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THE PRACTICAL LOGIC OF DIGITAL LABOR'S AUTONOMOUS IDENTITY UNDER TECHNOLOGICAL CONTROL

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ABSTRACT

Productive labor fundamentally aims to obtain the basic means of human survival. At its core, labor is a free and conscious practice activity aligned with human nature. However, modern platform systems, driven by technological advancements, implement mechanisms to monitor labor processes through strategies such as separating conception and execution, engaging in "algorithmic" games, and establishing customer evaluation systems. These mechanisms ultimately shape labor into an ideology of personal autonomy, concealing its true purpose of serving capital's pursuit of value enhancement and economic profit. In the era of the digital economy, overcoming the logic of capital and reconstructing individual ownership remains central to critiquing and transcending alienated labor. Achieving collective ownership of production resources such as digital technology and big data—shifting from private capital control to shared access—is the optimal choice for rebuilding individual ownership in the digital capital era. This transition not only helps to eliminate the alienation of digital labor and balance labor and capital justice but also enables human freedom, affirms human subjectivity, and offers a rational mode of existence for contemporary individuals.

KEYWORDS: *Digital Labor; Technological Control; Platform Systems; Autonomy; Logic of Capital*

1. INTRODUCTION

Production has been a central theme in classical social theory. In *Capital*, Marx elaborated on the "hidden abode of production", striving to uncover the oppressive and exploitative relations obscured within capitalist production processes, thereby revealing the actual conditions of production in capitalist societies. However, since the 1960s, with the rise of mass consumption in Western societies, theories centered on consumption have gradually replaced classical political economy's focus on production. In this historical context, consumption, as the natural derivative of production, has overstepped production to become the main historical theme, while production has been reduced to a necessary condition for achieving consumption. If this theoretical shift from production to consumption reflects the deindustrialization practices and societal transformations in Western societies—where the middle class ascended as the dominant social force—then the digital economy era presents a different landscape. The world is witnessing the emergence of a vast "super-net" of the Internet, accompanied by the rise of what might be the largest labor force of digital workers globally. Against this historical backdrop, Marx's theories on the working class and productive labor require refinement and development in alignment with contemporary themes. Exploring and examining the nature of productive labor in the digital economy era, as well as reconsidering and revealing the "hidden abode of production" within production settings and labor processes, are essential aspects of digital labor research. With continuous innovation in Internet and information technologies, the platform economy has experienced rapid growth both domestically and internationally in recent years. Due to relatively flexible and autonomous work schedules, coupled with the lack of restrictions based on education, gender, or class, ride-hailing and food delivery platforms have attracted a large number of workers. Ride-hailing platforms provide numerous employment opportunities and help address mobility issues for the public, while food delivery platforms similarly solve employment problems and save consumers significant time in dining. As key components of the sharing economy, these platforms enhance the efficient use of social resources, facilitate daily life for many, and foster new drivers of economic growth. However, the employment and organizational relationships between platform economies and their labor force differ significantly from those in traditional industries, driven by innovations in network technologies and socio-economic transformations. In the digital economy, the relationship between capital and labor has undergone profound changes compared to the industrial era, yet the fundamental dominance of capital over labor remains unchanged. Within new platform economic models, exemplified by ride-hailing and food delivery, capital utilizes data as a resource, the Internet platform as a carrier, and "digital labor" as a productive force. By influencing labor structures in the information society and reshaping value creation methods, capital exerts control over labor processes to ensure

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the orderly functioning of platform economies and secure the surplus value extraction that fuels capital accumulation. This paper examines the labor processes of ride-hailing drivers and food delivery couriers, as well as the operational procedures of platform systems, to elucidate the practical logic of autonomous identity in digital labor under technological control. By uncovering the control mechanisms within digital labor processes and the ideology of labor autonomy shaped by capital, this study aims to provide theoretical insights into labor governance in the digital economy.

2. SEPARATION OF CONCEPTION AND EXECUTION: DEPRIVATION OF CONTROL OVER THE LABOR PROCESS

According to the regulations of platform companies, ride-hailing drivers and food delivery couriers who meet certain conditions, such as age and driving experience, can join the platform system, after which the respective ride-hailing or food delivery applications are activated. Regardless of whether they are drivers or couriers, their labor processes—spanning from registration to their eventual exit—are broadly similar, as their work revolves around the internet platform system. The operational process appears simple, but the platform system not only monitors drivers' and couriers' labor processes in terms of time and space but also provides guidance on specific segments and routes of the delivery process. For instance, during the order acceptance phase, food couriers can use the platform's heat map of orders to determine specific areas for picking or waiting for orders based on regional demand. Crowdsourced couriers can flexibly decide whether to take orders based on the "cost-performance ratio" (e.g., distance and price), while team couriers passively accept orders assigned by the platform system. Ride-hailing drivers operate under two models: the "grab-order system" or the "dispatch-order system". In the former, the platform sends travel information to drivers within a certain radius, allowing them to grab the order autonomously; in the latter, the platform assigns an order to a specific nearby driver after complex calculations based on passenger information. While differences exist between the order acceptance processes of couriers and drivers, their subsequent workflows are largely uniform. During the food pickup phase, couriers can optimize their sequence of pickups based on the platform-provided estimated preparation times for orders. For delivery, the platform's routing and sequence suggestions help couriers save time and ensure accuracy and efficiency. Ride-hailing drivers, upon receiving an order, pick up passengers at designated locations and deliver them to their destinations via the platform's predetermined route. Throughout the service, drivers and couriers strictly adhere to platform guidelines regarding routes and behaviors, all while being monitored. An analysis of the platform system's operations and the labor processes of drivers and couriers reveals that digital labor under platform systems exhibits characteristics akin to labor control during monopoly capitalism, with strict technological control.

"The historical development of technology within capitalism has consistently functioned as a means of reproducing biopower, systematically regulating labor through social technological norms, procedures, and culture" (Fuchs & Mosco, 2017). In Marx's theory of technology, he delineates two types of technology: one as material artifacts concerning the relationship between humans and nature, and the other as social forms concerning relationships among humans (Grundmann, 1991; Chen, 2020). These two types correspond to two forms of technology applied in the labor process: first, the application of scientific technology in production, encompassing innovations in production or equipment technology; and second, the reorganization of the labor process, involving advancements in management technologies for workers. Marx's labor process theory reveals the dialectical relationship between reified technology and labor politics, emphasizing how technology becomes a tool for capital to control, exploit, and oppress laborers. The primary contribution of technology to the capitalist mode of production lies in improving labor productivity and advancing labor process management. Marx expounded on the transformation of capitalist production modes by examining changes in technological control. As Marx noted, "The revolution in the mode of production begins with labor power in manufacturing and with labor in large-scale industry" (Marx & Engels, 1995, p. 207). In the manufacturing era, craftsmanship dominated the labor process, with skilled workers independently completing tasks. Although capitalists implemented integrated production organizations and directly supervised labor, workers maintained control over production through the barriers formed by their private skills. Manufacturing labor exhibited vague technical divisions, granting workers relative autonomy over work pace and hours, enabling them to resist capitalists to some degree. Conversely, in large-scale industrial labor, automation accelerated worker specialization and refined technical divisions. "The principle of large-scale industry involves first breaking down each production process into its constituent elements, regardless of human hands" (Marx & Engels, 1995, p. 212). Machines replaced workers, seizing control of production tools, while natural forces supplanted human effort. Mechanized mass production dismantled the integrated organization of manufacturing labor, gradually stripping workers of control over the labor process. "The capitalist utilization of machinery fundamentally transforms the nature of labor and social labor itself. On one hand, it overcomes resistance to such trends; on the other, by subjugating previously inaccessible labor groups and displacing workers through machinery, it creates a surplus labor population, compelling them to conform to the rules imposed by capital" (Marx & Engels, 1995, p. 210). According to Marx, large-scale industry disrupts the fixation of labor and functions, generating worker mobility. The substitution of worker craftsmanship with machines eliminates distinctions based on age, gender, and other factors, thereby incorporating a vast number

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of children and women into the workforce under capital's direct domination. Technological innovation facilitates the acquisition of a controllable labor force for capital, exacerbating chaotic competition in the labor market under the pressures of unemployment crises, undermining workers' resistance, and worsening their living conditions.

As humanity transitions from the industrial era to the network era, societal and economic structures have shifted from tangible to virtual, embracing the digital economy. Correspondingly, labor forms and processes have undergone significant changes. Compared to the industrial production era, labor in the digital age exhibits new characteristics. Workers on various virtual platforms can choose flexible work schedules, appearing to enjoy greater "freedom" and "autonomy". For instance, platforms such as short-term rental services (*Airbnb*), food delivery platforms, and crowdworking systems (e.g., Amazon Mechanical Turk) attract numerous workers due to their flexible and elastic work modes. In recent years, the scale of workers participating in these platforms has grown annually (Katz & Krueger, 2019). However, the work state of virtual economy platform laborers is far from being genuinely free and autonomous. The capitalist profit motive remains unaltered within platform economies, instead manifesting through novel forms of infiltration and expansion. Capital's influence extends beyond controlling production labor processes, permeating circulation sectors such as ride-hailing drivers, food couriers, and delivery workers. According to Braverman, human labor possesses rationality and intentionality, granting it unparalleled adaptability. This adaptability not only enhances productivity but also increases surplus products. The multifaceted potential of human labor forms the basis for capital's expansion. Yet this inherent potential and uncertainty challenge capitalists: how can they maximize the quality and quantity of the purchased labor power? Thus, transferring control over the labor process from workers to capitalists becomes essential (Braverman, 1979, p. 54). Much like traditional industrial labor processes, the relationship between labor and capital in the platform economy remains relatively adversarial. From the laborer's perspective, they engage in the labor process; for capitalists, this process serves their profit-driven goals. In this antagonistic production relationship, the pressing question is how capital can realize the "full utility" of the labor power it purchases while simultaneously suppressing workers' resistance. Resolving these conflicts—balancing capitalist oversight with workers' autonomy—while maintaining stable labor relations and order is a critical and complex challenge in digital labor process theory. Drawing from Marx's analyses of the production process and structural changes within industrial capitalism, American economist Harry Braverman systematically explored the impacts of technology on job nature, worker psychology, class composition, and organizational forms during the era of monopoly capital in *Labor and Monopoly Capital*. Braverman expanded Marx's concept of reified technology, asserting that technological control not only applies to innovations in production machinery but also to the reorganization of production processes and labor management. Applying Braverman's theoretical framework to the labor processes of food couriers and ride-hailing drivers reveals significant insights. Braverman argued that early systems like household labor and subcontracting were transitional phases in which capitalists did not yet assume direct managerial roles or control over the labor process, contradicting the capitalist ethos of full exploitation. He identified the "free labor contract" as a prerequisite for capitalist relations. For capitalists, every moment of non-productive time among wage laborers represents a loss. Thus, labor processes under such contracts must maximize productivity while imposing the capitalist will on workers (Braverman, 1979, p. 63). Consequently, refining managerial methods to organize and control labor processes with greater precision becomes critical.

Today's ride-hailing and food delivery platforms exemplify capital's understanding of these dynamics. To maximize value extraction, platforms meticulously regulate the labor processes of vast driver and courier networks, ensuring compliant and orderly labor aligned with capital's objectives. Examination of their organizational strategies reveals adherence to Braverman's principles of Taylorism: (1) Separation of Labor Process and Worker Skill. Labor processes are decoupled from workers' crafts, traditions, and knowledge (Braverman, 1979, p. 104). In the labor processes of drivers and couriers, platforms collect and process data on delivery times, rider speeds, customer tolerance for delays, complaints, and ratings. Using algorithms, platforms aggregate these data points to calculate optimal routes and schedules, presenting drivers and couriers with precise instructions. This delegation of brainwork from workers to centralized "managerial" platforms ensures that labor relies entirely on the platform system's planning, not the worker's expertise. By deskilling drivers and couriers, platforms strengthen control over labor. Humans differ fundamentally from animals in their ability to separate the conceptualization and execution of tasks. However, as human labor becomes a social phenomenon, concept and execution can be divided, unlike animalistic instinct-driven action. Capitalists exploit this trait, reducing labor processes to mechanical, purpose-devoid actions. Workers detached from task conceptualization cannot optimize efficiency or work at a pace dictated by capital's profit motives. (2) Principle of Conceptual and Executive Separation. In capitalist wage relations, laborers sell their time to secure basic subsistence and relinquish autonomy over how their time is used. "Not only does capital belong to the capitalist, but labor itself becomes part of capital. Workers lose control over their tools and must surrender authority over their labor and its methods" (Braverman, 1979, p. 108). Similarly, platform systems dictate drivers' and couriers' working methods because equipping them with system knowledge would challenge capital's authority. Following Taylorist principles, platforms do not intend to enhance workers' knowledge or societal status. Instead, platforms aim to minimize training needs and increase output, thus reducing costs. Platforms encode constraints through symbolic systems such as automated task allocation, customer reviews, delivery schedules, and route planning. Drivers and couriers

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who deviate from these standards face penalties such as reduced ratings, diminished rewards, or fewer future assignments. (3) Systematic Pre-Planning and Calculation. In traditional management, workers relied on their expertise to determine the best ways to accomplish tasks. In modern scientific management, managerial departments outline detailed plans and instructions for workers, dictating both tasks and tools (Braverman, 1979, p. 110). Platform systems similarly analyze and compute data, not only to provide optimized guidance but also to strictly regulate workers' time and spatial movements. For example, by using data on traffic congestion, traffic lights, and road conditions, platforms determine the most efficient delivery routes to enhance customer satisfaction.

"If the first principle is to gather and develop knowledge about each labor process, and the second principle is to make this knowledge exclusive to management, leaving workers without it, then the third principle is to use this monopoly on knowledge to control every step and execution of the labor process" (Braverman, 1979, p. 110). Guided by these principles, modern platform systems separate the mental and manual labor of drivers and couriers, stripping them of control over the knowledge and skills embedded in the platform systems. Workers thus cease to be artisans, becoming instead "living tools of the managerial system" (Braverman, 1979, p. 124). The platform system functions as a tool for capital accumulation, not only improving productivity but also depriving drivers and couriers of control over their work. Through numerical control under technological oversight, drivers and couriers complete delivery tasks step-by-step, adhering to algorithmic procedures. This automated process demands minimal skill from workers, and the post-industrial gap between laborers and digital platforms fosters compliance with platform control, unlike the stronger resistance found in handcraft laborers of earlier industrial settings.

In summary, the technological control in platform systems bears striking similarities to labor organization and management in industrial automation. Platform systems uphold the principle of separating conception from execution, with the system itself functioning as the managerial entity and drivers and couriers acting as workers. Throughout the labor process, the platform system handles task assignments, route planning, time calculations, spatiotemporal monitoring, and performance quantification, reducing drivers and couriers to mere tools that sustain platform operations and fulfill capital's pursuit of value appreciation.

3. IMPLEMENTING "ALGORITHMIC" GAMES TO ENHANCE WORKER AUTONOMY AND SHAPE MECHANISMS OF CONSENT

While Marx and Braverman highlighted the technological despotism inherent in capitalist labor processes through their analyses of technology types, Burawoy, through his examination of worker autonomy, shed light on the scientific and technological hegemony in capitalist labor processes. Following Marx's method of political economy, Burawoy conducted field studies at Chicago equipment companies, where he analyzed piecework and "making out" games, arguing that the coupling of surplus games with internal labor markets and the internal state under structured domination shaped a consent mechanism within the working class.

Surplus games altered work organization to emphasize individualism, loosening certain managerial controls, such as part inspection and wage rate challenges, and increasing opportunities for shop floor bargaining and variation in piece-rate systems, thereby enhancing individual performance, effort, flexibility, and personal agency (Burawoy, 2008, p. 84). These games provide workers with opportunities for skill-building and personal expression. Surplus pay is not the primary motivation for participating in these games; rather, "the exercise of knowledge, skill, ingenuity, speed, and perseverance contributes to the excitement of the game and the pleasure of a 'successful completion'" (Burawoy, 2008, p. 92). As an identity mechanism, surplus games foster worker autonomy, unleash labor potential, and create a sense of "consent" to exploitation, masking the reality of workers being controlled by machinery and subjected to exploitation.

However, in the digital economy, the locus of control over labor processes has shifted from traditional factories and machinery to digital platforms. A significant characteristic of platform systems in managing human resources and evaluating performance is their use of software algorithms in place of human managers. The success of this substitution lies in the platform system's ability to establish a systematic evaluation and rating system for couriers' work practices. Based on factors like delivery volume, timeliness, and customer feedback, the platform constructs a "differentiated hierarchy" evaluation framework, upgrading it into a gamified system. Couriers of varying performance levels are rated differently, and to maintain a higher rating, couriers work tirelessly through the city streets, unable to disengage. "The game arises from workers' own initiatives to find ways of enduring subordination in the labor process, but it remains controlled, and when necessary, enforced by capital" (Burawoy, 2008, p. 93). As couriers' experience accumulates, the higher their rating, the greater the pressure they face in the following work cycle to maintain that rating. Through gamification, the courier is embedded within the platform's organizational framework, seamlessly merging the company's capital management with the courier's self-fulfillment. Ultimately, algorithmic exploitation by the platform gains legitimacy through the guise of gamification. Couriers become absorbed in the platform's operational mechanisms, and labor quotas are continuously met within this incentive structure.

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Platform incentive rules significantly boost drivers' and couriers' motivation, extend online labor time, and increase order acceptance. Driven by the incentive to "meet the order quota and earn bonuses", couriers unconsciously exert more effort, and the gamified environment adds enjoyment to their labor. "The difference between 'making out' and not is measured not in the few cents we earn in bonuses but in our sense of prestige, accomplishment, and pride" (Burawoy, 2008, p. 96). The transparency and openness of platform transaction rules and compensation systems stimulate driver and courier participation, fostering the positivity and fairness of "earning more by working more", which reinforces acceptance of platform operational norms. "We did not jointly decide what the rules of making out should be; instead, we are compelled to play this game and then go on to uphold its rules" (Burawoy, 2008, p. 99). The hierarchical management model for workers, or "calculated workers", as Gillespie terms it (Gillespie, Boczkowski, & Foot, 2014, pp. 167-194), is strengthened through platform algorithms, making organizational management more granular and turning digital labor into a calculable operational process. "Gamified and differentiated management mechanisms also shape an ideology of the 'worker entrepreneur'" (Sun, 2019). The hierarchical elevation in the platform system becomes a primary basis for drivers and couriers to assess the significance of their labor and the realization of self-worth. In digital capitalist labor processes, the gamified incentives and the platform's organizational management mechanisms complement each other. On one hand, capitalists use gamified incentives to grant digital laborers relative autonomy, thus motivating labor and enhancing individual agency. On the other hand, the platform's systematic regulatory mechanisms and normative recognition construct an ideology of "community of interests" that builds worker consent, mitigating class consciousness and resistance. As Upadhya suggests, "the spread of entrepreneurialism and individualism is one of the significant manifestations of postmodernization in technological capitalism" (Upadhya & Vasavi, 2006). Platform companies replace authoritarian control with structured designs and incentive plans, cultivating individualism and shaping a consent mechanism among workers. This fosters organizational control over digital labor, masking capital's exploitation and its pursuit of surplus value.

4. ESTABLISHING CUSTOMER EVALUATION SYSTEMS TO CONSTRUCT LABOR PROCESS MONITORING MECHANISMS

From setting wage levels and standards for rewards and penalties to methods of labor supervision, platform systems exert significant control over labor processes. A key means of monitoring labor quality within platform systems is by directly linking customer ratings to the earnings of digital laborers. Unlike traditional employment relationships, which rely on command-and-control systems, platform systems utilize a "digital reputation" mechanism to guide drivers' and couriers' work processes, ensuring efficient performance management. "Quality control can itself be crowdsourced to customers or other crowd workers, leveraging collective wisdom to determine each worker's performance level" (Prassl & Risak, 2015).

While platform models may differ, the basic approach is consistent. On both ride-hailing and food delivery platforms, after each completed transaction, the platform encourages customers to provide a star rating for the service, ranked from 1 to 5 stars. Higher star ratings indicate higher customer satisfaction and correspond with higher order rates for drivers and couriers. Customer ratings impact drivers' and couriers' reward performances and future order rates. High ratings, particularly in terms of order completion rate, are favored by customers and platform systems alike, making it easier for workers to secure future orders and receive more dispatches from the platform. The strong pursuit of high star ratings drives drivers and couriers to refine their service and invest in emotional labor, defined as "managing one's emotions to create positive verbal, facial, and bodily expressions" (Sun, 2019). For instance, couriers seeking high ratings may use polite, courteous, and friendly language when interacting with customers and express gratitude after completing orders. Ride-hailing drivers may improve their working environment by adjusting air conditioning, music, and providing amenities like tissues, chargers, and bottled water, responding positively to customer questions. Platform algorithms continue to refine labor discipline, emphasizing standardized and formalized service differences. Throughout the labor process, drivers and couriers transcend anonymous relationships by performing emotional labor. With algorithmic precision, platform systems increasingly normalize and rationalize emotional labor, further implementing labor discipline among platform workers.

The rating mechanism of platform systems is not only a critical tool for disciplining digital laborers but also an effective means of redirecting conflict between capital and labor. Whether a driver receives high star ratings from customers directly influences the intensity of their future workload. A one-star rating might require numerous five-star ratings to counterbalance its effect. If drivers fail to work diligently to offset poor ratings, their next phase of rewards and dispatch metrics will be seriously impacted. Failure to address low ratings may lead to deductions in rewards or even a portion of base pay. If ratings fall below a certain threshold, the driver's platform account may be deactivated, ultimately leading to a negative cycle in work conditions. "Platform systems use star ratings as a tool for enforcing specific rules, much like employers exert control over termination decisions" (Aloisi, 2016). This strict rating mechanism places drivers under constant evaluation. Under the "incentive" of continuous rating, drivers exhaust themselves to maintain high performance. While star ratings may seem based on customer assessment of service quality, this evaluation mechanism effectively

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redistributes managerial authority and redirects conflicts between capital and labor. Platform companies rely on customers' natural awareness of service quality to supervise and monitor drivers' and couriers' performance, thus shifting attention away from the company's control. In this monitoring mechanism, drivers and couriers bear the consequences of low ratings caused by external factors, such as system errors causing delays or passengers' personal moods, which can lead to conflicts between the worker and the customer. In this way, platform companies achieve comprehensive oversight of labor processes with minimal management costs, subtly transferring the burden of conflict onto digital laborers and customers, effectively masking the capital-driven exploitation and pursuit of surplus value.

5. CONCLUSION

In the context of the digital economy, technology has formed new alliances with capital, placing digital laborers in a modern work environment where they unknowingly relive the conditions faced by industrial-age workers. Technologically driven labor obscures the fundamental nature of digital laborers' existence, masking the call for labor justice within digital labor processes and, in doing so, reveals the inherent limitations of technological advancement itself. Under the dominance of capital logic, technology intensifies labor, leads to subjugation, and exacerbates the impoverishment of producers. In this regard, the development of science and technology should be rooted in the fundamental values of supporting human survival, growth, and prosperity. Achieving universal access to scientific knowledge, big data, and other means of production is a prerequisite for realizing the human-centered value of technology. In the digital economy era, the collective ownership of technological resources is essential to securing human freedom, affirming individual agency, and offering contemporary individuals a rational way of life.

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