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ARTÍCULO DE INVESTIGACIÓN

La alienación del trabajo en la era digital

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Resumen: Basándose en la metodología marxista, este artículo dilucida el concepto de alienación del trabajo e identifica sus nuevas manifestaciones en la era digital: la alienación del trabajo expresada a través de la alienación de la ciencia y la tecnología; la degradación del trabajo a actividades «inútiles», convirtiendo a los humanos en seres «sin sentido»; y la transformación de los trabajadores en entidades privadas de libertad. Junto a la alienación del trabajo están las agudas contradicciones entre capital y trabajo, que presagian nuevas crisis sociales en el futuro. Además de la base teórica marxista, el estudio emplea el método de análisis documental para recopilar y examinar trabajos académicos, informes internacionales e investigaciones empíricas sobre la alienación laboral en la era digital. Este enfoque metodológico sirve como base sólida para proponer varias soluciones para mitigar la alienación laboral en la actual era digital, incluyendo la gestión de la propiedad de los medios de producción digitales -más críticamente, el control de la propiedad de los big data-; el fomento del desarrollo de la tecnología en una dirección democrática y civilizada; y el avance del desarrollo humano integral.

Palabras clave: alienación laboral, era digital, contradicciones en la era digital, trabajo en la era digital.

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The alienation of labor in the digital era

Abstract: Based on the Marxist methodology, this article elucidates the concept of labor alienation and identifies its new manifestations in the digital era: alienation of labor as expressed through the alienation of science and technology; the downgrading of labor into "useless" activities, rendering humans into "meaningless" beings; and the transformation of workers into entities deprived of freedom. Alongside labor alienation are the sharp contradictions between capital and labor, foreshadowing new societal crises in the future. In addition to the Marxist theoretical foundation, the study employs the documentary analysis method to collect and examine academic works, international reports, and empirical research on labor alienation in the digital age. This methodological approach serves as a solid basis for proposing several solutions to mitigate labor alienation in the current digital era, including managing the ownership of digital means of production—most critically, controlling the ownership of big data; fostering the development of technology in a democratic and civilized direction; and advancing comprehensive human development.

Keywords: labor alienation, digital era, contradictions in the digital age, labor in the digital era.

INTRODUCTION

The digital industrial revolution is profoundly impacting all aspects of societal life today. It is constantly and rapidly reshaping humanity's way of existence. While the issue of labor alienation has existed in previous eras, it manifests more acutely in the digital era. For instance, with the explosive growth of big data and artificial intelligence (AI), humans are increasingly replaced not only in manual labor but also in intellectual work. Widespread unemployment is expected to pose significant challenges to nations worldwide. Moreover, the accumulation and concentration of the most critical means of production today—big data—into the hands of a few large capitalist corporations will exacerbate imbalances in production. Quantitative algorithms capable of analyzing the inner world of workers (emotions, thoughts, perspectives, etc.) are emerging, leading to new manifestations of labor alienation. Workers are not only alienated into a state of uselessness but also into states of unfreedom and meaninglessness. This article employs the methodology of historical materialism to view the development of the digital era as a necessary outcome of the advancement of industrial production forces. From this perspective, the article proposes solutions to mitigate labor alienation in the digital age.The study focuses on analyzing the globally pervasive nature of labor alienation within the context of the rapid advancement of digital technology and comprehensive digital transformation worldwide. The manifestations of labor alienation are explored primarily through the theoretical framework of Marxist philosophy and international academic works, aiming to highlight the universal impact of technology on labor, transcending national or regional boundaries. However, as a theoretical and solution-oriented study, the article does not delve into empirical verification through specific data or case studies. This limitation presents challenges in directly applying the proposed solutions in practice or evaluating their effectiveness. With a global orientation and long-term vision, this research aspires to provide a critical theoretical foundation for researchers, policymakers, and international organizations in addressing the labor challenges brought forth by the digital era.

LITERATURE REVIEW:

There have been numerous studies focusing on the aspect of labor alienation in the modern context. Some notable works include:

International Studies:

Christian Fuchs (2013), in his book "Digital Labour and Karl Marx", analyzes how Marx's theories on labor and alienation are applied to the digital economy. The study emphasizes that digital labor is not only exploited as physical labor but also commodified in the form of informational and knowledge value. This raises new issues regarding labor rights in online environments. He compares this to unpaid labor, viewing it as a modern form of alienation. Fuchs also underscores the importance of rethinking class struggle in the digital realm. Fuchs (2013) argues that:

> Digital labor under capitalism mirrors traditional forms of labor exploitation, yet it extends beyond physical labor to the realm of knowledge and information. The commodification of digital labor transforms how value is created and extracted in the information age (p. 45).

Phoebe V. Moore (2018), in "The Quantified Self in Precarity: Work, Technology, and What Counts", delves into the impact of quantification technologies on modern labor. The author argues that the monitoring and surveillance of workers' emotions through technological devices lead to a loss of both physical and mental freedom, increasing stress and pressure in the workplace. Continuous tracking creates a sense of insecurity, as workers are constantly required to validate their performance through numerical metrics.

In another study, Moore explores labor alienation in the digital environment by applying Marxist concepts. The article focuses on how productivity monitoring platforms and micromanagement through technology lead to a sense of workers losing control over their jobs. Moore argues that the reliance on surveillance technologies exacerbates alienation, transforming humans into tools for the digital system rather than being its subjects. The author contends that measuring emotional labor is not aimed at compensating employees but at managing and predicting their potential breakdown or resistance:

> New uses of technologies in the quantified workplace are part of an emerging form of updated Taylorism, that is, processes of subordination, where quantification of new areas of work through tracking technologies may help corporations keep up with cut-throat competition (Moore, 2018, p. 24).

This process, Moore suggests, can deepen alienation and increase corporate control over employees' personal lives and emotions. Furthermore, the study warns of the development of modern Taylorism, where digitized technologies are reshaping labor relations and requiring employees to continually self-manage and adapt in order to survive in an increasingly dynamic work environment.

Research in Vietnam:

Nguyễn Thanh Huyền (2007), in her book "Karl Marx's Concept of Alienation and Its Significance for the Development of the Vietnamese People Today", provides a comprehensive overview of Marx's theory of alienation and applies it to analyze the issues faced by Vietnamese people under the impacts of a market economy and globalization. This study proposes several solutions to eliminate alienation and foster comprehensive human development in Vietnam.

Research Gaps:

The aforementioned studies primarily focus on describing the manifestations of labor alienation in the digital era or predicting the losses that labor might face. However, they fail to adequately address: The new manifestations of labor alienation in the context of comprehensive digital transformation; The specific challenges faced by capitalism in addressing labor alienation during the digital era; The root causes and specific solutions to mitigate this issue in the future.

New Contributions of the Research:

The author's research not only inherits theoretical insights from previous studies but also focuses on: Generalizing the new manifestations of labor alienation in the digital era, such as alienation through science and technology, the loss of freedom in workers' consciousness, and the prediction of crises within capitalism; Identifying the root causes of alienation, stemming from the ownership of digital means of production and the division of labor in society, closely tied to the domination of large technological corporations; Proposing specific solutions to control data ownership, promote the development of humane science and technology, and foster comprehensive human development.

METHOD

This study employs dialectical materialism and historical materialism as its methodological framework: Dialectical materialism: It examines the contradictions between capital and labor as reflections of the conflict between the relations of production and the forces of production. The root cause of labor alienation is identified as the private ownership of the means of production. Historical materialism: This approach focuses on the material conditions of the digital production system, where labor alienation has intensified and reveals new manifestations, challenging the core values of human existence. Additionally, the study utilizes an interdisciplinary approach, integrating philosophy, data science, and economics to analyze the impacts of labor alienation on modern society.

The document analysis method was employed to collect and study academic works, international reports, and practical research related to labor alienation in the digital era. Notably, works such as "Digital Labour and Karl Marx" by Fuchs and "The Quantified Self in Precarity: Work, Technology and What Counts" by Phoebe V. Moore, along with other reputable studies, were thoroughly analyzed to establish the theoretical foundation for this article. Additionally, the deductive and synthesis methods were used to forecast future developmental trends and propose solutions to mitigate labor alienation in the digital era. This approach not only ensures objectivity and scientific rigor but also provides a comprehensive perspective.

RESULTS AND DISCUSSION

1. Marxist Theory of Labor Alienation

Alienation is a concept used to describe the transformation and change of an object in a way that contradicts its inherent nature. According to the Concise Dictionary of Philosophy (1987), alienation, in its objective form, manifests as resistance to the inhuman qualities of private property relations. Alienation has been explored in the philosophies of Hegel and Feuerbach: for Hegel, it is the alienation of the world spirit; for Feuerbach, it is the alienation of religion. Unlike his predeces-

sors, Karl Marx clarified the concept of alienation in labor and outlined a path for overcoming it. In Marx's view, labor is an activity performed by a living person, requiring the expenditure of physical energy to operate tools and the entire system of production. Labor is described as "living" because it is rooted in human life. When this energy is depleted, it must be regenerated. Marx defines labor power in Capital:

> By labor power or capacity for labor is to be understood the aggregate of those mental and physical capabilities existing in a human being, which he exercises whenever he produces a use-value of any kind (Marx & Engels, 1994, p. 251).

In the context of capitalism, Marx's theory of labor alienation can be summarized as follows:

Alienation of Workers from the Product of Labor

In capitalism, labor power does not belong to the worker, and thus the results of labor do not belong to them either. The product of labor becomes an independent entity that dominates the worker:

> The object produced by labor, its product, now stands opposed to it as an alien being, as a power independent of the producer (Marx & Engels, 2000a, p.128).

The more goods a worker produces, the cheaper their labor power becomes. As the value of the material world increases, the value of the human world diminishes. The worker, once the subject who creates the product, becomes subordinate to the product and must adhere to its inherent rules.

Alienation in the Act of Labor

In the capitalist mode of production, human labor power is reduced to the basic physical forces required to operate machinery. Under such conditions, the humanistic qualities of labor are degraded. Labor is reduced to "bare exertion," increasingly characterized by mechanical and simplistic tasks. This represents a dehumanization of labor, as the work performed no longer requires any special qualities. At this point, labor power is merely a combination of raw muscles, nerves, and a basic brain, used to perform repetitive tasks in assembly lines controlled by simple mechanisms.

Labor, as an activity, becomes an external burden, imprisoning the worker's body and mind. This results in a paradoxical reversal: workers feel free only when engaging in instinctual behaviors akin to those of animals, such as eating, drinking, procreating, dwelling, or moving. Conversely, in labor—the uniquely human activity—workers feel reduced to the state of animals. What is intrinsic to animals becomes the role of humans, and what is uniquely human becomes intrinsic to animals (Marx & Engels, 1994).

> The worker does not labor to satisfy a need for work itself, but rather as a means to satisfy other needs. This is forced labor, which transforms the species-being of human life into a mere instrument for maintaining individual existence (Marx & Engels, 2000a, p.135).

Human Alienation Through Labor

In transforming the material world, humans affirm themselves as species-beings because human life activity is conscious activity. Through labor, humans elevate themselves and distinguish themselves from the animal world. However, when

> Alienated labor estranges the physical body of man, the natural environment outside him, and the spiritual essence of man—his human essence—it becomes alien to him (Marx & Engels, 2000a, p.138).

Under these circumstances, labor and life activities are reduced to merely maintaining physical survival. The result of this alienation from the product of their labor, from their life activity, and from their species-being leads to the alienation of humans from one another:

> When man is confronted with himself, he is also confronted with other men (Marx & Engels, 2000a, p.138).

In summary, Marx's theory of labor alienation reflects the reality of capitalist production. While capitalism generates unprecedented productivity, it simultaneously reduces labor to a fragmented, dehumanized activity, stripping it of its intrinsic human essence.

2. New Manifestations of Labor Alienation in the Digital Era

In the digital era, Marx's theory of labor alienation retains its relevance while gaining new and more subtle manifestations. These are reflected as follows:

Labor Alienation through the Alienation of Science and Technology

As early as the 19th century, Marx pointed out the dual nature of technological advancements: they not only facilitate human production but also bring poverty and misery to workers. In capitalist society, machines do not directly function to alleviate human labor; instead, they serve as tools for increasing surplus value for capitalists. Humans fundamentally possess two forms of labor power—manual and intellectual. In previous eras, when machines replaced manual labor, humans could still engage in intellectual labor. However, in the digital era, artificial intelligence (AI) is replacing humans even in intellectual labor, leading to a new form of alienation—alienation into "uselessness." This concept reflects the large-scale loss of jobs for workers in the digital age. Researchers Carl Benedikt Frey and Michael Osborne from Oxford University project that by 2033, 94% of paralegals, 97% of cashiers, 96% of chefs, 98% of sports referees, 94% of waitstaff, and 99% of telemarketers and insurance agents will become redundant, replaced by robots or algorithms. Jobs least likely to be replaced by AI are those that are low-profit yet extremely challenging (Frey & Osborne, 2013). This reveals a paradox: while humans invent AI through technological advancements to increase labor productivity, these tools, in turn, strip the majority of workers of their value as employable labor. AI essentially digitizes human cognitive processes based on large-scale data. With computation speeds vastly superior to the human brain, AI outperforms humans in specialized fields, further exacerbating labor alienation.

Of course, new jobs have emerged, such as virtual world designers or AI programmers. However, these professions demand a high degree of creativity and flexibility, which only an elite group of workers can meet. Even for those capable of taking on these roles, the rapid pace of digitization imposes immense pressure. They must constantly race against the advancement of intelligent machines. This relentless pressure leads to stress and psychological harm, explaining the rise of stress-related disorders, depression, and even suicide in modern society. Labor no longer enhances human life, joy, or happiness; instead, it exhausts individuals both physically and mentally, sometimes pushing them toward self-destruction.

When Labor Is Downgraded to "Useless" Activities, Humans Become "Meaningless" Beings

The use of machinery in capitalist production renders humans increasingly dependent on machines. Marx predicted:

> All our inventions and progress appear to result in endowing material forces with intellectual life, and in degrading human life into a mere physical existence. (Marx & Engels, 2000b, p.10).

In the digital era, the emergence of AI appears to imbue machines with a form of intellectual life, while workers themselves become increasingly hollow. Labor, once intrinsic to humans, allowed them to transform nature and, in doing so, transform themselves, elevating their existence above the animal world. Humans differ from animals in their ability to labor and create in their work:

> An animal produces only what it immediately needs for itself or its young, whereas man produces universally; he produces in freedom from physical need, and only truly produces in freedom. Man therefore forms things in accordance with the laws of beauty. (Marx & Engels, 2000a, p.137).

However, in the digital age, humans are gradually losing their creativity, instead following the programming of machines. Intelligent machines reduce labor to its simplest expressions, eliminating the need for skills, judgment, and even physical exertion. These formerly essential human qualities are no longer required, as machines dominate more aspects of work.

Humans gradually lose trust in their own judgment and willpower when machines can perform these functions better. As algorithms make increasingly accurate decisions, people begin to lose faith in their emotions and personal agency. This process signifies a shift in decision-making authority from individual will to intelligent algorithms. At this point, human existence becomes "meaningless."

> The Frankfurt School of Neo-Marxism described this phenomenon as: "Regression concealed within progress, barbarism accompanying civilization; the greater the progress, the deeper the regression, and the more developed the civilization, the greater the threat of barbarism" (Lưu, 2004, p. 684).

Workers Become Entities Deprived of Freedom

Previously, workers were only deprived of freedom in their labor activities (as their labor power belonged to others). However, today they are also losing freedom in their consciousness and thoughts. Through big data technology, the entire inner world of humans can be measured and quantified. This data enables algorithms to understand the internal world of individuals and guide decisions according to the intentions of those who control the data.

To enhance labor productivity, new technologies have emerged, such as Affective and Emotional Labour, which involves emotions, mental states, and interactions with customers or colleagues. According to Moore (2018b), the measurement and monitoring of emotions have become tools to assess employee productivity and adaptability. The measurement of emotional labor is not aimed at compensating employees but rather at managing and predicting their potential collapse or resistance:

> Workers are subject to increasingly intimate tracking and monitoring and their every move surveilled. Agile workers are prepared for constant change, happy to make personal changes, always on the move, always trackable (Moore, 2018b, p.9).

If this technology continues to develop, employers could understand workers' thoughts in real-time, every second and minute. At that point, workers would lose freedom not only in their physical world but also in their mental world. When the inner world is guided by algorithms and this extends into the socio-political realm, humans will become "digital slaves" living in "digital dictatorships," controlled by the owners of "omnipotent" algorithms, all under the guise of a new form of democracy and freedom.

3. The Alienation of Labor in the Digital Age Foreshadows a New Crisis of Capitalism

Since its inception, capitalism has undergone cyclical crises, as such crises are inherent to its nature. The first major crisis was the Great Depression and economic downturn of 1929–1933, during which millions of tons of goods were discarded into the sea because they could not be sold. This was the result of anarchic commodity production, where supply exceeded society's purchasing capacity. Millions of people starved, and hyperinflation devastated Germany and several Western European countries. Capitalism nearly collapsed had it not reformed itself under the New Deal policy initiated by Franklin D. Roosevelt and the effective demand theory of J.M. Keynes. The second crisis stemmed from the sudden contraction of physical space, marked by the collapse of large sections of colonial systems following World War II. The rise of working-class movements and the strengthening of socialist tendencies within capitalist societies forced capitalism to adapt for survival and growth. The third crisis occurred between 1974 and 1975, commonly referred to as the oil crisis. A sharp rise in oil prices caused the average profit rate of capital to plummet rapidly. Fundamentally, this was a crisis linked to the limits of profit rates. Physical space became constrained (due to resource depletion), while the accelerated development of new technological forces significantly impacted capital's profit margins. The productive capacities of technologically advanced nations became excessively large, while the markets approached saturation. Between 1990 and 1995, global industrial production grew by only 10%, while global trade increased by 43%, yet products remained unsold (Đỗ, 2003, p. 29–30). The issue was not a lack of societal demand but the inability of many individuals to afford goods at a level that would ensure sufficient profitability for capitalists. The only solutions were to innovate new technologies that reduced production costs, thereby increasing consumer purchasing power, or to create novel technologies capable of generating extraordinary profits.

The advent of a new scientific and technological revolution, spearheaded by information technology and the transition to a knowledge economy, along with the acceleration of globalization (essentially the expansion of the global capitalist market), has become the primary lifeline for contemporary capitalism. The Fourth Industrial Revolution—marked by digitalization—emerged within this context. The achievements of digital transformation have significantly increased labor productivity and reduced production costs, thereby stimulating consumer demand, precisely aligning with the objectives of capitalism. However, the downside of this process is a decreasing need for "living" labor, which inevitably leads to widespread unemployment. In modern society, the working class simultaneously assumes two roles: as laborers and as consumers. When workers are unemployed and have no income, they lose their purchasing power for the goods and products manufactured by

capitalists. While the digital economy creates limitless productive capacity, society lacks the means to afford it. This paradox poses not only a catastrophe for workers but also a crisis for capitalists, as their goods remain unsold. This is a vivid manifestation of the contradiction between the socialized forces of production and the privatized capitalist relations of production over the means of production in the digital age.

The new manifestations of labor alienation in the digital age foreshadow a fresh crisis for capitalism. It appears that in anticipation of the seismic shifts brought about by the digital era, capitalist governments are currently implementing a series of measures to tighten control over digital technology platforms. Historically, every time a crisis arises, capitalism adapts and adjusts itself to progress into a new phase of development. However, all such efforts remain temporary, as the fundamental contradictions of capitalism are merely "preserved in cold storage" within these societies.

4. The Causes of Labor Alienation in the Digital Age

Karl Marx identified the causes of labor alienation as rooted in the capitalist system of private ownership of the means of production and the antagonistic nature of the division of labor. In the digital age, this observation remains highly relevant.

First, the capitalist private ownership of the means of production continues to drive labor alienation. As Marx noted,

> Machinery is humanity's triumph over the forces of nature, yet its capitalist use enslaves humans to those forces (Marx & Engels, 1995, p. 630–631).

. In the digital era, artificial intelligence (AI) is not inherently the cause of labor alienation; rather, it is its application within the capitalist system that exacerbates this condition. Fundamentally, the root cause lies in the capitalist private ownership of the means of production. Today, big data has become the most crucial input for intelligent production processes. Thus, ownership of data equates to ownership of the means of production. A vast amount of information that was previously impossible to quantify, store, analyze, or share has now been transformed into data in the digital era. The ability to possess a large volume of data, even if much of it remains unrefined, has opened new doors for deeper insights into our world (Mayer-Schönberger & Cukier, 2020). Consequently, data has become a valuable asset that can be owned and traded. Furthermore, data is increasingly becoming a critical resource with the potential to be monopolized within the framework of the market economy. The more data is accumulated, the easier it becomes to create intelligent algorithms.

Currently, the vast reservoirs of data in capitalist countries remain under private ownership. If data ownership continues to be dominated by private corporations, these data repositories will primarily serve the purpose of maximizing economic profits for these corporations. They will develop big data technologies to optimize profits, with little concern for the risks of labor alienation. Capitalists who own large datasets and intelligent machines use these tools to increase surplus value, turning these extraordinary instruments into vivid examples of the dominance of "reified labor" over "living labor." As intelligent algorithms push humans out of the labor market, wealth and power become increasingly concentrated in the hands of a small, extremely wealthy class that owns these algorithms. This dynamic gives rise to some of the most acute manifestations of labor alienation.

Second, the Division of Labor in Society. Karl Marx asserted that:

> The division of labor and private ownership… are synonymous terms: the first is viewed in terms of activity, and the second in terms of the products of that activity (Marx & Engels, 2004, p. 46).

Different stages of the division of labor also correspond to different forms of ownership. The division of labor in society serves as the foundation for specialization in production, resulting in groups of people being perpetually dependent on specific types of work. Today, humans are increasingly vulnerable to replacement by machines—not only because algorithms are becoming more intelligent but also because humans are becoming more specialized. Individuals often belong to narrowly defined fields, making it much easier for AI to replace them. This is because AI is fundamentally designed to digitize and automate repetitive human tasks. While the prospect of AI replicating a fully human-like version remains unlikely, it only needs to surpass human capability in a specific, specialized area to push humans out of the labor market. In capitalist societies, new tools and technologies have always competed with workers from the moment their economic advantages become evident. These advantages are only accessible to those who own the means of production. AI becomes a direct competitor to workers when it is owned and controlled by capitalists.

5. Solutions to Address Labor Alienation in the Digital Age

First, Controlling Data Ownership

In the digital age, capitalists who own data and intelligent machines have gained disproportionate benefits, while workers have lost everything, including the ability to sell their labor power. This severe imbalance is a defining feature of the digital era. According to Marx, imbalance is an inherent characteristic of commodity production, but in the digital age, it has reached its peak. Data, now the essential input for AI and other intelligent algorithms, must be recognized as a means of production—owning large datasets is tantamount to owning the means of production. However, data is far more difficult to control than land or machinery because it is omnipresent, entirely intangible, infinitely replicable, and can travel at the speed of light. For the vast reservoirs of data that humanity generates daily, it is not only necessary to revolutionize their transformation into social ownership but also to establish entirely new mechanisms of control, distinct from those used for traditional resources.

If humanity wishes to prevent the concentration of wealth and power in the hands of a small elite, the solution lies in regulating data ownership. As Harari states,

> In the 21st century, data will eclipse the importance of land and machinery to become the most critical asset, and politics will be a battle to control the flow of data (Harari, 2019, p. 105).

The question of how to regulate data is the most pressing political challenge of this era. Currently, large data corporations such as Google, Facebook, Twitter, and YouTube control the data of billions of users. How to manage these vast data repositories remains a complex issue. There are no guarantees that these corporations will not form alliances with businesses or political groups to leverage algorithms for manipulating and influencing users.

The UNDP asserts that:

> Current technological advancements will require stronger antitrust policies and laws to ethically regulate the use of data and artificial intelligence (p. 19).

Strengthening the legal framework and regulatory measures for data governance is a key solution to mitigating the negative impacts of data monopoly on equality and democracy. First and foremost, it is essential to enact and enforce antitrust laws specifically targeting data monopolies. Such measures can curb the accumulation of excessive data by large technology corporations, which creates unfair advantages and facilitates social manipulation. Requiring the sharing of critical data with independent agencies or the scientific community could help reduce monopolies and enhance transparency. Additionally, laws protecting personal data must be established, akin to the General Data Protection Regulation (GDPR) of the European Union. These regulations ensure user privacy while preventing the misuse of data for surveillance, analysis, or discriminatory practices (European Union, 2016). Another critical requirement is to increase transparency in the operations of technology companies. They must disclose how they collect, use, and develop data and algorithms for decision-making, enabling users to understand and monitor the impact of data on their rights. Strengthening the legal framework not only helps regulate the power of data monopolies but also ensures fairness, transparency, and the protection of citizens' rights in the digital age.

Establishing independent oversight mechanisms is an urgent requirement for controlling data exploitation and usage, while enhancing transparency and fairness in the digital environment. First, it is essential to establish data governance bodies at national or international levels. These bodies would be tasked with monitoring the data exploitation activities of technology corporations and ensuring compliance with legal regulations. Such institutions would also bear the responsibility of supervising, evaluating, and addressing violations related to personal data and data transparency.

Technological changes do not occur in isolation; they are shaped by economic and social processes. These changes are the result of human action. Policymakers can steer technological advancements in ways that enhance social equity. For example, artificial intelligence may replace tasks traditionally performed by humans, but it can also rejuvenate labor by creating new tasks for people, generating positive effects that have the potential to reduce inequality.

Second, Utilizing Science and Technology to Address Labor Alienation

The digital age not only alienates workers but also transforms capitalists, who cease to remain their authentic selves. Capitalists must fiercely compete to expand markets and pursue profits, but industrial civilization is reaching its limits, with everything gradually approaching a breaking point. In this struggle for survival, capitalists increasingly undermine each other, losing their "species essence" in the process. As a result, the development of science and technology further deepens the fundamental contradictions of capitalism. Workers, therefore, need to view science and technology as a new resource for self-liberation. Developing technology and decentralized governance mechanisms is a crucial solution to minimize the negative effects of labor alienation. For instance, blockchain technology can be employed to manage and distribute data in a decentralized manner. Blockchain functions as a transparent and secure digital ledger, ensuring data security, integrity, and preventing monopolies by eliminating centralized control over data by a few entities or individuals. Compared to traditional technologies, blockchain stands out due to its decentralized nature,

data traceability, and resistance to tampering. These characteristics make blockchain a critical tool in combating news fraud, protecting intellectual property rights, and enhancing transparency in governance issues. Additionally, open data models should be promoted to develop transparent and publicly accessible data systems, allowing equal participation of individuals and organizations under neutral oversight. This approach strengthens fairness and limits the concentration of data power in the hands of a few entities.

Moreover, privacy-protecting technologies such as data encryption and ethical AI must also be developed to prevent the misuse of data for citizen surveillance or discriminatory purposes (AI Now Institute, 2019). The establishment of an interdisciplinary and international AI Ethics Council is essential. This council would evaluate and audit AI systems to ensure that they operate transparently, fairly, and without creating forms of discrimination. The council could propose ethical standards, provide guidance for technology developers, and act as a safeguard to mitigate societal harms. Establishing independent oversight mechanisms would bolster public trust and ensure that AI systems and data serve the common good without conflicting with human interests.

Moreover, halting the development of digital technology is impossible. However, we must implement solutions to guide its growth toward a more humane and democratic direction, ensuring that science and technology serve humanity rather than profit. When this is achieved, labor will return to its original essence—voluntary, conscious, and dignified—labor as a source of glory.

Third, Developing Holistic Human Potential

To liberate humanity from labor alienation, it is not sufficient to merely regulate data ownership; a comprehensive strategy for holistic human development is also required. The causes of labor alienation are not only tied to the ownership of the means of production but also to the social division of labor, which leads to excessive specialization. While specialization increases labor productivity, it also pushes humans toward one-sided, fragmented development, making them easily replaceable by AI. How can we continue developing these technologies while ensuring employment opportunities for humans? We must revisit Karl Marx's perspective: allowing individuals to work with passion and according to their intrinsic needs, liberating them from the specialized labor dictated by the social division of labor. He wrote:

> No one is restricted to a single, exclusive sphere of activity, but each individual can develop themselves in any field they prefer, with society regulating production so that I can hunt in the morning, fish in the afternoon, rear cattle in the evening, and engage in critical reflection after dinner, as I please, without ever becoming a hunter, fisherman, herdsman, or critic (Marx & Engels, 2004, p. 47).

This idea represents an early concept of holistic human development in Marx's philosophy. Holistic development does not mean excelling in every field but rather cultivating all four dimensions—physical, intellectual, emotional, and spiritual—enabling individuals to find happiness and balance in life. Additionally, the exploration of human potential and abilities must also take a more comprehensive approach. Currently, we invest heavily in developing artificial intelligence but far too little in understanding human consciousness. This imbalance may lead to AI developing too rapidly while human consciousness remains underexplored. To prevent such outcomes, alongside investing in AI development, we must also invest in researching human consciousness. So far, humanity

has no clear understanding of the full extent of human potential because we know too little about consciousness. As Harari describes, human consciousness remains a vast, uncharted ocean, with our current research akin to a small boat on its surface (2018).

CONCLUSION

The digital age is unlocking limitless potential for socio-economic development while simultaneously presenting unprecedented challenges to the future of society. This is because the private ownership of the means of production, particularly the private ownership of big data in this era, exacerbates the problem of labor alienation, ultimately leading to human alienation. This alienation will become an "intolerable force," one that compels revolutionary action, as it reduces the majority of humanity to trivial, hollow, and unemployable existences, starkly contradicting a world brimming with wealth and knowledge (Marx & Engels, 2004). If the new manifestations of labor alienation are not recognized and addressed, they will deepen the conflicts and contradictions of modern society, leading to fresh economic and social crises in the future. Therefore, solutions to overcome labor alienation must be implemented immediately.

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