Academic Journal of Management and Social Sciences
ISSN: 2958-4396 | Vol. 9, No. 1, 2024

The Virtuous Interaction between Capital and Technology in the Context of New Productive Force

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Abstract: The world has entered an era of intelligence led by the Internet of Things and smart manufacturing. In response to the current situation, the concept of 'New Productive Force' emerges. The new productive force, which is qualitatively defined as the renewal of science and technology, cannot be realised without the effective promotion of capital. The technologically driven logic of capital multiplication in the age of capitalism has developed the law of capital's behaviour in the pursuit of value multiplication to such an extreme that exploitation seems to have become a 'logical "misadventure" on the road to the good life'. Under the conditions of socialist market economy, capital and technology are no longer in a relationship of 'collusion', but should be realised within the orbit of the socialist system to achieve a benign interaction between each other, so as to empower the high-quality development of the economy with the new productive force.

Keywords: New Productive Force; Technology; Capital; Interaction.

1. Formulation of the Problem

Based on the new round of scientific and technological revolution and industrial change, the intensification of international competition, and the critical historical convergence of China's economic development mode to the stage of high-quality development, the concept of 'New Productive Force' has been creatively developed in response to the new demands placed on the level of productivity development in the current situation. The new productive force is rooted in productivity, and the development of productivity depends on the enormous momentum generated by scientific and technological innovation. The renewal and iteration of science and technology is the new productive force in the 'quality' of the core connotation of the meaning of its reality cannot be separated from the effective promotion of capital, and capital also need to take advantage of the application of technology to achieve the accumulation and value-added, the two in the promotion of social productive capacity of the significance of the interactive mechanism of capital and technology.

At the domestic level, China's economy has now shifted from a stage of rapid growth to one of high-quality development. Over the past four decades of reform and opening up, the level of productivity development in China has gained a remarkable rise through the interaction of capital as an important factor of production and scientific and technological innovation as an important driving force. The construction of a strong modern socialist country cannot be separated from solid material and technological support, while the level of productivity development directly determines the baseline strength of material and technology. In line with the accelerated evolution of the new round of global scientific and technological revolution and industrial change, the use of dialectical and systemic thinking to promote the issue of the benign interaction between capital and technology in the process of developing new productive force is the key hand that liberates and develops the productive forces of society at the present stage and empowers the socialist economy to achieve high-quality development.

From the international level, China's scientific and technological innovation strength compared to the western developed countries there is still a gap, strategic emerging industries and future industries and other areas of technological innovation short board still need to further breakthrough. In the face of the "scientific and technological bullying" behaviour of Western developed countries in key core areas, such as technological blockades and monopoly suppression, China must increase its capital investment to enhance its capacity for independent innovation and build up new kinetic energy for development. In the new field, the new track to seize new advantages in international competition, to achieve the synergistic and complementary force of capital and technology in the new quality of productivity conditions, and to accelerate China's transformation from a scientific and technological power to a scientific and technological power.

New productive force is the new quality of productivity development in the new era, and it is the contemporary advanced productivity spawned by revolutionary technological breakthroughs, innovative allocation of production factors, and in-depth transformation and upgrading of industries. First of all, domestic scholars' interpretation of the connotation of new productive force can be summarised at the following three levels: Firstly, it is considered that new productive force is a leap forward on the basis of traditional productivity. New productive force represents a "qualitative" breakthrough in productivity, a leap from old, low quality to new, high quality.[1] Secondly, it is believed that the new productive force implies a qualitative improvement in productivity. This qualitative improvement is manifested in the components of the productive forces, such as the improvement of the quality of workers, the improvement and wide application of the means of labour, the continuous expansion of the objects of labour, the progress of science and technology, and the improvement of the level of management[2]. Thirdly, the connotation of new productive force is grasped from the dual perspective of 'newness' and 'quality' of productivity. The 'newness' of the new

productive force is reflected in the new factors of production and the way in which the factors are combined, while the "quality" represents the high quality of the industrial base and the development of kinetic energy[3]. Next, domestic scholars' studies on the characteristics of new productive force can be broadly divided into two dimensions: general characteristics and epochal characteristics. Among them, innovation, integration, leadership and transcendence are the general characteristics of new productive force[4]. Digitalisation and greening, on the other hand, are the epochal characteristics of new productive force in the context of the new round of technological revolution and industrial change[5]. Once again, there is the study of the relationship between capital and technology. From the perspective of the interactive logic of technology and capital, the intrinsic endowment of science and technology caters to capital's will to control and expansion, thus opening up paths for capital proliferation[6]. From the point of view of primitive capital accumulation, the success of primitive capital accumulation is due to the collusion between capital and technology[7]. From the perspective of human subjectivity, capital is the "decisive force in the relationship between human beings and technology" in the capitalist mode of production, which in turn leads to the growing absence of human subjectivity[8].

Taken together, the current academic research on the issue of the relationship between capital and technology mainly focuses on the perspective of Marxist political economy, and centres on the critique of the paradox of development brought about by the application of modern science and technology in the context of capitalism with the logic of capital as its axis. Combined with the specific requirements for the development of new productive force at the present stage of China's development, exploring the mechanism of benign interaction between capital and technology is the inheritance and development of Marxist political economy. Humanity has stepped from the machine-based industrial era in which Marx lived into the intelligent era dominated by the Internet of Things and smart manufacturing, and the interaction between capital and technology has become more complex, more diversified, and more profound in its impact on society. Technological progress, while bringing about advanced productive forces, is also necessary to enable the realisation of the socialist system. Based on the basic national conditions and development practice of the primary stage of socialism, we should, in the specific context of adhering to the socialist system with Chinese characteristics, transcend and abandon the mechanism of "complicity" between capital and technology under the capitalist system, and realise the benign interaction between capital and technology under the condition of new productive force, so as to promote the high-quality development of economy with the "qualitative" enhancement of productive forces. The "qualitative" enhancement of productivity will help promote the high-quality development of the economy.

2. The Logic of Technology-driven Capital Multiplication in the Age of Capitalism

The combination of capital and technology has constructed the basic structure of modern society and the logic of its development. If capital is the "key" that unlocks modern society, then the application of science and technology is the enabler of modern social development. Marx pointed out that "the very appearance of capital marks a new epoch in the process of social production."[9] The 'hallmark' of this new era is the fact that the production process no longer relies primarily on the physical strength and direct skills of the worker, but is based primarily on the widespread use of science and technology in the production process. The pursuit of value proliferation is the general behavioural law of capital, technology as the most powerful factor in the process of development of productive forces has become the material basis for economic growth, and the updating and application of technology undoubtedly fits the behavioural law of capital seeking to proliferate.

2.1. From the "Tangible" to the "Intangible": the Transformation of "Alienated Labour" in "Technological Rationality"

The term 'alienation' was first coined in Marx's Philosophical Manuscripts of Economics of 1844, and is used to reveal that the oppression and exploitation of the working class by the capitalist class through ownership of the means of production under the capitalist system has transformed labour into a force external and alien to the workers, thus producing a monstrous labour phenomenon. Under the capitalist mode of production, workers' labour is often forced labour, with capitalists appropriating and continuously extracting the surplus value created by workers, resulting in workers barely surviving with a subsistence "wage" after their productive activities, which leads to the four-fold prescriptive nature of alienated labour①. Capitalist private ownership actually recognises the legitimacy of the existence of private property, and the exploitation and oppression of workers by the capitalists is no more than a tangible force that is 'justified' under the guise of wages. The whole of capitalist production is like a 'cage' in which the worker is trapped, and for him labour becomes something 'external', 'not of his essence'. For the worker, 'in his labour he does not affirm himself but denies himself, does not feel happiness but misery, does not freely use his physical and intellectual powers but subjects himself to physical torture and spiritual destruction.' [10]

After the Second World War, the rapid development of science and technology contributed to the awakening of the subjective consciousness of human beings, but at the same time, "technological rationality" began to become an objectifying force that dissolved the subjectivity of human beings. "Technical rationality" is a kind of technical rationalist cultural belief formed by combining the Western "rationalist" tradition and modern science and technology since modern times. However, the rapid development of modern science and technology in the late nineteenth and early twentieth centuries led to the beginning of a crisis in this techno-rationalist cultural belief, and people were not liberated from the enormous power of material production that science and technology had given to mankind. On the contrary, people have become more deeply involved in the modern technological world of their own making, and technological rationality has begun to emerge as a new type of alienating force that binds and dominates human beings, thus contributing to the rise of critical thinking on technological rationality. The most representative of these is Marcuse's profound critical thought of technological rationality as expressed in One-Dimensional Man. Marcuse enriched Marx's "theory of alienated labour" based on the industrial revolution era, and explained that along with the development of science and technology, the "theory of

alienation" has taken on a new historical character, "the alienating power is transformed from tangible political and economic power to intangible cultural power". [11] Marcuse points out that the trend towards mechanisation in advanced industrial societies has led to a shift in the situation of labour as described by Marx, whereby the physical effort and intensity of labour expended by workers in their work has been reduced. Although the fact that the working class was exploited remained unchanged, the position and situation of the exploited working class in mechanised labour was changed. As a result, the working class became mired in an "invisible" force of oppression, where the worker's "individuality is suppressed in the socially necessary but tiresomely mechanized process of labour". [12] Workers in the operation of automated mechanical systems have been reduced to "cogs" of the machine, becoming a fixed corner of the assembly line. However, they are immersed in a society of "false prosperity" brought about by technology, and are not aware of the "invisible chains" that bind them externally, and that technological alienation exists in new and more insidious ways in the process of social production. Marcuse puts this law of progress of capitalism in the formula "technological progress = increase in social wealth = intensification of slavery", where exploitation becomes a logical "misadventure" on the road to the good life.[13]

2.2. From "Commodity Fetishism" to "Digital Fetishism": the Metamorphosis of Fetish Theory in the Age of Digital Capitalism

The third scientific and technological revolution has brought mankind into the information age, in which data, information, knowledge and technology are the factors of production. In the context of this era, capital began to "marry" with digital technology, thus transforming the form of capital to digital capital. Digital capital is the third form of capital to emerge after industrial and financial capital, and at its core, digital capital is profit-making through the seizure and appropriation of data in general.[14]At the conceptual and ideological level, digital fetishism is still subsumed under Marx's critical theory of fetishism, and is an extension and deformation of the theory of fetishism in the age of digital capitalism.

Commodity fetishism, money fetishism, and capital fetishism are the threefold dimensions of Marx's critique of capitalist society. Marx begins his critique of the first form of the "thing" of fetishism with the commodity, "the elemental form of wealth in a society dominated by the capitalist mode of production". The fetishistic nature of the world of commodities "derives from the peculiarly social nature of the labour that produces them", and the exchange of commodities, which is in fact a relationship of material exchange between human beings, has evolved in capitalist production as a relationship between things that masks the social relationship between human beings in terms of the abstract labour that is congealed in the process of production. 'As a result of this transformation, the product of labour becomes a commodity, a sensible and supersensible thing or a social thing.'[9] Monetary fetishism is a further deformation of commodity fetishism. With the expansion of the scope of commodity exchange, a special commodity - money - as a general equivalent gradually appeared to facilitate the exchange of commodities, which made the process of exchange of commodities free from all formal stipulations and brought direct material forms into relation with each other. Money became the supreme 'god' in the capitalist 'law of the jungle', which strengthened the materialistic nature of capitalist society and further obscured the social relationship between human beings by the 'thing' of money. Capital fetishism is the highest expression of the nature of fetishism in capitalist society after commodity fetishism and money fetishism. The production of surplus value is the fundamental purpose of capitalist production, and the magic of capital is demonstrated by the fact that it is a value that can multiply itself. In the process of movement of capital, it takes the material form of money, labour tools, labour materials and labour places, etc., so that people form an illusion in their conception, as if these things are naturally capital in themselves, and they have the magic power of adding value by themselves. Ultimately, capital not only dominates the entire process of capitalist production, but also becomes a holistic force that governs the productive life of society as well as the ideology of man. The evolution of the mode of production and the changes in social relations directly determine the transformation of the nature of worship. In The German Ideology, Marx states that the individual is a person with a specificity in the mode of production. "What they are like is consistent with what they produce - both with what they produce and how they produce it."[10] With capitalism entering the era of digital capitalism, which is heavily reliant on information network technology, the traditional mode of production based on material materials and wage-labour relations has begun a gradual transition to the digital mode of production, which uses data as a new type of production factor and digital labour as a new type of labour form. Data, data commodities, digital capital, and digital technology are the historical results of the enhancement of human intelligence and the evolution of the technological revolution, and were originally value-neutral factors of production that played an important role in driving the development of productive forces. However, capitalist society, because it has never been able to overcome the systemic ills inherent in capitalism, has reincorporated these new factors of production into the operating order of the digital capitalist society, which has become an abstraction of the "complicity" of technology and capital in the suppression of the existence of human life. The new deformation of digital fetishism is manifested in the transformation of human relations into relations between cold data, even blurring the line between production and consumption, so that people are immersed in the ecstasy of the virtual world created by digital technology and digital commodities and are unable to extricate themselves from it. In the field of digital capitalism, where digital fetishism exists, the logic of technologically guided capital multiplication is characterised by the diversification of the content of exploitation, the invisibility of the forms of exploitation, and the extensiveness of the scope of exploitation. Firstly, from the point of view of the content of exploitation, data has become a new type of capital for value multiplication, which in turn has shifted the content of exploitation from material goods to virtual goods; Secondly, from the point of view of the forms of exploitation, the complicity of capital and technology has made it possible for the capitalists to exploit both the 'exploitation of the other' of the traditional mode of production and the 'self-exploitation' inherent in the labourer; Thirdly, from the perspective of the scope of exploitation, digital workers seem to have achieved free and flexible labour time and space constraints, but they are once again caught in a more 'advanced' exploitation 'trap', with all digital users becoming the target of digital capitalists'

exploitation of surplus value.

In short, through the innovation of the traditional industrialised mode of production, digital capitalism has changed the alienation of workers from the 'tangible' to the 'intangible', and further evolved the fetishism into digital fetishism, thus constructing a special logic of capital multiplication in the era of digital capitalism through technological progress.

3. Constructing a Mechanism for Positive Interaction between Technology and Capital in the Context of New Productive Force

The renewal of science and technology is the 'qualitative' requirement of the new productive force. The development of the new productive force under the conditions of the socialist market economy is inseparable from the use of the various types of capital existing in the market to effectively promote the qualitative leap of productive forces. The interaction of capital and technology can take on different purposes in different social systems. In the capitalist system, the 'collusion' between capital and technology has led to the evolution of digital technology to digital capital under the control of the logic of capital, and the development of digital capitalism has continued to strengthen the kinetic energy of production under the leadership of advanced technology, but at the same time, the virtualised world has further aggravated the inherent contradictions of capitalism. However, in the Chinese arena, the interaction between capital and technology must always be under the value of people's supremacy, in order to become an important strength to promote the high-quality development of China's economy.

3.1. Improving the Organic Composition of Capital

The organic composition of capital responds to the proportionality between the means of production and labour as determined by the level of production technology. In his theory of capital accumulation, Marx suggested that "the amount of the means of production used by the worker to perform his labour grows with the productivity of the worker's labour."[9] Here, the increase in labour productivity relies mainly on technological progress, which means that the organic composition of capital is constantly rising. 'Science and technology are the first productive forces', and innovative breakthroughs in science and technology are key to the development of social productive forces. Accompanied by the accelerated penetration of digital technology into various industries and fields, traditional manufacturing enterprises are actively leveraging digital technology to carry out all-round, whole-chain digitalisation, intelligent transformation and upgrading, and are continuously empowering economic growth in the process of industrial digitisation and digital industrialisation. In addition, the wide application and deep development of digital technology also makes the division of labour and collaboration more professional and diversified, further enhance the production efficiency of the traditional manufacturing industry, improve the quality of production products, and continue to technological innovation for the transformation and upgrading of China's traditional manufacturing industry and high-quality development to open up new paths. Therefore, the development of new quality productive forces should take key and disruptive technological innovations as a breakthrough, increase capital investment in scientific and technological research and development, and inject driving force into China's economy to achieve high-quality development.

Achieving technological breakthroughs in key core areas in new fields and new tracks requires huge upfront capital investment, and technology research and development is characterised by "long research and development cycles, slow returns, high risk and high uncertainty".[15] Therefore, under the competitive rules of the market mechanism of survival of the fittest, private enterprises in general do not dare to invest or are even unwilling to invest in scientific and technological research and development, which is extremely risky. In this form, it is necessary to deal with the relationship between the market and the Government and to give full play to the Government's decisive role in the allocation of resources. Firstly, the Government's 'top-level design' function in the macro area should be strengthened. By relying on the power of the Government to lead social capital to make targeted investments in basic, critical and original technological research and development, and through financial subsidies, tax incentives and other forms of relaxation of the various policy channels and support for the operation of 'new quality capital' under the sun. Secondly, the Government should increase the training and support for research talents. Talent as the first resource plays a key role in the process of cultivating and developing new quality productive forces, and people are the main body of scientific and technological research and development, and promoting the progress of productive forces. Therefore, the State must cultivate and deploy 'high-precision' human resources to support the development of new productive forces, optimise the establishment of disciplines in institutions of higher education and optimise the mode of human resources training in accordance with new trends in scientific and technological development. At the same time, we will continue to optimise and improve the incentive mechanism for highly skilled personnel, and give scientific and technological researchers adequate material and spiritual incentives, so as to continue to grow the 'new quality workers' who develop new productive force.

3.2. Regulating and Guiding the Healthy and Orderly Development of Capital for the Development of New Productive Force

While vigorously developing new productive force, effective regulation in accordance with the law is essential for the basic healthy operation of the means. In modern national governance systems, national governance systems and capacities are directly generalised to the effectiveness of governance capital. The regulation and supervision of capital should be implemented into the institutional system, activating capital within the orbit of the system to provide a constant impetus for the development of new productive forces. In the process of developing new productive force, to reasonably regulate and guide the orderly and healthy development of 'new capital' need to promote and control organic combination, so as to 'New capital' to empower the sustained and healthy development of new productive force. From the perspective of promotion, the development of new productivity requires science and technology innovation as the core driving force. Encouraging, supporting and guiding the inflow of capital into the field of scientific and technological innovation, provide an effective system supply

for scientific and technological innovation through the means of scientific and technological system reform, and opening up the blockages that impede the transformation of innovative achievements into real-life productivity. From the perspective of management, on the one hand, it is necessary to improve the institutional mechanism for capital regulation on the basis of the laws of behaviour of capital in the process of developing new quality productive forces. The market competition principle of survival of the fittest leads to the possibility that capital may eventually move towards monopoly. Therefore, it is necessary to carry out key screening and supervision of unfair competition and monopolistic behaviour, increase the supervision and discipline of the capital market in accordance with the relevant laws and regulations, and increase the cost of non-compliance through the comprehensive use of administrative penalties, market bans and other means, so as to strengthen the deterrent effect and create a disciplinary effect. To cope with the complex and volatile market environment, it is necessary to combine the actual situation of capital in promoting the development of technological innovation, continuously strengthen the foresight and agility of capital governance, improve the relevant laws and regulations on anti-monopoly and anti-unfair competition. On the other hand, we should adopt a developmental perspective to deal with the complex and volatile capital market environment and establish a coordinated capital regulatory mechanism. With the rapid development of the digital economy and the platform economy, some Internet giant enterprises, by virtue of their abundant capital and mature technological advantages, have led to the emergence of a new type of monopoly phenomenon in the market, which is easily caused by the 'collusion' between capital and technology. Therefore, the traditional regulatory system is no longer adapted to the new changes in capital development, and there is a need for a sound online and offline synergistic regulatory system. The use of big data, artificial intelligence, cloud computing and other emerging technologies to build a digital and intelligent regulatory early warning system, to form a complementary regulatory synergy between online and offline, and between manpower and intelligence, and to improve the relevant laws and regulations governing the operation of capital in emerging areas in a timely manner in the light of the actual situation.

Note

The fourfold prescriptive nature of Marx's theory of alienated labour: alienation between labour and the product of labour (also called 'alienation of things'), alienation of the worker from his labour (also called self-alienation), alienation of the human being from his own kind of nature, and alienation of the human being from his human relations.

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