

Theoretical Misconceptions and Institutional Reconstruction of Labor Empowerment in Data Property Rights

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Abstract. In the digital era, the process of data as a production factor is accelerating, drawing widespread attention to data labor and its income distribution issues centered around data activities. Some scholars cite Locke's labor theory of property and propose a labor empowerment theory for data property. However, this theory suffers from problems such as the overgeneralization of labor nature, inaccurate assessment of value contribution, and logical disconnection in rights generation. The deeper issue lies in its failure to distinguish the gradient forms of data labor in the data value chain. By reconstructing the traditional labor empowerment theory, this paper reveals the heterogeneity of data labor and categorizes it into data behavior, user-generated content (UGC), and professionally generated content (OGC). It then proposes a layered approach to labor-based property empowerment in data, providing an institutional framework to address the income distribution dilemma in data marketization.

Keywords: data labor; data income distribution; labor empowerment theory; typological analysis.

1. Introduction

Human society is rapidly advancing into a networked and digitalized age. The deep application of digital technologies such as big data and artificial intelligence (AI) has not only facilitated the rapid transition from traditional to digital economies but also reshaped the fundamental forms of labor. Traditional production methods characterized by physical and mental exertion are gradually being replaced by a digital labor paradigm centered on data collection, processing, and circulation. Against this backdrop, measuring the value of digital labor and establishing corresponding property distribution rules have become pressing issues of our time.

Locke's labor theory of property has been widely cited to justify user data rights, yet the boundaries of "digital labor" remain unclear. Some scholars argue that users' "data labor" lacks the "continuity" and "subordination" of traditional labor, and generalized empowerment may lead to hollow rights foundations [1]. Others, from a market efficiency perspective, highlight the passive nature of user-generated data and the difficulty in quantifying contributions. Directly granting users data ownership could increase circulation costs and hinder market efficiency [2]. The core of this debate lies in the inability of traditional labor empowerment theory to accommodate the composite nature of data value generation. When a single user action simultaneously produces raw and value-added data, simplistic labor empowerment logic results in imbalanced rights allocation.

This paper seeks to address these challenges by revealing the heterogeneity of data labor, proposing a typological classification, and outlining a layered approach to labor-based property empowerment in data. This framework aims to resolve the income distribution dilemma in data marketization.

2. Data as Labor: Theoretical Review and Misconceptions

2.1 The Origins of Labor as Property Rights

The ethical foundation of labor as property stems from humanity's instinctive demand for distributive justice [3]. Its core logic lies in establishing a connection between individuals and objects through labor, thereby justifying exclusive rights. John Locke's labor theory of property provides the classic paradigm, asserting that individuals who apply labor to natural commons can rightfully

convert the fruits of their labor into private property [4]. This framework relies on three key premises: the common ownership of natural resources, the legitimacy of labor as an extension of personhood, and the "enough and as good" proviso. Locke's "spoilage limitation" constrains infinite accumulation, but his theory reveals contradictions in monetary economies—where the durability of money breaks physical limits, enabling infinite accumulation and providing a philosophical basis for capitalist private ownership.

The extension of labor empowerment theory to intellectual property (IP) validates its cross-domain applicability. For instance, in *Miller v. Taylor*, British courts linked authorship rights to natural justice, advocating perpetual protection for labor outcomes. However, the overextension of the "sweat of the brow" doctrine [6] was ultimately overturned in *Feist Publications v. Rural Telephone Service* [7], reflecting the practical boundaries of labor empowerment theory. In the digital age, data production—characterized by intangibility, collaboration, and derivative value—further challenges traditional frameworks. Unconscious user data generation and corporate reprocessing constitute dual labor inputs, yet mechanically applying the "labor creates rights" logic risks exacerbating imbalances in platform-user benefit distribution.

2.2 Data Labor and Income Distribution Disputes

Academic views diverge on whether data labor justifies income distribution. Proponents, grounded in labor value theory and digital production relations, argue that user digital behaviors constitute a new labor form deserving of rights under Locke's theory. Professor Shen Weixing emphasizes user empowerment as data originators [8], while German scholar Vogel proposes the "cognitive surplus value" concept, advocating legal recognition of "prosumers." Critics challenge labor qualification and institutional costs: Professor Zhou Hanhua notes the absence of "continuity," "compensation," and "subordination" in user behaviors [9]; Professor Gao Fuping stresses that data value relies on corporate algorithmic processing [10], likening raw data to unpolished jade whose property rights belong to processors.

Judicial practice and policies lean toward pragmatism. China's *Taobao v. Meijing* case denied user property claims over raw data [11], while the EU's *HiQ v. LinkedIn* reinforced platform control, prioritizing commercial order (Table 1). China's "Data 20 Measures" adopts a "three-right separation" framework that dilutes user ownership, whereas the EU Data Governance Act couples data portability with profit claims for sustained user control over non-personal data [13]. These differences reflect clashes between efficiency-first and fairness-first values.

Table 1: Comparative Judicial Rulings on Data Rights

Case	Core Logic	User Rights Position
<i>Taobao v. Meijing</i> (China)	Raw data as platform byproducts; no user rights	Defensive personality rights
<i>HiQ v. LinkedIn</i> (US)	Platform control supersedes user access	Commercial order prioritized
<i>Facebook Data Transfer</i> (EU)	Data value stems from platform aggregation	Personality rights and profit-sharing rights

2.3 Pitfalls in the Theory of Data Labor

In integrating the labor theory of value and the property-rights theory, existing research suffers from three theoretical deviations due to an insufficient recognition of the unique features of digital labor. The foremost problem is the absence of a standardized labor-categorization criterion. Traditional labor law centers on subordination, compensability, and continuity. In contrast, the value-

generation mechanism of digital labor is notably characterized by technological dependence and dynamic scenarios. When users' unconscious data-footprint-generating behaviors and professional content-production activities are forced into the same analytical framework, value assessment often goes awry due to the misuse of criteria, leading to a misalignment between labor contributions and rights allocation. Conversely, the non-rivalrous and reproducible characteristics of data elements should have spurred innovative breakthroughs in the rights-allocation model. Nevertheless, existing theories still cling to the binary framework of nominal ownership and practical usufruct, attempting to address the issue of dynamic value distribution with static empowerment rules. Evidently, such institutional design fails to meet the practical demands of the differentiation of rights and powers during the circulation and utilization of data elements.

The deeper-rooted predicament stems from the economies of scale in data-value realization and the dilution effect on individual contributions. Given that data value can only be manifested through massive aggregation, the labor outcomes of individual users are often overshadowed in the data torrent constructed by algorithms, rendering the traditional principle of distribution according to labor ineffective in such a context. The key to surmounting these theoretical constraints lies in reconstructing the constituent elements of digital labor. On the one hand, it is essential to establish the data-convertibility of human activities, which are transformed into computable and storable forms via digital interfaces, as well as the technological intermediacy of labor outcomes, which rely on algorithmic processing and platform architecture for value enhancement. On the other hand, the criterion of extractable contributions should be introduced, using technological means to identify specific value segments of individuals or collectives within the data flow. This approach echoes the principle of identifiable data contributions advocated by the EU's Data Governance Act, offering a viable path for the establishment of a differentiated distribution mechanism.

3. Typological Analysis of Data Labor

3.1 Classification Basis and Theoretical Framework

The typological study of data labor requires the data value chain theory as the basic framework, constructing classification criteria from the dual dimensions of the value-creation hierarchy and the gradient of legal relationships. The data value chain theory reveals the value-leap path of data elements from original collection to commercial application [14], specifically manifested as differentiated labor forms of basic data processing, user-generated content (UGC), and occupational-generated content (OGC). The value-creation hierarchy dimension focuses on the rank characteristics of labor outcomes in the value chain: the original data stream, as the underlying means of production, has a low value density but plays a fundamental role; user-generated content forms structured data products through intellectual input; and occupational-generated content relies on professional processes to produce tradable assets. The gradient of legal relationships dimension takes labor subordination as the basis for division: in data-related behaviors, the relationship between users and platforms is loose, user-generated content is constrained by platform contracts, and occupational-generated content is included in the scope of labor-relationship adjustment due to its labor-control characteristics. This classification framework breaks through the single-identification model of traditional labor law and provides a typological analysis tool for data-rights disputes.

Marx's theory of the two-fold nature of labor [15] provides theoretical support for typological analysis. Concrete labor creates use-value, and abstract labor forms exchange-value. This classic proposition takes on new practical forms in data labor: users' unconscious data-related behaviors provide basic data for algorithm training, constituting the creation of means of production in concrete labor; user-generated content realizes the value-added of data products through intellectual input, reflecting the revenue of the attention economy in abstract labor; and occupational-generated content completes the value-condensation of data assets through standardized labor. In terms of ownership allocation, the three types of behaviors correspond to different legal rules respectively: original data applies the "contribution-control" dual-ownership structure, user-generated content follows the

"author-centric" principle of copyright law, and occupational-generated content applies the "works for hire" rule due to labor subordination.

3.2 Data-related Behaviors

Data-related behaviors refer to the form of labor in which users generate original data streams through unconscious operations. Its core features lie in the weakening of labor autonomy and the concealment of platform control. During information acquisition or social interaction, users complete data production through embodied practices such as eye-tracking and finger-swiping [16], yet the flow and use of labor outcomes are completely subject to the platform's technical architecture. Platforms guide users' behavior paths through technical designs like page layout and recommendation algorithms. For example, the "infinite scroll" mechanism extends users' stay time to obtain more data. Such labor outcomes are characterized by low value density and high dispersion. The data of a single user needs to be aggregated in large quantities to form high-value-added derivatives such as user profiles, resulting in the dilution of individual contributions by algorithms.

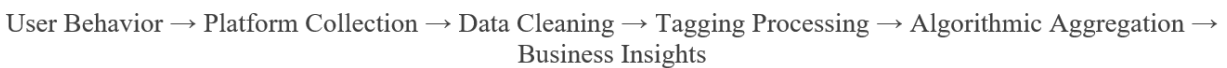


Figure 1: Data Aggregation Flowchart of Social Platforms

There are institutional obstacles in the current legal system regarding the rights and interests allocation of data-related behaviors. Due to the non-exclusive nature of data, the Property Law is difficult to apply, and the Labor Law cannot cover unconscious labor because it lacks the elements of continuity and compensability. Platforms convert users' data achievements into corporate assets through standard contracts. For example, the user agreements of social platforms often expand the scope of data collection with complex clauses, using the formal legality of the informed-consent rule to cover up their actual control. **Strengthening** the informed-consent and data-minimization principles of the Personal Information Protection Law is more in line with the characteristics of such labor than directly granting property rights. Technology-empowered control mechanisms such as blockchain-based data-tracking systems can enhance users' actual management capabilities over data flows and balance the rights and responsibilities between platforms and users.

Platforms achieve implicit control through the design of technical architectures. Technical tools such as page layouts and recommendation algorithms not only guide users' behavior paths but also reinforce data production through persuasive designs like notification push-overs. For example, a certain social platform's user agreement stipulates that "data can be used for any commercial purpose", which essentially transforms users' labor achievements into the platform's intangible assets. The unreasonable use of such technological advantages and contract clauses exacerbates the imbalance in benefit distribution in the digital age.

3.3 User-Generated Content (UGC)

User-Generated Content (UGC) refers to data products created by users through active creation. Its legal nature combines the rights and interests of personal information with the characteristics of the knowledge-based economy. [17] Original expressions can be protected by the Copyright Law, yet platforms nullify users' rights through standard clauses such as agreements on exclusive use rights. The economic value of UGC is reflected in directly driving the growth of platform traffic and indirectly forming high-value data assets. To distribute its benefits, it is necessary to break through the equal-distribution model and establish a two-dimensional evaluation system based on quality and influence.

Table 2: UGC Incentive Models

Platform	Rules	Distribution
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Douyin	¥0.5–2 per 10k views	Cash + traffic promotion
YouTube	Ad revenue by watch time	Bank transfer
Zhihu	Paid consulting for expertise	Virtual currency + badges

For the quality dimension, AI anti-plagiarism technology is required to evaluate originality, and semantic complexity algorithms are used to analyze information density. The influence dimension takes into account both the breadth of dissemination and the continuous contribution value. Differentiated distribution should match the labor value. For example, YouTube's "Partner Program" has increased the income of top creators by 300% [12], verifying the economic efficiency of distribution according to contribution. Platforms need to disclose algorithm parameters such as the weight of originality scores and introduce third-party audits to ensure the transparency of rules.

3.4 Occupationally-Generated Content (OGC)

Occupationally-Generated Content (OGC) is a form of labor in which users continuously produce content in a professional manner. It forms a compound relationship of "weak organizational subordination + strong economic dependence" with the platform. Professional creators need to follow the platform's content review rules and traffic distribution mechanisms. The labor process is implicitly disciplined by algorithms, yet the determination of labor relations is avoided through cooperation agreements. In judicial practice, in a labor dispute case of a certain live-streaming platform, the absence of a fixed-salary agreement was used to deny the existence of a labor relationship, highlighting the lag in determination standards.

The legal relationship of occupationally-generated content creation shows three characteristics of subordination. Personal subordination is manifested as the platform exerting substantial intervention in creative activities through community norms and content review policies. If professional creators violate the platform's review standards, they may face disciplinary measures such as work removal, account traffic restriction, or even account suspension. These measures essentially constitute explicit restrictions on labor autonomy. Economic subordination stems from the high binding of creators' incomes to the platform's traffic-sharing rules. The platform adjusts the content exposure through the algorithm-recommendation mechanism, and creators' incomes are directly subject to the adjustment of traffic-distribution parameters. A unilateral change in the rules can lead to sharp fluctuations in economic returns. Organizational subordination is reflected in the deep dependence of professional creative activities on the platform's technical architecture. Creators need to follow exclusive release clauses and regular update obligations. Their account operation, content distribution, and user interaction are completely reliant on the platform's technical ecosystem, forming an inseparable systematic attachment. The three types of subordination jointly shape a compound legal relationship of "weak organizational control + strong economic dependence". However, the current legal framework still adheres to the physical-location-control standard of traditional labor relations and fails to effectively identify the implicit domination of the labor process by algorithmic rules. In judicial practice, platforms often avoid the determination of labor relations in the form of "cooperation agreements" [18], resulting in a systematic lack of core rights and interests such as social security and revenue-sharing for professional creators. To break this deadlock, it is necessary to reconstruct the determination standards of labor relations, incorporate the characteristics of digital labor such as the intensity of algorithmic control and the degree of income dependence into the comprehensive judgment system, so as to realize the transformation of legal protection for occupationally-generated content creation from formal fairness to substantive justice.

Table 3: Data Labor Typology

Type	Autonomy	Value Creation	Rights Allocation
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Data	Unconscious, guided	Raw data; scale-dependent value	Limited control under privacy laws
UGC	Active but constrained	Structured data; cognitive surplus	Copyrights often voided by platforms
OGC	Professionally managed	Tradable assets; platform-dependent	Labor rights circumvented by contracts

4. Institutional Reconstruction of Data Labor Income Distribution

4.1 Composite Guarantee Paths for the Rights and Interests of Data-related Behaviors

To safeguard the rights and interests of data-related behaviors, a governance framework should be established that prioritizes the protection of personal rights and interests, supplemented by limited income exploration. The original data generated by users through unconscious behaviors is characterized by dispersion and low-value density, making it difficult to directly apply the traditional property-rights protection model. Although the Personal Information Protection Law has established the informed-consent rule, in practice, there are widespread problems such as formalistic agreements and nominal control rights. The core of institutional optimization lies in strengthening users' substantive control over data and exploring a limited-income realization path empowered by technology.

To deepen the protection of personal rights and interests, it is necessary to start with a dynamic consent mechanism and risk-grading management. A hierarchical authorization model can be introduced, dividing authorization levels according to the risk levels of data-use scenarios. For basic-service data, default authorization can be adopted; for commercial-analysis data, users need to confirm item by item; and for third-party-shared data, a second explicit consent is required. The consent standards of being specific, clear, and freely given proposed by the EU's General Data Protection Regulation are worth learning from [19]. Platforms should present a data-use map through a visual interface to avoid inducing blanket authorization by taking advantage of information asymmetry. For highly sensitive information such as biometric data, a dual-mechanism of pre-event risk assessment and post-event dynamic audit should be established. [20] Before collection, platforms need to submit a risk-assessment report to the regulatory authorities, explaining the purpose of data processing, the anonymization path, and the contingency plan for data leakage. During the processing, they need to be regularly audited by third-parties to ensure compliance with the principle of minimum necessity.

Technology-empowered control tools can enhance users' management capabilities over data flows. A personal data control panel supported by blockchain technology allows users to track the collection, processing, and utilization paths of data in real-time. The Japanese data-bank system has achieved the traceability of data flows through such technology. On the basis of protecting personal rights and interests, data-trust and collective-management models can be explored. As user agents, data-trust institutions negotiate income-distribution plans with platforms through a collective-authorization mechanism, reducing the cost of individual rights protection. The user-data-dividend-pool model piloted by the Guiyang Big Data Exchange shows that collective authorization can effectively aggregate the value of scattered data, and it is practically feasible for users to distribute income according to their contribution levels. The automatic-splitting mechanism of smart contracts proposed by the EU's Data Governance Act provides a reference for this [21], and its core is to execute preset distribution rules through algorithms to avoid unilateral manipulation by platforms.

To realize limited income, it is necessary to balance privacy protection and labor rewards. The data-contribution-point system calculates points based on the frequency and type of user behaviors. Users can exchange these points for value-added services or amounts for public-welfare donations,

which not only avoids the privacy risks of direct monetization but also reflects the ethical legitimacy of labor rewards. Such a mechanism needs to be coordinated with the data-minimization principle of the Personal Information Protection Law to ensure that income exploration does not harm users' core rights and interests.

4.2 Income Distribution of User-Generated Content Behaviors and Meta-Regulation of Platform Responsibilities

The income distribution of User-Generated Content (UGC) needs to break through the equal-distribution model and construct a three-dimensional evaluation system of quality, influence, and economic transformation. In the quality dimension, third-party evaluation tools are relied on to certify the originality, information density, and compliance of content, and blockchain technology can ensure the traceability of the creation process. In the influence dimension, the breadth of dissemination and the continuous contribution value are integrated, and the value of content is quantified through click-through rates, forwarding rates, and citation rates of secondary creations. In the economic-transformation dimension, income is distributed according to the actual contribution rate of content to advertising revenue and commodity sales.

Meta-regulation of platform responsibilities requires the construction of a two-layer governance framework that coordinates self-discipline and supervision. The core of the self-discipline mechanism lies in the transparency of rules and the fairness of contracts. Platforms should disclose algorithm parameters and the logic of income sharing. For example, they should publicly disclose the weights of core indicators such as originality scores and user-stay durations in recommendation algorithms, rather than just providing principle-based descriptions. The introduction of a third-party audit mechanism can monitor algorithmic discrimination and implicit deductions. Independent institutions regularly review the compliance of rule-implementation, with a focus on preventing traffic manipulation and income interception. To reconstruct contract fairness, it is necessary to strengthen the notification process for professional creators. Pop-up prompts, interpretation by artificial customer service, and other methods are used to ensure the understanding of key clauses, and a negotiation mechanism for user representatives to participate in rule-making is established, embedding co-governance elements in core clauses such as income-sharing ratios.

Government supervision needs to set up a dynamically adjusted performance-indicator system that covers key parameters such as the user-distribution ratio and the social-security coverage rate. The hierarchical-supervision model of the EU's Digital Services Act is of reference value. Differentiated obligations are set according to platform size and data traffic, and algorithm filing and real-time monitoring are implemented for super-large platforms. For dispute resolution, a professional arbitration mechanism needs to be constructed. Arbitrators with legal and computer-science backgrounds are appointed, and a combined model of technical investigation and legal judgment is adopted to handle distribution disputes caused by algorithmic black boxes.

4.3 Determination of Labor Relations and Guarantee Mechanisms for Occupationally-Generated Content Behaviors

The determination of labor relations for Occupationally-Generated Content (OGC) behaviors needs to break through the traditional subordination standard [22]. Platforms exert substantial control over creators through algorithm rules, traffic distribution, and income mechanisms, which conforms to the essence of personal and economic subordination in labor law. Judicial interpretations should clarify three important elements: continuity, dependence, and income relevance, and include professional creators who meet the standards within the scope of labor relations. The mandatory conclusion of electronic labor contracts can solidify the rights and obligations of both parties. The contract content needs to cover income-sharing ratios, copyright ownership, and social-security clauses. [23] The creator-grading system of Xiaohongshu provides guarantees for full-time bloggers through a basic-salary-plus-performance-sharing model. Such practices show that contract transparency can effectively resolve the risks of hidden employment.

To guarantee rights and interests, it is necessary to reconstruct the external-supervision mechanism. Administrative agencies should formulate a rights-and-interests list for professional creators, clarify the minimum-wage standard and the lower limit of data-income sharing. The scope of work-injury insurance for flexible workers in local practices can be extended to this group. Industry associations need to promote the formulation of self-regulatory income-distribution conventions and implement a joint boycott of platforms that maliciously lower sharing ratios. In terms of judicial relief, the Hangzhou Internet Court ruled that the platform should make up the sharing amount in a collective rights-protection case of short-video creators based on the Anti-Unfair Competition Law, providing a precedent for public-interest litigation. In the future, by amending the Civil Procedure Law, the rights and interests of professional creators can be included in the scope of public-interest litigation, allowing consumer-protection organizations or procuratorial organs to file systematic rights-protection lawsuits.

The quantitative assessment of the intensity of algorithmic control is the key to the implementation of the system. It is necessary to establish an algorithmic identification standard for labor subordination and use data-analysis tools to identify the implicit control of platforms over creation directions and update frequencies. A multi-dimensional collaborative-governance system can integrate administrative supervision, industry self-discipline, and judicial relief to form a full-chain guarantee mechanism covering pre-event standardization, mid-event supervision, and post-event accountability.

5. Conclusion

This article deconstructs the application dilemmas of traditional labor-empowerment theories in the digital realm and systematically reveals the heterogeneous characteristics of data-labor forms and their inherent requirements for legal-right allocation. The value-generation mechanisms, legal-relationship attributes, and ownership demands of data-related behaviors, user-generated content, and professional content production show gradient differences. As a basic form of labor, data-related behaviors have a low value density and rely on economies of scale for value-added, making it difficult for users to independently claim property rights and interests. User-generated content forms structured data assets through intellectual input, but platform standard clauses lead to the nominalization of intellectual property rights. Professional content production constitutes a substantial labor relationship due to algorithmic control and income dependence, yet lacks rights-and-interests protection because of contract-avoidance clauses. Although the current "three-rights separation" framework for data rights and interests has practical rationality, the lack of a labor-categorization standard has led to distribution imbalances. Only by establishing a new legal-right paradigm based on contribution identification and dynamic equilibrium can institutional adjustments be achieved between protecting users' rights and interests and promoting data circulation.

This research still has two theoretical limitations. First, although the labor-categorization standard is constructed based on the data-value-chain theory, its inclusiveness for marginal digital-labor forms remains to be verified. For example, the human-machine collaborative labor in the context of artificial-intelligence-assisted creation has not yet been included in the analytical framework. Second, the research on the intensity of platform algorithmic control lacks empirical measurement, making it difficult to accurately quantify the value-contribution degrees of different labor forms and restricting the refined design of distribution rules. Future research needs to construct an interdisciplinary analytical framework that integrates the labor-value theory and data science, with a focus on solving the problem of tracing the contributions of aggregated data value. In terms of institutional design, a dynamic ownership model supported by blockchain technology can be explored. Through smart contracts, precise distribution and automatic execution of data-value-added returns can be achieved, providing a technology-empowered solution for the principle of distribution according to work in the digital age.

The legal-right structure of digital labor ultimately needs to seek a dynamic balance between technical rationality and legal values. This is not only a theoretical challenge for legal research in

response to digital civilization but also a practical choice for achieving the inclusive development of the digital economy.

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