies and approaches for riders themselves and society to improve such issues through case studies.

2. Literature review

This paper mainly discusses the inequality issues faced by food delivery riders under the two major frameworks of time and space. From the perspective of time, Karl Marx once pointed out that "the magnitude of the value of a commodity is determined by the socially necessary labor time required for its production", putting forward the view that time is the absolute measure of value [1]. For the service industry of food delivery riders, time is an important yardstick to measure the value of their labor. Under the algorithmic control of food delivery platforms, in the process from order generation to order completion, the time and routes for riders to pick up meals, as well as the time and routes for delivering meals, are accurately calculated by platform algorithms [2]. Therefore, the time of food delivery riders is strictly controlled by the platform, depriving them of control over their own time, and making their working hours disjointed from personal needs. The non-standard working hours and fragmented working time of food delivery riders have also exacerbated the conflict between their rest and working hours. In addition, the

labor remuneration of food delivery riders is closely related to time. The algorithmic time squeeze of the platform forces riders to complete work tasks within the limit time. Coupled with the platform's overtime fines, this further contributes to the serious time inequality for food delivery riders. Moreover, in order to meet the delivery time compressed by the platform through algorithmic governance, food delivery riders have to violate traffic rules on the road, causing inconvenience to other social workers or increasing their workload, which also seriously affects social governance.

From the perspective of space, Henri Lefebvre proposed the trialectics of space: spatial practice, representations of space, and representational spaces [3]. These are three interrelated and dialectically unified dimensions for understanding space. Space is "the core of social theory" [4], and social issues can be analyzed from the perspective of space. As an indispensable part of society, food delivery riders should also be analyzed for the current inequality issues they face from multiple spatial dimensions. Existing studies have divided the spatial issues of food delivery riders into four major dimensions: physical, psychological, social, and governance, and pointed out four main spatial segregations encountered by riders in work and life, including geographical segregation formed by mobile "habitation", self-segregation formed by insufficient resilience, career development segregation formed by job holes, and social participation segregation formed by disembedding [5]. These spatial segregations have seriously affected the "survival" of the food delivery rider group in society. The working space of food delivery riders is fragmented, and their working space is divided into countless delivery routes, which exacerbates their lack of a sense of spatial belonging. At the same time, due to the limitations of spatial scope, food delivery riders have no suitable parking spaces when delivering meals. Random parking in order to rush for time has also affected the attribution of social spatial management.

3. Dual oppression of time and space: an in-depth analysis of the inequality faced by food delivery riders

This paper adopts the case study method, selecting food delivery riders from two major food delivery platforms (Meituan and Ele.me) as the research objects. It conducts an in-depth study and analysis of the time-space inequality issues of food delivery riders by collecting documents and materials, consulting relevant news, and other methods. Food delivery riders are typical representatives of the digital gig economy. Their labor process is highly dependent on platform operations, and their daily work is restricted within certain time and space. Meituan and Ele.me are the main food delivery software used by people in contemporary Chinese society. Meituan officially announced that it has nearly 4 million registered riders [6], while Ele.me announced that the number of annual active riders is about 3 million [7]. Meituan uses technologies such as GPS and IoT for platform algorithms including "order assignment" and "estimated delivery time", striving to balance the experience of riders, users, and merchants as much as possible [8]. Ele.me has adopted four major algorithm models including focused pricing, dispatch assignment, time estimation, and path planning to promote the positive development of platform algorithms and continuously improve the algorithm platform in practice [9]. Both have commonalities in platform algorithms, which allocate orders and make predictions based on time and space.

Through the analysis of food delivery riders on Meituan and Ele.me, this paper finds that this group experiences inequality both in the time dimension and the spatial dimension. In the time dimension, the labor process of food delivery riders presents a state of "transitional labor", which is neither a beginning nor an end, but a suspended state [10]. On the one hand, the transitional nature has trapped most food delivery riders in the labor model of flexible employment, lacking long-term and sustainable career opportunities. Most people choose to be food delivery riders because of the flexible working hours, low threshold, and short-term salary payment methods, which can be used as a transitional job when moving from rural areas to cities for work. Some food delivery riders initially only wanted to take this job as a short-term plan and then switch to other more stable jobs later. However, as precarious proletarians [11], the labor contracts of food delivery riders are a mere formality, and they cannot enjoy basic rights and interests such as paid leave, making it impossible for them to fulfill their initial idea of taking this job as a short-term one. At the same time, food delivery riders cannot achieve career promotion through continuous order taking. The career promotion channel is narrow, and they can only stay in the rider position to take and deliver orders continuously. The occupational constraints have exacerbated the instability of food delivery riders. On the other hand, under the control of platform algorithms, food delivery riders need to continuously compress various types of time in their daily work. Time is an important criterion for judging the labor income of food delivery riders. Firstly, platform algorithms, such as overtime fines and customer complaint fines, compress the delivery and rest time of food delivery riders. Secondly, riders have to compete for orders to get income—no orders mean no income, and more orders lead to higher income. This instability forces food delivery riders to race against time. During peak order periods, the platform assigns orders randomly, which breaks the riders' independent time planning and seriously weakens their time autonomy. Sometimes, the platform's random order assignment does not take into account the riders' location. To avoid being late for delivery, behaviors such as running red lights and reversing against traffic have become common for food delivery riders. Data from traffic police departments shows that in 2023, traffic accidents involving the food delivery and courier industries accounted for more than 25%, with speeding and running red lights being the main causes [12]. The platform calculates the time required for riders' routes in advance, and riders must deliver the orders within the specified limit time; otherwise, they will get nothing for that order or even have to pay additional compensation. The prospect of high income

from more orders also makes riders willing to take orders continuously, compressing their meal and rest time. They have no fixed rest time and may even be on the road delivering orders all year round. If food delivery riders encounter rush hours during delivery, it will further exacerbate their time inequality. During these peak hours, the number of vehicles and pedestrians on the road increases sharply, making it difficult for riders to deliver orders on time. They have to speed through the traffic, and their safety cannot be guaranteed. When they finally arrive at office buildings, there are usually not enough elevators, which are overcrowded. If they cannot get on the elevator and the destination is on a high floor, choosing to take the stairs may cause them to be late for the next order. All these factors constitute the time inequality issues faced by food delivery riders.

From the spatial dimension, there are constraints and differences in the space of food delivery riders during the labor process and daily life. This paper finds that the working space of food delivery riders is characterized by fragmentation and marginalization. During the delivery process, they experience spatial exclusion and are constantly deprived of spatial resources and rights. The working space of food delivery riders is divided into several areas covering specific merchants and customers. Riders often shuttle through the gaps between different spaces in their daily work, resulting in a weak sense of spatial belonging. Food delivery riders are in a marginal position in social space. People only care about the two points of merchants and customers, while riders have to deal with the entire route in between alone. When riders go to merchants to pick up meals, sometimes the meals are not ready, and they have to wait in the store. However, the stores only have seats for diners and no special resting and waiting spaces for food delivery riders. Therefore, riders have to stand inside or at the door of the store to wait for the meals, which may sometimes affect the order in the store. After leaving the store, there are no special resting places for food delivery riders in other parts of the city. Most riders take short breaks or eat meals sitting on their vehicles in non-motor vehicle parking spaces [13]. When they reach the customers' side, some residential communities do not allow non-motor vehicles to enter the community, so riders have to park their vehicles and complete the last section of the delivery on foot. Some high-end residential communities even do not allow food delivery riders to enter at all; riders need to register or obtain permission from the customers via phone call before they can enter to deliver meals. The layout of some communities is complex, with no clear signs. These problems make it difficult for riders to deliver orders on time or even find the delivery location, increasing their workload. The "marginality" that food delivery riders face in the labor space reflects the inequality in the distribution of spatial resources. There are spatial differences between different delivery areas, with varying delivery difficulties and demands. In the urban fringe areas, the demand for food delivery is relatively low, but riders may face the problem that the distance between merchants and customers is relatively long while the platform still compresses the delivery time. In the urban central areas, the demand for food delivery is high, but the traffic flow is heavy and there are numerous office buildings, which correspondingly increases the delivery difficulty for riders. Different areas and road sections in the city vary, but the platform only makes general route plans and cannot avoid some special problems. At this time, riders need to be sufficiently familiar with the delivery routes. Being forced to complete delivery tasks only within a certain space specified by the platform not only deprives riders of the right to independent spatial choice but may also increase the delivery difficulty. All the above reflect the constraints and differences existing in the space of food delivery riders.

Finally, food delivery riders also experience the squeeze of social and psychological space in the process of daily life and social integration, which is specifically manifested in their lack of space to create a comfortable living and psychological world. Against the background of urban-rural labor migration, most food delivery riders find it difficult to integrate into the urban life of the cities where they work due to their identity as "outsiders". In recent years, the proportion of riders with rural household registration on Meituan has remained stable at around 80%. Being a rider is an important way to migrate to cities for work. In 2024, nearly 60% of riders worked across provinces, showing strong mobility [14]. There are significant differences between them and other urban groups in terms of lifestyle, economic conditions, and habits, resulting in a low degree of social integration. The remuneration for each delivery order is relatively low. To earn more and better resources for their families, they have to work long hours and take continuous orders to get higher pay. Therefore, the boundary between work and life for food delivery riders is blurred. Fragmented working time invades personal time, squeezing the time they need for eating, sleeping, and other daily needs. Moreover, most of these daily needs are met during the working process. Food delivery riders have no certain personal space for eating and resting, and there are no special rest areas for riders in urban planning, resulting in insufficient living space for them. At the same time, food delivery riders do not have enough time to take care of their families and lack time for in-depth communication and emotional companionship with their family members. Over time, they will gradually become estranged from their family members, and riders are prone to feelings of guilt and anxiety about role deficiency. Under multiple pressures from family and life, food delivery riders lack space to release psychological pressure and mostly suppress negative emotions on their own, which seriously affects their physical and mental health and leads to a lack of psychological security. The work of food delivery riders is isolated from social activities, and they have few opportunities to communicate with others. Except for short-term interactions with merchants and users during work, they do not have enough time and energy to maintain social relationships. Therefore, their social relationships are fragmented, making it difficult to form stable social connections. In addition, the residences of food delivery riders are often far away from the mainstream social and entertainment spaces in the city. They only exist in these social and entertainment spaces briefly during work. Due to the high mobility and instability of their work, they will not specifically consume in large entertainment venues such as shopping malls and restaurants. The low degree of contact between food delivery riders and social entertainment is likely to leave a sense of social estrangement in their

minds, and they may even be unwilling to engage in social and entertainment activities. The above factors have exacerbated the inequality in social and psychological integration.

4. Conclusion

Through in-depth analysis of multiple cases, this study has established a time-space inequality framework for food delivery riders. In the time dimension, food delivery riders have their time compressed by the platform and thus lose their time autonomy. On the one hand, in daily life, food delivery riders do not have enough time to rest, handle social interactions, or take care of their families. On the other hand, in the medium and long-term career process, food delivery riders cannot obtain career promotion opportunities through continuous labor. In the spatial dimension, the platform plans delivery routes, leading to the exclusive distribution of spatial resources. When working, food delivery riders face spatial exclusion in merchants and residential areas. Problems such as the lack of suitable parking spaces around merchants and the inability to enter communities for delivery occur frequently. In social life, due to economic resources and urban-rural migration issues, they experience spatial segregation and are unable to integrate into social space, thus building a high wall of psychological segregation in their minds. The unscientific nature of platform algorithms, the irrational distribution of social spatial resources, and the instability of the digital gig economy constitute the time-space inequality faced by food delivery riders. Based on the above analysis, we should rationally improve urban spatial planning and allocate sufficient rest space for food delivery riders. We should accelerate the improvement of relevant bills on protecting the rights and interests of gig workers to fill the gaps in the system. We should promote the update and functional enhancement of platform algorithms to ensure their rationality. This study focuses on the time-space inequality issues faced by food delivery riders and conducts an in-depth analysis of them, but it still has certain limitations. This requires us to further explore the issues faced by other groups in the gig economy and the mechanism problems of digital platforms.

References

- [1] Marx, K. (1975). *Das Kapital: A critique of political economy*. Volume one: The process of production of capital. People's Publishing House. (Original work published 1867)
- [2] Luo, G. S. (2024). *A study on the relationship between food delivery platforms and riders under "algorithmic control"* [Master's thesis, School of Philosophy, Guizhou University].
- [3] Lefebvre, H., & Liu, H. Y. (Trans.). (2016). The production of space (Abridged translation). *Chinese and Foreign Cultures and Literary Theory*, (3), 94–110. <https://doi.org/10.13760/b.cnki.csalt.2016.0074>
- [4] Giddens, A. (1979). Time, space and regionalization. In *Central problems in social theory: Action, structure and contradiction in social analysis* (pp. 198–233). Macmillan Press.
- [5] Li, X. F., & Long, J. H. (2022). Spatial segregation in social integration of migrant worker riders and social work intervention paths. *Journal of Shenzhen University (Humanities and Social Sciences)*, 39(3), 117–126.
- [6] Meituan Delivery. (n.d.). *Meituan Delivery official website homepage* [Website]. Retrieved from <https://peisong.meituan.com/>
- [7] Hummingbird Matching (Ele.me). (n.d.). *Hummingbird Matching Official website homepage* [Website]. Retrieved from <https://fengniao.ele.me/>
- [8] Meituan. (2025, August 24). *How are orders assigned to riders?* Meituan News. <https://www.meituan.com/news>
- [9] CNR.com. (2025, April 25). *Ele.me holds annual consultative algorithm forum to make algorithms a means for riders to build a better life*. CNR Tech. https://tech.cnr.cn/techph/20250425/t20250425_527148342.shtml
- [10] Sun, P. (2024). *Transitional labor: Food delivery riders in the platform economy*. East China Normal University Press.
- [11] Standing, G. (2011). *The precariat: The new dangerous class*. Bloomsbury Academic.
- [12] *Has running red lights become the norm for food delivery riders? Should platform algorithms be held responsible?* (2025, April 1). Toutiao News.
- [13] Workers' Daily. (2021, December 15). *Where do food delivery riders eat when they deliver food for you and me?* The Paper. https://www.thepaper.cn/newsDetail_forward_15932651
- [14] Meituan Research Institute. (2024). *Meituan rider annual career report (2024-2025)* (p. 17) [Report]. https://s3plus.meituan.net/v1/mss_f5cecf526b384cbaa1117230d53b4bd6/smart/%E3%80%8A%E7%BE%8E%E5%9B%A2%E9%AA%91%E6%89%8B%E5%B9%B4%E5%BA%A6%E8%81%8C%E4%B8%9A%E6%8A%A5%E5%91%8A%EF%BC%882024-2025%EF%BC%89%E3%80%8B_h4vy9d.pdf