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# Research on the Design of a Dynamic Evaluation System for the Rationality of Labor Algorithms for Food Delivery Platform Riders

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**Abstract:** As an important representative of workers in new forms of employment, food delivery platform riders are large in scale and diverse in structure, and their current labor model is still in an early stage of development. At the same time, with the deep integration of digital technology and labor management, algorithms, as a new type of management tool, have been deeply embedded in platform employment relationships. In this process, riders' labor behavior, status, and performance are quantified and analyzed as data, and then the complete personality and subjectivity of workers tend to become concealed within the algorithmic system, reduced to calculable and controllable data nodes. After being integrated and utilized by platforms, data become the core basis for enterprises to optimize operations and implement labor control, further strengthening the management of the labor process. While this data-driven management improves efficiency, it also brings structural problems such as the erosion of riders' subjectivity and systemic risks to labor rights and interests. The pursuit of happiness is a right of the people. Therefore, it is necessary to construct a dynamic evaluation system for the rationality of labor algorithms for food delivery platform riders, and through a four-element assessment framework, regulate the logic and boundaries of algorithmic management, so that it not only serves enterprise efficiency but also ensures that workers can achieve the unity of livelihood, development, and self-worth in their work, thereby truly safeguarding their right to pursue professional dignity and a happy life.

**Keywords:** Algorithm Rationality; Labor Alienation; Subordination; Food Delivery Riders.

## 1. Introduction

In recent years, with the explosive growth of the platform economy, food delivery has become part of the infrastructure of urban life. Public data show that in 2023, the scale of China's instant delivery industry reached 340.98 billion yuan, the number of online food delivery users reached 530 million, and the total number of active riders exceeded 13 million. The category characteristic matrix of the food delivery industry covers a wide range.

Behind the huge scale of employment, algorithmic systems are deeply embedded in the entire labor process. Platforms have achieved real-time scheduling and management of ultra-large-scale workers through algorithms, but this has also triggered a series of rights and interests issues that have attracted widespread social attention: average delivery times are continuously compressed, and the traffic violation rate of riders rushing to meet deadlines remains high; the "strictest algorithms" assess performance with second-level precision, and minor violations lead to high fines; workers' income stability, occupational security, and long-term development space are all on a downward trend.

In response to the above problems, multiple guiding opinions have been issued at the national level. Seven departments jointly issued the Guiding Opinions on Implementing the Responsibilities of Online Food Delivery Platforms and Effectively Safeguarding the Rights and Interests of Delivery Riders, explicitly proposing to "optimize algorithm rules" and prohibiting the use of the "strictest algorithm" as an assessment requirement. Eight ministries and commissions issued the Guiding Opinions on Safeguarding the Labor Security Rights and Interests of Workers in New Forms of Employment, further proposing the principle of "algorithmic moderation," requiring platforms to reasonably determine assessment elements such as order volume and online rate. These policies provide principled guidance for algorithm governance, but they have not yet been translated into operable evaluation standards, resulting in "algorithmic reasonableness" often remaining at the level of vague declarations in practice, with both platform self-certification and external supervision lacking a unified benchmark.

The judicial field likewise highlights the dilemma of missing standards. Empirical research on judgment documents has found that the determination of the legal relationship between riders and platforms is highly inconsistent, and the problem of "different judgments in similar cases" is prominent. Its root cause lies in the significant defects of current relevant judicial practice: too many factors considered, confused determination logic, and the absence of unified adjudication rules.

Although academic research has discussed the issue from multiple perspectives such as labor subordination, algorithmic power, and worker subjectivity, it still lacks a comprehensive evaluation framework that integrates legal foundations, technical indicators, and dynamic adjustment mechanisms. On this basis, this study intends to construct a dynamically adaptive evaluation system for the reasonableness of employment algorithms on food delivery platforms, with "the preservation and cultivation of worker subjectivity" as the highest value goal and rule-of-law principles as formal safeguards, so as to provide theoretical support and institutional tools for the protection of the rights and interests of workers in new forms of employment.

## 2. The Rider Crisis in the Era of Platform Algorithm Governance and the Dynamic Evaluation Methodology Response

Against the background of the era of platform algorithm governance, algorithmic technologies such as intelligent dispatch, real-time monitoring, and dynamic pricing are deeply embedded in the labor organization and process management of food delivery, profoundly changing the way riders' labor processes are organized, controlled, and evaluated. Platform algorithms' control over riders' labor processes is becoming increasingly refined and comprehensive. The algorithm-driven pace of labor is continuously accelerating under instant feedback mechanisms, and riders' autonomous space is being sharply compressed. Riders' performance evaluation standards are characterized by algorithmic black-box opacity in their design and exhibit dynamic opacity in their operation. This poses severe challenges to riders' labor rights protection and occupational safety, and seriously hinders the safeguarding and advancement of the basic labor rights and interests of flexible workers in the platform economy, a livelihood issue with broad social impact.

### 2.1. Challenges Riders Face Today

1. Challenges arising from algorithmic technology itself. The algorithmic black box, dynamic control, and automated decision-making are the three major characteristics that accompany algorithms, and they are also three major problems. Traditional labor law regards an employer's rules and regulations as the main vehicle through which workers understand their own rights and obligations[1] , requiring that rules and regulations directly involving workers' vital interests be formulated through democratic procedures and publicized to workers [2]. On this basis, workers can form reasonable expectations about working conditions, behavioral boundaries, and reward and punishment consequences, and enjoy a certain space for autonomous arrangement of specific working methods on the premise of complying with the rules and regulations[3]. Management behavior is carried out by managers in a hierarchical organization issuing instructions and exercising supervision in a person-to-person manner, and workers still have room for communication and negotiation when faced with unreasonable demands. At the same time, traditional labor law also establishes multiple relief channels for protecting workers' rights and interests[4], such as labor dispute resolution, labor inspection reporting, and trade union rights protection, on the premise that management behavior has traceable decision-making subjects and reviewable rule bases. However, when algorithms with essentially zero interactivity replace rules and regulations as the actual vehicle of labor management, the above three safeguards are no longer absolutely feasible.

The algorithmic black box deprives riders of basic knowledge of their working conditions. Under algorithmic management, the dispatch logic, pricing formulas, and reward and punishment parameters constitute a completely closed technical black box for riders. The algorithm's formation mechanism is extremely complex and concealed, and riders can only speculate about its approximate logic through the labor process. In addition, once the algorithm program is started and running, it lacks braking and correction mechanisms [1]. Riders receive dispatch instructions and assessment evaluations from the algorithm every day, yet have no way of knowing the specific rules of dispatch. Even if riders try to inquire, platforms often refuse to disclose them on the grounds of trade secrets. Even if the code were made public, riders would still be unable to truly understand its operational logic [5] .

The dynamic iteration and data-driven nature of algorithms deprive riders of substantive autonomy over their labor process. In traditional labor management, workers can autonomously arrange their work rhythm within the boundaries of rules. Algorithmic management transforms this entire logic into automated decision-making: riders' behavior is converted into data input in real time, and the algorithm continuously adjusts delivery time limits and dispatch strategies accordingly. More seriously, after the data generated by the various adaptation strategies that riders develop in practice are absorbed by the algorithm, they instead become the empirical basis for further compressing delivery time limits and refining performance standards[5], forming a vicious cycle in which workers participate but are powerless to stop. Some scholars have revealed the essence of this process: the "optimal efficiency" set by the algorithm is in fact an extreme demand within the scope of computational rationality aimed at forcing practitioners to continuously output the limits of their physical capacity [6] .

The automated decision-making and "dehumanized" operation of algorithms have deprived riders of effective remedial channels. Some scholars have summarized this phenomenon as "algorithms as institutions" [1] . When algorithms become the de facto rule-makers and enforcers, the ex post remedial channels established by traditional labor law for workers are systematically short-circuited by their technical architecture.

In summary, algorithm technology, through its black-box rule forms, self-reinforcing dynamic control, and automated unmanned decision-making, poses a threefold fundamental challenge to the protections riders should enjoy in the labor process: the protection of informed consent, the protection of autonomy, and the protection of remedies. Riders must obey rules without knowing them, are denied autonomy yet required to bear all risks, and find no accountable party to appeal to when their rights are infringed. The superposition of these three factors means that riders' labor conditions under algorithmic management have effectively lost the minimum protections presupposed by traditional labor law. This predicament is not caused by the special business model of platform employment, but is rooted in the operational logic of algorithm technology itself. Therefore, any institutional design that attempts to respond to this predicament must start from understanding the intrinsic characteristics of algorithm technology and construct a new evaluation framework capable of penetrating the black box, tracking iterations, and rebuilding humane discretionary space within unmanned decision-making.

2. The challenges of labor alienation and the dissolution of subjectivity in riders' labor process. In high-intensity physical labor, this problem is particularly prominent: workers' surplus energy has been squeezed dry, the space for thinking no longer exists, their bodies are disciplined into repetitive mechanical devices, and subjectivity tends to dissolve in unconscious repetitive operations. The emergence of labor alienation is rooted in the separation of workers from the means of production under capitalist private ownership. When workers lose control over the conditions of production,

labor no longer belongs to themselves but becomes a tool for capital valorization. In Marx's theory of technological critique, alienated labor is "a special type of objectification based on alienated labor that arises in capitalist private property relations" [7] . Private ownership constitutes the institutional root of alienation, and capital, through its exclusive possession of the means of production, transforms labor into an externally coerced alien activity. The delivery service provided by riders is the product, and the results of delivery services are appropriated by the platform. The data generated by riders in their labor is also collected by the platform, and data, as a digital labor product, is appropriated by platform operators and used by algorithms, thereby becoming an "alien force" [8] towering over workers. When riders make deliveries, the platform unilaterally sets rules through algorithms. Algorithms incorporate every link of the labor process into calculation and monitor it with strict standards. Once riders deviate from preset routes or exceed time limits, they face the risk of negative reviews, fines, or even reduced order assignments, and riders cannot resist the platform. Riders' labor should be conscious, free, and creative activity, but under the "more work, more pay" mechanism and survival pressure, riders seemingly "autonomously" extend working hours, yet in reality this is something they are compelled to do under the platform's priority rules and activity monitoring, and labor is reduced to a mere means of making a living. This infringes on riders' right to rest and labor autonomy, packaging "involuntariness" as "effort." For efficient management, the platform abstracts riders into data and, through "de-temporalized and de-spatialized" labor arrangements, disperses them into highly isolated work environments. Riders are de-socialized and atomized into "digital virtual bodies"[8] , and their sense of solidarity and cooperation is systematically weakened. Thus, riders' labor under algorithmic management is completely reversed from the self-realization of human essence to the deprivation of human essence, plunging workers into labor alienation.

Alongside the alienation of labor comes the dissolution of subjectivity. This is not a disruptive mutation that emerged only after entering the digital age, but an inevitable result of the industrial era's scientific management logic evolving from treating actual people as the subject of management to treating algorithms as the subject. Taylorism used a stopwatch to break down workers' movements, while algorithms use data to dismantle the entire delivery process. Compared with human management, algorithmic management can be said to be exhaustive in every detail. It can distill and analyze the labor detail data of every rider, fragmenting and homogenizing it [9], and use the analysis results for management to improve efficiency, giving rise to a new element of subordination: technological subordination. This kind of management can be summarized as the "6R" mechanism [10] , namely restrict, recommend, record, rate, replace, and reward. Every link from accepting an order to completing delivery is incorporated into the algorithm's preset track, and the extremely strong technological subordination within it means that riders' choices do not come from genuine self-reflection, but are very limited choices made within the limited scope of management determined by algorithmic data analysis. This also causes riders to spontaneously engage in "counter-algorithmic" behavior5 , such as violating traffic regulations, relay delivery under the same account, and privately transferring delivery orders. When faced with the two predicaments of real danger and algorithmic management, riders choose to obey the algorithm and place their personal safety in danger, whereas ordinary people of normal intelligence would avoid foreseeable danger as much as possible. From this it can be seen that under algorithmic management, autonomy is illusory, while the dissolution of subjectivity is real. The riders' formal flexibility, the so-called "autonomous login and free order acceptance," is in fact a flimsy cover-up of this substantive hollowing out of autonomy.

Employer algorithmic power, as the employer's mouthpiece, implements the subordination of technology into daily management practice. It has three characteristics: the concealment of command and orders, the decentralization of supervisory means, and the arbitrariness of disciplinary measures [1] . In traditional employment relationships, command, supervision, and restraint still needed to rely on visible institutional texts and interpersonal communication, whereas algorithmic management transforms all three into code logic, causing riders to unknowingly accept regulations even more rigorous than those in traditional factories, yet making it difficult for them to identify the source and boundaries of these regulations, and even more impossible to know the details of such restrictive rules. What is even more paradoxical is that the more efficiently riders deliver, the more the algorithm uses their data as a baseline to raise requirements for all riders, forming a self-accelerating closed loop—riders are both producers of data and objects of data backlash [11]. It is not only the algorithm that supervises riders' labor, or rather, the algorithm is merely the processor of evaluations. In fact, food delivery platforms assign the assessment of riders' work performance to consumers or customers, evaluating riders based on evaluations from multiple parties, and the evaluation results determine the nature and quantity of orders assigned. For example, active riders will have sufficient order volume during low-peak periods, while riders with lower ratings will have idle periods with no orders to deliver. This algorithmic labor discrimination is based on the employer's goal of maximizing interests, imposing unreasonable restrictions and reductions of interests on disadvantaged workers in the allocation of labor resources [12], ignoring the survival needs of riders with weaker working ability. On the other hand, the platform's deduction rules are as dense as a net, and the threshold for appeals is insurmountably high. Being three to five minutes late deducts half of the delivery fee for that order; being more than ten minutes late reduces the entire delivery fee to zero. Slow food preparation by merchants, hard-to-find residential compounds, heavy rain and traffic jams—the platform uniformly determines all of these to be the rider's responsibility, with no exemption mechanism whatsoever. Negative reviews and complaints are subject to indiscriminate heavy penalties—regardless of whether the negative review stems from the merchant's food taste, the customer's delayed pickup, or objective traffic congestion, a single instance results in a direct deduction of fifty to two hundred yuan; the evidence process for malicious complaints is cumbersome and lengthy, and nine out of ten appeals fail. For spilled or damaged food, or overturned soup, riders must fully compensate the customer's meal cost; failure to wear the uniform, failure to wear a helmet, or clicking "delivered" in advance incurs a fine of fifty to one hundred yuan per instance; absence from the station morning meeting, or stopping work without permission due to failure to secure a slot for temporary leave, results in forfeiture of the full attendance

bonus; voluntarily canceling an order (called "peiqu" in the industry) carries a maximum fine of five hundred yuan per instance. After a month of diligent running around, even if one is fortunate enough to avoid accidents, under layer upon layer of penalty rules, there may still be a huge gap between actual take-home pay and labor expended. Therefore, riders need "three ruthlessnesses": be ruthless in riding—running red lights, riding against traffic, taking shortcuts, and carrying six to eight orders at once; be ruthless about daily order-taking targets; and be even more ruthless with their own bodies—making do with bread for three meals, not daring to waste even one extra second on drinking water or using the toilet [11]This way of working that challenges the limits of the human body is riders' helpless adaptation under algorithmic management, and it is also ironclad evidence of the dissolution of riders' subjectivity.

3. The safety and health crisis and risk externalization challenge driven by algorithmically optimal labor time. Algorithms are not neutral efficiency tools; their essence is that the employer's algorithmic power dominates the operating logic of algorithms. This makes socially necessary labor time no longer suitable as the standard for judging riders' labor, replaced instead by algorithmically optimal labor time[12].. Such algorithmic efficiency standards comprehensively dominate the rhythm of labor, treating riders as tools, one-sidedly and rationally imposing optimal efficiency requirements without correctly reflecting social production and production relations, and carrying a strong flavor of machine controlism [13] . The impact of the two on labor differs enormously: socially necessary labor time is an objective scale naturally formed in long-term market competition practice and reflecting real productive forces and production relations, while algorithmically optimal labor time is a subjective algorithmic standard unilaterally set by platforms and continuously approaching the physical limits of laborers through data fitting. In other words, socially necessary labor time is a result constantly revised through long-term practice, in which laborers are treated as people rather than data; algorithmically optimal labor time is a conclusion calculated by algorithms combined with data under the idealized condition of maximizing labor output, carrying a slave-owner mentality and not allowing laborers to retain any spare capacity. This in turn makes riders' labor diffuse, and this diffuseness naturally breeds safety and health crises. Laborers' working hours and holidays are no longer fixed, and they may even be on call around the clock at any time; working hours are blurred, with no specific time periods or standards, making the right to rest difficult to guarantee. This diffuseness is not the product of riders' free will, but the result of carefully designed incentive mechanisms in algorithms: peak-hour premiums, continuous online rewards, and tiered incentives based on order volume [11] - these seemingly rewarding algorithmic designs in essence induce riders to continue working at moments when their bodies need rest. Riders appear to have the freedom to decide when to go offline, but under the pricing mechanism, income during off-peak hours is relatively insufficient. This institutional design constrains riders, making autonomous rest economically unfeasible. In order to obtain sufficient income and higher unit prices, riders have no choice but to frequently engage in prolonged physical labor during late-night and other periods when human natural rhythms dictate rest, which undoubtedly brings about safety and health crises.

Algorithmically optimal labor time is the direct driver of safety and health crises, while risk externalization is the institutional operation by which platforms strip crisis costs from themselves. In traditional employment relationships, employers bear the costs of workers' safety training, work injury insurance, labor protection equipment, and lost work time and compensation caused by work injuries, and these costs are incorporated into the enterprise's internal management costs. However, to reduce labor costs, the platform employment model has chosen an opposite path: platforms replace market transaction parties with internal administrative directives [14] through outsourcing and crowdsourcing cooperation models, deliberately avoiding standard labor relations, and from internal recruitment rules do not directly establish labor relations. Instead, by defining riders as "independent contractors" or practitioners in "incomplete labor relations" engaged in "cooperation," they use outsourcing and crowdsourcing models to externalize the safety management costs that traditional enterprises should have internalized into riders' personal expenditures - self-purchased insurance, self-provided vehicles, self-borne accidents. By this means, they have achieved "zero marginalization" of platform costs. This is precisely the institutional root of risk externalization: platforms have not eliminated safety management costs, but rather transferred these costs from their own financial statements into riders' personal burdens and society's public expenditures. Only a very small number of platform-exclusive full-time positions can enjoy complete five social insurances and one housing fund, and such positions account for less than 10% of all riders. Even if a traffic accident occurs during food delivery, causing injury and work stoppage, there is no base salary, no sick leave subsidy, and not a cent of income on the day of stopping work. Taking leave still requires competing for limited daily slots, and unauthorized work stoppage directly leads to order assignment restrictions and account bans11[12]. Labor safety and protection issues that should have been considered by the employer have been shifted onto the workers themselves because of the issue of labor relations definition, and at this point the platform has truly completed the operation of risk externalization.

## 2.2. Dynamic Evaluation Methodology Response

The purpose of using dynamic system theory is to determine the elements for evaluating algorithm reasonableness, and by observing the dynamic systemic movement of these elements, to flexibly conduct multi-angle scientific evaluation of algorithms, avoiding overgeneralization or one-sidedness. The elements are determined by analyzing algorithm logic and practical activities, and different elements are complementary and interchangeable. Having all elements present is not the only possible way to realize reasonableness, nor is it the only goal advocated by the evaluation system. Extreme data and high weight of one element may compensate for the deficiencies of weak elements to achieve reasonableness, and heterogeneous elements may exercise a "one-vote veto" over reasonableness. This flexibility is intended to enable the evaluation system to analyze issues specifically and develop as practice changes, with the ability to keep pace with the times and continuously innovate, get rid of rigid and stereotyped dogmatic practice, avoid one-size-fits-all algorithm corrections, and avoid gaming the evaluation through borderline technicalities and truly evaluate individual

cases scientifically. At the same time, elements are graded, and restrictions are adopted for basic algorithm evaluation and evaluation of the principled example [15] , framing the boundaries of the evaluator's discretionary power. It is precisely in this way that dynamic system theory strikes a balance between the two ends: it does not allow rigid constitutive element thinking to mechanically dissect rich and diverse life forms, nor does it allow vague general clauses to dissolve normative constraints by encompassing everything, thereby gaining the dual advantages of stability and openness. Accordingly, the author believes that the dynamic evaluation methodology has the following two functions for evaluating the reasonableness of algorithms used by food delivery platform riders.

First, specific analysis can be conducted on a specific individual algorithm. An overly fixed evaluation method will inevitably be unable to avoid using the current form of a mainstream algorithm as the benchmark, thus lacking fairness for individual cases, and the evaluation cannot be guaranteed to be scientific and objective. Second, it departs from a dogmatic absolute-standard evaluation model. In practice, to save human and material resources and unify standards, a series of fixed standards are often set for evaluation methods. Faced with an object such as platform algorithms, which are cutting-edge and rapidly iterating, a purely rule-based corresponding treatment can neither truly evaluate them nor adapt to development and change. Therefore, the use of the dynamic evaluation methodology combines the seriousness of standards with practical flexibility, adds "red-line elements," makes evaluation standardized, and also gives the evaluation system and its users room to conduct targeted scientific evaluation, while also allowing updates as the evaluated object group develops.

In summary, dynamic system theory has an important guiding role in the study of algorithm evaluation systems and is the living soul of the system.

# 3. Dynamic Evaluation System for the Reasonableness of Rider Labor Algorithms on Food Delivery Platforms

## 3.1. Algorithmic Transparency is a Prerequisite Evaluative Element

The essential consequence of algorithmic opacity is power asymmetry: the controller knows the full picture of the rules, while the controlled have no way to glimpse the norms that bind them. This information disparity is not an incidental byproduct of technical operation, but a structural feature of the employer's algorithmic power [16] . The fundamental purpose of algorithmic accountability is precisely to "pierce the veil of the 'algorithmic black box' and make the controlling subjects behind the algorithm bear responsibility" [17] . Conversely, before the veil is pierced, algorithmic power is a form of power that need not face accountability. Only rules that are precise, normative, and comprehensible [18] are conducive to production and management, and conducive to individual compliance and positive behavior. To prevent algorithmic power from constituting the technological alienation of labor, algorithmic system design should achieve transparency, informed consent, and explainability, which are also the three major elements of algorithmic transparency. Algorithmic transparency guarantees riders the right to know about the algorithm, the possibility of supervising unreasonable aspects of the algorithm, and is also the prerequisite of riders' autonomy of will in consenting to the algorithm's reasonableness. If the algorithm is opaque, evaluation of its reasonableness cannot even begin [7] . As an emerging economy, the platform economy's employment practices have the characteristics of "de-identification" and "decentralization." Such algorithms are in fact what the algorithmic, non-negotiated employer's unilateral communication expects [19]. Food delivery platforms use vague and unknowable algorithms to create a "barracks-style discipline" [20] , forcing riders to push themselves to drain all their labor power.

The right to algorithmic transparency is a right that riders deserve as managed subjects. Algorithmic management provides a high level of flexibility, autonomy, task diversity, and complexity [21] . In fact, it both optimizes the platform's management of riders, making order processing more efficient and generating more revenue, and allows riders to receive orders to the greatest extent possible in order to earn compensation, so both sides benefit. Algorithms should be subject-centered [22] , meaning that transparency does not require disclosing technical details or trade secrets to riders, but it must let riders know: what logic underlies order assignment, how timeouts are determined, how evaluations affect income, and how behavioral data is collected and used. The goal of this "substantive transparency" is not to satisfy technical curiosity, but to safeguard riders' basic cognitive capacity as labor subjects - only when people know what rules they are being evaluated and constrained by can they become conscious subjects of their own labor behavior, rather than passive executors driven by algorithms. The superficially loose management and internally strict control under algorithmic management [23] are mainly reflected in the invisibility of the content of algorithmic control, the invisibility of the manner of control, and the invisibility of the degree of control. The only solution is to dissolve the invisibility of the root cause, namely the "internal strictness." Making algorithmic rules transparent is the first step for riders to transform from atomized passive recipients into collective subjects capable of understanding their own situation and raising demands for improvement.

## 3.2. The Degree of Labor Autonomy is a Foundational Evaluation

If algorithmic transparency is evaluated through the algorithm itself of the platform, which is the Party A role in the labor relationship, then the degree of labor autonomy starts from the algorithmic management services provided by Party A and uses Party B's process of performing labor to reversely test the reasonableness of Party A's algorithmic management. The degree of labor autonomy distinguishes labor relationships from civil relationships and is the core dividing line between standard labor relationships and "incomplete labor relationships." The core of personal subordination emphasizes that the employer has control over the worker, and the worker's labor has the characteristics of personal performance, exclusivity, and altruism. Whether it is the subordination theory of the civil law system or the control standard of the common law system, the common core of judgment they point to is the degree of control exercised by the employer over the worker's labor process, and this is precisely the reverse expression of the degree of labor autonomy - the stronger the control, the weaker the autonomy;

the weaker the control, the stronger the autonomy. Some scholars, after comparing the two major legal systems, advocate supplementing the traditional subordination theory with the "control" standard [24], and the basis of their argument lies precisely in this: compared with abstract status subordination, the degree of labor autonomy can more accurately reflect the substance of the employment relationship. How much labor autonomy practitioners retain determines the legal characterization of their relationship with platform enterprises and whether the corresponding labor management is reasonable.

The core object of erosion by algorithmic control in the digital age is precisely labor autonomy, not anything else. Empirical research on food delivery riders reveals that digital control not only weakens riders' willingness to resist and erodes the space in which they exercise autonomy, but also makes them unknowingly participate in the process of managing themselves [25] . What algorithms impose on workers is an omnipresent yet formless socialized discipline, whose disembodied nature means there are no sanctioning measures and no form of authority appearing, so it cannot be resisted [26]. The impact of algorithmic management is concentrated precisely on the node of labor autonomy. It does not directly deprive labor remuneration or refuse to provide relief channels, but first implements hidden and deep control at the level of autonomous decision-making in the labor process. This control prevents riders from correctly evaluating the rationality of their labor. For this reason, evaluating the rationality of algorithmic management without first examining its impact on the degree of labor autonomy bypasses the most sensitive indicator.

At the theoretical level, the foundational positioning of the degree of labor autonomy drives the paradigm renewal of the subordination theory toward a return to its essence. The traditional subordination theory uses personal subordination, economic subordination, and organizational subordination as a three-dimensional analytical framework, which has strong explanatory power in factory-based employment during the industrial era. However, the de-organizationalization [27] , taskification [28] , and the flexible structure of "large platform + small front end" 24[25]in platform employment have simultaneously weakened or blurred all three criteria, causing the subordination theory to fall into a predicament of failure. Establishing the degree of labor autonomy as a foundational evaluative dimension does not mean abandoning the traditional three-dimensional framework, but rather returning to the essential core of the subordination theory - "subordination of the person," that is, the restriction of behavioral autonomy. The judgment criteria for technological subordination all revolve around labor autonomy, and this methodological path of using autonomy to govern specific judgment elements can enable the subordination theory to regain explanatory power and adaptability in the digital age. The reason why the degree of labor autonomy can assume the function of foundational evaluation is rooted in its position within the deep structure of the subordination theory: although the three dimensions of the subordination theory each have different emphases in expression, the object of judgment they collectively point to is precisely the extent to which workers have lost autonomous decision-making power over their own labor process. Personal subordination focuses on whether labor time, place, content, and method are unilaterally determined by the employer, and its essence is whether behavioral autonomy in the process of labor provision continues to exist; economic subordination focuses on whether income sources depend solely on a specific employer and whether workers bear business risks, and its essence is opportunity autonomy outside labor provision, that is, whether the substantive possibility of workers retaining the ability to make an independent living by leaving that employment relationship has been hollowed out; organizational subordination focuses on whether workers' labor provision is systematically integrated into another's production and operation organization, and its essence is whether purposive autonomy has been transferred. It is in this sense that the degree of labor autonomy constitutes the logical starting point and measurement benchmark of the entire algorithmic management evaluation system.

## 3.3. The Feasibility of Relief is a Process-Based Evaluation

The first connotation of the feasibility of relief is to achieve a reasonable prior allocation of risk at the level of algorithmic system design, clearly distinguishing the operational risks that should be borne by platform enterprises from the labor risks that should be borne by workers themselves, and preventing the former from being covertly shifted to workers through the technical architecture of algorithms. The application and intensification of algorithmic management has transformed the employer's direct management of workers into indirect management mediated by algorithms, and its direct consequence is that risks such as operational management and service quality, which should be borne by the employer, are shifted to workers. This risk shifting is particularly concealed in the design of algorithmic systems: platforms use algorithms to compress delivery times to physical limits, directly link customer evaluations to income without distinguishing the reasonableness of evaluations, and convert demand changes caused by market fluctuations into income uncertainty for workers. These practices are formally packaged as algorithmically neutral efficiency optimization, but in substance they convert commercial risks that should be borne by the platform as a business entity into individual labor risks for workers. And such operations are clearly unjust. The essence of this allocation of rights is that the platform, which should bear the obligation to control risks, controls the design of algorithmic rules and enjoys the market benefits brought by efficiency improvements, yet shifts safety costs onto riders and the public, resulting in a structural separation among control rights, benefit rights, and responsibility, constituting the unjust essence of risk externalization. It seems that rights should be allocated to the party that can bring about a greater total social product, namely the platform. The pursuit of efficiency should not come at the cost of systematically harming rider safety and public traffic safety. The employer's algorithmic power creates a technological power gap between labor and capital, and algorithms conceal the direct contradiction that should exist between labor and capital as an indirect contradiction between technical procedures and workers, thereby changing the balance of power between labor and capital and triggering the dual consequences of employers evading legal responsibility and the lack of protection for workers' rights and interests.

Looking at the issue of risk allocation from the perspective of riders themselves, the time, vehicle equipment, skill learning, and platform reputation accumulation invested in entering food delivery platform labor represent unrecoverable sunk costs paid by riders. The binding effect of these sunk

costs causes practitioners to effectively lose the ability to exit or negotiate with the platform on equal terms, and the platform then has the confidence to shift risks onto riders through algorithms. Under this structure, if the initial institutional design of the algorithm fails to fairly allocate risks between the platform and practitioners, subsequent individual remedies will face the fundamental dilemma of "unfairness at the source"—that is, every unreasonable burden borne by food delivery industry practitioners can be traced back to the initial misallocation of risk at the level of algorithmic institutional design. More seriously, due to the existence of the algorithmic black box, practitioners find it difficult even to detect the occurrence of this risk shifting. When delivery times are continuously compressed by algorithms, practitioners feel only an anonymous pressure from the algorithm, unable to identify that behind this lies the platform shifting onto workers the efficiency improvement costs it needs in market competition. Practitioners fall into the autonomy paradox of "subjectively autonomous while actually controlled in behavior." They believe they are autonomously choosing to work a little harder, when in fact they are complying with a risk allocation scheme already preset by the algorithm. Even if riders realize the unreasonableness of risk allocation in algorithmic management, they are forced to accept it because of the aforementioned sunk cost problem.

Based on the above analysis, the remedial requirements of the prior risk allocation system call for examining the rationality of algorithmic system design from the following three aspects. First, whether the labor standards set by the algorithm place practitioners in risks they should not bear. If the algorithmic setting of delivery time establishes standards based solely on extreme data, such as using the efficiency of the top-performing riders in historical data as the benchmark, while ignoring the physical limits of traffic regulations, the force majeure of weather changes, and the uncontrollability of merchants' meal preparation speed, then it essentially transfers the risks of traffic violations and personal safety to individual riders, and can be judged as unreasonable. The initial fairness of risk allocation requires that when the algorithm sets labor standards, it must strip external factors beyond the practitioner's control from the benchmark of efficiency assessment. Practitioners should bear responsibility only for the parts controllable by their own actions, namely their own active conduct, rather than serving as a backstop for all uncertainties in the entire delivery chain. Second, whether the punishment mechanism in the algorithm follows the principle of proportionality. The punitive measures imposed by the platform on practitioners through the algorithm, such as fines, demotion, reduced order assignment, and even account suspension, should be commensurate in severity with the nature and degree of the practitioner's fault, rather than treating "maximizing customer satisfaction" or "optimizing platform efficiency" as the sole, unconstrained optimization goal. Riders make a living by surrendering the right to use their labor, and their personal rights and the right to receive wages should take precedence over the employer's property rights [29] . When the algorithm's pursuit of management efficiency conflicts with riders' basic right to subsistence, the protection of the latter should be given priority at the level of algorithm design, because an unreasonable overtime fine is merely a tiny increment in the revenue stream for the platform, but for practitioners who sustain their livelihood on daily or per-order wages, it may be a decisive reduction in that day's income. Third, whether occupational injury risks are incorporated into the institutional framework of social security rather than borne by riders themselves. Some scholars have proposed the idea of "decoupling" labor relations from social insurance, meaning that occupational injury protection for practitioners should not be premised on the formal confirmation of a labor relationship, but should instead be incorporated into the structural arrangement of risk sharing at the initial stage of algorithmic system design, so that practitioners do not have to make an either-or choice between accepting all risks and giving up labor opportunities.

The second connotation of the feasibility of relief is ensuring that practitioners, when subjected to unreasonable algorithmic decisions in the course of their work, can initiate spontaneous relief through effective and efficient appeal channels. This requirement aims to address the opacity and unchallengeability of algorithmic decisions, enabling riders to have means to actively seek relief when they encounter unfair penalties. However, in the current employment practices of food delivery platforms, the greatest predicament riders face is precisely that when they encounter unreasonable overtime fines, erroneous negative-review penalties, or abnormal order-assignment restrictions, filing an appeal is extremely difficult: appeals are often processed slowly, and queuing is commonplace; whether an appeal can succeed also remains an open question. Under conditions where these preliminary questions cannot be answered, practitioners' appeals become blind. They can only express dissatisfaction, but cannot raise targeted objections.

Here it is necessary to particularly clarify a key categorical distinction: the core issue that spontaneous relief focuses on is the effectiveness of appeal channels, not whether riders understand algorithmic principles. The latter falls within the evaluative scope of algorithmic transparency, and the two have different connotations. Algorithmic transparency asks about cognitive-level issues such as how algorithms operate and the logic of their decisions, and its function is to provide practitioners with the informational premise for understanding and predicting algorithmic behavior; spontaneous relief, by contrast, asks whether, when riders believe an algorithmic decision is erroneous or unfair, they can initiate an appeal procedure within a reasonable time frame and at an affordable cost, and obtain an enforceable ruling. In other words, transparency addresses the issue of "knowing," while relief addresses the issue of "acting." Knowing algorithmic principles does not mean one can obtain effective relief when treated unfairly; conversely, even if practitioners know nothing about algorithmic principles, as long as appeal channels are unobstructed, review is independent, and rulings are efficient, their rights and interests can still be protected. Confusing the two can easily cause the evaluative function of relief feasibility to be obscured by issues in the transparency dimension, thereby making it impossible to independently examine the procedural justice quality of the appeal mechanism itself.

Based on the above distinction, a reasonable spontaneous algorithmic relief mechanism should satisfy at least three procedural standards.

First, the accessibility of appeal channels. Practitioners should be able to initiate appeal procedures during the labor process at the lowest time cost and economic cost. For platform practitioners whose main source of income is daily wages or per-order wages, the time cost of appealing is itself

a substantive barrier to entry. If initiating an appeal requires spending a large amount of labor time that could otherwise be used to accept orders and earn income, appealing in effect becomes a luxury right for riders. Therefore, the ideal state is to embed the appeal entry point into the labor operation interface of the platform software, so that practitioners can initiate an appeal with one click immediately upon receiving an adverse decision, rather than being required to convey it layer by layer through multiple customer service transfers, email exchanges, or offline channels. The accessibility of appeal channels directly determines whether the procedural character of relief can be realized.

Second, the independence of appeal review and the preservation of human review. Algorithmic decisions cannot be the sole subject of appeal review; algorithms cannot be both player and referee. In automated decision-making systems, scenario risk levels should be distinguished, algorithmic review mechanisms should be established, and human review channels should be preserved in decisions involving the major interests of practitioners, embedding discretionary human judgment to remedy the structural defect of algorithms lacking flexibility in specific situations [12]. The existence of human review not only corrects algorithmic errors at the level of individual cases, but also constitutes a check on algorithmic power at the institutional level. It sends a procedural signal to practitioners: the algorithm is not the final, unquestionable authority, and above the algorithm there still exists a human judgment mechanism to which one can "appeal." The independence of appeal review is the concrete implementation of algorithmic accountability at the procedural level. It forces the controlling subjects behind the algorithm to assume procedural obligations of review and error correction for their algorithmic decisions.

Third, the timeliness and enforceability of appeal outcomes. For food delivery riders who exchange single instances of labor for immediate income, delayed justice is practically equivalent to the absence of justice. A timeout fine wrongly deducted during the labor process, if corrected only weeks or even months later through the appeal procedure, has already caused irreversible negative impact on the practitioner's immediate livelihood. Even if the fine is eventually refunded, it cannot compensate for the chain of difficulties arising from the reduction in that day's income. Therefore, the design of the appeal mechanism should aim at "immediate relief during the labor process," compressing the processing time for routine appeals to a range that practitioners can bear. At the same time, automated correction and compensation mechanisms should be established for algorithmic decisions confirmed through appeals to be erroneous. Once an appeal is upheld, the corresponding fine should be refunded immediately, the erroneous negative review should be removed immediately, and improper order assignment restrictions should be lifted immediately, rather than waiting for the completion of another approval process.

### 3.4. The Degree of Subjectivity Development is the Ultimate Evaluation

In Volume 1 of Capital, Marx defines labor as a process between humans and nature, and points out that the fundamental characteristic distinguishing human labor from the instinctive activities of animals lies in purposeful will: "Before the labor process begins, the product of the labor process already exists ideally in the mind of the laborer." This assertion reveals the intrinsic connection between labor and subjectivity: labor is not only a means of livelihood, but also a subjective activity through which people realize their purposes and display their creativity. However, alienated labor breaks this connection: laborers are alienated from the products of their labor, from the activity of production, from the species-essence of humanity as conscious and free activity, and ultimately from other people. The essence of alienated labor is precisely the loss of subjectivity. The rider industry faces intense competitive pressure, the content of labor is monotonous, and the phenomenon of labor alienation is particularly prominent among the wage-earning class.

Some scholars hold that in labor, human beings possess inviolability, that is, people cannot be treated as objects, reified, or even subjected to inhuman treatment [30]. The International Labour Organization has proposed the concept of "decent work" [31], with the core connotation of "workers engaging in productive work under conditions of freedom, fairness, security, and human dignity." Evaluating whether the legal regulation of algorithmic management is successful cannot be judged only by whether explicit rights infringements have been curbed; more importantly, it must be judged by whether the implicit dissolution of subjectivity has been reversed, and whether laborers have been restored from a set of data back to laboring subjects with purposeful will [32] .

## 4. Conclusion

This study constructs a four-element dynamic evaluation system premised on algorithmic transparency, grounded in the degree of labor autonomy, safeguarded procedurally by the feasibility of remedies, and aimed ultimately at the development of workers' subjectivity. The theoretical significance of this system lies in its direct confrontation with the reality that digital technology, under the guise of neutrality, is replaying labor's subordination to capital: from Marx's revelation of the machine system dominating living labor, to Braverman's demonstration of the transfer of control over the labor process, to contemporary scholars' proposals of technological subordination, employer algorithmic power, and the paradox of autonomy, this theoretical lineage collectively points to one judgment—the mode of control has shifted from explicit status-based subordination to implicit algorithmic discipline, and workers' actual dominated condition is being dressed up as autonomy. The institutional function of the evaluation system lies precisely in using transparent rule awareness, an autonomous labor process, feasible remedial channels, and sustainable subjective development to restore workers from being a set of data back to being labor subjects with purposeful will. This is both the realization form of the working class's leading position in the micro labor process, and the intersection of the Party's goals and the people's right to pursue happiness in the labor field, as well as the concrete content of equality, justice, and the rule of law established by the core socialist values in digital labor scenarios. In the final analysis, labor protection has never been a passive intervention in market efficiency, but an active affirmation of workers' personal dignity; only when labor governance in the digital age uses institutions to constrain the logic of capital and uses evaluation systems to defend the value of labor can technological progress become a tool of liberation for workers rather than a tool of control.

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