The Algorithmic Assemblage: Artificial Intelligence, Real Subsumption, and Labor Contestation in the Global Fashion Supply Chain

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Abstract

This paper critically examines the penetration of artificial intelligence (AI) in China's fashion supply chains through the dimensions of culture, labor, and ethics. It argues that AI integration is not merely technical but a socio-technical process reshaping capital labor relations. Culturally, AI redefines "Made in China" from cheap labor to algorithm-driven intelligent production, aligning with national upgrading narratives. At the factory level, AI-enabled "small-order, quick-response" models, typified by ultra-fast fashion, create a new "Digital Taylorism" that digitizes market pressure, intensifies labor, and extends working hours. Yet workers adapt and resist through daily strategies, revealing agency within constraint. Ethically, brands employ AI-driven transparency discourses as "performative ethics," masking structural contradictions and labor rights violations. The study concludes that ethical reflection must move beyond corporate-led initiatives, scrutinize algorithmic power in production, and advocate co-governance frameworks with worker representation in technology design and oversight.

1 Introduction: The Promise of Algorithms and Its Paradoxes

In the landscape of 21st-century global manufacturing, artificial intelligence (AI) is being hailed as the driving force of a profound revolution, especially in the fast-paced and ever-changing fashion industry. Industry reports, technology forums, and business media have collectively constructed a narrative filled with technological optimism: AI will completely solve long-standing problems in the fashion supply chain such as inefficiency, inventory backlog, and resource waste. In this narrative, AI, through precise demand forecasting, automated inventory management, and intelligent production scheduling, can help brands "achieve a real-time balance between product supply and consumer demand," thereby creating an "intelligent and flexible all-industry ecosystem." This data-driven agility is seen as the key for enterprises to gain a decisive competitive advantage in the global market. AI is not only viewed as a tool for improving efficiency but also depicted as the core engine driving the industry toward a more sustainable and resilient future.

However, beneath this blueprint of a "beautiful economy" woven by algorithms lies a profound paradox. As the "intelligence" of the supply chain increases, the labor conditions at its production end do not seem to be "civilizing" in tandem. It is precisely the ultra-fast fashion giants, praised as paragons of AI-driven supply chains, whose supplier networks have repeatedly exposed serious violations of labor rights. This phenomenon of coexisting "intelligence" and "exploitation" compels us to question the mainstream discourse of efficiency. Does the intervention of AI solve problems, or does it reconfigure them in a more complex and insidious form? The core argument of this paper is that the integration of AI into the China-centric fashion supply chain is not a neutral process of technical optimization but a profound sociotechnical transformation that unfolds simultaneously across cultural, labor, and ethical dimensions. This paper aims to transcend the narrow perspective of viewing AI as a mere efficiency tool, employing theoretical frameworks from cultural studies and critical labor studies to analyze the complexity of this phenomenon.

To achieve this goal, this study adopts a critical case study method, focusing on the ultra-fast fashion sector as a quintessential example of AI integration into manufacturing. This research design allows for an in-depth, concrete, and contextualized examination of a specific real-world subject to reveal broader theoretical issues. The analytical method of this study is Critical Discourse Analysis (CDA). CDA is not just a research method but a theoretical-analytical framework aimed at studying the relationship between written or spoken language and its social context. Its core objective is to understand, expose, and ultimately challenge how the abuse of social power and inequality are enacted, reproduced, legitimized, and resisted through text and discourse[1, 2]. Therefore, CDA provides a crucial theoretical lens for the core contradiction of this study—the coexistence of "intelligent" discourse and the reality of "exploitation." It enables us to view the "intelligent" supply chain discourse itself as a productive force that actively manufactures legitimacy and conceals its structural contradictions.

The sampling of textual materials for this study follows the principle of oppositional analysis in CDA, specifically divided into two groups. The first is the "Discourse of Optimization and Ethics" text corpus, which includes official discourses constructed at the corporate and national levels regarding technology, efficiency, and ethics. Specific sampled materials include publicly released corporate sustainability reports, supplier codes of conduct, modern slavery statements, and national-level industrial policy documents. The second is the "Discourse of Material Reality" text corpus, which contains texts that reveal the material reality on the production front line, primarily sourced from in-depth journalistic investigations and independent reports from non-governmental organizations (NGOs) on labor practices.

The analytical coding process of this study follows the analytical framework of CDA founders such as Norman Fairclough and Teun A. van Dijk[1, 2]. The process begins by coding the "Discourse of Optimization and Ethics" text corpus to identify key discursive strategies (such as lexical choices, modality, active-passive voice transformations, etc.) to reveal how they construct a technologically advanced and socially responsible corporate image. Subsequently, the analysis of these discursive strategies is systematically juxtaposed and contrasted with the empirical evidence from the "Discourse of Material Reality" text corpus, thereby revealing the disjuncture and contradictions between the two. This methodological design enhances the reproducibility of the study and allows the ideological function of the discourse to be clearly presented.

We acknowledge the limitations of this method, which relies on secondary data, the main one being the inability to directly present the firsthand voices and experiences of workers. However, this methodological choice is not one of convenience but a necessary strategy to achieve the core critical objectives of this study. An ethnographic study might provide profound insights into the internal dynamics of a specific factory, but it would struggle to capture and analyze the structural contradiction between a multinational corporation's globally constructed public discourse and the widespread labor realities within its vast and highly opaque supply chain. The unique contribution of this study lies precisely in the systematic juxtaposition and analysis of these two levels—discursive production and its material consequences. Through the

triangulation of multi-source secondary data, this study aims to reveal the operational logic of algorithmic power in production relations and to set the agenda for future in-depth field research in this area.

This paper will argue that, first, AI is becoming the core driving force reshaping the cultural connotation of "Made in China," transforming it from a symbol of a "world factory" with cheap labor to a symbol of technological capability led by algorithms. Second, on the production front line, the AI-driven business model has given rise to a new "Digital Taylorism," which, through an opaque algorithmic management system, directly transfers market uncertainty and speed pressures onto the workers' bodies, leading to an unprecedented intensification of the labor process. Third, the "supply chain transparency" promoted by brands is largely a form of "performative ethics"; its technological narrative, while constructing a responsible corporate image, also conceals the inherent ethical contradictions of its business model. Through this multi-level analysis, this paper hopes to provide a more critical and humanistic perspective for understanding the intricate relationship between technology, labor, and globalization.

2   Reshaping "Made in China": From Labor Power to the Algorithmic Subsumption of Labor

The application of artificial intelligence in China's fashion industry is not just a technological upgrade but a profound cultural reshaping. To understand the full significance of this transformation, it must be placed within the complex and dynamic history of the "Made in China" label itself. This paper argues that the AI-driven transformation is not a simple linear transition from "labor power" to "data power," but a more profound structural change: capital, through algorithmic technology, achieves a more thorough "real subsumption" of the labor process.

2.1   "Real Subsumption" in the Digital Age: A Theoretical Framework

To precisely grasp the role AI plays in production relations, it is necessary to introduce Marx's distinction between the "formal subsumption" and "real subsumption" of labor by capital. In the first volume of *Capital* and its unpublished sixth chapter draft, Marx elaborated on this core concept[3]. "Formal subsumption" refers to capital appropriating surplus labor by merely turning producers into wage laborers without altering the existing labor process (such as traditional craftsmanship), primarily by extending the working day to extract absolute surplus value[4]. In contrast, "real subsumption" occurs at a higher stage of the capitalist mode of production, where capital is no longer content with merely controlling the products of labor but begins to actively and systematically transform the labor process itself. By introducing new technologies, scientific management, and detailed division of labor, capital reshapes the labor process from the inside out into a form most suitable for capital accumulation, thereby extracting relative surplus value by increasing labor productivity[3]. The classic example is the Fordist assembly line, which completely changed the way cars were manufactured, stripping workers of their skills and autonomy and subordinating them to the rhythm of the machine.

However, in applying this classic theory, one must be wary of reducing it to a rigid historical periodization. As criticized by the Endnotes school in their article "The History of Subsumption," treating "real subsumption" as a fixed historical stage can lead to an abstract, schematic view of history that ignores the complexity and unevenness of capitalist development[5]. Therefore, this study does not use "real subsumption" as a label for a historical period but as a process-oriented analytical concept to describe how capital, with the help of algorithmic technology, achieves a new and deeper level of control over the labor process.

In the digital age, algorithmic management systems constitute a new form of "real subsumption." An algorithm no longer merely supervises a predetermined workflow; it designs and reorganizes the work-

flow in real-time and dynamically. It breaks down complex production tasks into minute, quantifiable instructions, distributes them in the most optimized manner, and continuously monitors and evaluates the execution process. The pace, content, and intensity of the labor process are no longer determined by the worker's skill or the foreman's experience but are dominated by the algorithmic logic that serves the goal of capital accumulation. Thus, the intervention of AI does not mean the "replacement" of labor but its deeper and more refined "re-subsumption" under a new technological paradigm. The characteristic of this "re-subsumption" is its dynamism and continuity: algorithms enable capital to constantly reshape and optimize the labor process at an unprecedented speed, thereby transforming "real subsumption" from a relatively static structural change (like the introduction of the assembly line) into an ongoing, dynamically adjusting micro-process.

2.2   A New Cultural Signifier: "Algorithmic Agility" as National Capital

The cultural connotation of the "Made in China" label has undergone a dramatic transformation, from a symbol of exquisite ancient craftsmanship to a byword for cheap, low-quality goods under the "world factory" model of the late 20th century. In response to this predicament, the Chinese government has promoted a top-down strategic shift from "Made in China" to "Created in China." The "Made in China 2025" plan is its core manifestation, aiming to establish China as a "world-class technology and design center." In this grand narrative, AI is given the role of the core driving force for creating a new generation of manufacturing systems "enhanced by artificial intelligence," with the textile and apparel industry, as a cornerstone of people's livelihood and an important export sector, being a key part of this digital transformation.

The business model represented by ultra-fast fashion e-commerce platforms like SHEIN provides the most persuasive practical example of this transformation. Its pioneering "on-demand production with small orders and quick response" model uses AI to capture fashion micro-trends in real-time and pushes small-batch orders to the market in extremely short cycles (7-11 days). This capability is injecting a brand-new cultural signifier into "Made in China": algorithmic agility. This new narrative successfully reshapes the competitiveness of "Made in China" from a reliance on a vast and cheap labor reserve to a reliance on its ability to process massive amounts of data and its efficient algorithmic models.

This discursive substitution from "labor power" to "data power" cleverly shifts attention from the specific laborers in the production process to the abstract, clean, and futuristic concept of "technology." Behind this discursive shift is a powerful symbiotic relationship between the grand strategy at the national level and the business practices at the corporate level. The state needs companies like SHEIN to demonstrate the success of its technological upgrading strategy, thereby building technological confidence on the global stage. In turn, these companies gain legitimacy and development momentum from the state's advocacy and support for technological innovation. This synergy produces a powerful ideological effect: while celebrating technological marvels, it strategically places the labor process that underpins this miracle in the shadows.

However, this discursive shift conceals a fundamental fact: the rise of data power does not mean the obsolescence of labor power but marks the stricter and more precise subordination of labor under the command of algorithmic capital. Data power is not a substitute for labor power; it is an amplifier and multiplier of capital's power over labor. An algorithm that can predict fashion trends is worthless without highly flexible workers who can withstand extreme pressure to sew design sketches into garments in a very short time. Therefore, this is not a linear substitution of two forms of power but a new, deeply entangled composite form.

3   The Algorithmic Factory: Digital Taylorism and Labor Contestation

If AI is reshaping the cultural narrative of "Made in China" at the macro level, then at the micro level of the factory floor, it is reshaping the labor process itself in a more direct and harsh manner. By introducing the theoretical framework of "Digital Taylorism," we can reveal that the efficiency revolution of the AI-driven supply chain comes at the cost of an unprecedented intensification of labor control. However, the factory is not a place where power is exercised unilaterally but a "contested terrain" full of contradictions and tensions, where workers' agency is suppressed but continues to resist in various forms.

3.1   Algorithmic Management as a Mechanism of Real Subsumption

"Digital Taylorism" is the extension and upgrade of Frederick Taylor's scientific management ideas in the digital age. It uses digital technology to standardize, decompose, quantify, and monitor the labor process with unprecedented breadth and precision. Its core tool is "algorithmic management," which is the "delegation of management functions to algorithms." In this model, task allocation, work pace setting, performance evaluation, and even rewards and punishments are all decided by an automated system based on real-time data. Workers are no longer commanded by human supervisors but are subject to an opaque, continuously running, and seemingly objective and neutral algorithmic system. International research by scholars such as Wood et al. clearly points out that algorithmic management, by automating the guidance, evaluation, and discipline of the workforce, is reshaping traditional forms of work organization, especially in platform work and logistics industries[6].

The "small-order, quick-response" model of ultra-fast fashion giants is a perfect example of Digital Taylorism. This model, through an AI-driven demand forecasting system, generates thousands of small-batch, short-cycle orders and distributes them to a highly competitive supplier network managed by algorithms. The retention of suppliers is not determined by long-term cooperative relationships but by a strict data-driven KPI system, which includes key indicators such as the "on-time delivery rate for urgent orders." The system ranks suppliers based on their scores, and the bottom-ranking 30% are eliminated. This system creates a relentless, automated "survival of the fittest" mechanism that transfers immense speed and cost pressures unreservedly to the very end of the production chain. The impersonal nature of this management style provides an effective mechanism for companies to evade labor responsibilities. When an algorithm makes a decision such as firing a worker or deducting wages, the company can claim "the computer did it," transforming labor disputes into technical or commercial issues that are difficult to appeal, thereby evading accountability.

3.2   The Contested Terrain: Worker Agency and Everyday Resistance

Although algorithmic management constructs a "panoptic" factory landscape where power is omnipresent, viewing workers as passive recipients of algorithmic pressure would overlook the complex reality of the labor process. A large body of labor sociology research has long proven that workers are not "robots" passively executing instructions; they possess agency and continuously engage in overt or covert negotiation and resistance. In the context of algorithmic control, this agency has not disappeared but manifests in new forms. This dynamic game between control and resistance is not a simple binary opposition but a relationship of "co-evolution." Platforms deploy algorithms to strengthen control, and workers develop counter-strategies; the platform then updates the algorithm to patch loopholes, and workers are forced to find new ways to cope[7]. This "tug-of-war" shows that the "real subsumption" of the labor process is not a one-off, static result but a continuous and contradictory process of struggle.

Drawing on research on gig economy workers who also face algorithmic management, we can roughly categorize workers' resistance strategies, revealing cross-industry commonalities. The most common form

is individual and covert resistance, or "gaming" the system, which aims to gain more autonomy or income for the individual. In the context of China's gig economy, numerous ethnographic and qualitative studies have documented the rich strategies of food delivery riders for "gaming" the algorithm[7]. For example, riders might exploit system loopholes to click "delivered" early to avoid late penalties, intentionally interfere with GPS positioning to create invalid data, or deliberately slow down in stages not easily detected by the algorithm (such as while waiting for food)[7]. In the context of a fashion factory, this could manifest as workers exploiting ambiguities in the piece-rate system or taking "shortcuts" in areas where quality control is not stringent to complete tasks under extreme time pressure. Another form is relational and informal resistance, which involves building solidarity. Algorithms attempt to atomize workers, but workers counter this by establishing informal social networks. For example, food delivery riders form groups on social media like WeChat to "band together for warmth," sharing information about the algorithm's behavior patterns, such as which types of orders are least profitable or how to deal with the system's automated warnings[8]. These online communities become important spaces for riders to exchange experiences, provide emotional support, and coordinate actions. Similarly, garment factory workers also form informal mutual aid networks to share work skills, provide emotional support, and even coordinate informal breaks to resist the algorithm's total control over the work pace. Lastly, there is open and collective resistance, or "algorithmic activism." Although there is no clear evidence in this case of workers launching collective action against the algorithm itself, strikes and protests have a long and continuous history in China's textile and garment industry. In recent years, despite pressures, the number of worker collective actions reached a new high in 2023, with manufacturing being one of the main sources, and Guangdong Province being particularly prominent. The main causes of these protests are typically wage arrears or compensation disputes during factory relocations or closures. These actions show that when individual and informal resistance cannot solve fundamental problems, workers have the ability and willingness to take more public collective action to defend their rights.

Introducing the perspective of worker agency is not to deny the harshness of algorithmic control but to present a more complete and dialectical picture. It reveals that the algorithmic factory is a site of ongoing power struggles. The workers' resistance strategies are themselves a diagnostic tool, precisely pointing to the core mechanisms and inherent weaknesses of the algorithmic control system—such as its reliance on precise data and reliable evaluations. It is by studying *how* workers resist that we can more profoundly understand *how* the system operates.

3.3   The Cost to the Body: From Algorithmic Commands to Human Limits

The algorithm's commands must ultimately be executed by the human body. In the "small-order, quick-response" model, the digital world's endless pursuit of speed is directly translated into the exploitation of workers' physical limits. These labor conditions are not unilaterally imposed on passive victims but are the result of an imbalance in the aforementioned power game. In the current balance of power, capital's control holds an absolute advantage.

Multiple investigative reports have revealed this process in astonishing detail. To complete urgent orders that must be delivered within 7-11 days, workers are forced into an extreme state of work, with weekly working hours reaching as high as 75 hours and only one day of rest per month. The detail of a worker "washing her hair during her lunch break" vividly portrays the complete encroachment of work on personal life; the worker's body is thoroughly instrumentalized, reduced to a production machine that must meet the algorithm's rhythm.

This work intensity directly and severely violates the Labor Law of the People's Republic of China. According to the relevant articles in Chapter 4 of the law, Article 36 stipulates: "The state shall practice a working hours system wherein laborers shall work for no more than eight hours a day and no more than 44

hours a week on average" (later specified by the State Council as a standard of 40 hours per week)[9]. Article 41 clearly states: "The employing unit may extend working hours as necessitated by its production or business operations after consultation with the trade union and laborers, but the extended working hour for a day shall generally not exceed one hour; if such extension is called for due to special reasons, the extended hours shall not exceed three hours a day under the condition that the health of laborers is guaranteed. However, the total extension in a month shall not exceed thirty-six hours"[9]. Working 75 hours a week, which averages over 12 hours a day (if calculated for a 6-day work week), means that monthly overtime far exceeds the legal limit of 36 hours, which is clearly illegal. By directly citing these legal provisions, the paper's argument elevates from descriptive statements based on media reports to authoritative judgments based on legal texts.

This high-intensity labor is complemented by a piece-rate wage system, where workers' income is directly tied to their output, earning only a few cents for each additional piece of clothing made. This system internalizes management pressure into the workers' self-drive, forcing them to "voluntarily" work overtime for their livelihood. Ultimately, the "intelligence" of the supply chain is achieved at the expense of workers' physical health, personal time, professional skills, and collective agency. A structural hypocrisy exists between the brand's algorithmic system and its supplier code of conduct: the former, with its relentless demands for speed and cost, systematically incentivizes the latter to engage in the very exploitative practices that are explicitly forbidden by the code.

4   The Illusion of Transparency: Performative Ethics and the Contradictions of the "Intelligent" Supply Chain

Against the backdrop of growing global consumer concern for sustainability and corporate social responsibility, "transparency" has become an indispensable moral capital for fashion brands. However, the critical analysis in this study shows that this technology-driven discourse of transparency is largely a form of "performative ethics." It goes beyond simple "greenwashing" or "blue-washing" by using technology itself as the core prop of the performance, creating an illusion of "transparency" while also concealing the deeper, inherent ethical contradictions of its business model.

4.1   "Performative Ethics" : An Analytical Concept

Concepts like Corporate Social Responsibility (CSR), "greenwashing," and "blue-washing" (referring to false advertising on social and labor issues) provide us with important tools for understanding how companies manage their public image. CSR generally refers to voluntary actions taken by companies to enhance social well-being, while "greenwashing" refers to companies exaggerating their environmental contributions through misleading propaganda.

The concept of "performative ethics" proposed in this paper aims to capture a more specific and contemporary phenomenon. Its uniqueness lies not only in the misalignment of discourse and action but also in *how technology itself is constructed as an agent of ethical action*. In this model, companies "perform" their commitment to transparency and morality by deploying and publicizing advanced technologies (such as AI, blockchain, and big data analytics). The complexity, objectivity, and futuristic aura of technology are used to create an impression of "technological solutionism," the idea that complex social and ethical problems can be solved with the right algorithms and data. This makes criticism more difficult because questioning a company's ethical practices seems tantamount to questioning technological progress itself. Therefore, the analytical focus of "performative ethics" is on revealing how technology becomes a complex reputation management tool that conceals "injustice" by displaying "intelligence."

4.2   The Discourse–Reality Dichotomy: A Structured Analysis

When we juxtapose these corporate discourses full of technological optimism with the actual situation on the production line, a profound rupture emerges. The following table, through a structured comparison, reveals the discursive strategies of this "performative ethics" and its inherent contradictions. This table is the core application of the critical discourse analysis method of this study; it does not simply list facts but reveals the operation of ideology through direct textual comparison. It is this huge gap between discourse and reality that constitutes the essence of "performative ethics."

Table 1: Discursive Dichotomy in the AI-Driven Fashion Supply Chain

Corporate Discourse & Technological Promise	Documented Labor Reality & Algorithmic Pressure
Promise: "Through our on-demand production business model... we reduce waste from the source." "Digitalization runs through the entire supply chain."	**Reality:** The "on-demand production" model, through algorithmic commands, is directly translated into a production rhythm requiring workers to work 75 hours a week and 12-18 hours a day to meet tight deadlines.
Promise: To establish and enforce a *Supplier Code of Conduct* based on International Labour Organization (ILO) conventions, prohibiting forced labor and ensuring reasonable working hours.	**Reality:** Widespread illegal practices of working 75 hours a week with only one day of rest per month. This directly violates Articles 36 and 41 of the Labor Law of the People's Republic of China regarding working hours[9].
Promise: "Suppliers must pay employees on time, and wages shall not be lower than the local legal minimum wage." Third-party audits found "workers' basic wages are on average twice the local minimum wage."	**Reality:** Compensation is based on a harsh piece-rate system, with "only a few cents per piece," and wages have "hardly changed." Many workers cannot even earn a living wage.
Promise: "Partner with third-party agencies to conduct regular and unannounced on-site compliance audits of suppliers." Audit results in 2023 showed the proportion of D/E grade (worst) suppliers dropped to 8%.	**Reality:** Independent investigations and human rights organizations have raised serious questions about the credibility of corporate-commissioned audits, believing they fail to identify or resolve fundamental problems. Investigations found that many factories are informal workshops lacking basic safety facilities like emergency exits.
Promise: Invest tens of millions of dollars in "supplier community empowerment" and facility upgrades.	**Reality:** The core business logic—rewarding extreme speed and the lowest cost through KPIs and a last-place elimination mechanism—directly and systematically incentivizes suppliers to suppress wages and extend working hours.

This table clearly reveals the performative nature of corporate discourse. As shown in the first row of Table 1, the company promises to improve efficiency through "on-demand production," a discourse that is directly translated on the factory floor into algorithmic commands requiring workers to work 75 hours a week. The "efficiency" achieved by the algorithm is therefore directly built on the over-exhaustion of the human body's limits. By publishing codes of conduct and conducting audits, the brand fulfills a procedural compliance obligation, constructing a responsible public image. However, the core of its business model—an algorithmic system with speed and cost as its sole optimization goals—continuously creates labor conditions that run counter to these codes. This structural contradiction turns "transparency" into a selective disclosure of information: the brand is happy to showcase its advanced tracking technology and impressive ESG data but maintains a strategic silence about the labor process that drives it all.

4.3   The "Poverty of Ethical AI" in the Supply Chain

This contradiction is not unique to the fashion industry; it reflects the "poverty of ethical AI" that exists in broader AI supply chains. Research on "ghost work" such as AI data annotation has found that many companies promoting "impact sourcing" or "ethical AI" also have business models built on the exploitation of workers in low-income countries. These companies face an irreconcilable internal conflict: on the one hand, their publicly declared social mission, and on the other, "the powerful forces of competitive market dynamics, which compel these companies to limit the actual social impact of their business models to ensure higher profit margins."

Applying this insight to the fashion supply chain, we can see the same logic at play. The disruptive competitiveness of the AI-driven ultra-fast fashion model comes from its ability to satisfy consumer desires at a lower cost and faster speed than traditional models. The economic viability of this model is precisely based on externalizing efficiency costs, which are borne by the workers at the bottom of the supply chain. Therefore, to demand that this system achieve genuine protection of labor rights without changing its core logic of speed and cost is tantamount to seeking fish from a tree. Ultimately, AI technology plays a contradictory role here. It is both the tool that enables extreme efficiency, thereby leading to labor exploitation, and the discursive tool used to promote "transparency" and "morality," thereby concealing this exploitation.

5 Conclusion: Beyond Efficiency Calculation: Toward a Co-Governance Framework for Algorithmic Production

Through an analysis of the cultural, labor, and ethical dimensions of the application of artificial intelligence in China's fashion supply chain, this study has reached a core conclusion: the integration of AI is far from a neutral technological upgrade; it is a sociotechnical process that profoundly reshapes power relations, cultural meanings, and forms of labor. The mainstream discourse of efficiency conceals its complex and often negative social consequences. The original contributions of this study can be summarized in the following three points. Theoretically, it reveals the logic of "re-subsumption" in labor relations under AI intervention. By combining Marx's theory of "real subsumption" with contemporary research on algorithmic management, this paper updates labor process theory, revealing how algorithms achieve a dynamic, continuous, and deeper control over the labor process. Empirically, it reveals the structural contradiction between the discourse of supply chain transparency and reality. Through critical discourse analysis, this paper systematically reveals the operating mechanism of corporate "performative ethics," pointing out the irreconcilable internal conflict between its "intelligent" supply chain discourse and the harsh labor reality. In terms of policy, it proposes a worker-centered co-governance solution. This paper moves beyond mere critique to propose a forward-looking co-governance framework aimed at incorporating worker representatives into the process of technology design and supervision, providing a concrete direction for future policy-making and labor practices.

Based on the above findings, this paper argues that any serious ethical discussion of the application of AI in manufacturing must move beyond corporate-led, technology-centric "transparency" solutions. Future research and policy agendas need to shift from passive supervision of corporate "social responsibility" to active questioning of the ethics of the business model itself. This represents a fundamental shift in governance models: from a passive, consumer-driven accountability model to an active, worker-centered co-governance model. The current accountability model relies on external pressure (such as media exposure and consumer boycotts), which is not only inefficient but also easily neutralized by corporate "performative ethics." A more sustainable solution is to shift the center of gravity of governance from the external market to the internal production process, empowering laborers with substantive power in technology governance through institutional design.

This shift does not require creating entirely new legal systems from scratch but advocates for the critical application and modern interpretation of China's existing legal framework to address the new challenges brought by algorithmic technology. China's *Labor Law*, *Trade Union Law*, and *Personal Information Protection Law*, among others, already provide basic principles and mechanisms for protecting labor rights. The problem is not the complete absence of law but the severe test of the applicability and enforcement of these existing frameworks in the face of new algorithmic power. Therefore, the proposed "worker-centered co-governance framework" aims to specify how to translate existing legal spirits and principles into governance tools that can effectively constrain algorithmic power.

To this end, we propose a framework consisting of the following three pillars. First is algorithmic transparency and accountability. This is not just about opening up source code but about making the decision-making logic of algorithms and their social impacts explainable, auditable, and accountable. This directly echoes the provisions on the transparency of automated decision-making in China's *Personal Information Protection Law* (PIPL). This includes mandatory algorithmic impact assessments, requiring companies to conduct independent evaluations and disclose potential risks to regulatory bodies and worker representatives before deploying any management algorithm that has a significant impact on labor conditions. It also involves granting laborers the "right to an explanation": legislating to ensure that workers have the right to receive a clear, non-technical explanation when they are subject to a significant adverse decision made by an algorithm (such as task allocation, performance rating, disciplinary action, or dismissal). Article 24 of the PIPL already stipulates that when automated decision-making has a significant impact on an individual's rights and interests, the individual has the right to demand an explanation from the personal information processor. This right must be explicitly defined and strengthened in labor relations. Furthermore, it requires establishing independent algorithm audit mechanisms, promoting third-party audits involving trade unions, technical experts, and civil society organizations, focusing on the actual impact of algorithmic systems on labor rights, rather than just technical biases.

The second pillar is workers' data rights. In a data-driven production model, it must be recognized that workers have certain rights over the data generated during their labor process to counter the trend of data being used purely as a tool for monitoring and discipline. The PIPL has established basic principles for personal information processing such as "legality, legitimacy, necessity, and good faith," as well as "clear and reasonable purpose" and "minimum impact," which should be strictly applied to employee information management. This involves the right to access and correct, ensuring that workers have the right to access all data collected by the enterprise about their personal performance and the right to request correction of inaccurate information. It also involves the principle of data minimization; according to Article 6 of the PIPL, the processing of personal information should have a clear and reasonable purpose and be limited to the minimum scope necessary to achieve the processing purpose, and excessive collection is prohibited. This means that companies can only collect necessary data directly related to the completion of work and are prohibited from conducting intrusive monitoring for purposes unrelated to work.

The third pillar is co-governance models and collective bargaining. This is the core of the framework, aiming to institutionalize the voices of laborers throughout the entire process of technology design, deployment, and supervision. This requires modernizing the collective negotiation mechanisms in the *Trade Union Law of the People's Republic of China* and the *Regulations on Collective Contracts*. It calls for worker representation on technology committees: when establishing committees responsible for technology procurement and implementation within enterprises, a certain proportion of workers or trade union representatives must be included to ensure that technological decisions fully consider the experience and interests of laborers. It also advocates for "collective bargaining over algorithms": including the key parameters of algorithmic management systems (such as work intensity, task allocation logic, and performance evaluation standards) within the scope of collective bargaining. The *Regulations on Collective Contracts* and the *Trial Measures for Collective Wage Negotiation* have already clarified that labor remuneration and working hours are core contents of collective negotiation. In the digital age, the parameters of algorithms directly determine actual working hours and labor remuneration; therefore, including these parameters in the scope of negotiation is a necessary extension of the existing legal spirit. Just as trade unions have the right to negotiate over wages and hours, they should also have the right to negotiate the algorithmic rules that shape their members' daily work.

Ultimately, the challenge is how to ensure that the dividends of technological progress can be shared fairly, rather than at the cost of exacerbating social inequality. On the road to "Industry 4.0" and "smart manufacturing," we must constantly ask: Whose "intelligence"? For whose "efficiency"? And who pays

the price for technological progress? Only by placing human value and dignity above the calculation of efficiency can we truly harness the power of AI to build a more just and humane future of production.

References

[1] Fairclough, N. (1995). *Critical discourse analysis: The critical study of language*. Longman.

[2] van Dijk, T. A. (2015). Critical discourse analysis. In D. Tannen, H. E. Hamilton, & D. Schiffrin (Eds.), *The handbook of discourse analysis* (2nd ed., pp. 466-485). John Wiley & Sons.

[3] Marx, K. (1976). *Capital: A critique of political economy, Volume 1* (B. Fowkes, Trans.). Penguin Classics. (Original work published 1867)

[4] Marx, K. (n.d.). *Results of the immediate process of production*. Retrieved September 28, 2025, from https://www.marxists.org/archive/marx/works/1864/economic/ch02.htm

[5] Endnotes. (2010). The history of subsumption. *Endnotes 2: Misery and the Value Form*. Retrieved from https://endnotes.org.uk/articles/the-history-of-subsumption

[6] Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019). Good gig, bad gig: Autonomy and algorithmic control in the global gig economy. *Work, Employment and Society*, 33(1), 56-75. https://doi.org/10.1177/0950017018785616

[7] Huang, H. (2025). Weapons of the riders: Everyday algorithmic resistance of migrant food-delivery workers in China's gig economy. *Journal of Contemporary China*. https://doi.org/10.1080/10670564.2025.2493883

[8] Yu, Z., Treré, E., & Bonini, T. (2022). The emergence of algorithmic solidarity: Unveiling mutual aid practices and resistance among Chinese delivery workers. *Media International Australia*, 183(1), 107-123. https://doi.org/10.1177/1329878X221074793

[9] National People's Congress of the People's Republic of China. (2018). *Labor Law of the People's Republic of China*. Retrieved from http://www.npc.gov.cn/zgrdw/npc/xinwen/2019-01/07/content_2070261.htm