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Exploring the Essence of Internet Platform Economy

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Abstract

Platform economy is the most important feature of economic industry of the Internet era. The main feature is that the Internet platform companies will idle resources through the Internet and multilateral market integration, which greatly reduces the transaction cost, and further spawns the economic subject differing from that under the guidance of traditional enterprises, as well as a large number of innovative behavior emerge. This paper first points out the emergence, characteristics and development status of Internet platform economy, and introduces the important role of Internet platform in China and even the global economy. Then, the essence of Internet platform economy is revealed through the literature review of platform and platform economy. This paper proposes that the essence of platform economy is to solve the transaction costs of Internet platform in the three relationships of business, social and information. Therefore, the generated platform has three different forms of expression, namely business platform, social platform and information platform. The main functions of the three platforms are respectively to meet the needs of the members of the platform for economic exchanges, to meet the needs of the members of the platform for social communication, and to meet the needs of the members of the platform to obtain the required information.

Subject Areas

Business Management

Keywords

Platform Economy, Network Effect, Internet Technology, Transaction Cost

1. Introduction

Platform economy is the most typical and prominent manifestation of Internet

economy. Internet platform economy is a new economic form based on Internet technology, big data, cloud computing and other new generation of information technology. Generally speaking, all Internet companies have the nature of "platform economy". Because different Internet companies appear in different forms of Internet economic development, the performance of platform economy is different.

Generally speaking, researchers divide the development of the internet into three stages, Web 1.0, Web 2.0 and Web 3.0. In the Web 1.0 era, users could only get information from the internet. In the Web 2.0 era, users could interact with each other through the internet. Web 3.0 realized the interaction between users and the internet, and the interactive data could be stored and reused by the internet. In the eras of Web 1.0 and Web 2.0, when the economic development was not driven by big data, the internet economy was not a new business model, and its main role was to realize the previous offline intermediaries that operated on the internet. Compared with offline intermediaries, intermediaries based on the internet technology and platform could break through the limitation of region and time, reducing transaction costs largely. With the help of the Internet, people can communicate with each other in a wider range, and online payment has brought great convenience to the transaction. The rise of various internet platforms has changed the behavior patterns of economic entities in the past and laid a foundation for the emergence of a new economic model in the future.

In recent years, with the rapid development of the Internet economy, the importance of Internet platform enterprises in economic life is constantly improving. Google, Amazon, Facebook and Tencent, Alibaba and Baidu are all Internet platform companies that have achieved great success in recent years. For nearly 25 years, the Internet economy has grown dramatically. In the Internet Trends Report 2020, "The Queen of the Internet", noted by Mary Meeker, 1995, the market value of the top 15 Internet companies is $17 billion. Twenty-five years later, it reached $4.8 trillion in 2020.

About 60 of the world's top 100 companies now have the vast majority of their revenues from internet platforms. Of the top 10 technology companies with the highest market value in the world, five are Internet platform companies, namely Google, Alibaba, Facebook, Tencent and Amazon. Among them, Google established a search engine-based information sharing platform, its market value reached $2 trillion in March 2022; Facebook established a social platform to promote interpersonal communication and emotional communication; Alibaba established a platform for business transactions and further derived sub-platforms such as rookie logistics, Alipay, etc. Internet platforms such as JD.com and Qunar have also emerged in other vertical fields, all of which have been successful in their respective fields, with a large number of users with high stickiness. In addition, open development platforms, cloud computing platforms, software stores and other PAAS are the latest manifestations of the platform economy. The kinetic energy of the digital-driven platform gives this type of economy

completely different from the traditional economy and promotes economic and social development. This change indicates that the micro-foundation of the modern economy is being reshaped. At the same time, the inclusiveness of the Internet platform enables people of different ages, different degrees and different backgrounds to find their own value within the platform, which becomes an important means to reduce the unemployment rate and increase the income of full-time personnel.

In recent years, China's platform economy has developed rapidly. The new mode of "Four Crowds", including crowd innovation, crowd sourcing, crowd support and crowd funding, was mentioned in "The Guidance on Accelerating the Construction of the Platform Supporting Mass Entrepreneurship and Innovation". "Four Crowds" are used to pool resources on the internet to promote entrepreneurship and innovation. As the most typical industrial manifestation of the "Four Crowds" mode, the sharing economy can realize transactions, information collecting and capability empowering through the internet. Internet platforms can thus enable peer-to-peer sharing or exchange of documents and capabilities offline, making it possible to integrate online and offline activities. It has brought a tremendous impact on the strict division of labor between enterprises and consumers in the traditional manufacturing enterprises, and changed the hierarchical and centralized organization mode in the manufacturing era. Individuals are free to show great creativity on the platform, and that's why emerging economic entities like individual enterprises and "Slashie" or people with multiple careers appear. The inclusiveness of the internet platform allows people of all ages and educational and family backgrounds to realize their value on the internet. PricewaterhouseCoopers believes that internet companies based on the sharing economy have generated a revenue of $15 billion worldwide, and estimates that the global revenue of sharing economy will reach $335 billion by 2025.

As it turns out, the rise of internet platforms has brought about more innovative and entrepreneurial opportunities. Taobao, an e-commerce platform, has created over 10 million jobs directly or indirectly. In East China's Zhejiang Province, 2202 Taobao villages, also known as e-commerce villages as many of their residents operate online stores, have generated 3 million jobs, including not only sellers and suppliers on Taobao, but emerging professions such as "cyber models" and online store decorators.

The emerging innovation and entrepreneurship activities promote the continuous expansion of the internet platform, creating an industrial ecology based on the platform. In the ecosystem dominated by the internet platform, due to different industrial divisions of labor and the gathering of people, the value flow in the ecosystem can complete a closed loop, achieving self-sufficiency to a certain extent. Alibaba, initially an e-commerce platform, has expanded its businesses to logistics and payment platforms, and established its own financial and logistics system. It took the e-commerce platform as the traffic portal, and

opened the platform to attract the third party to enter. The platform now provides services and entrepreneurial opportunities in fields of entertainment, local life, and so forth, which has promoted the deep integration of online and offline activities. Finally, it has formed a huge closed-loop ecosystem that realized value circulation. The operation mode of online economy is changing people's perception of economics.

To sum up, internet enterprises have undergone tremendous development since 2000. Some internet enterprises have reached the scale that traditional ones can only reach in decades or even a hundred years in just a dozen years or so. Essentially, internet platforms serve as an intermediary. Unlike brick-and-mortar enterprises, those on internet platforms do not engage in actual production. How did these enterprises expand to the present scale step by step? Which factors play a key role in the expansion of internet enterprises? Therefore, it is necessary to find out the essence of Internet platform economy.

2. Literature Review

2.1. From Monopoly Issues to Network Effects

The topic about whether platform economy should be regarded as a unique economic phenomenon to be studied was first put forward in a debate around 2000, which concentrated on whether international bank cards in European and American countries as well as Australia should be accused of monopoly. Katz and other scholars considered that this industry had cut costs thanks to network effects [1]. Therefore, the monopoly charges were so inappropriate that those industries which depended on network effects should not adopt the previous antitrust law [2] [3]. After that, researchers successively found that such industries as operation systems and media characterized by network effects had a common feature: integrating resources on the central platform. Thereupon, the platform economic theory has been developed.

Rochet, Tirole and other scholars who participated in the debate made a great contribution to the development of the early platform theory [4]. Meanwhile, Caillaud, JullienIn also promoted the development of the theory of platform and two-sided market [5]. In the argument about whether platform industries have become monopoly, one of the most typical opinions is that the members of platforms can adopt multi-homing behaviors. The multi-homing behaviors mean that the members of a platform can connect to several other platforms simultaneously. For example, in the case of operating systems, parts of users can not only install multiple systems at one time, but also switch among different operating systems in the daily work and play. Likewise, Rochet and Wright made an analysis in the field of bank cards and their study suggested that the existence of multi-homing behaviors is more important than the state of multi-homing behaviors [6]. In other words, the platform users tend to use one specific platform though they can adopt multi-homing behaviors. Thus, there is a great asymmetry in the frequency of using multiple platforms.

2.2. From Network Effects to Platform Pricing

As an extension of the monopoly issue, the prior issue to be discussed of the theory of platforms and network externalities is the pricing of the platform. Jullien thought that the platform would be at a loss if they aimed to maximize the welfare because the platform would always set a negative price for one side of the market [7]. Hence, in order to break even or earn profits, the platform would lower prices or increase subsidies and make a negative pricing for one side of market while increasing the price of the other side of market. Apart from adjusting the prices, the platform, as an organizer of the two-sided market, will adjust the market by mending rules or other methods without any change of pricing. The actual costs of the platform vary from the nature of two-sided market and it is quite complex to explain the principle of allocation of costs by building an abstract model. Consequently, when measuring the actual costs, it is necessary to homogenize the two-sided market members and the costs may vary from the transaction volume. A successful deal on the platform should be completed by the two-sided market, whose difference of network externalities determines its different subsidies (or charging high prices). Generally speaking, numerous scholars hold that if one side brings much more network externalities than the other side that brings, the one will enjoy the most favorable price. With the analysis from two-sided market to multi-sided market, obtaining the most preferable price in the multi-sided market needs adjusting and balancing the demand. Similarly, this price may also be less than the marginal cost. Obviously, the analysis above only aims at static pricing rather than dynamic pricing, but the pricing in reality tends to change. Meanwhile, this model is heavily restricted by strict assumptions. Although the platform grasps a lot, the pricing it gives to the two-sided market cannot match the basic information, that is, two sides of the two-sided market know that the actual expenses they pay are higher or lower than the average price. For example, the advertisers are still willing to pay a high price despite they clearly know that the expenses they pay will be subsidized for the users on media platform and let them enjoy free service [5]. In the case of information symmetry, asymmetric pricing is obviously different from the normal business model in that when the subsidy from platform of one side cannot offset the high price of the other side, the platform will probably generate negative profits for a long time.

Therefore, Hagiu believed that without any competitions, decreasing the price for one market must have caused price increasing for the other market [8]. However, under an intense competition, the platform had to bear the loss caused by higher costs than profits to obtain the two-sided market. Even though this might increase the actual profits for its competitor, the market would strike a balance in the platform competition by such strategy. The sunk cost it may cause will increase because of more and more intensifying platform competitions.

2.3. From Two-Sided Market to Platform Competition

The early development of the platform requires integrating two-sided or even

multi-sided market. The nature of the two-sided market is symbiotic relationship, which means that any one side of the market cannot survive without the other side. Caillaud and Jullien discussed this kind of issue earlier [5]. They agreed that the platform must obtain two-sided market simultaneously by means of paying money more or less. In this way, once obtaining one side of the market, the other side will come. In this case, "the other side of the market" always gains profits directly on the platform (e.g. monetary income). Thus, this kind of subsidy can be regarded as one of important investment funds in the early foundation of the platform. When a certain number of people have been attracted by the investment funds, the platform will appeal a growing number of users by its own network effects rather than subsidies. The investment make the platform start from scratch and be part of the competition among platforms within the industry, which aims to attract more users than other platforms.

The platform competition can be divided into two types, internal competition and external competition. The internal competition refers to the competition among market economic entities on the same platform of the same side of market while the external competition refers to competitions among various platforms, especially for the attractiveness to the users. In the mean time, when the platform internalizes the externalities of its own network effects, the core competitiveness of the platform will be exposed [4]. This competitiveness can be naturally formed by the network effects and the platform can also take active measures to attract more users [9].

The competition among platforms might weaken the original market control and correspondingly their prices would be adjusted. Without the competition, the platform would re-balance the two-sided market by internalizing the externalities of the network effects based on the principle of maximizing the social welfare. However, the competition might lower the price, not only on the total price, but also on the changes of relative price on the one side of the market. Hagiu argued that this kind of competition would tear apart the principle of maximizing the platform benefits and the goal of maximizing the social welfare [8]. After analyzing and comparing duopoly model and syndication model, Roson pointed out that when the market competition gradually progressed into duopoly model, the decline in the overall price caused by the competition is more sharply than the change of the relative price of the internal platform but such phenomenon is more likely influenced by the nature of the platform and the feature of the market [9].

Under the premise of the existence of multi-homing behaviors, the competition among different platforms purely depends on the differential service, which reflects that one platform can provide multiple services. The previous researchers could not find out the problem because they just focused on the bank card service. Nevertheless, service differentiation is easily to be seen when the focus of study turns to the media platform. The research of Rochet indicated that the platform price was still influenced by the user heterogenization [10]. In the two-sided market, the platform makes preferential price, even subsidy, to the

side with higher degree of multi-homing behaviors, or increases the size of market by relying on network externalities to attract the side with higher degree of multi-homing behaviors. Roson also admitted that user heterogenization influenced the platform, that is, the nature of user heterogenization determined which side of the two-sided market will obtain higher profits [9]. In this case, choosing a mechanism also enable the principle of pricing to affect the actual value of the platform. Concluding from the analysis above, restraining multi-homing behaviors is the major goal of all platform marketing strategies. Multi-homing behaviors of users don't undermine the advantage of platforms which are fresh to the market, but weaken the monopoly of platform industries. It is the other side of the market instead of the platform side that decided whether it is time for multi-homing behaviors [10]. For example, in two media platforms, the major reason for users to enter the platform is not the platform's regulation of the activity but the success of the performance by the program producer. Obviously, multi-homing behaviors of users, what they do in various platforms, implicitly boosts the competition of the program producers, which further improves the program quality.

2.4. From the Platform Competition to Multi-Homing Behaviors

In principle, the multi-homing behaviors of users are also affected by the model of the platform competition. In the model of Hermalin and Katz, the researchers assumed that without the externalities of network effects and the charge of membership fees, heterogeneous users would only need to pay the user fees, and final equilibrium result of the model revealed that two-sided market in the platform possesses the multi-homing behaviors because the service provided by the platform varies from users to users [11]. On the contrary, in the model of Rochet, with the existence of the network externalities and membership fees, the use expenses of the platform were free [10]. But the users were still heterogeneous and showed different levels of sensitivity to the network externalities. The final result demonstrated several balances but only one balance could produce positive profits for the platform. With the hypothesis that multi-homing behaviors were endogenous in his competition model of the platform, the model results of Roson suggested that in the condition of having positive membership fees and use fees, the two-sided market can independently make a choice by coordination and the profit of the platform is positive in the state of balance [12].

The behavior of users is affected by their expectations. If the platform can make a price commitment for the users, to clarify their expectations of transaction volume and externalities of network effects, they can more freely choose and influence the result of the dynamic game [8]. In the two-sided market, users play different roles in different sides, but when the platform enable various markets to face asymmetric price structures by differentiated rules, the internal platform structure and the user expectation will be affected.

Generally, the research of platform economy has not shaped a unified analysis

framework and mainstream research methods. Compared with other economic phenomena, the study on platform economy is not profound enough and its building of analysis model is still staying at the static stage, with few attempts to dynamic model. This paper argued that the study on the platform economy should be expanded into its essence, structure, model, evolution, competition and social influence, with analysis of systemic construction in many aspects. By completing dynamic model on the basis of static model, from single stage to multiple stages, the static game will be extended to the dynamic game, hoping to precisely describe the platform economic phenomena.

3. The Essence of Internet Platform Economy

As an online platform established relying on Internet technology, what kind of role the Internet platform play in the micro level of reducing transaction cost and how to create value is the main line of the essence exploration of the Internet platform.

3.1. The Development of Internet Technology Leads to the Change of Transaction Structure

Computer network technology is essentially a communication technology, which is to establish a link to facilitate the transmission of data between computer terminal and terminal. When first used in the military field, the computer network technology helped the US military to transmit the military intelligence and information in the shortest time it could do at the same time, the cryptography technology also helped the computer terminals to encrypt the information when transmitting the data, which was not easy to be stolen by the enemy.

It is seen that computer network technology can help reduce the cost of information when acting in the business field. This transaction cost savings are reflected in four aspects: first, compared with other modes of communication, Internet technology can complete faster retrieval, help traders save time; Second, the Internet enables the scope of information search to the world, at the meantime, with the technology development, the speed of Internet transmission will not change greatly by distance; Third, unlike traditional telephone and telegraph, as a terminal connected to network technology, computer is more complete information carrier, can transmit diversified information including text, pictures, voice, video, etc. At the same time, what network technology provides is not tangible objects products. The knowledge-intensive characteristics and rapid iterations make them extremely low marginal cost and product line upgrade improve efficiency. Therefore, network technology greatly reduces the cost of search before trading.

Although Internet technology effectively reduces the cost of search before trade, but if you only rely on Internet technology for trade, the rest of the transaction expenses also increase.

First, although Internet technology can provide a lot of information in a very short period of time, users of computer networks cannot make the most accurate

choice after reading all the information in a short time, that is, Internet technology itself does not achieve the accurate match of traders, even if the parties can form an accurate match will be delayed due to the speed of personal information screening. Second, Internet technology cannot help traders form an effective contract, and the existence of false information. At the same time，it not guarantee that the party signing the contract will not appear opportunistic behavior, that is, the risks generated by the exchange increase, and finally traders still choose to conduct offline transactions. Third, when the transaction content is tangible objects, the information flow and logistics time synchronization leads to the time of a transaction, for the longer the party or both sides of the transaction, the higher the uncertainty, the greater the risk, at the same time, based on the perspective of utility, the purpose of a transaction is to maximize the utility of the trader will be reduced because of the longer waiting time. Fourthly, due to the cross-locality of Internet technology and the virtuality of terminal links, the cost of traders seeking compensation after being placed in default and resolving the disputes between the two parties has been greatly increased.

The quantification of transaction expenses has been controversial, and this paper also believes that there is no effective tool to measure transaction expenses accurately. It is seen from the analysis above that the initial application of Internet technology not only reduces part of transaction expenses while also increasing part of transaction expenses. Therefore, it does not reduce the level of transaction expenses, but changes the structure of transaction expenses.

3.2. Generation and Essence of the Internet Platform Economy

Internet technology is essentially a communication technology, but it is different from the general and traditional communication technology, which is not only complete in the transmission of information, but also allows the technical conditions for the terminal to multi-link at the same time. Therefore, the terminal group based on Internet technology, multi-point mutual link and diversified information exchange can be regarded as a reset society across the distance. When the information exchange between terminals is further transformed to value exchange, an online trading market under the reset social network can be generated. As mentioned above, there are still transaction costs in the online market at this time, as compared with the offline market. The structure used produces changes one after another.

For traders, the rational choice for online and offline research is to clinch a deal. However, this transaction approach has limited savings on transaction costs. Further, if the trader cannot guarantee that the online and offline information are consistent, the potential transaction risk will cause the trader to directly choose the offline trading. At this time, traders will still rely on traditional third-party intermediaries to find trading targets, and then reach a deal.

The computer terminal for value exchange provides the possibility of the reset society formed by Internet technology. Therefore, when a special computer terminal gathers the participant terminal together based on a certain type of trans-

action, and puts itself in the position of a third-party intermediary, promotes the terminal transaction, and reduces the transaction costs and transaction risks in the transaction process, it can be said that the terminal builds an Internet platform.

An unofficial Internet platform has no government endorsement, and to some extent, it has no credibility. Therefore, the platform can not accurately and qualitatively analyze the transaction cost savings, and the category and degree of the transaction cost saving depends on the business model and development degree of the platform.

The platform is the market. Under the control of an Internet platform, participants gather based on a certain value exchange, and the platform really has the characteristics of the market. Moreover, some of the transaction costs brought by Internet technology are reduced, the market under the platform can be expanded, and the scale of the Internet platform can be expanded. However, the Internet technology itself also brings an increase in another part of the transaction costs. For the platform side, it does not deal with the transaction costs, the platform cannot expand, and even the existence of the platform itself is meaningless.

According to Williamson, integration becomes possible when opportunistic, frequent and exclusive, and both parties take the three dimensions as the basis for integration [13]. In the Internet platform, participating in the transaction involves both parties and the platform owner. At the same time, when you compare these three dimensions in pairs, it will be found that their structural differences cause them beyond the total comparison.

Therefore, the platform policy integrates the structural selection of transaction parties into the structural differences of transaction costs. That is, the autonomy of the trader is retained in the dimension of lower transaction cost, and the trader is integrated in the dimension of higher transaction cost. A specific performance is that the trading party can choose the transaction object and transaction scope, and in the party due to high transaction costs, when the platform will integrate the two parties, form authority, and stipulate the code of conduct of the parties, the transaction at the same time grasp the resources, although the transaction of distribution results is still based on the market rules, but the distribution behavior is platform does it, while the latter attributes all the data resources generated by the exchange to itself.

Therefore, the Internet platform is not only the market, more importantly it also has enterprise attributes, namely the Internet platform has market and enterprise dual attributes, according to Coase, for enterprises, the external market transaction cost is greater than the internal management cost of the enterprise, enterprise scale expansion, external market transaction cost is less than the enterprise internal management cost, market scale expansion [14]. An Internet platform has the dual attributes of market and enterprise, therefore, it has full initiative in expanding options.

The platform's analysis of the reduced transaction costs should start from the platform function. Whether there is a platform party or not, the Internet-based interaction behavior of the computer terminal is necessarily intended for a certain purpose, and the essence of the platform is also designed to gather the platform members and help to achieve this purpose. Therefore, the analysis of the interaction purposes is the analysis of the platform essences.

A complete computer terminal interaction behavior should be that the terminal searches for the object terminal based on a certain purpose, while the two thus develop a relationship. As in real life, these relationships cover economic relationships based on value exchange, emotionally maintained social relationships, and general relationships based solely on the exchange of information.

It is not difficult to see that the relationship is the premise of interaction, so the essence of the platform is to solve the transaction costs existing in these three relationships, namely business, social networking and information. Different relationships, although all have faced the problem of information asymmetry and false information, huge amounts of information screening, leading to trade extended and the accuracy of the information problem, but the problems in the performance of the three kinds of relations, thus solving the problem of relation of transaction cost and the platform has three forms of expression of different categories, Namely business platform, social platform, information platform. Main essences of the three platforms in order to meet the needs of the economic exchanges of the platform members, the social exchanges of the platform members, and the needs of the platform members to obtain the needed information.

For information platforms, information search and screening is its core function, in this process, information providers and acquisition will also further generate social or business relations; for social platforms is the first problem to reduce transaction costs, while the two parties with social relations will have more or less economic information or interaction in the future, business partner search also needs to search, business relationship with traders is not difficult to have a social relationship, meanwhile, the search of business objects is the same A process of obtaining the object information. Therefore, it is not difficult to see that any platform must have all three essences at the same time, and the difference is that the performance degree of the platform in the three essences is different, and then they form different platform modes.

4. Conclusion

At present, the development of global economy has entered the "new normal". The traditional economic-driving development factors are changing from factor-driven to innovation-driven, and the traditional manufacturing economy must also transform to service economy. Therefore, the platform economy based on the Internet and information is an important growth point to drive global economic development in the future. In the economic society, any economic operation activity based on the value chain and value network can be plat-

formed. The function of platform economy is to improve the speed and efficiency of value flow in the platform. The platform economy is more conducive to resisting risks, attracting all kinds of idle resources, improving the vitality of economic development, giving birth to more innovative entrepreneurial activities, promoting the normalization of innovation, and making the economy in an advantageous position in international competition.

Conflicts of Interest

The authors declare no conflict of interest.

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