

# A political–economic explanation of “internet space”

Explanation of  
“internet  
space”

Yan Ma and Cai Minqiang

*Shanghai University of Finance and Economics, Shanghai, China, and*

Li Yun

*University of Massachusetts System, Boston, Massachusetts, USA*

141

Received 8 May 2020  
Revised 15 June 2020  
Accepted 15 June 2020

## Abstract

**Purpose** – The purpose of this paper is to define the Internet as a virtual space supported by technologies and presented in the form of socioeconomic relations from the perspective of political economy. The Internet space is a unique virtual commodity different from ordinary commodities and has the following effect characteristics: super replicability, space- and time-transcendence, open-source shareability and reality–virtuality transformation.

**Design/methodology/approach** – Internet space can also be imagined as a piece of virtual land. Internet space can be deemed as a piece of virtual land and its value can be divided into labor value and virtual value. The pricing model of virtual value is mainly determined by the gain and discount rate and this value comes from the transfer and markup of social value. In the context of the Internet Plus era, Internet space has become an essential economic factor that influences human economic activities.

**Findings** – Therefore, it is of practical significance and theoretical value to introduce Internet space as an economic variable into the framework of economic theory. The realistic logic of Internet space is to influence human economic behaviors with the combination of information binding.

**Originality/value** – The theoretical mechanism is to have an impact on the micro-market price by changing market relations from two-dimensional to three-dimensional. Its path to functioning at the macro level is to influence economic behaviors by changing the expectations of investment and consumption, resulting in new economic trends.

**Keywords** Internet space, Theoretical definition, New thinking path

**Paper type** Research paper

Nowadays, we have surpassed Robert Solow’s era when “You can see the computer age everywhere but in the productivity statistics” and entered the “Internet Plus” era where “the Internet is imprinted on any economic activity”, for example, Internet plus production, management, marketing, finance or business. Also, a series of new business methods have sprung up subsequently and rapidly, such as business to business (B2B), business to consumer (B2C), customer to customer (C2C), online to offline (O2O), business to many (B2M), business to government (B2G), business to team (B2T), consumer to business (C2B), customer to business-share (C2B2S), business to business to consumer (B2B2C), crowdfunding, Yu’eobao and Alipay. Moreover, E-commerce giant Alibaba has achieved high growth in sales for many consecutive years. In 2014, the gross merchandise volume (GMV) of Alibaba was 2.3tn yuan, increased by 47% year over year, and in 2015, the GMV reached even 2.95tn yuan, representing 28% YoY growth. The Internet is deified as a wonderful treasure trove. To sum up, the Internet has no longer been changing the whole economy and society but already filtered and dominated it.

© *Academic Monthly*. Published in *China Political Economy*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>. Originally published in Simplified Chinese in *Academic Monthly*.



This raises a major issue for our study of theoretical economics. We have to answer the following questions: What is the Internet or “Internet Plus”? Is it a technology, a commodity or economic relations? At the same time, we have to figure out where the treasure of the Internet treasure trove comes from. Was it generated by itself, or transferred? Will it be exhausted? There are also deeper questions: How does the Internet filter the society? What makes it ubiquitous? In other words, how does “Internet Plus” achieve “plus”?

In short, these questions are what we must study theoretically in the face of the “Internet Plus” era, which shall be the fundamental theoretical basis and starting point required for analyzing any real issues about “Internet Plus”.

## 1. The Internet as a virtual space

### 1.1 Definition of Internet space

The concept of the Internet should actually date back to 1945, when Vannevar Bush, the presidential science advisor of the United States during Second World War, published “As We May Think” in *The Atlantic*. In this article, [Bush \(1945\)](#) mentions building a “memex” system, which is an information machine. In the system framework, “. . . Wholly new forms of encyclopedias will appear, ready-made with a mesh of associative trails running through them, ready to be dropped into the memex and there amplified.” [Bush \(1945\)](#) Some basic ideas of the Internet have been included herein, such as replication, sharing, system, association, storage, etc.

The practice of the Internet began in 1969, i.e. the ARPANET led by the Advanced Research Projects Agency of the US Department of Defense, from which the Internet evolved. However, 1983 was often regarded as the true birthyear of the Internet because the TCP/IP protocol became the standard protocol of ARPANET in this year, which enables all computers using the TCP/IP protocol to communicate with each other via the internet. Since then, the Internet has stepped out of the ARPANET lab and gradually gone global, becoming a global network.

With the development of in-depth practice, people’s understanding of the internet concept was also improving. On October 24, 1995, the Federal Networking Council (FNC) passed a resolution on the “Definition of the internet”, which holds that the “Internet” refers to such a global information system: (1) It is logically linked based on network media through a globally unique “network logical address (NLA)”, which is established based on the “Internet Protocol” (IP) or other future protocols; (2) Communications can be conducted through Transmission Control Protocol/Internet Protocol (TCP/IP), or other alternative protocols or protocols compatible with IP in the future; (3) Public or private users are allowed to enjoy high-level and comprehensive services offered by modern computer information technology based on the above communications and related infrastructure.

At this point, it could be seen that people already had a highly comprehensive understanding of the Internet concept, which can be summarized as follows: First, the Internet is logically connected by Internet protocols, and this connection is a technical relation. Second, the Internet establishes a hierarchical network relationship through protocol relationships, such as the TCP layer and the IP layer, making the technical relation evolve from a linear to a mesh relationship. Third, the Internet is used to serve society in the reality. Relations at this level constitute the social relations of the Internet (such as economic relations), which were certainly based on technical relations.

In addition, a more authoritative explanation deepens people’s understanding of the Internet concept. Robert Kahn, the co-designer of TCP/IP and one of the four greatest people in the formation of the Internet, points out that the Internet is a “logical architecture” independent of its specific constituent elements, where any network can connect to another network or equipment ([He, 2009](#)). According to Robert Kahn’s concept of

---

“logical architecture”, the Internet has actually been separated from the technical level and regarded as a new concept above it. Based on this new concept, the Internet began to rise from a technical relation to the spatial level.

Currently, a relatively authoritative definition is the interpretation of the Internet made by the International Telecommunication Union (ITU) that the Internet is a group of interconnected networks by Internet protocols, which allow these networks to work as a large virtual network. Here, the understanding of the Internet has been further upgraded, that is, Internet space is endowed with a “virtual connotation”, which is a more scientific definition and a general summary of the Internet based on previous knowledge.

These definitions of the Internet concept suggest that people’s understanding of the nature of this phenomenon has continued to develop in depth. Based on the above concepts of Internet connotation, we can also summarize the Internet as follows: a virtual space supported by Internet technology and connected through various levels of Internet social relations. It can be broken down as follows:

Firstly, the Internet is a technological factor. Without the advancement and innovation of Internet technology, there will be no Internet. The so-called Internet technological factors can be divided into two parts: hardware and software technological factors. Hardware technological factors mainly refer to hosts and network communication equipment for data storage, processing and transmission, such as servers, base stations, switches, satellites, optical fibers, Ethernet, Digital Subscriber Line (DSL), WLAN and routers. Software technological factors can be divided into network service programs and various applications. Network service programs include Domain Name System (DNS), TCP/IP service programs and HTTP service programs; various Internet-based applications include search programs, online games, email, peer-to-peer (P2P) programs and web browsers. The Internet is not only the connection among hardware technological factors but also software ones, which make the Internet greatly surpass the contact methods of telephone, telegraph and television, etc.

Secondly, the Internet is a kind of relationship, which refers to a connection where things are interdependent, interacting with and restricted by each other. This relationship includes two levels: technical relation and social relation.

The technical relation is the interdependence, mutual influence and mutual restriction of various technological factors, which is mainly reflected in the internet protocols that various equipment has to abide by in intercommunication. A social relation mainly refers to the interdependence, mutual influence as well as mutual restriction of people. In terms of economics, social relations of the Internet are economic relations between people connected by Internet technology, mainly including relations of production, transaction, consumption and distribution. In addition, there are contractual and social contact relationships from legal and sociological perspectives.

However, technical and social relations cannot be separated completely. The operation of a technical relation is also that of a social relation. Of course, the expression of social relations based on technical relations are different from general social relations.

There are numerous Internet protocols, of which common protocols include TCP/IP, HTTP and STMP. These protocols are all technical relations and also reflect social relations between people. For example, STMP is a mail transfer protocol, and this technical relation reflects a social connection of people through correspondence. The HTTP protocol is a hypertext transfer protocol allowing people to share hypertext on different servers via hyperlinks and therefore it reflects a sharing relationship of people on hypertext resources.

Thirdly, the Internet is a space, which refers to not only physical natural space but also the product of relations according to sociological theories. Hence, as an interconnected system containing technical and social relations, the Internet meets the property requirements of space. Since Internet relations consist of technical and social relations, the Internet is a technical space and also a social space, and is the product of technical relations and social

relations accordingly. In fact, just as technical and social relations that cannot be separated completely, the technical and social spaces of the internet are also intertwined.

Finally, in respect of the virtual space, although Internet space is material, it is invisible and intangible, that is, it is expressed through a set of data or symbols, to be more specific, "a set of computer programs". Hence, the Internet is a virtual space.

At this point, the Internet can be further defined as a virtual space that is essentially supported by Internet technology, connected through various technological factors and expressed by social relations and presents in the form of technical and social space unity.

### *1.2 Structure and status of internet space*

Internet space can be roughly divided into three layers: Internet infrastructure layer, network connection layer and online space layer.

The Internet infrastructure layer consists of the infrastructure of the internet, such as optical fiber, satellite networks and machines. It is the actual physical layer. The operating subject in this layer is physical hardware equipment, i.e. the actual physical factors.

The network connection layer consists of elements such as multimedia contents and hyper-links of the network. Their existence depends on the infrastructure layer of the Internet. However, the structure of the network connection layer is determined totally by its logical topological structure, which is a hyper material layer. In this layer, there are no physical differences in machines – there is only a technical space formed by different applications through interconnection. The operating subjects of this technical space are technological factors (i.e. programs or data).

The online space layer is the most conceptual part of the network environment and the true virtual space layer of the whole Internet space. It is the virtual space that we can directly face as supported by the preceding two levels. The operating subjects of this space are people, that is, virtual economic relationships between people.

Hence, the virtual Internet space should consist of the Internet basic layer, network connection layer and online space layer in the broad sense. The virtual Internet space in the narrow sense refers to the online space layer.

Like the general material production process, the basic layer of Internet space is a product of labor. Its value-composition is mainly labor value, except that it has some intangible characteristics in form. The network connection layer has a component of labor; however, it has begun to be virtualized in a real sense, which is mainly reflected in a series of programs and data sets. Its value composition can be divided into two parts: labor value and virtual value. The online space layer is more virtualized with minimal or even negligible contribution of labor, and its value composition is mainly virtual value.

With the emergence of Internet space, the whole economic world is divided into two levels: the real economy and the network virtual economy, where the internet space first replicates the actual real economy and then virtually represents the reproduction of the real economic world. During this process, Internet space is the carrier platform for mapping and mirroring the real economic world, and hence, the real economic world and the virtual economic world are separated.

Apparently, Internet space is the carrier of connection between the real and virtual economies. It first separates the virtual and real economic worlds, and the separation process is the process of replicating the real word in the virtual word. Also, it is a channel connecting the two worlds. The real world can be transformed into the virtual one through Internet space, and vice versa. Moreover, Internet space is not a simple copy and mirror of reality but serves as a filter, which means the virtual world filtered by Internet space is already full of new connotations and functions. This is the magic of the Internet and also the foundation for the establishment of "Internet Plus".

---

## 2. Internet space as a special virtual commodity

After we define the Internet as a kind of space, the next theoretical question to be answered is what the Internet space is. From an economic perspective, Internet space can be defined as a commodity. Certainly, Internet space is not a commodity in the general sense but a special kind of virtual commodity.

As a commodity, Internet space has both a theoretical and practical basis. The so-called commodity refers to a product that is used for exchange and has specific utility for people. It is a unity of use-value and value. We define Internet space as a commodity because it has use-value as a technical space, which can meet certain needs of people. At the same time, as a social space, it has exchange value and can be used for exchange. In reality, the use-value of the internet is indubitable, and its value is also real. For example, at present, the market value of Alibaba is estimated at more than 240bn US dollars.

Of course, Internet space is not a labor product in the strict sense but a virtual commodity. There are two aspects to the interpretation of Internet space as virtual commodity.

First, Internet space is virtual as it is intangible, which differentiates itself from general tangible commodities. The theoretical interpretations of online virtual commodities can be divided into the following types: (1) Electromagnetic record data with the production process of digitalizing information of real-word products that turns a real-word product into an online one, i.e. “simulation” of tangible, physical products; (2) Network products, such as online games, digital products and digital services, i.e. a group of computer programs that can be transmitted and distributed through the network, which is the concept connotation of virtual commodities widely used at present; (3) A group of symbols, a concept or an appellation (Tan, 2007). No matter which understanding mentioned above, it can be related to the virtualization of Internet space. Hence, Internet space is indeed a kind of virtual commodity.

Second, Internet space is a nonlabor product. Karl Marx defines commodities in the general sense as “products of labor for exchange” and regards nonlabor products such as land, reputation and conscience as virtual commodities. According to Marx (2004a, p. 123), some things are not commodities in themselves, such as conscience and reputation, but they can also be sold by their owners in exchange for money and obtain the forms of commodities through their prices, and the form of the commodity’s price is “. . . virtual, just like certain quantities in mathematics. . . . For example, the price of uncultivated land has no value, because it contains no materialized human labor.” Marx (2004a) Therefore, based on Marx’s definition of commodities, Internet space is clearly a virtual commodity. Although Internet space requires human labor on infrastructure and human services on Internet operation, the proportion of the labor inputs is not high compared with that of the social effect and the value of spillovers of Internet space. Therefore, our analysis of the Internet space mainly focuses on the virtuality of the Internet space without further details about its labor costs since it is not different from other commodities in this aspect.

The special property of Internet space commodities lies in their significant difference from general commodities.

The characteristics of Internet space are reflected in various economic features of the network economy. For example, Katz and Shapiro (1985) suggest that the network has a robust positive externality, i.e. network effect. As the number of users who use the same product or service increases, the utility that each user receives from consuming this product or service increases accordingly. The network effect is an essential factor in information product pricing. Shapiro (1996) further indicates that in network industries, the competitive dynamic is general, and dynamic efficiency is crucial for industries with network effects. Harary (1969), Wasserman and Faust (1994) and Bollobás (1988) define a series of network concepts such as frequency, closed chain and clusters, which provides a language for describing the basic forms and characters of the network and pioneers the research on the virtualization of the relationship among participants involved in the network economy.

Bramoullé and Kranton (2007) and Ballester *et al.* (2006) use the game model of network to apply this virtualized relationship analysis to practice, respectively. Oz Shy (2002) indicates four important characteristics of network economic products that are different from traditional economic products: (1) complementary, compatible and standardized; (2) consumption externalities; (3) switching costs and lock-in; (4) significant economies of scale in production. These studies make great sense and are highly valuable for understanding the special property of Internet space. From the perspective of Marxist capital cycle and turnover theory, Wang (2002) analyzes the characteristics of the network economy and concludes that: (1) The network economy does not create new value; (2) The development of the network economy shortens the circulation time and improves the efficiency of capital use; (3) The network economy promotes scientific and technical progress and knowledge update. In the process of the network economy, the relationships among participants are also virtualized. Zhou (2003) emphasizes that network economics has its unique theoretical foundation and the theoretical model of traditional economics is untenable under the conditions of the network economy. We have also carried out research in this area and propose that the network economy has strong virtuality, which is expressed through replication, scale, and shareability. The above analysis suggests that the theoretical circle has already had a sound understanding of the special property of Internet space. However, in the new era, especially with the rise of the “Internet Plus” concept, it is necessary to deepen the understanding of the special property of Internet space.

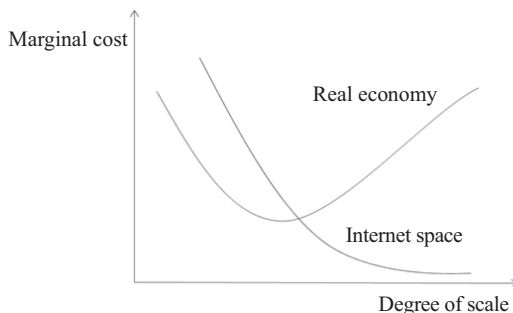
There is no doubt that the fundamental difference between Internet space and general commodities lies in the virtuality of the Internet space, which has been concluded in theoretical discussions and elaborated in the above analysis. Now we focus on the differences between Internet space as a virtual commodity and general commodities and try to summarize them in the following aspects:

First, super replicability. The replicability of Internet space is unparalleled by that of general commodities. The replication of general commodities is merely reproduction of one or a batch based on the appearance of a sample commodity. Moreover, such replication requires massive costs, e.g. the cost of counterfeit currency must be higher than that of real currency, because it is not simple labor to make counterfeit look real, and the standard of the replica must benchmark that of the product replicated without any deviation.

The replicability of Internet space is different from that of general commodities. Firstly, the replication of Internet space is not replication of a specific commodity but the whole economy and society, especially the economic logic implied. Whatever present in the real world can be reproduced – the Internet space can reproduce a physical enterprise to a virtual one; an actual market to e-commerce; a bank to an e-bank; a society to a virtual community, etc. Secondly, the replication cost of the Internet is almost equal to zero. Aside from the network infrastructure, regarding the effect of Internet space, the replication cost of the whole society in Internet space is very low, no more than the cost of using the network, etc. As these costs are constant costs, the costs can be assumed to be a constant and negligible. Thirdly, the most significant difference between the replicability of Internet space and that of general commodities is that the reproduction of Internet space is not a simple copy or imitation but transcendence. For example, virtual enterprises, markets and banks reproduced by Internet space are unparalleled by the real economy in production costs, transaction costs, scale, convenience, scalability and shareability, etc. Imagine which physical market is larger than the transaction scale of Amazon, Taobao, Tmall and Alibaba? According to statistics, Yiwu, the largest market of small commodities in China, uses almost a city as the venue, covering a business area more than 4.7 million square meters, but can only accommodate a maximum of around 70,000 merchants. By comparison, Tmall, which was launched in 2012, reached more than 80,000 online merchants by the end of 2013 and over 130,000 merchants in 2014, an increase of above 37%, and even more than 150,000 merchants by the end of 2015 [1].

Second, the space- and time-transcendence. The time and space of general commodities are limited. For example, cash crops that can be planted on an acre of land, houses that can be built on a piece of land, products that can be manufactured on a pipeline, and people that can live in a community are always limited. After all, the surface area of the Earth is approximately 510 million square kilometers, which is not infinite even if it can be superimposed. Regardless of the physical constraint of space, there is a modest limit on the scale of the real economy. Although the average production cost of a manufacturer decreases with the expansion of the production scale, a negative feedback mechanism will be triggered when the production scale reaches a certain critical level, which is mainly caused by management and organizational costs. Hence, the development of the real economy will eventually guide the scale of an enterprise to a moderate level rather than infinite expansion. The same is true with regard to time. Both the production time and transaction time are limited. The production time is divided into the labor and non-labor periods. The labor period cannot be extended at will. On the one hand, there are limitations in human physiology. Especially in modern society, the workday has been continuously shortened. On the other hand, it cannot be solved by rotation, because some products require time for natural process. So are market transactions. There are restrictions on the time and space of transaction. For example, transaction time will be adjusted with the workday. However, the space and time of the Internet are completely different from it.

Internet space has a relatively strong boundary extendibility. Under given conditions in a specific basic layer, the expansion of the online space scale is generally not restricted by physical conditions, and the larger the scale, the higher the effect. In general, the boundary of Internet space is determined by its scale (production or user scale). In terms of the scale of supply, attributing to the strong, almost cost-free replicability of Internet space, the scale of supply of Internet space is highly flexible and not subject to many physical conditions. In terms of the scale of demand, the scale of Internet space is mainly determined by the number of demanders or consumers, different from the scale of the real economy, which is mainly determined by the scale of production. Due to the high flexibility of the Internet supply space, the scale of Internet space depends primarily on the scale of demand. The more the people using Internet space, the larger the space scale. This is just an analysis based on the material conditions and the number of users. More importantly, Internet space can extend beyond material space and has an economic mechanism, namely, the special scale effect of Internet space. In terms of costs, as mentioned above, based on the scale effect, the cost of real economy generally decreases progressively first and then shows an increasing trend after a certain scale is reached. Hence, there is a problem of moderate scale effect. However, Internet space is different. Its cost continues to decrease as the scale keeps expanding. Finally, the marginal cost will approach zero (which is one of the reasons why the cost of Internet space is almost negligible), as shown in [Figure 1](#).



**Figure 1.**  
The relation of  
marginal cost and  
degree of scale

---

On the contrary, with the continuous expansion of Internet space, its scale effect will become larger, and the gain will continue to increase as the scale expands. Such scale return effect is true not only for suppliers but also for demanders, as their interest satisfaction will keep increasing with their scale expansion, i.e. the extension of Internet space, in the condition that the amount and price of products consumed remain unchanged. All these are determined by the positive feedback effect and positive externality of Internet space (Ma and Guo, 2011a, p. 115). In addition, cross-border transactions on the Internet are also a manifestation of spatial extension, which will not be set out herein.

It is important to point out that the extension of Internet space may be limited by technology under certain conditions, such as the server capacity. However, the emergence of cloud computing has broken the boundary of this limitation in a sense, making the trend of unlimited extension of Internet space possible.

Internet space has also broken through the time limit so that people's economic activities are no longer limited by natural time. On the one hand, the operation time in Internet space is seven days a week, 24 h a day, which is always available and never interrupted. On the other hand, Internet space saves time by shortening the transaction time, thus the natural time is extended relatively. For example, the de-intermediation feature of Internet transactions and the digital characteristics of Internet finance have significantly reduced transaction time.

Third, open-source shareability. The producers of commodities in the real economy are highly individual or private. First of all, the property rights of these commodities are clear, regardless of state-owned/private companies and their products, which is the basic premise of market transactions. Second, in the real market economy, the basic principles widely accepted are the law of value, equivalent exchange and "survival of the fittest", and the principle of benefit distribution is the zero-sum game. Moreover, private companies do not provide public goods, which are provided by the government.

Internet space commodity is actually an open-source form of commodity. An open-source commodity refers to a new kind of software commodity that is developed based on open-source software, which means that the source code of software is published in an online community (e.g. an open-source community), and any member of the community can have access to the source code free of charge and then modify, improve or innovate the code, and the results are shared with other members for free. The most prominent features of open-source products are shareability and the nature as quasi-public goods.

As an open-source form of commodity, Internet space also has the evident property of quasi-public goods; firstly, the protocols of Internet space guarantee the transparency of Internet space and the equality of people in use. Secondly, one's use of Internet space not only will not reduce but also instead increase the gain of others, i.e. more people using Internet space can improve the extensibility and efficiency of the Internet space. Thirdly, the operation of Internet space is also a process of private provision of public goods for free under the conditions of public property rights, without any severe problem of public goods supply in the real economy (von Krogh and von Hippel, 2006). As Internet space is open to the public, and resources are shared that everyone can get the resource for free or at a small cost, the contribution of each participant is not owned by an individual but shared. Therefore, the economic norms followed in Internet space are not "survival of the fittest" or zero-sum game but the nonzero-sum game and the principle of win-win outcome (Ma and Guo, 2011a, p. 115).

Cloud computing takes shareability of the Internet space to a new level, such as cloud storage, cloud office software system and cloud ERP, so that many different individuals or companies can get the corresponding services on the same platform and share these resources with each other. According to the definition made by the National Institute of Standards and Technology (NIST) of the US: Cloud computing is a pay-per-use model that provides usable, convenient and on-demand network access to the "shared pool" of configurable computing resources, which include networks, servers, storage, applications and services.



These resources can be provided quickly and require only minimal management work or interaction with service providers. In short, cloud computing is equivalent to a shift from the ancient single generator mode to the centralized power supply mode of a power plant. It means that computing power can also be circulated as a commodity, just like gas, water and electricity, easy to access and low in cost. The most significant difference between them is that computing power is transmitted through the internet (Cloud computing, 2016). Due to the great shareability of cloud computing, companies that provide professional cloud computing services can offer some professional services to massive users at the same time at a marginal cost approaching zero. In the past, enterprises had to establish their own servers and install various software systems, which can be implemented through the cloud computing system now, equivalent to outsourcing these software systems and storage services to a professional company at very low costs.

Fourth, real-virtual conversion. As mentioned above, Internet space can not only filter and divide the whole economic society into virtual and real ones but also connect them for the conversion of them to the other. This conversion is mainly reflected in the transformation of wealth or value. Internet space can transform the forms of wealth or value in the real economy into virtual forms of wealth or value, and vice versa.

The form of wealth and value in the real economy are different from virtual forms of wealth and value dependent on the Internet. The former represents actual wealth and value while the latter virtual wealth and value.

Internet space is the carrier and channel of the conversion. Firstly, the value in the virtual economy is not without grounds. It actually transfers the value in the real economy to the online resources in the virtual economy through the platform of Internet space. Since this part of value is a kind of value spilling over from the internet space, it has little to do with actual labor value, and therefore it is called as “virtual value”. Then, when the owner of virtual value distributes this value through Internet space or makes it flow back to the real economy, which becomes real profits, investment or wages in the real economy, the virtual value turns into actual value. Secondly, it is also the case for commodity transactions based on Internet space. Both parties to the transaction first trade virtual commodities, then transform these virtual commodities into actual commodities and deliver them to consumers through modern logistics, i.e. the Internet of Things (IoT). In order to sell these real commodities through Internet space, it is necessary to convert real commodities into virtual ones in the Internet space first, which is a work step that e-merchants have to accomplish. before online transactions can occur (Admittedly, there may be some falsity during this process, such as orders canceled in the Double 11 Shopping Festival.). The same is true for manufacturers. Manufacturers in the real economy are engaged in real production activities. However, if they want to conduct business activities through the internet, they need to turn into online merchants first and become economic subjects in the virtual economy.

It is worth noting that during the real-virtual conversion in the Internet space, social wealth changes accordingly, which not only results in the virtual value spillover from Internet space, leading to amplification of social wealth but also creates the internet economic bubble due to the emergence of Internet finance. For example, Internet finance has dual virtuality, i.e. the virtuality of finance and the virtuality of the network, and hence generates dual risks, i.e. financial risk and network risk, which is inevitable during the real-virtual economy transition process through Internet space.

### 3. Internet space as virtual land

From the above analysis, it is not hard to see that as a commodity, Internet space has both use-value and value. In terms of the characteristics of the commodity and the use-value and value of the commodity, the feature of the internet space is its virtuality.

The virtuality of the use-value of Internet space lies in that Internet space meets people's needs through a group of programs, a series of numbers and some symbols. The virtuality of the value of Internet space mainly lies in its features as a nonlabor product and the spillover of value. However, it should be pointed out that the value of Internet space is not all virtual. It includes virtual value and labor value. The labor value comes from the upfront investment required for the formation of Internet space and the daily input for regular maintenance, which accounts for a small proportion compared with the virtual value. Therefore, in order to facilitate the problem analysis, we ignore the labor value.

Due to the virtual nature of the value of Internet space, how to price Internet space has become a tricky problem. According to our early research, we provide a network pricing model as follows:

$$w_n = \sum_{i=1}^{\infty} \frac{D_i(n_a, n_b, n_c)}{(1+r)^i}$$

where  $w_n$  denotes virtual value of a network product,  $n_a$  replication volume,  $n_b$  the scale of demand (number of users) and  $n_c$  the scale of sharing, and  $\partial D_i(n_a, n_b, n_c)/\partial n_a > 0$ ,  $\partial D_i(n_a, n_b, n_c)/\partial n_b > 0$ , and  $\partial D_i(n_a, n_b, n_c)/\partial n_c > 0$ . Hence,  $\partial w_n/\partial n_a > 0$ ,  $\partial w_n/\partial n_b > 0$  and  $\partial w_n/\partial n_c > 0$  can be deduced, respectively, which indicates that the greater the replication volume, the scale of demand and the scale of sharing of a certain network product, the higher the expected return and the virtual value of this product (Ma and Guo, 2011b).

In this analysis, the virtual value of the Internet is obviously regarded as the ratio of gains from the Internet to the discount rate. Undoubtedly, this pricing model for the virtual value of the Internet is correct in the direction. However, it cannot offer a good explanation in theory.

However, when we define the Internet as a space, a new way of thinking is opened for this pricing model, i.e. Internet space can be imagined as a piece of land (the land is virtual, of course). Whoever uses this land, i.e. the internet space, shall pay a "rent".

Our understanding mainly benefits from the Marxist land price and ground rent theory. Marx specifically analyzes the issues of land and rent in *Capital: Volume III*. In Part VI of *Capital: Volume III*, Marx (2004d, pp. 702–703) points out that as land is not a product of labor, it has no value. Hence, the price of land is unreasonable. In fact, it is the capitalized ground rent that forms the purchase price or value of the land. "In fact, this purchase price is not the purchase price of the land but the ground rent provided by the land."

Marx also makes a detailed analysis of ground rent in *Capital: Volume III* (2004). According to his opinion, ground rent is the economic price paid by the tenant to the landowner for renting the land, which is the economic realization of land ownership. The ground rent can be divided into differential rent, absolute rent and monopoly rent. The differential ground rent refers to a part of the surplus profits gained from the more productive lands and transferred to the landowner, which is composed of the difference between the individual production price and the social production price. The differential rent is further divided into differential rent I and differential rent II. The former is converted from the surplus profits generated by the investment of the same amount of capital on different lands of equal volume due to different land abundance and locations. The latter is converted from the surplus profits caused by different productivity due to the change of economic abundance or relative location of the land as a result of continuous investment on the same plot of land. Absolute rent is the rent that has to be paid whenever the owner's land is used, which may come from the part of value exceeding the production price of agricultural products, the deduction of average profits and wages, or the balance of agricultural product price exceeding its value and production price. Monopoly rent is formed by surplus profit brought about by monopoly price.

Thus, Marx believes that although the land has no value, as the land has rental income, the price of the land is the purchase price for the ground rent provided by the land. In short, under

the land property ownership, the rent income can be obtained based on the land. Therefore, when the landowners transfer the right of obtaining ground rents, they will ask for the corresponding remuneration, which forms the purchase price of land. This is the reason why the price of land is not the purchase price of land but the purchase price of the ground rent provided by the land.

Marx further points out that in this sense, the price of land is actually a capitalized rent. That is, the rent to be obtained after the purchase of land should be equivalent to the interests of the monetary capital, which is used for the purchase of land, deposited in a bank. Hence, the level of land prices directly depends on two variables: gains from ground rent and bank interest rate.

According to the above theory of Marx, we regard Internet space as a piece of virtual land and the gains from the use of Internet space as the rent income. Thus,

$w_n = \sum_{i=1}^{\infty} D_i(n_a, n_b, n_c)/(1+r)^i$  represents the quantitative relationship: Internet

space = Internet space gain/interest rate, where the virtual value of Internet space is considered as a capitalized rent, the rental price calculated based on the interest rate, or the years of rent capitalization. For the owner or creator of Internet space, the rent obtained based on Internet space is the gain from space rental, and for users of Internet space, paying the rent is to obtain the right to use Internet space. Hence, the use of such Internet space is not a transfer of space, but a lease for a certain period, like a long-term loan.

As we know, ground rent is collected according to the land area, and the Internet also collects the rent according to the size of its space, which is determined by the number of users. In addition, the returns on Internet space can also be divided into absolute returns, differential returns and monopoly returns, etc.

The returns on Internet space mainly includes two parts: rental income and service income. The former can be regarded as the cost of the right to use Internet space, which can be considered as an absolute return. Sometimes this part of return comes in the form of membership fees. In general, as long as users pay this rent, they can get some basic services of the Internet space. Service income includes incomes from search, advertising, business data analysis, financial services, etc. As the structure of most Internet space is a closed-loop monopoly structure, once the users enter the virtual space, subsequent services can only be provided by the provider of the Internet space. Therefore, it is sometimes difficult to separate these service charges from absolute returns on Internet space.

In addition, due to the diversity and binding feature of services, the charge of these services also has the characteristics of certain differential and monopoly returns.

In terms of differential returns, we can classify the differential returns on Internet space into three categories, i.e. differential return I, differential return II, and differential return III. Differential return I refers to the difference in gain due to the uneven distribution of Internet resources. For example, the Internet connection speed or the quality of the supporting logistics can make a difference in the effects of Internet space, which results in differential returns on Internet space. Differential return II means the differential returns resulting from improvement of space services and operation effects due to continuous investment in Internet space. As the level of services is higher, users can gain more benefits and will be charged with higher fees. For example, Alibaba's Taobao and Tmall are different in level and their services differ significantly. Therefore, their fees charged are different. Differential return III refers to differential returns on brands. Although the services offered by Internet space and their effects may be the same, as some space has better credit and reputation, it will bring more returns. For example, Taobao and Tmall, JD.com and Vipshop have different credibility, and thus their brand returns are different.

We analyze Alibaba and calculate its virtual value based on the Internet space pricing model mentioned above.

---

According to the data on Alibaba's official website (Alibaba Group, 2016), Alibaba's net income for the full year 2015 was 42.847bn yuan. At a 3% discount rate, we can calculate the virtual value of Alibaba, i.e. the purchase price for the returns as described by Marx is as follows:

$$W^e = 428.43R/3\% \rho = 1428.233 \text{ billion CNY (approximate 230.36 billion USD)}$$

It is highly consistent with the market valuation of Alibaba in 2016 (about 230 billion US dollars). Certainly, the purchase price for Alibaba we calculated is only a theoretical value. The fixed assets investment and labor value should also be considered when it comes to the actual market price. Nevertheless, Alibaba's virtual value does have some consistency with its actual valuation.

The source of the virtual value of Internet space is another question that requires theoretical answers.

The virtual value [2] of Internet space can be divided into two parts: the virtual value with the support of labor value (referred to as virtual value I of Internet space) and the virtual value without the support of labor value (referred to as virtual value II of Internet space). The latter is generally more virtualized than the former.

The virtual value I of Internet space is the false social value described by Marx. This part of the virtual value has nothing to do with labor. It is purely the part of value realized by Internet space. Marx (2004e, pp. 744–745) states in Capital regarding this part of value that “market-value is always above the total price of production of the total quantity of products. . . This is determination by market-value as it asserts itself on the basis of capitalist production through competition; the latter creates a false social value.” Regarding this false social value, Marx (2004e, p. 745) also states “. . . It is based necessarily upon the exchange-value of the product. . . What society overpays for agricultural products in its capacity of consumer, what is a minus in the realization of its labor-time in agricultural production, is now a plus for a portion of society, for the landlords .”

In other words, the value realized based on Internet space is not the value generated by Internet space itself, but the value paid for by consumers or users of Internet space. This part of value is a negative value for the users of Internet space because their payments are not exchanged for the equivalent labor value. It is, however, a positive value for the owners of Internet space as it becomes their income. Hence, it is “false value”. This part of virtual value comes from the transfer of social value. In other words, we may assume that the part of value paid for by users of Internet space is derived from the transfer of value created by productive labor in the real economy, possibly corporate profits, wages of laborers or international value.

The virtual value II of Internet space is simply a “commercial markup”, i.e. a markup that exceeds the total value of labor. This part of value is the virtualization of virtual value, a bubble derived from Internet space and a risk factor for Internet virtual economy.

#### 4. Internet space as a new economic variable

The academic value and practical significance of the above theoretical definition and analysis of Internet space is concerned with no more than an economic interpretation and understanding of “Internet Plus”.

Human understanding of economic variables is the result of long-term practice and experience generalization and summarization process. For example, classical economics has long focused on the capital and labor factors, which have had a relatively more significant impact on human economic activities during its time, while not much attention was paid to technological factors. With the continuous development of social practice, the impact of technological factors on social and economic activities has become increasingly significant,

---

that is when the neoclassical economist Solow incorporated technological factors into the category of economic factor. However, in Solow’s model, technology was defined only as an exogenous variable. With several major technical revolutions, the influence of scientific progress on socioeconomic activities has been increasingly growing, demonstrating a practical and endogenous effect. Hence, since Romer, technology has been introduced into the logical analysis framework of economics as an endogenous economic variable.

The same is true of the role of the Internet in modern socioeconomic activities. For a long time, the role of the Internet in socioeconomic activities had not been prominent, and hence it was not included in the research field of economics. More importantly, the Internet is regarded as a medium factor, i.e. a carrier, in many theoretical understandings. A carrier alone is unlikely to play a significant role in economic activity. Hence, the Internet has instead been the main object of media studies for a long time because it is a new media tool. It has attracted similar attention in information economics because it is also the carrier of information transmission.

However, with the advancement of technology and the development of social and economic activities, the Internet is rapidly developing and changing with each passing day, generating a revolutionary impact on the traditional production, lifestyle and social relations. It has changed the concepts and behaviors of human production, exchange, distribution and consumption, such as the replication, scale and sharing effect of Internet space analyzed above, and B2B, B2C, C2C, O2O, B2M, B2G, B2T, C2B, C2B2S, B2B2C modes carried on in the Internet space. While changing the social relations of production, Internet space has also brought about changes in ideology, people’s mode of thinking, communication and entertainment (along with changes in the education, social connection and entertainment functions of the internet), as well as the political system and legal relations.

Today, we can no longer exclude the Internet from the economic analysis framework, nor can we simply put the Internet in the economic analysis framework simply as a general economic variable. Instead, it should be analyzed as a special economic variable, playing at least the role of engine and facilitating factors. The “Internet Plus” theory aims to study the mechanism of this “engine and facilitator” factor.

The significance of our definition of the Internet as a special virtual product, and consider this special virtual product as a special economic variable lies in the fact that we can thereby properly explain why the traditional industry plus the “Internet” can be a game-changer to the corporate philosophy and production mode; why the market and merchants plus Internet space can result in e-commerce and e-merchants; why traditional banks plus Internet space can become e-banking and online finance; why distribution plus Internet space can change people’s interest preferences and social wealth distribution; why a society plus Internet space can reconstruct people’s value and emotional orientation.

In short, Internet space can almost be understood as a dynamic system that incorporates socio-politics, economy and culture and in the meantime one of the most important factors affecting them. This is the “Internet space” and “Internet Plus” we have analyzed above.

Based on the above analysis, we propose the introduction of “Internet space” into the research of theoretical economic framework as a special economic variable. It is not only the call of the times but also the need for theoretical break-through.

If we analyze Internet space as a key economic variable that affects economic activity, we must first define its economic connotation. In our opinion, as a special economic variable, Internet space is uniquely different from other economic variables such as capital, labor and technology in that it is inseparable from information. The Internet and information are like two sides of a coin. We can also compare the Internet to a truck and information the cargo loaded on the truck. If there is no cargo, then the truck is rendered useless. Conversely, if there is no truck, there will be no cargo flow. In this sense, the Internet is the carrier of information and Internet space is therefore the space accommodating information. It should be noted that there are many carriers of information that have always been

---

accompanied by and associated with information. However, Internet space is something different in that it breaks the linear information flow of the traditional carrier with a net-like, divergent structure, revolutionizing the structure of our information dissemination. The Internet provides us with other features that are unrivaled by traditional information carriers, including larger information flow, massive storage capacity, stronger tendency for decentralization and interactivity, higher transparency, great instantaneity and space- and time-transcendence.

Once the economic definition of Internet space is clarified, we can introduce the economic variable of Internet space into the theoretical framework of economics.

From a micro perspective, the impact of Internet space variables on economic activities is mainly demonstrated as significant reducer of information incompleteness, asymmetry and cost of information search.

Firstly, Internet space has a strong capacity to reduce incompleteness of information. In terms of information creation, Internet space has a strong capacity to create information. It can turn a tremendous amount of potential information into comprehensive data. From information transmission channels, poor communication channels are one of the reasons for incomplete information. With the development of the Internet, people can access more information through online medium. As far as the amount of information is concerned, an excessive amount of information is more difficult to digest and equally hard to store. The Internet has excellent capacity in information processing and storage, which can help people handle massive amounts of data or information explosion, thereby alleviating the incompleteness of the information in a certain sense. Regarding the time lag of information transmission, the internet as a carrier of information transmission has dramatically shortened its process to allow people to access most of the latest information in the world instantly.

Secondly, Internet space is conducive to the mitigation of information asymmetry thanks to its unique approach and advantages in solving the problem. For example, the most significant advantage is that it can transform private products into public goods. As assumed by theory of information asymmetry, information is a private product, and therefore it can give rise to such problems as information concealment and identification difficulty. As a special commodity, Internet space possessed greater publicness, and so is the information it carries. That is to say, the Internet offers a platform for people to publish and exchange information freely. People are willing to provide information for an exchange due to reasons such as the need for information exchange, trust in opinion leaders and self-satisfaction from such exchange. This is how the Internet converts information as private products into public goods, which demonstrates the openness and sharing nature of the internet. It is fair to say that the Internet has solved the problem that those who have an advantage in information refuse to have such information disseminated and thereby monopolize such information. The transmission of information by the Internet deprives those with information edge of their privilege and make up for the disadvantages of those who are at an inferior position in terms of information. The Internet is also conducive to information screening, resulting in a tendency for the information to become symmetric and information possession balanced. Hence, as the adverse selection and moral hazards in the principal-agent problem can also be solved, people can gradually make the better choice, and the market optimization can also be achieved progressively.

Thirdly, Internet space can also reduce the cost of information to a certain extent. This is because information acquisition requires searching, which comes at a cost. The Internet can be used to as an alternative to traditional information search. Under certain conditions, there is a negative correlation between the cost of information search and the use of the Internet, i.e. the more extensive the use of the Internet, the less the search count in people's private information searches. When consumers and producers can acquire the information needed

through the Internet (search engines) instead of using traditional searching methods and paying for them, and if both time and monetary costs through the Internet searching is much lower than those of traditional searching methods, media information search will replace the private information searching behavior.

Due to the significant impact of Internet space on microeconomic activities, we can introduce Internet space as a variable affecting market prices into a two-dimensional market model to establish a three-dimensional market model.

For example, if we assume that in the absence of a two-dimensional market in Internet space, since information is incomplete and asymmetric, or the cost of acquiring information is excessively high, then the supplier cannot accurately obtain the price level  $p_t$  at this point, but instead only predict the current price based on experience or the price of the previous period and thus determine its existing supply. The expected price, denoted  $p^e$ , shall meet the adaptive expectation equation:

$$p_t^e = P_{t-1}^e + \eta(p_{t-1} - p_{t-1}^e), \quad 0 < \eta < 1$$

$p_t$  and  $p^e$  denote the expected prices in period  $t$ , and  $\eta$  is the price expectation coefficient. The above formula indicates that the deviation between the price in the previous period and the expected price in the previous period is partially used to adjust the expected price in the current period.

Assuming that in a three-dimensional market containing the factor of Internet space, the current price expectations of market suppliers will be adjusted based on the more complete and symmetrical information provided by the internet space. The expectations of product suppliers for the current price level can be expressed as:

$$p_t^e = p_{t-1}^e + \sigma\eta(p_{t-1} - p_{t-1}^e), \quad 0 < \eta < 1, \quad 0 < \sigma < 1/\eta$$

where  $s$  is the adjustment factor for the price expectation coefficient  $\eta$ .

Here,  $s$  is actually the influence coefficient of the factor of Internet space on the supplier's expectations. When  $\sigma > 1$ , the greater it is, the more the expected price of the current product is adjusted compared with the expected price in the previous period, the greater the change in the current supply. It also suggests a greater influence of Internet space on suppliers, and vice versa. As the impact of Internet space on the market demand operates in the same manner, it will not be elaborated herein.

From the macroeconomic perspective, Internet space has a significant impact on investment, consumption, government behavior, international trade and even the economic crisis. The mechanism of action is as follows: firstly, through the transformation of Internet space into an information platform, massive information can be provided to investors, consumers and other stakeholders as a basic reference to adjust their expectations. Secondly, once the stakeholders have formed rational expectations, that is, a rational attitude toward the current economic circumstances, this attitude will in turn directly determines their economic behavior. Thirdly, changes in the economic behavior of these individual interests will form a new economic development trend.

We have also conducted empirical verification on the mechanism of the effect of Internet space variables on economic activity:

We first used the empirical data regarding the scale of Internet development, mobile Internet access, the rise and development of Tencent QQ and WeChat (two major instant communication program lines in China) to verify the development process of Internet space in China and prove that 2007 and 2013 were two key turning points of China's Internet development. Based on these points as the boundaries, we divided China's Internet space development into three time periods: Phase I (before 2007), Phase II (from 2007 to 2013) and Phase III (from 2014 to the present).

Then we selected second-hand housing market transaction data in three major Chinese cities (Beijing, Shanghai and Guangzhou) as samples and used the HP filter to perform empirical verification of the response speed of second-hand housing prices to real estate policies in these three time periods.

The empirical results suggested that the speeds of second-hand housing price response to real estate policies in these three big cities were different in the three periods. Before 2007, the average response time was more than three months. Between 2007 and 2013, the average response time was three months. After 2014, the average response time was only two months, and some policy effects even achieved a time-lag-free response. It proves that Internet space has truly begun to affect actual economic activity as an economic variable.

### 5. Internet space as a new economic form

What is the mark that distinguishes different socioeconomic forms? This has always been a controversial question. According to classical Marxist economics, there are at least two criteria for such distinction:

Firstly, the level of technical progress or productive force development can be used as a criterion for distinction of socioeconomic periods, as Marx (2004b, p. 204) points out in *Capital*, the difference between the various economic epochs lies not in what are produced, but rather in how they are produced and with what means of labor – the means of labor is not only a measure of the development of human labor but also an indicator of the social relations through which labor is carried out. Marx (Marx, 1958, p. 144) also notes that "... The hand-mill gives you society with the feudal Lord; the steam-mill, society with the industrial capitalist." Moreover, even Lenin (1986, p. 117) once affirmed a motto printed in a pamphlet that reads "The age of steam is the age of the bourgeoisie, the age of electricity is the age of socialism".

Secondly, demarcation of different social forms can be defined from the perspective of relations of production, i.e. distinction can be made from the form of ownership and distribution of the means of production. Marx (2004c, p. 44) points out that "Whatever the social form of production, laborers and means of production always remain factors of it. But in a state of separation from each other either of these factors can be such only potentially. For production to go on at all they must unite. The specific manner in which this union is accomplished distinguishes the different economic epochs of the structure of society from one another." Marx (2004c, p. 44) also stresses that "The essential difference between the various economic forms of society, between, for instance, a society based on slave-labor, and one based on wage-labor, lies only in the mode in which this surplus-labor is in each case extracted from the actual producer, the laborer."

In light of above insights, it can be deduced that the Internet has the potential to demarcate the boundary of a new economic form, whether from the perspective of productive forces or the perspective of ownership form and distribution of the means of production, as discussed in detail below.

From the perspective of productive forces, Internet technology, as the fruit of information technology, is the product of the third technology revolution. Although people have given various definitions of the changes in the socioeconomic normality triggered by the current technical revolution, such as those given under the general term of "information society" or "knowledge-based economic society", as the impact of such information or knowledge factors on the economy and society people observed over the past decades hardly compare to the Internet as we know it today, a conclusion is unlikely to be reached on that basis. As a new technology, the Internet is a complete game-changer. It is mainly reflected in the fact that any economic activity will experience revolutionary or subversive changes as long as the internet is involved. Firstly, for traditional industries, the Internet Plus traditional industries have



completely changed the production mode of traditional industries, thereby greatly improving the labor productivity of traditional industries. On the one hand, the continuous penetrating and integrating capability of Internet technology facilitated the constant expansion of factors of production in traditional industries, continual improvement in the quality of factors of production and continuous optimization of the allocation of factors of production, thereby driving the innovation and upgrade of development models and optimization and improvement of organizational structures in traditional industries. On the other hand, when Internet space is involved in the production process, production mode virtualization is made possible through intelligent manufacturing of products, production mode collaboration through the collaboration between machineries “human-machine collaboration”, and product models individualization through restructuring and optimization, thereby driving the entire real economy toward industrial intelligentization. Secondly, from the perspective of reproduction, Internet space has improved labor productivity and lowered the cost value by becoming embedded in various links in social reproduction, boosting the efficiency of the entire macroeconomic operation. For example, Internet finance has accelerated currency circulation, Internet logistics accelerated commodity circulation and Internet transaction accelerated commodity exchange, all of which contribute to the reproduction of the entire society for more sustainable overall GDP growth.

Secondly, in terms of social relations, the emergence of Internet space has broken the traditional model where means of production and laborers are combined, i.e. a new mode of their combination has emerged that is carried out through Internet space. In other words, Internet space has become the new platform and joint for their combination. This is what we mean by “Internet Plus”, i.e. Internet plus means of production combined with Internet plus laborers = means of production + Internet + laborers. The combination of Internet + means of production and Internet + laborers is obviously different from the manner of combining means of production and laborers in the previous socioeconomic form. This difference is the basis to regard the internet economy as a new economic form. The practical performance of this different production method is also very prominent.

From the perspective of production, the combination of the means of production and laborers through Internet space virtualized their relationship, that is, the means of production and laborers no longer need to appear in both physical and on the spot. Meanwhile, as these virtualized factors of production are not necessarily the owners of capital, but could be the laborers themselves. For example, for e-merchants who depend on Internet space to operate, capital is no longer a necessary condition for their social and economic activities. It has mitigated the restraint of the means of production on the laborers to some extent, enabling the laborers to make full use of the means of production for production and creation; on the other hand, it has enriched and expanded the connotation and form of the ownership of the means of production, so that the combination of laborers and capital can be reconfigured and even reversed through Internet space.

From the perspective of exchange, after Internet space is involved in social exchange activities, all exchange activities in social production and all the circulation processes became attached to Internet space, which has dramatically changed the exchange links in the social reproduction process and the relationships and positions among enterprises, producers and consumers in the exchange process. For example, the existence of Internet space enables enterprises to purchase raw materials and sell commodities through online trading platforms, which can not only expand the scope of enterprise exchanges but also reduce transaction costs and improve the efficiency of commodity circulation. The contents of these exchanges include not only material means of production and tangible commodities but also knowledge, information and services. In particular, the emergence of Internet finance and the extensive use of modern logistics not only make the exchange frequency higher and the exchange cost lower but also allow the gradual diversification of the objects of exchange from a single object

---

due to the network relationships of Internet space, and eventually result in the globalization of exchange, thereby offering more choices for socioeconomic activities.

From the perspective of consumption, the emergence of e-commerce and online payment powered by Internet space allows consumers to buy commodities without leaving their homes. This time- and cost-saving consumption/shopping mode has greatly impacted the traditional consumption practice by changing the position of consumers in economic activities, i.e. shifting the consumption from its traditional focus on the production of commodities by enterprises to a new focus centered on the provision of services and information to consumers. In this way, the position of consumers has changed from a passive selection of homogeneous commodities to active selection of personalized products and services, i.e. the choice regarding the type and property of commodities are more likely to be determined by consumers. At the same time, since companies can use the modern Internet to communicate with consumers directly, they can collect individual preferences and performed personalized customization. Consumers can also get involved in the production process, provide market information or product opinions for enterprises, thereby reducing company production costs and improving company management capabilities. Consumers gradually enter the production link from the consumption link and participate in the whole process of commodity production.

From the perspective of distribution, when Internet space is involved in the process of social distribution, it has also affected the accumulation of social wealth and implemented the third distribution of social wealth, such as those made possible by the emergence of Internet finance through what is called third-party payments in China, including both Internet payments and mobile payments, through network financing, including small and microloans and consumer loans based on platform customer information and cloud data, peer-to-peer (P2P) marketplace fundraising and crowdfunding, through online investment, including investment by finance providers of P2P marketplace and crowdfunding platforms and online monetary market funds, through online currency, etc. These modes of redistribution not only diversified the accumulation of social wealth but also offer convenient online funding support for the sustainable development of enterprises. During this process, shared distribution methods are made possible thanks to the sharing nature of the internet technology itself. More importantly, social wealth can be redistributed through Internet platforms, Internet financing and IoT such as the extensively used Alipay, Yu'e bao and WeBank, thereby rapidly changing the distribution pattern of wealth as well as rapidly concentrating social wealth.

In conclusion, premised on its facilitative effect on the ever growing productive force, the rapid development of Internet space has dramatically changed the relations of production of the whole society. It has changed the relations between the means of production and labor in the production process and the traditional exchange and consumer relationships and redistributed social wealth in the meantime.

#### Notes

1. According to estimates through technical means.
2. Regarding the part of value related to labor value in the Internet space, since it has the property of general labor value, no special analysis will be made here in.

#### References

- Alibaba Group (2016), "Detailed financials and metrics", available at: [http://www.alibabagroup.com/cn/ir/Alibaba\\_Financials\\_and\\_Metrics\\_Eng.pdf](http://www.alibabagroup.com/cn/ir/Alibaba_Financials_and_Metrics_Eng.pdf) (accessed 4 May 2016).
- Ballester, C., Calvo-Armengol, A. and Zenou, Y. (2006), "Who's who in networks. Wanted: the key player", *Econometrica*, Vol. 74 No. 5, pp. 1403-1417.

- Bollobás, B. (1988), “The chromatic number of random graphs”, *Combinatorica*, Vol. 8, pp. 49-55.
- Bramoullé, Y. and Kranton, R. (2007), “Public goods in networks”, *Journal of Economic Theory*, Vol. 135 No. 1, pp. 478-494.
- Bush, V. (1945), “As we may think”, available at: <http://web.mit.edu/STS.035/www/PDFs/think.pdf> (accessed 8 July 2016).
- Cloud computing (2016), *Baidu Baike*, available at: <https://baike.baidu.com/item/cloudcomputing/9969353?fr=aladdin> (accessed 16 August 2016).
- Harary, F., Hedetniemi, S.T. and Robinson, R.W. (1969), “Uniquely colorable graphs”, *Journal of Combinatorial Theory*, Vol. 6 No. 3, pp. 264-270.
- He, B.H. (2009), “Shenme shi hulianwang [What is the Internet]”, *Dianxinwang jishu [Telecommunications Network Technology]*, Vol. 35 No. 10, pp. 35-38.
- Katz, M.L. and Shapiro, C. (1985), “Network externalities, competition, and compatibility”, *The American Economic Review*, Vol. 75 No. 3, pp. 424-440.
- Lenin, V.I. (1986), “Report on the work of the all-Russian central executive committee and people’s committee (february 2)”, Circulation Department of People’s Publishing House (Ed.), *V. I. LENIN Collected Works Volume 38 (Chinese Edition)*, People’s Publishing House, Beijing, p. 117.
- Ma, Y. and Guo, B.Y. (2011a), *Wangluo xuni jiazhi de lilun fenxi yu shizheng jianyan [Theoretical Analysis and Empirical Test of Network Virtual Value]*, Shanghai University of Finance and Economics Press, Shanghai, p. 115.
- Ma, Y. and Guo, B.Y. (2011b), “Wangluo jingji xunixing de lilun fenxi yu shizheng jianyan [Theoretical Analysis and Empirical Test of Virtuality of Network Economy]”, *Jingjixuejia [The Economist]*, Vol. 23 No. 2, pp. 34-42.
- Marx, K. (1958), “The poverty of philosophy”, Central Compilation and Translation Bureau for Works of Marx, Engels, Lenin and Stalin (Ed.), *Complete Works of Marx and Engels Volume 4 (Chinese Edition)*, People’s Publishing House, Beijing, p. 144.
- Marx, K. (2004a), “Chapter 3: money, or the circulation of commodities”, Central Compilation and Translation Bureau for Works of Marx, Engels, Lenin and Stalin (Ed.), *Capital: Volume I (Chinese Edition)*, People’s Publishing House, Beijing, p. 123.
- Marx, K. (2004b), “Chapter 7: the labor-process and the process of producing surplus-value”, Central Compilation and Translation Bureau for Works of Marx, Engels, Lenin and Stalin (Ed.), *Capital: Volume I (Chinese Edition)*, People’s Publishing House, Beijing, p. 204.
- Marx, K. (2004c), “Chapter 1: the circuit of money-capital”, Central Compilation and Translation Bureau for Works of Marx, Engels, Lenin and Stalin (Ed.), *Capital: Volume II (Chinese Edition)*, People’s Publishing House, Beijing, p. 44.
- Marx, K. (2004d), “Chapter 37: introduction”, Central Compilation and Translation Bureau for Works of Marx, Engels, Lenin and Stalin (Ed.), *Capital: Volume III (Chinese Edition)*, People’s Publishing House, Beijing, pp. 702-703.
- Marx, K. (2004e), “Chapter 39: first form of differential rent (differential rent I)”, Central Compilation and Translation Bureau for Works of Marx, Engels, Lenin and Stalin (Ed.), *Capital: Volume III (Chinese Edition)*, People’s Publishing House, Beijing, pp. 744-745.
- Shapiro, C. (1996), “Antitrust in network industries: a speech before the American law institute and the American bar association”, available at: <https://www.justice.gov/atr/speech/antitrust-network-industries-speech-american-law-institute-and-american-bar-association> (accessed 4 0 2016).
- Shy, O. (2002), *Wangluo Chanye Jingjixue [The Economics of Network Industries]*, Chinese Edition, Shanghai University of Finance and Economics Press, Shanghai.
- Tan, S. (2007), “Qianxi xuni shangpin ji qi xiaofei shichang” [A brief analysis of virtual goods and their consumer market], *Shangyeshidai (currently known as Shangyejingjiyanjiu) [Commercial Times, Currently Known as Journal of Commercial Economics]*, Vol. 26 No. 23, p. 16, 107.

- 
- von Krogh, G. and von Hippel, E. (2006), "The Promise of research on open source software", *Management Science*, Vol. 52 No. 7, pp. 975-983.
- Wang, C. (2002), "Cong Makesi zhuyi ziben xunhuan he zhouzhuang lilun kan wangluo jingji" [Review the network economy from the marxist capital cycle and turnover theory], *Changsha tiedao xueyuan xuebao (shehui kexue ban)* [Journal of Changsha Railway University (Social Science)], Vol. 3 No. 2, pp. 17-19.
- Wasserman, S. and Faust, K. (1994), *Social Network Analysis: Methods and Applications*, Cambridge University Press, Cambridge.
- Zhou, C.M. (2003), *Wangluo Jingjixue [Internet Economics]*, Shanghai People's Publishing House, Shanghai.

**About the authors**

Yan Ma, Professor at the School of Economics, Shanghai University of Finance and Economics (Shanghai 200433); Yan Ma is the corresponding author and can be contacted at: [yanma@mail.shufe.edu.cn](mailto:yanma@mail.shufe.edu.cn)

Cai Minqiang, PhD student at the Institute of Marxism, Shanghai University of Finance and Economics (Shanghai 200433).

Li Yun, PhD student at the College of Social & Behavior Sciences, University of Massachusetts, USA.