

The Transformation Mechanism and Coping Strategies of Digital Labor and Alienated Labor

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Abstract: In the era of the digital economy, digital labor, as a new form of labor, has significantly reshaped the traditional labor structure and aggravated the phenomenon of labor alienation. Marx's theory of alienated labor reveals the alienation characteristics of labor under capitalist production conditions, and digital labor shows new dimensions on this basis, including the dematerialization of labor products, excessive labor in digital production, the opposition of intelligent production, and the invisibility of labor relations. The alienation of digital labor is mainly reflected in the free possession of labor achievements, the lack of subjectivity and creativity in the labor process, the loss of labor autonomy, and the imbalance between humans and technology. In response to this challenge, it is necessary to strengthen the construction of digital ethics and standardize the use of data; reconstruct labor relations and protect the rights and interests of workers; enhance the control of workers on digital technology; and build a harmonious digital space. Marx's theory of alienated labor provides a theoretical framework for understanding digital labor. It can not only criticize the logic of capitalist exploitation, but also guide the rational development of digital labor, and promote the labor relations in the era of the digital economy to move towards a fair and sustainable direction.

Keywords: Digital labor; Alienated labor; Marx's theory of alienated labor

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1. Introduction

The rapid development of digital technology is profoundly changing the way of human labor and social relations. The rise of new labor forms, such as the platform economy and gig economy, has also triggered new forms of alienation while improving production efficiency and creating economic value. These changes not only pose new challenges to the Marxist theory of alienated labor but also provide new opportunities for its contemporary development. Marx systematically expounded the theory of alienated labor in the "Economic and Philosophical Manuscripts of 1844", revealing the four forms of alienation between workers and labor products, labor process, class essence, and others under the capitalist production relations ^[1]. This theory provides an important analytical

tool for understanding the essence of capitalist society. However, in the digital age, profound changes have taken place in labor forms, production relations, and exploitation mechanisms. The traditional theory of alienated labor needs to be developed and innovated with the times.

2. The characteristics of digital labor and the performance of alienated labor

The rapid development of digital technology has given birth to digital labor, a new form of labor, which is significantly different from traditional labor in terms of labor object, labor process, and labor relationship. Based on Marx's theory of alienated labor, it is of unique value for the times to systematically analyze the core characteristics of digital labor and explore the transformation mechanism and specific performance of digital labor to alienated labor.

2.1. The core characteristics of digital labor

Digital labor is a new form of labor that creates value through data processing, information production, and platform services in the contemporary economic society with digital technology as the medium. Its core features profoundly reshape the essence and form of labor from multiple dimensions.

2.1.1. Virtualization and globalization integration of labor objects

The uniqueness of digital labor lies in the virtualization of labor objects-non-material resources such as data, information, and knowledge become the core objects of labor. This feature breaks through the dependence of traditional labor on material products, so that the labor process can cross the boundaries of physical space and achieve resource coordination and integration on a global scale. Digital workers deeply process and reproduce virtual resources through algorithm analysis, content creation, platform operation, and other means to promote the rapid development of the information society. The virtualization feature not only broadens the labor boundary but also promotes global knowledge sharing and innovation.

2.1.2. The de-skilling, algorithmization, and automation of the labor process

In digital labor, the labor process is highly dependent on algorithms and automation technologies, showing a clear trend of deskilling. The gig labor and crowdsourcing tasks in the platform economy are decomposed into standardized and fragmented operation units. Workers only need to follow the algorithm instructions to complete specific tasks without mastering the complete skill system. This trend has weakened workers' control over the labor process, and algorithms have become a core tool for dominating labor. Although the application of automation technology further improves production efficiency, it also brings the risk of workers' skill depreciation and employment instability.

2.1.3. Platformization, petty work, and flexibility of labor relations

Digital labor realizes the efficient matching of labor supply and demand through a platform intermediary, and forms a new labor relationship of "platform-laborer-consumer." This relationship is highly flexible and unstable. Most workers participate in the labor market in the form of odd jobs and freelancers, and lack social security and rights protection in traditional employment relations. Although platformized labor relations provide more employment opportunities and independent choices, they also aggravate the marginalization and exploitation risks of workers.

2.1.4. Datamation, commercialization, and capital accumulation of labor results

The achievements of digital labor are mainly intangible products such as data, content, and traffic. These achievements not only have significant economic value but also become an important source of platform capital accumulation. However, in the process of digital labor, workers' right to control their labor results is seriously deprived: the ownership of data and the distribution of income are often concentrated in the hands of platform enterprises, and workers can only get meager remuneration, and cannot even benefit from labor results. This unequal income distribution mechanism has exacerbated the economic difficulties of workers and the inequality of social status.

2.2. Alienation in digital labor

Under the rapid promotion of digital technology, digital labor, a new form of labor, came into being. While greatly improving production efficiency and creating unprecedented economic value, it has also triggered a series of complex alienation phenomena. Based on the classical framework of Marx's theory of alienated labor, namely, the alienation of workers and labor products, the alienation of the labor process, the alienation of the nature of the class, and the alienation of others, people can deeply analyze the phenomenon of alienation in digital labor and explore its unique manifestations and deep roots.

2.2.1. A new dimension of labor product alienation: the dual dilemma of data monopoly and commercialization

In the field of digital labor, the labor achievements, such as data, content, and traffic created by workers, are often monopolized and highly commercialized by platform enterprises. This alienation is not only reflected in the fact that workers are deprived of direct control over labor results but also in the fact that workers often know nothing about the specific use and value of labor results^[2]. Data monopoly not only aggravates the economic exploitation of workers but also leads to further deterioration of social inequality. The data produced by workers is used by the platform for commercial purposes such as advertising and algorithm optimization, but the resulting economic benefits are completely monopolized by the platform.

2.2.2. Deepening the alienation of the labor process: The double shackles of algorithmic control and deskilling

The algorithmic characteristics of digital labor make the alienation of workers and the labor process more and more significant. The platform carries out fine management and control of the labor process through algorithms. Workers must strictly follow the algorithm instructions to complete the task, and then lose labor autonomy and creativity. Algorithmic control not only weakens workers' control over the labor process but also puts them in a dilemma of "algorithmic cage." In addition, the de-skilling trend of digital labor has also exacerbated the sense of alienation of workers: the labor process is decomposed into standardized and fragmented operating units, and workers do not need to master a complete skill system to complete specific tasks.

2.2.3. The highlight of the alienation of class nature: The dual crisis of the weakening of collective identity and the loss of labor meaning

The characteristics of zero work of digital labor have seriously weakened the collective identity and class essence consciousness of workers. The workers in the platform economy mostly participate in labor in the form of individuals, lacking the collective organization and class consciousness of the traditional working class. This

weakening of collective identity not only makes it difficult for workers to fight for their own rights and interests through collective action but also aggravates their sense of isolation and helplessness. At the same time, the virtualization characteristics of digital labor also lead to the loss of the meaning of workers' labor. It is difficult for workers to perceive the social value and significance of labor and fall into a deep sense of alienation, which not only weakens the connection between workers and the nature of the class but also makes them fall into spiritual emptiness and confusion.

2.2.4. The aggravation of interpersonal relationship alienation: The double isolation of mediation and instrumentalization

The platform characteristics of digital labor make the relationship between workers and others mediated and instrumentalized. The platform matches labor supply and demand through algorithms, and the relationship between workers and employers, and consumers is simplified into data exchange and benefit calculation. This kind of mediated interpersonal relationship not only weakens the social connection between workers and others but also makes them fall into a lonely and helpless situation. The workers in the platform economy often face fierce competition. In order to obtain orders and income, they have to cater to the platform algorithm and consumer demand, further exacerbating the sense of alienation and distrust between workers. In addition, the virtualization of digital labor also weakens the social trust between workers and others. This alienation of interpersonal relationships not only affects the physical and mental health and well-being of workers but also poses a potential threat to social stability and harmony.

3. The mechanism of the transformation from digital labor to alienated labor

Under the background of the deep integration of digital technology and capital logic, the transformation of digital labor to alienated labor not only continues the basic characteristics of traditional alienated labor but also presents a more complex and hidden mechanism due to the unique attributes of digital technology. This process involves profound changes in the three dimensions of technology, economy, and society, which together shape the new face of digital labor alienation.

3.1. Technical dimension: Alienation of the labor process under algorithm control

Algorithmization is one of the core features of digital technology. It profoundly changes the essence of the labor process and becomes an important driving force for the alienation of digital labor. The algorithm implements comprehensive control of the labor process through data analysis and automated decision-making, resulting in the loss of labor autonomy. In the digital labor scene, workers need to perform tasks in strict accordance with the algorithm instructions. For example, the delivery route and time of takeaway riders are accurately planned by the algorithm, and the workers are reduced to the execution tool of the algorithm, and the labor autonomy is seriously deprived. In addition, the algorithm also promotes the de-skilling and fragmentation of the labor process, and decomposes complex labor into standardized and fragmented simple operations. Workers can complete specific tasks without mastering a complete skill system. This trend aggravates the monotony and tediousness of labor and further deepens the sense of alienation.

3.2. Economic dimension: The economic logic of data monopoly and labor achievement alienation

Data is the core means of production of digital labor, and data monopoly has become the key economic

mechanism of digital labor alienation. Platform enterprises deprive workers of their control over their labor results by controlling the ownership of data and the distribution of income. The achievements of digital labor are mainly intangible products such as data, content, and traffic. These achievements not only have economic value but are also important sources of platform capital accumulation. However, workers' right to benefit from labor results is completely deprived by the platform—for example, the content generated by social media users is used by the platform for advertising and algorithm training, and the economic benefits generated are monopolized by the platform. This data monopoly not only aggravates the sense of alienation of workers, but also leads to serious social inequality.

3.3. Social dimension: Platformized labor relations and the alienation of interpersonal relationships

The platform-based characteristics of digital labor reshape labor relations, make the relationship between workers and others mediated and instrumentalized, and become an important social mechanism for the alienation of digital labor. The platform economy realizes the matching of labor supply and demand through a platform intermediary, and forms a new labor relationship of “platform-laborer-consumer.” This relationship has a high degree of flexibility and instability. Workers mostly participate in labor in the form of odd jobs, freelancers, etc., and lack social security and rights protection in traditional employment relationships. The platform-based labor relations make it difficult for workers to form effective collective organizations, weakening their bargaining power and rights protection ability; at the same time, labor relations are mediated by algorithms, and the relationship between workers and others is simplified into data exchange and benefit calculation. This instrumental interpersonal relationship weakens the social connection between workers and others and makes them fall into isolation. In addition, workers in the platform economy often face fierce competition, and their income depends entirely on the results of algorithm distribution. This competitive relationship makes it difficult for workers to form effective cooperation and mutual assistance, which further aggravates the phenomenon of alienation.

4. Strategies to deal with the alienation of digital labor

Against the background of globalization and the rapid development of digital technology, the phenomenon of digital labor alienation has become increasingly prominent and has become an important issue to be solved urgently in contemporary society. In order to effectively deal with this challenge, it is necessary to build a comprehensive and in-depth coping strategy system from the perspectives of technical governance, institutional innovation, labor empowerment, and cultural remodeling.

4.1. Technology governance: Enhancing algorithm transparency and promoting data democratization

Technological governance is crucial in dealing with the alienation of digital labor. The primary task is to enhance the transparency of algorithms: through legislative and regulatory means, platform enterprises are required to disclose algorithm logic and decision-making process, establish an algorithm audit and accountability mechanism, and effectively curb algorithm abuse and invisible exploitation. The EU's General Data Protection Regulation (GDPR) provides a useful legislative example for this and lays a solid legal foundation for algorithm transparency. In addition, promoting algorithm open source and algorithm ethical review is also an important way to improve algorithm transparency and help build a fairer and transparent algorithm ecology. At the same time, the data

democratization process is indispensable. As the core means of production of digital labor, data monopoly is the key economic root of alienation. Therefore, we should break the data barriers of platform enterprises by establishing a public data pool and data sharing platform, so as to realize the fair distribution and efficient utilization of data resources. This can not only promote the social use of data but also stimulate the vitality of innovation and promote the healthy development of the digital economy.

4.2. Institutional innovation: Building a legal framework and policy system adapting to the characteristics of digital labor

Institutional innovation is the fundamental guarantee to deal with the alienation of digital labor. In view of the new characteristics of digital labor, it is urgent to formulate special laws and regulations, clarify the scope of protection of the rights and interests of digital workers, and take specific measures, covering the protection of data rights and interests, the review of algorithm fairness, and the improvement of the social security system^[3]. Ensuring that digital workers enjoy the same rights and interests as traditional workers through legislation is the key to building a fair digital labor ecology. In addition, in view of the characteristics of the platform economy, a suitable social security system should be established: set up a social insurance fund for platform workers, provide flexible and diverse social security services, and ensure that digital workers can obtain timely and effective protection in the face of risks. At the same time, it is also an important part of institutional innovation to strengthen anti-monopoly and fair competition supervision, prevent platform enterprises from abusing market dominance, and maintain a fair competition order in the digital market.

4.3. Empowerment of workers: Strengthening organizational construction and improving digital literacy

Labor empowerment is the core strategy to deal with the alienation of digital labor. In view of the characteristics of decentralization and individualization of workers in the platform economy, researchers should actively explore the establishment of new digital workers' autonomous organizations, which can realize the democratization and autonomy of labor relations through the common ownership and operation platform of workers. At the same time, the use of online labor communities and digital labor unions, and other platforms to enhance the collective action ability and self-protection awareness of workers. In terms of improving workers' digital literacy and skills, it is necessary to provide comprehensive digital skills training and education services to help workers master new technologies and tools, and enhance their competitiveness and adaptability in the digital labor market. In addition, it is also important to promote the participation of workers in algorithm governance: by establishing a mechanism for workers' representatives to participate in algorithm design and review, the fairness and transparency of algorithm decision-making can be ensured, and the abuse of algorithms can be effectively curbed.

4.4. Cultural reconstruction: Reconstruction of labor value and social identity system

Cultural remodeling also plays an important role in dealing with the alienation of digital labor. The virtualization characteristics of digital labor make it difficult for workers to intuitively perceive the social value of labor. Therefore, it is necessary to enhance society's cognition and respect for digital labor through media publicity, social education, and other ways, and reconstruct the labor value system and social identity system. This helps to enhance the professional pride and sense of belonging of workers and alleviate the negative impact of alienation. At the same time, advocating technical ethics and social responsibility is also an important aspect of cultural

remodeling: the application of digital technology should follow ethical principles and social responsibility standards to prevent the abuse and alienation of technology. By formulating technical ethical standards and social responsibility standards, enterprises and developers are guided to pay attention to the ethical impact and social value of technology, and promote the healthy development and wide application of digital technology. In addition, building an inclusive digital culture is also an important strategy to deal with the alienation of digital labor. The globalization characteristics of digital labor alienation require us to build a more inclusive and open digital ecology at the cultural level. Through cross-cultural communication and training programs, we can enhance the cultural inclusiveness and global vision of workers, promote the communication and cooperation of workers with different cultural backgrounds, and jointly promote the prosperity and development of the digital economy.

5. Conclusion

At the moment of the digital wave sweeping the world, the research on the transformation mechanism of digital labor and alienated labor not only provides a new interpretation perspective for Marx's alienated labor theory, but also profoundly reveals the fundamental changes of labor form in the digital era. Through this research, people can more clearly understand the challenges and opportunities brought by digital technology while promoting social progress. In the future, people need to face the digital technology change with a more open and inclusive attitude, actively explore its liberation potential, and promote the benign interaction between technological progress and social development. At the same time, people must always be vigilant against the risks and challenges of digital labor alienation, and gradually eliminate its negative effects by deepening research, improving laws and regulations, and strengthening supervision. Finally, under the impetus of digital technology, people expect to realize the true liberation of labor and the comprehensive fairness and justice of society, and build a better and harmonious social future.

Disclosure statement

The authors declare no conflict of interest.

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