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Research on the Antinomy of Production in the Artificial Intelligence Era

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Abstract: With the advent of the AI era, AI technology can greatly improve labor productivity. However, the force of capital also makes the relationship between AI and humans increasingly complex, and the concealment of capital exploitation becomes stronger. Regarding the new phenomena occurring in the AI era, we can use relevant theories of Marxist economics for analysis. For example, we can use "the continuous rise of the organic composition of capital" and "the law of the long-term decline of the rate of profi t" to analyze the antinomy of production in the AI era. At the same time, we must realize that only under the socialist system can we use the power of the system to restrain capital and make capital serve the people.

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In today's era, we have inevitably arrived at the age of artifi cial intelligence. The impact of the AI era on people's production and lifestyles is comprehensive. The advent of a new era cannot be smooth sailing; it may bring about a leapfrog growth in productivity, or it may bring about many diffi culties in people's material and spiritual lives. Facing this transformation, we should neither panic nor take it lightly, but we should treat this era's changes with a positive and prudent attitude.

Based on this, standing from the perspective of political economy, this paper uses the basic principles of Marxism to analyze the changes in the production fi eld brought about by the AI era, with the aim of helping to improve people's understanding.

1. Invisible Laborers in the AI Era

From the Marxist perspective, only living labor is the sole source of value creation. Various factors of production generate use-value through the production process, but only living labor that produces products or services for others is the sole source of value . Similarly, it is this living labor that binds people into certain production relations, thereby creating a complex social structure. Dead labor can only transfer value, and capitalists become rich by appropriating the surplus labor of workers without compensation.

As humanity enters the age of artifi cial intelligence, the essence of capitalists acquiring wealth cannot change, but the form of acquiring wealth becomes extremely hidden, even giving people an illusion: Has capital exploitation disappeared in the AI era? Has the secret of capital exploitation pointed out by Marx ceased to function?

The truth never fl oats on the surface; it always requires your serious thinking and practice to be realized. With the advent of the AI era, especially in its early stages, competition from various startup AI companies is extremely fi erce. Everyone wants to be the one to survive until the end and become the winner-takes-all. Therefore, various AI companies (especially

AI application companies) will try every possible way to provide "free" services to users. Only in this way can a "flywheel effect" be generated. The so-called flywheel effect is that to make a stationary and heavy flywheel rotate, every turn at the beginning requires a lot of effort. However, with the continuous accumulation of kinetic energy, after reaching a certain critical value, the flywheel's own gravity and inertia become part of the driving force. You don't need to exert much force, and the flywheel will rotate easily. The age of artificial intelligence is the same. The more users a large model has, and with users constantly participating in it, the more effective data will be generated. Large model companies can use this massive amount of data to continuously train and upgrade their equipment, while attracting more users to participate through publicity and word of mouth. In this cycle, they will occupy a place in the AI market, and even achieve a dominant position, forcing other large model companies to exit this market.

Marx have said:"Capital is not a thing ,but rather a definite social production relationg belonging to a specific historical socila l information ;it is embodied in a thing and endows this thing with a specific social character"[1]. From the perspective of Marxism, capital, as a special value invested in the production system to pursue value appreciation, spends its entire life pursuing self-expansion. Once it stops expanding, its life activity will also cease. "Capital has one sole life-principle ,the priniple of self-expansion"[2]. Capital always seeks profit; a business model with only input and no output is unsustainable. For various large model companies, the early free services are only temporary, and future charging is inevitable. Once they cultivate users' consumption habits and make everyone dependent on a certain type of large model, the profit-seeking nature of capital will be exposed.

For capital to make a profit, there must be corresponding investment. In the era of commodity economy, capital investment manifests as the purchase of large amounts of raw materials and the employment of industrial workers. However, in the AI era, whether it is the procurement of raw materials or the employment of industrial workers, it is extremely hidden.

In the actual operation process of large models, the service recipients become free industrial workers. They generate a large amount of useful data during their interaction on the platform. This data is occupied by the large models without compensation, and there is no need to provide any wages or remuneration to the service recipients. In this way, the vast number of users have become the data proletariat of production data, and capital forces have artificially created a place for external exploitation.

If we analyze it carefully, we will find that the products produced by large model companies can be divided into three parts. First is the "c" part, which consists of various AI servers and AI chips. These are "dead labor" that has accumulated in the past. These dead labor products will be transferred to new products through various consumptions in the future, and they will not generate new value. Secondly, there is the "v" part. The v part includes the wages, benefits, and housing provident funds of the AI company's employees, but it does not include the wages of digital laborers, because their contribution to the company is carried out in a very hidden form. They are not even aware that they have been employed, and their contributions have been occupied without compensation. As for the "m" part, it is the remaining part after paying for machinery and equipment and employee wages. This surplus value is appropriated by entrepreneurs without compensation.

Of course, you might say that currently, the services of most AI large model companies are free, and it is more of a time node where they are burning money. Right now, they don't care about making money at all. However, everyone must realize that this is just the beginning. As the timing matures, there is no such thing as a free lunch in the world. Capitalists must make a profit; otherwise, so many industrial funds would not give them such high valuations and compete to acquire corresponding shares of the company.

For platform capitalists, their prepaid cost is c+v, and the company's profit rate is reflected as the ratio of m to c+v. Compared with traditional industries, this result will appear: AI capital does not need to pay wages to the vast number of users, resulting in a significant reduction in wage costs. This also causes the increase of the denominator m. Furthermore, because the vast number of users use AI products at any time, this makes the living labor that continuously generates data become the new starting point for the next round of AI value addition.

2. Gig Workers in the AI Era

Although free labor in the AI era can significantly reduce company expenditures and increase the surplus value rate and profit

rate of AI companies, these free companies alone cannot push the company to a higher level; they are just the cornerstone of the development of AI companies. AI companies' demand for data is massive, and the requirements for data quality are also very high. For AI companies to reach a higher level, further actions are necessary. Therefore, the managers of AI companies will inevitably hire a large number of part-time personnel to provide them with large-scale data production, which gives rise to the so-called "gig economy".

In the era of the gig economy, the income and treatment of part-time workers are not static. At different stages of an AI company's development, their status on the enterprise platform will constantly change, and their compensation will naturally change as well. When their value to the platform becomes dispensable, they may become unemployed.

In the early stages of development in the AI era, capital is still quite some time away from profitability. Since it is currently in the early stages of industrial development, capital needs to continuously "burn money" and provide high subsidies to achieve growth.

At this juncture, capital will invest heavily to purchase the latest chips and equipment, while also paying the incomes of a large number of gig workers. At this stage, gig workers actually possess more bargaining power because capital is in its infancy and requires more support to grow rapidly. Therefore, platforms must provide gig workers with higher income and benefits. This creates an illusion among gig workers that making money in this industry is much easier than in traditional industries, attracting more practitioners to join.

Against the backdrop of a massive influx of practitioners, the relationship between labor and capital will reverse. The scarcity of part-time workers will decrease significantly, leading to a reduction in bargaining power. Job seekers will no longer be able to obtain the relatively generous returns of the early stages. With the emergence of compounding technological effects from the initial stages,a massive influx of gig workers will inevitably be driven out of the market.

Because AI capital has accumulated a lot of effective data in the early stages, technology undergoes iterative upgrades. To maximize their own interests, capital will inevitably seek further capital substitution, using new technologies to replace the input of living labor, thereby obtaining more profits. For example, capital can use AI technology to improve the quality and expand the scope of data searches. This directly threatens the gig economy. If part-time workers cannot obtain the income necessary for their basic livelihood and that of their families, as well as for training, they will have to seek other means of subsistence.

At this stage, an unresolvable deep-seated contradiction will form: with continuous technological progress, capital will spare no effort to use constant capital to replace the quantity of living labor. This will also shake the foundation of value appreciation, after all, living labor is the only source of creating new value. With the R&D achievements of the platform in the early stage are continuously put into use, and the large models are constantly trained. As a result, their inference efficiency becomes higher and higher, which leads to a marginal decrease in the proportion of living labor within the platform system.

In the later stage, as the platform gains an overwhelming advantage, or even achieves such dominance in a specific sub-category, this will inevitably bring about an overwhelming advantage of capital over labor. At this time, the rate of surplus value will definitely reach its peak, and this is also the moment when workers in this industry are most helpless.

Regarding this outcome, we can analyze it from two perspectives: macro and micro. If we analyze it from a micro perspective, this is certainly a good thing for an individual capital entity, as it has realized the substitution of living labor with capital, reducing workers' income to a very low level.Marx has said:"The capitalist must,like a vampire ,continuously exploit and suck the surplus value created by the living labour of the workers"[2]. However, standing from a macro perspective, for the entire society, the increment of total social wealth is manifested in the form of variable capital and surplus value. Dead labor can only realize the transfer of value. Therefore, the aggregate of the entire economic system actually experiences marginal diminishing returns. The widespread substitution by AI results in a decrease in total social employment and a massive increase in the unemployed population.

This forms a certain paradoxical force: in pursuit of capital appreciation, capital seeks massive opportunities to substitute living labor. However, the increase of living labor itself is the source of surplus value for capital. Capital tries every possible way to achieve cost savings, but ultimately causes a reduction in its own profits. This is like a boomerang, eventually

damaging the capital itself. If we look at it from this perspective, we can see that machines ultimately cannot replace humans; living labor in this world has irreplaceability. However, in the labor process of the AI era, workers become tools for capital discipline, degrading into AI serfs who can be replaced at any time.

3. Complex Labor in the AI Era

In the era of commodity economy, socially necessary labor time is inversely proportional to labor productivity. The higher the labor productivity, the less socially necessary labor time is required, and vice versa. In this case, to obtain (excess) surplus value, some enterprises will be motivated to continuously improve their own labor productivity. They will either achieve this goal by improving business management or by adopting new technologies.

After the advent of the AI era, this phenomenon will similarly occur. To secure potential future excess profits, some enterprises will continuously refine their product quality to guide consumer demand. In this way, various designers and product developers have taken the stage of history. They take creative activities as their core work. These workers do not necessarily have an employment relationship with AI enterprises; it may also be a cooperative relationship. They use various contracts as the bond of cooperation to share the final profits obtained.

In this process, creative workers do not engage in simple, repetitive work, as these tasks can be handled by ordinary large models. Instead, they focus on various types of creative labor, enhancing labor productivity and increasing the complexity of labor through such creative efforts.

From the perspective of Marx's labor theory of value, simple labor refers to labor that can be performed without specialized training, whereas complex labor refers to labor that requires specialized study, education, and training to master certain cultural knowledge and technical skills. Marx pointed out: "Complex labor is only simple labor multiplied by itself or, rather, several times simple labor." [3] In other words, a small amount of complex labor can be converted into a large amount of simple labor. The complex labor engaged in by creative workers, with the continuous increase in labor complexity, allows AI tools to undertake even more complex tasks. Meanwhile, with the help of AI tools, they can further engage in work that is much more complex than what AI can do, laying the foundation for the further upgrading of AI technology.

Therefore, with the further popularization of AI technology, technological upgrading is in a state of never resting. Because once one rests, they may be surpassed, and the technological barriers established in the early stage will fail at the last hurdle. Consequently, the focus of AI technological competition has shifted to whose innovation capability is higher and who can better solve the pain points arising during AI development. Under this path, AI creative workers can obtain higher treatment than ordinary AI workers. They will continuously undertake challenging work and high value-added projects, always ready to achieve epoch-making progress through innovative technology.

Due to the irreplace ability generated by the complex labor of creative workers, AI capital is also willing to pay them more remuneration. This is also a very cost-effective deal for AI capital,after all, the surplus value they can extract is correspondingly higher.

Actually, technology itself has no thoughts; it is value-neutral. That is to say, AI technology itself is value-neutral. However, after being utilized by the forces of capital, it develops certain contradictions. For ordinary practitioners in the AI industry, capital can turn them into cogs on an AI assembly line. For those engaged in more complex labor, capital can extract surplus value from them.

4. Production Antinomy in the AI Era

From AI's unpaid appropriation of user-provided data, to the wanton exploitation of gig workers, and further to the squeezing of creative workers, AI technology spares no effort in its attempts to discipline and squeeze living labor. However, this squeezing will inevitably form a boomerang that eventually strikes its own heart, causing a paradox of production. This production paradox is corely reflected in the opposition and contradiction formed by the continuous rise of the organic composition of capital and the continuous fall of the rate of profit.

As stated earlier, the widespread use of AI computing represents the advent of a new era. Relying on its powerful information processing and content generation capabilities, and empowered by electricity, the level of computing power will continuously

improve. Moreover, this improvement is ceaseless, day and night. AI computing is like a perpetual motion machine that never stops; it utilizes its own computing and operational capabilities—far exceeding those of traditional computers—to output data 24 hours a day without interruption. The popularization of AI computing power will undoubtedly bring about an increase in the productivity of the whole society and a huge growth in social wealth.

However, the growth driven by AI comes at a cost; it cannot be unassailable, otherwise, this society will fall into stagnation because the perfection brought by AI drives will leave the whole society lacking the motive force to move forward further.

However, the growth brought about by AI drives comes at a cost; it cannot be flawless, otherwise, this society would fall into stagnation, because the perfection brought by AI drives would leave the whole society lacking the motivation to move forward.

For the entire society, the development of AI technology presents a paradox. For the entire society, due to the continuous development of AI technology, the training and inference capabilities of large models have been significantly improved. This also drives capital forces to continuously expand capital expenditure to purchase more computing power and pursue higher-quality algorithms. These invested capitals cause the constant capital "c" to rise continuously. The reason why there is a driving force for the increase of constant capital "c" is that the demand for variable capital "v" will marginally decrease. Capital forces pursue using more machines to replace humans, which makes the organic composition of capital c/v rise continuously.

Marx has said:"I call that composition of capital which is determined by its technical composition ,and mirrors the changes in the latter,the organic composition of capital"[5]. The organic composition of capital is a core concept in Marxist political economy. It refers to the value composition of capital determined by the technical composition of capital and reflecting the technical composition. This involves two concepts—technical composition and value composition.

The so-called technical composition refers to the proportional relationship between a certain quantity of means of production and the workers using these means of production in the production process; the so-called value composition refers to the proportional relationship between constant capital and variable capital at the value level. With the continuous development of the economy, there will be a trend of decreasing demand for labor and an increasing effect of machine substitution for manual labor in the future.

The advent of the AI era cannot escape this trend either. Due to the widespread use of AI technology, the organic composition of capital continues to rise, forming a double-edged sword. On one hand, AI technology can continuously improve the productivity of enterprise workers, greatly enriching social wealth. On the other hand, the rate of increase of the rate of surplus value is not that fast. This makes the speed of the increase in the organic composition of capital higher than the speed of the increase in the rate of surplus value. This causes capital to increase AI R&D in pursuit of surplus value, but this kind of R&D weakens the foundation of its profit.

In the actual operation process, a paradox will arise. Capital forces use AI technology to pursue the increase of the profit rate, thereby continuously reducing the usage of variable capital to expand the profit rate of funds. However, this behavior objectively limits the increase of the profit rate. Thus, it can only strike a frantic balance between the increase of the organic composition of capital and the decline of the profit rate.

In fact, since the organic composition of capital is equal to c/v, and the profit rate is equal to m/(c+v), while the rate of surplus value is equal to m/v, it can be deduced that there is essentially an inverse relationship between the rate of profit and the organic composition of capital. An increase in the rate of profit will lead to a decrease in the organic composition of capital, and vice versa.

The introduction of AI technology naturally increases the investment in AI means of production such as models, equipment, and computing power, while simultaneously minimizing the consumption of living labor. This results in a continuous rise in the organic composition of capital. Even if the rate of surplus value increases in the future, it cannot offset the attrition caused by the rapid rise in the organic composition of capital. From a long-term perspective, the rate of profit will show a downward trend. In fact, the long-term downward trend of the profit rate applies to nations as well. For developed countries, after the rapid growth of the economic take-off period, it is difficult to maintain an economic growth rate above 5% in the future.

However, for developing countries, it is possible to maintain an economic growth rate of over 10% for up to a decade.

The above is a static analysis of the relationship between the rate of profit and the organic composition of capital. Analyzing from a dynamic perspective yields consistent results. Since workers are biological entities of flesh and blood, there is a physiological limit to the exploitation by capitalists. Once this physiological boundary is exceeded, it will inevitably face moral condemnation from all sectors of society, imposing great mental pressure on capitalists. However, an increase in the organic composition of capital does not incur corresponding pressure; instead, it receives support from all sectors of society. This makes it possible for the curve of the organic composition of capital to exhibit J-shaped growth in the future.

If we analyze from an extreme perspective, there will be an upper limit to the rate of exploitation in the future, but there is no upper limit to the organic composition of capital. Under the condition of an infinite time domain, the trend of the general rate of profit will infinitely approach 0.

Through the above analysis, we can draw the following conclusion: with the continuous development of AI technology, the inherent social contradictions of capitalism have not disappeared, nor can they disappear. In pursuit of surplus value, capital will continuously promote the development of technology, but this ultimately undermines its own profit foundation. When its subjective desires encounter the objective laws it must obey, capital can only sigh in helplessness, as it too must face the limits of growth.

Regarding this paradoxical behavior, we must maintain a rational perspective. We need to deeply recognize that artificial intelligence is an industrial revolution; it can greatly elevate the level of global productivity development and bring a massive increase in wealth to the world. Regarding the production paradox arising from this, and the alienated behavior of this capital logic, we can analyze it from a broader perspective.

As a socialist country, the essence of socialism is to liberate and develop productive forces, eliminate exploitation and polarization, and ultimately achieve common prosperity. Facing the advent of the AI era, we must adhere to the people-oriented principle in developing AI, truly realizing the empowerment of humans by machines. We must utilize AI technology to solve people-centered problems. For example, we can use AI technology to engage in dangerous industries, allowing workers to withdraw from hazardous sectors. We can also enable workers to step away from tedious, repetitive labor, thereby expanding their free labor time and ultimately realizing the comprehensive development of human beings.

As we are standing in the 21st century,we find ourselves on the cutting edge of the Fourth Industrial Revolution. We are also navigating into deep waters along the path of socialism with Chinese characteristics. Through this revolutionary transformation, we will surely be able to overcome the paradoxes that the capitalist system could not resolve, and create unprecedented achievements.

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