



Inter-organizational Relations in the Capitalist Economy under the Application of Digital Technology: a "Center-periphery" Organizational System based on Dynamic Imperfect Competition on the Internet Platform

Han Qiao, QingYue Ren*

School of Economics and Management, Inner Mongolia Normal University, Hohhot, China

**CORRESPONDING AUTHOR*

**E-mail: renqingyue08@163.com*

Abstract

Digital capitalism is a new form of capitalism in the digital economy. The continuous advancement of the information revolution has led to the rapid development of digital capitalism, and platform capitalism is the highest stage of development at present, and there is even a tendency to develop into platform imperialism. The widespread application of digital technology in Internet platforms has accelerated the deepening of the "data + algorithm" model, in which the relationship between platform organizations is to be defined. imperfect competition pattern. The nested "center-periphery" system, with technology platform organizations providing application software, hardware and various development tools as the core, and the existence of digital gap accelerates the rapid operation of the incomplete competition pattern of platform ecology within the above system. With the support of traffic and data, platform organizations have a natural tendency to monopolize, and it is necessary to study the inter-organizational relationship in the digital capitalist economy and analyze its "center-periphery" system in order to seek a breakthrough from the hegemony. In this paper, we analyze the inter-organizational relationship and then analyze it empirically in the United States, with the intention of highlighting the monopolistic tendency of platform organizations and their dynamic imperfect competition pattern.

Keywords: *digital capitalism; platform organization; dynamic imperfect competition; "center-periphery" system*

1. INTRODUCTION

The current digital capitalism has developed to a highly monopolized stage, i.e., the stage of platform capitalism. ^[1]The industry underlying digital capitalism is the information and communication industry, and it is the information and communication industry that currently has the largest single category of investment in the United States. Apple's financial reports show that it is by far the most profitable company with revenues of \$274,515 million in 2020. The globalization of capital has prompted the information and communication industry to become the dominant industry in the U.S. As the Internet industry continues to expand, the

information and communication industry, as a new high value-added industry, will prompt the formation of a large number of start-ups. Based on sorting out the development of digital capitalism, the article explores the types of inter-organizational relationships in digital capitalism and the digital gaps in between, and analyzes the inter-organizational relationships in the U.S. digital economy, so as to provide a reference for the construction and healthy development of the digital industrialization system.

2. REVIEW OF DIGITAL CAPITALISM RESEARCH: TWO RESEARCH PERSPECTIVES AND THEIR UNIFICATION

With the continuous development of ICT technologies such as the Internet, big data, cloud services, and artificial intelligence, the organic combination of digital technology and capitalism has become a new model of the development of Western capitalist society - "digital capitalism", the concept of which was first proposed by Dan Schiller (2001) in his book "Digital Capitalism". The concept was first introduced by Dan Schiller (2001) in his book "Digital Capitalism". Digital capitalism is "a system that uses digital technologies to discover, exploit, and create differences for profit, in pursuit of the continuous accumulation of capital"^[2]; digital capitalism is "a dimension of contemporary society where digital technologies such as computers, the internet, mobile phones, tablets, robots and AI-powered technologies regulate their capital accumulation, influence and reputation"^[3]. Digital information technologies do not change the relationship between labor and capital, but only the "periphery" and the "protective belt" of capitalism, the 'core of capital' that defines digital capitalism as capitalism remains fundamentally unchanged, and digital capitalism remains within the conceptual and logical framework captured and explained in Marx's Capital.

Academics have analyzed digital capitalism from different perspectives, and summarizing them, we can find that the analysis basically starts from two different perspectives: capital circulation and class. This perspective is based on Marx's capital cycle theory, labor value theory and surplus value theory in Capital, and proposes a theoretical framework for systematic analysis of digital capitalism: (1) data becomes an important factor of production, and digital capital and platform capital divide the profits of industrial capital and financial capital; (2) the platform is not directly involved in the production process, and the digital labor of "producers and consumers" and the re-commodification of workers' consumption materials are important components and means of surplus value production; (3) the expansion of capital in the process of capital accumulation, extending from the sphere of production and circulation to the sphere of consumption; (4) the digitization of the means of labor has led to an increasing tendency to increase the organic composition of capital; (5) the law of value is still valid, but the form of its action has changed, from the abstract law of value to the law of the price of production.

The second analytical approach is the "class analysis perspective", the main points of this perspective include: (1) the logic of capitalists' profit-seeking still exists, and capitalists achieve greater capital accumulation by

exploiting workers beyond space and time, which intensifies the conflict between classes; (2) the monopoly of general data leads to the alienation of data from its producers, which in turn leads to digital alienation; (3) the exploitation of digital capitalism is more hidden and diversified^[4]; (4) the digital means of labor create the problem of labor surplus; (5) when financial capital is combined with digital capital, the digitalization of materials of labor adds to the growing gap between labor and capital income.

Although there are some differences between these two analytical perspectives, they are essentially dialectical and unified. On the one hand, both approaches emphasize the increasing exploitation of labor by capitalists in the digital economy, which are two aspects of the same whole; on the other hand, the new changes and characteristics of capitalist labor reproduction brought about by the rapid development of information and digital technology, as emphasized by the capital cycle analysis approach, are the results of analysis in the specific era of the digital economy, while the class perspective analysis approach is applicable in every At the same time, the new changes and characteristics of capitalist labor reproduction intensify the exploitation of laborers. In other words, as the center of production organization in the digital economy, the "center-periphery" system is a dialectical unification of the dynamic imperfect competition of platform organizations, which leads to the change of labor reproduction and serious class differentiation.

3. ORGANIZATION IN DIGITAL CAPITALISM: PLATFORM-CENTRIC ORGANIZATION OF PRODUCTION

Digital capitalism is the latest development form of capitalism, and platform capitalism is the stage in which digital capitalism is currently developing. That is, in the stage of platform capitalism, the platform becomes the center of production organization, people's existence, production, exchange, consumption and distribution of products are reconstructed by general data again, the odd-labor economy is developed, a large number of odd-labor workers and non-employed labor appear, both absolute surplus value exploitation and relative surplus value exploitation reach the extreme, transnational digital capitalism accumulation is carried out, and finally platform imperialism is formed.

Before exploring the relationship between platform organizations in digital capitalism, it is necessary to clarify the classification of the digital economy, which is well recognized by Bukht and Heeks (2017), as shown in Figure 1.

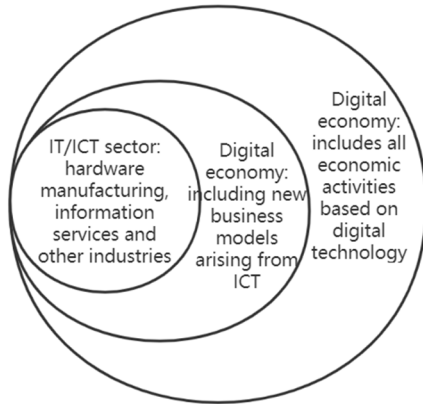


Figure 1. Bukht and Heeks' division of the digital economy

First, in the macro sense, there are platform organizations and non-platform organizations. As shown in Figure 2, there is a relationship of mutual control and interdependence between platform organizations and non-platform organizations, and platform organizations are often not directly involved in the material production process, while "producers and consumers" produce data through their behavioral activities on the platform^[5]. The raw materials are used as the basis for reproducing labor to create more value.

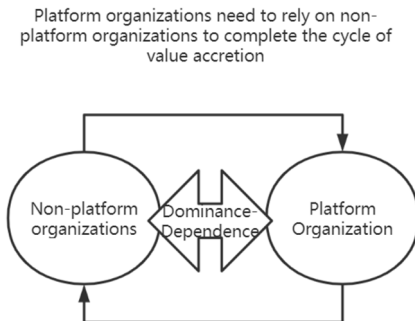


Figure 2. Diagrammatic representation of the relationship between platform and non-platform organizations

Second, based on the functions of each platform organization for further classification, as shown in Figure 3, in the core of all platform organizations is the technology platform organizations that provide application software, hardware and various types of development tools. The core technology is always the first productive force to promote social and economic development, and the central platform includes hardware manufacturing, software provision, operating system provision, big data application and artificial intelligence in the IT or ICT field. Technology platform organizations largely lead to the "de-skilling" of users, and each platform organization pre-sets the parameters of the technology process in advance, and when users use them, they only need to choose what they need according to their preferences in the application software, which

also contributes to the dependence on the technology platform, and at the same time creates its core position. Second, the sub-center is a platform organization that provides professional services such as data and information analysis and storage. It mainly includes content information platform, search engine platform, various forms of service trading platform, "cloud" service platform, etc. For example, Baidu Cloud Drive serves as a data "cloud storage" service platform. Third, the widest range of platform organizations is the deepest "tentacles" of the composite innovation. This type of platform organization is represented by companies such as Google and Amazon. The key to this type of platform is to combine technological innovation with business model innovation, and to provide services in a consumer-oriented way, which is the only way to improve production methods and thus increase productivity. Fourth, platform organizations that provide various levels of rules and trading venues are interspersed with various types of platform organizations. For example, C2C e-commerce platforms, B2C mall platforms and B2B trading platforms that provide online trading platforms, as well as capital trading platforms and asset trading platforms that provide financial services, and electronic payment and online payment platforms that are interspersed with various platform organizations. Such platform organizations are characterized by shortening the industrial chain between users and merchants, allowing merchants to face users directly, using real-time data to provide timely information for e-commerce service platforms, and capitalists, through their monopoly on data, flexibly use algorithms to calculate consumer preferences and even predict consumers' upcoming purchases through real-time input method monitoring to grasp more information and be the first to react to attract consumers. Fifth, the social platform to meet the demand for instant communication. This includes social networks and social open platforms that meet people's daily instant communication needs and profit mainly through the rent of advertisements.

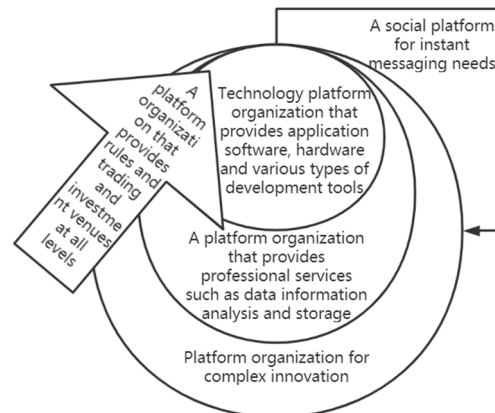


Figure 3. "Center-periphery" system of platform organization in digital economy

Therefore, in the development of the digital economy, the inequality between platform organizations will further expand into a larger "center-periphery" inequality system, in which the antagonism between classes is the result of the continuous promotion of the digital process. The formation of this system overlaps with the logic of capitalist development, firstly, the developed countries, by virtue of their technological superiority, are feverishly plundering the newly generated digital capital - data; secondly, in terms of ideology, a new type of "slavery" is emerging, but because of the openness and inclusiveness of the digital economy. Secondly, there is a new type of "slavery" in terms of ideology, but due to the openness and inclusiveness of the digital economy, consumers and producers can choose whether to escape from the prison of "slavery" or not; secondly, there is a new type of capitalist - data capitalist, which forms a monopoly through the privatization of data and gains profits continuously; finally, there is a new type of "slavery" in terms of ideology. Finally, the line between workers' labor and leisure time is blurring, and capitalism is able to maximize exploitation in the context of the digital economy.

4. TYPES OF INTER-ORGANIZATIONAL RELATIONS IN DIGITAL CAPITALISM: IMPERFECT COMPETITION AND DIGITAL GAP

Based on the scale effect and network effect of digital platforms and the potential productivity of data, various types of organizations in the platform economy have a natural tendency to monopolize. As the monopoly power of large platforms continues to concentrate, their clutches reach out to the deepest levels of social production and reproduction, and as they form some sort of limit to the continued deep development of the products or services that previously made them successful, the larger the platform grows in its field, the more difficult it is to quickly extricate itself to respond to new social needs for technological innovation. Emerging small-scale platforms have the potential to grow into large monopolistic platforms that seek their own foothold in their respective domains and are potential competitors to large-scale platform organizations. The emergence and growth of small-scale platforms is inevitable due to the rapid development of social needs and digital technologies, making small and large platforms always in a dynamic and imperfect competition pattern. The relationship between platform organizations of similar size has monopolistic competition due to the commonality of services or products offered.

Horizontally, there are competing relationships among platform organizations of the same type, while vertically, it seems that each tier has a natural tendency to monopolize the next tier. The intermediary nature of platform organizations triggers competing relationships, and through empowerment they have different focuses in

terms of business models and competition mechanisms, and thus monopolize in different areas. The access to data as a technical level element influences the organic composition of the capital, thus affecting the deep development of platform organizations.

At present, the platform economic system within the platform organization relies on data management to achieve effective regulation, and it seems that whoever has more users and data will be able to attract more venture capital and "capture" the larger Internet market, which is a disorderly competition without macro regulation^[6]. However, the demand of "producers and consumers" and the degree of adaptation of social and economic development and technological innovation are the keys to determine whether a start-up platform can stand on the windfall of profit, so relatively speaking, the relationship between platform organizations is seemingly disorderly but actually orderly. Through controlling the Internet and digital infrastructure, platform organizations possess data, which is a key resource for future economic and social life, and pursue profit maximization.

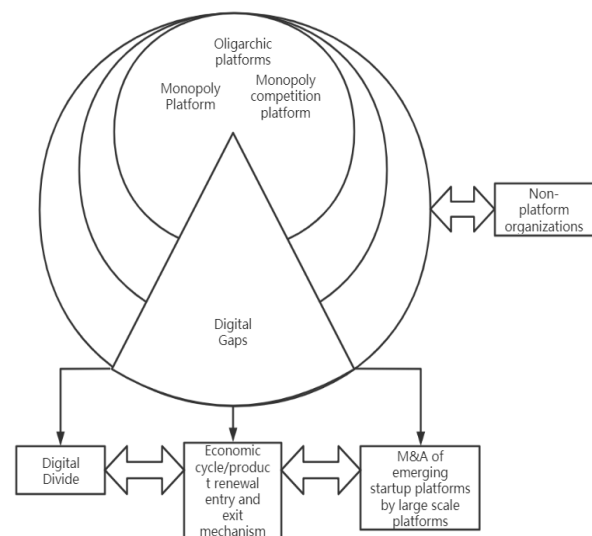


Figure 4. Imperfect competition pattern among platform organizations and the formation of digital gap

In this pattern of imperfect competition, there is a potential gap, as shown in Figure 4, which has two different meanings: first, the first gap is caused by the rapid development of the digital economy, the globalization of the economy, the globalization of capital, the globalization of labor, the legacy of digital globalization - the digital divide and information poverty. In addition, the digital proletariat - the "producers and consumers" - have never fully and independently owned the means of production, which also contributes to the formation of the gap to a certain extent; secondly, the gradual progression of the economic cycle has led to the turnover of platforms and even generations of products, which in turn has led to the formation of the exit mechanism between platforms and organizations. The

exit mechanism between the platform organizations, which is always inevitable in capitalist development. The existence of data accelerates the operation of the economic cycle of capitalism and creates a greater power gap and income divide due to the existence of data hegemony. To break out of the shackles of stagnation, the major platforms are choosing to make mergers and acquisitions of emerging startups in order to break the public perception of what the platform already does, which is a large part of what creates the digital gap. The existence of this gap has accelerated the emergence of disruptive new innovations in platform organizations, which in turn sustains the rapid functioning of the entire platform ecosystem.

On the basis of the above assertion, it is possible to build a platform ecology that is full of competing relationships in a relative sense, and the number and quality of participants in the platform organization affects the competitiveness of the platform organization. As shown in Figure 5, there are four elements in the ecology: data as the core, platform to build the substrate, "producers and consumers" and merchants fully interact, one of the four elements is indispensable, but three of the roles can be played by the same organization, there are no restrictive requirements. In the future market competition, it is actually the competition between ecology and ecology, and what kind of mechanism can be built to promote the healthy development of ecology, but what needs to be clarified is whether there is a specific connection point between ecology and ecology. Platform alliance is also a part of ecology, and the platform ecology theory includes financing mechanism, resource sharing mechanism, etc.

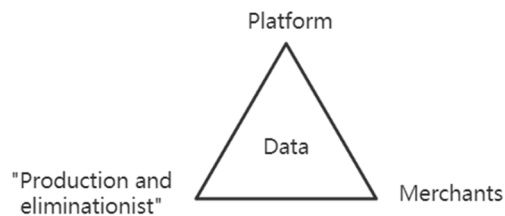


Figure 5. Four elements of platform ecology theory

5. INTER-ORGANIZATIONAL RELATIONS IN THE CONTEMPORARY CAPITALIST DIGITAL ECONOMY: AN EMPIRICAL ANALYSIS OF THE UNITED STATES AS AN EXAMPLE

The digital economy generated by the monopoly system of financial capital led by the U.S. is spreading globally, and the digital economy industries in most regions are built on the communication facilities and Internet system of the developed economies led by the U.S. None of the inter-regional competition is in essence beyond the U.S. Internet thinking^[7]. The United States used its position and other advantages to globalize the

use of the Internet, and exclusion also played a role in consolidating its monopoly to a certain extent, and the United States brought its hegemonic position to the development of the digital economy. In the 1990s, the telecommunications industry was the largest sector of foreign direct investment in low-income countries, with more than \$331 billion in investment.

Seven of the world's top 10 technology companies are from the U.S. The combined market capitalization of the top five U.S. technology companies in 2020 (\$424.4 billion) already exceeds the combined GDP of Germany, the world's fourth-largest country (\$3806.06 billion), and the U.S. platform organization is categorized as shown in Figure 6, with "more than 30% of total global Internet revenue and more than 40% of net revenue is held by the United States"^[8].

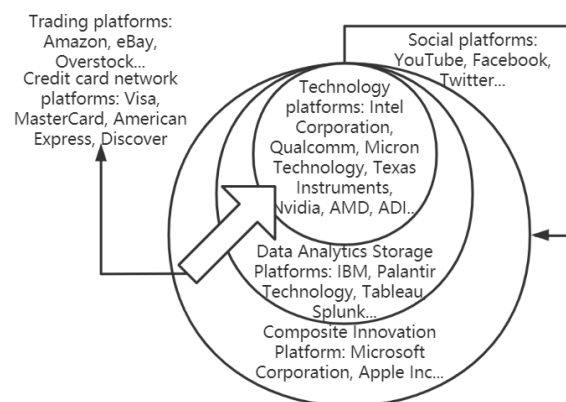


Figure 6. Classification of platform organizations in the United States

Content-based software platforms such as Facebook and YouTube rely on the social collaboration and social relationships of their users, providing unpaid cultural labor for the capital cycle through platform users^[9]. Facebook is a fast-growing platform worldwide that combines many individual users and platform users, and also integrates a large number of features; Twitter has the personal blog property of Facebook, and its word limit per tweet makes it different from other social platforms in terms of the rapidity of dissemination of meals, and well-known journalists also publish important statements on Twitter; YouTube is a hegemonic video sharing site in the United States, and as a platform for video retrieval, storage and playback, it can integrate a considerable number of social media platforms; Instagram, a relatively late-developed platform organization, focuses on photo and micro-video sharing, maintaining its uniqueness under the existing framework, i.e., seeking monopoly in its area of expertise.

Amazon has built the first major cloud platform that does not rely on advertisers to buy data, but rather to build the infrastructure of the digital economy in a way that is profitable to rent to others while collecting data

for its own use. Data is a way to sustain economic growth and dynamism at this point, first as a service to individuals or businesses, optimizing the production process in the process, and at the same time generating data when it is fully utilized, constituting a virtuous circle.

According to publishing monitor Parse.ly, Facebook drove 45% of traffic to content providers' websites at the end of 2016, while Google drove 31% of traffic^[10]. Without publishing content or links through these two platforms, such high traffic would be unattainable.

In the era of digital economy, platform organizations realize the simulation economy through network externality, breaking the limit of unlimited expansion of enterprise organizations in the industrial economy. The number of "producers and consumers" is the key source of the competitiveness of platform organizations, which determines the success or failure of their rapid expansion and all-inclusive strategies. The Metcalfe's Law of the Internet platform refers to the fact that the value of the network grows at the square of the number of users, and when the number of users exceeds a certain threshold, the value of the network will grow explosively. Therefore, the economy of scale pursued in the digital economy is to increase the average profit by expanding the scale of network users and thus maximize profit.

The best way to expand the size of the web is through acquisitions, and Google has acquired hundreds of companies on its way to expanding its platform, some of which are even strong competitors as well as emerging startups with the potential to grow into competitors. Notably, it has acquired YouTube, a direct competitor to Google Video, and Waze, a direct competitor to Google Maps, and by acquiring competitors and startups, Google has achieved a monopoly and moved into new areas, including artificial intelligence, robotics, and renewable energy, without being limited to its original search business. Facebook's acquisitions have been similar to Google's in that it has acquired competitors to expand its platform footprint and nip potential competitors in the bud. The acquisition of Instagram in 2012 and Whats App in 2014 were important points in its development, with both Instagram and Whats App coming under Facebook's umbrella.

Any technological revolution in progress tends to seize the core to make substantial investments in infrastructure development and form its characteristics, and attract enough companies when they can obtain the largest monopoly, which is and its terrible basis for business map expansion. There is a tendency for platform capitalism to extract rents inherent in the provision of services in the form of cloud platforms, infrastructure platforms or product platforms. Lean platforms further categorize types of occupations, increasing the pressure on the working labor force, the growing size of the reserve army of labor, and finally the

high degree of antagonism between classes that requires Marxism for ideological emancipation.

6. CONCLUSION

Under digital capitalism, the exploitation of labor by capital becomes invisible, but the development of digital technology through the information revolution is not controversial in itself. The solution to many substantive problems should be traced back to the institutional approach, which places technology in the context of overall social relations.

We should be deeply aware of the global hegemonic influence of the U.S. organizational structure on various platforms and the global digital "center-periphery" system created by the globalization of its industrial layout. The only way to break through this inequality is to break through the digital gap, promote autonomous technological innovation, understand people's livelihoods in real time, and adapt technological innovation to social needs. As General Secretary Xi mentioned, "Countries should seize the opportunities brought by the new round of technological revolution and industrial change, strengthen cooperation in the digital economy, artificial intelligence, nanotechnology and other frontier areas, and jointly create new technologies, new industries, new business models and new modes."

Since the structure of platform organizations involves specific industries that have a profound impact on the country's economic development, such as telecommunications and operating systems, there is an urgent need to conduct applied research on the platform industry. The level of operation of platform organizations should be assessed in the future by integrating their vision and value to the society as a whole. In addition, the production health of platform organizations is also important, and it is necessary to establish a sound anti-monopoly legal punishment mechanism.

Acknowledgement

Supported by Startup Foundation for Advanced Talents of Inner Mongolia Normal University "Research on the nature and form of stock capital on contemporary capitalist society" (ID: 2020YJRC027).

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