# Research on E-commerce Targeted Poverty Alleviation Model Based on Ecological Concept

**Mengru Shen[1], Yang Yao[1], Jin Zeng[1], Yongcun Wei[2, *]**

[1]Key Laboratory of Transport Industry of Big Data Application Technologies for Comprehensive Transport Beijing Jiaotong University, Beijing 10004, China

[2]Transport Planning and Research Institute Ministry of Transport, Beijing 10004, China

*Corresponding author: weiyc@tpri.org.cn

**Keywords:** E-commerce, Targeted Poverty Alleviation, Ecological Model, Game Research

**Abstract:** During the specific progress of the e-commerce poverty alleviation project, various entities will promote or compete with each other. With the help of ecological concepts, this paper first classifies all the various subjects participating in the e-commerce poverty alleviation project, divides the population, forms the division of major subjects, and then conducts game analysis between the major subjects. Finally, based on the results of game analysis, give the government's response and countermeasures.

## 1. Introduction

Targeted poverty alleviation is a strategic choice made by the Party Central leadership group with General Secretary Xi Jinping at the core, and it is also an important content of Xi Jinping's thoughts on socialism with Chinese characteristics in the new era. General Secretary Xi Jinping pointed out at the 2016 Cyber Security and Informatization Work Symposium: We must give full play to the role of the Internet in promoting poverty alleviation and promote targeted poverty alleviation, so that more people in need can use the Internet and allow agricultural products to pass through [1-2]. This discussion points out the direction of poverty alleviation in China in the new era and puts forward new requirements.

## 2. E-commerce poverty alleviation model based on ecological concept

Ecosystem is an open system that can achieve dynamic balance. With the rapid development of economy and society, more and more people are integrating ecological concepts into relevant research of social sciences. Generally speaking, the ecology of the business system is established based on various economies, and its purpose is to solve the problem that a single enterprise cannot create benefits through the cooperation of internal members. For e-commerce, the e-commerce ecosystem is built based on the network economy, and it includes business operators, manufacturers, consumers, and service providers.

From an ecological point of view, the main body in the system can be seen as composed of individual populations. These populations play different roles, and can be divided into core population, key population, support population and parasitic population. The core population mostly plays a leading role in the ecosystem, and the services provided by all the subjects in the ecosystem are developed around it, and they are the indispensable resource integrators in the entire ecosystem. The key populations are mostly transaction participants in the system. Supporting populations mostly provide necessary support for the system's core population and key population operations. Although parasitic populations also provide necessary support for core populations and key populations, this support is actually a value-added service in essence. This value-added service is not limited to the activities that the system is operating, and any activities that may be related to it can be covered.

In the natural ecosystem, the relationship between various populations can be divided into the following two types: one is a positive promotion relationship, and the other is a negative containment

relationship. In an ecosystem composed of various commercial activities and entities, it generally presents a state of positive promotion and mutual benefit. Therefore, the ecology formed by e-commerce should also show a positive relationship.

Based on the above analysis, combined with the concept of the ecosystem, the e-commerce poverty alleviation ecological model is shown in Figure 1.
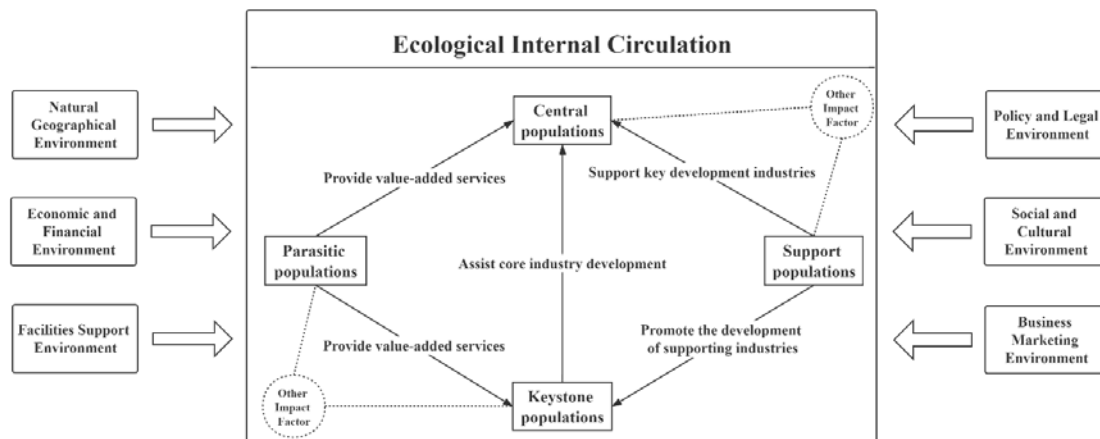


Figure 1. E-commerce Poverty Alleviation Ecological Model

As shown in Figure 1, in this e-commerce poverty alleviation ecological model, a clearer explanation of the meaning of all populations is given. All subjects participating in actual activities are divided into different groups according to their different functions. The following will explain what the main body of the various groups are.

According to China's current practical experience in poverty alleviation, there is a key supported industry in the poverty alleviation plan of any impoverished county, which is the core force and profit point of the entire poverty alleviation project. Generally speaking, in the poverty alleviation plan of various poverty-stricken counties, some poverty-stricken counties have identified the county's focus as e-commerce, and their core task is to create e-commerce poverty alleviation projects and develop the e-commerce industry in the region, such as Guizhou Qian Counties and villages in the southern region; and other industries that have identified other industries as key targets for development will carry out other types of poverty alleviation projects. But all in all, the various production and operation enterprises in the supported industries have become the core group in the poverty alleviation ecosystem and are in the middle position.

The two groups most relevant to this supported industry are the government and poor villages. The policy guidance and financial support given by the government will directly affect the resources obtained by the supported industry, and then directly affect the macro environment for the development of the industry. Therefore, the government will be one of the key populations, standing on the side of the core population. For poor villages, poor villages are the main force participating in the construction of the industry, but the forms of participation are different. Poor villages can participate in the construction of supported industries by providing raw materials, providing manpower, or joining production operations. Therefore, poor villages will also serve as another key population, affecting the development of the core population.

However, e-commerce platforms, banks, logistics companies and other Internet companies provide the core population with the necessary external support for its development. The salient feature of these companies is that they will participate in the construction of the supported industries in their own form in combination with their own business scope, and will not directly compete with the operating companies in the supported industries.

In addition, some third-party service companies or third-party retail companies will also participate in the actual construction of the supported industries. The services provided by these companies are not necessary, but if adopted, they will add value. Based on the above analysis, this model is only applicable to the situation where the e-commerce poverty alleviation project is established as the core force point.

# 3. Discrimination and Analysis of the Main Body Relationship of Poverty Alleviation

From the perspective of the participants in the e-commerce poverty alleviation project system, whether they are e-commerce giants, small and medium-sized enterprises or poor villages, they are all independent decision-makers pursuing the maximization of their own interests, and they all conform to the complete "economic man" role in the economic sense [3-5]. Based on this, the behavior of the subjects participating in e-commerce poverty alleviation can be analyzed from the perspective of game theory, and this can be used to determine which group and status these subjects belong to in the ecosystem.

(1) E-commerce Giants and SMEs (Small and Medium-sized enterprises)

The game analysis between e-commerce giants and SMEs needs to be based on the government's choice and support. The game between e-commerce giants and SMEs is similar to the classic "smart pig game" model, government policy preferences and e-commerce poverty alleviation projects The expected return is like the "pig food" in the "smart pig game". The game matrix is shown in Table 1:

Table.1. Game relationship matrix between e-commerce giants and SMEs

|  | SMEs participation | SMEs waiting |
| --- | --- | --- |
| E-commerce giants participate | (5,1) | (4,4) |
| E-commerce giants wait | (9, -1) | (0,0) |

According to Table 1, under the premise of the development of e-commerce giants, if SMEs develop at the same time, it is obvious that e-commerce giants will occupy most of the profits, while SMEs can only occupy a small portion of the profits. When SMEs choose to wait and enter the market at a later stage, and the e-commerce giants enter first and bear the development costs, the SMEs can make improvements based on some of the pain points and shortcomings of the e-commerce giants and form their own personalized service system. Under the premise that e-commerce giants bear more development costs, SMEs can also compete with e-commerce giants. Under the premise that e-commerce giants choose to wait, if SMEs act spontaneously, SMEs may get benefits, considering the initial development cost, the actual net income is negative. And e-commerce giants can rely on their own. The advantages of technology, publicity and marketing quickly occupy the market, so huge profits can be obtained. If both parties do not act, there is no benefit to both parties. From this analysis, it can be learned that whether or not e-commerce giants participate in poverty alleviation projects, waiting for SMEs is the best strategy. SMEs will not take the initiative and cannot afford the promotion costs of the e-commerce poverty alleviation project, but they will wait to maximize their policy preferences and economic benefits.

In the same way, the above analysis methods are also applicable in the game of choosing self-built e-commerce platforms or relying on third-party platforms. Obviously, SMEs will choose a third-party e-commerce platform as the best business strategy. For e-commerce giants, there are different situations. If the e-commerce giant itself is the operator of a third-party e-commerce platform, such as Ali, JD, etc. Then the resource allocation loss at this time will be minimized and then optimal. However, if the e-commerce giant itself is not the operator of a third-party platform, no matter whether it chooses to build its own e-commerce platform or rely on a third-party e-commerce platform, the resource allocation will not reach the best state. Because some resources will always flow into the platform owner, and at this time, since the platform owner is not involved in the construction of the substantial e-commerce poverty alleviation project, its identity is equivalent to the parasitic population in the ecosystem model, although it is not Other populations are positively promoting, but as a whole, certain resources will not be effective.

(2) Enterprises and Poor Villages

The behavioral relationship between enterprises and poor villages can also be analyzed with this game model. In the e-commerce poverty alleviation project, if both enterprises and poor villages participate, an ideal state will be reached. The profits of the entire market will be jointly held by the enterprises and the poor villages, and the enterprises will get the big money, and the poor villages will get the small money. Without the participation of enterprises, poor villages will enter the

e-commerce poverty alleviation project on their own, and they will be at a loss due to lack of e-commerce knowledge and enterprise operation experience. However, if the company chooses to participate in the e-commerce poverty alleviation project and the poor villages refuse to participate, the company can still make profits, but part of the profits will be converted into the cost of purchasing raw materials from the poor villages. Therefore, from the perspective of poverty alleviation at this time, it seems that the state of enterprise participation and poor village waiting is the optimal solution under the special background of poverty alleviation. However, from the actual situation, if a poor county has identified the development focus as e-commerce, the people's government of the county will inevitably lead all poor villages to join the construction of the e-commerce poverty alleviation project, reaching the common goal of enterprises and poor villages. Status of participation. At the same time, almost no impoverished counties will form a situation where enterprises participate and impoverished villages wait. Because this situation will hinder e-commerce giants from participating in the construction of the e-commerce poverty alleviation project, even if they participate in the e-commerce giants, they will replace some of the raw materials acquisition methods to reduce their own costs.

## 4. Conclusions

In the progress of the e-commerce poverty alleviation project, the role positioning of each subject is determined by its comparative advantage, interest appeal, and market segmentation, and is also affected by the status of each subject, the resources occupied, and the knowledge and technical level of each subject. Due to the advantages of scale, market resources, channel terminals, and past experience, e-commerce giants tend to pay more attention to the decline of industrial products. Even if agricultural products are to go up, they must rely on the participation of a large number of SMEs. However, SMEs have inherent advantages in the upward process of agricultural products due to their market concentration, proximity to the terminal, flexible organization, diverse products, and low cost. The government should use its own credibility to connect enterprises and poor villages with itself, and try to balance the competition between e-commerce giants and SMEs, and promote the formation of positive relations between various groups in the ecosystem.

## Acknowledgements

## References

[1] Yuan Xu. Research on the development of agricultural e-commerce based on agricultural supply chain [J]. Liaoning Agricultural Sciences, 2019, 2:69-71.

[2] Hongxia Yang. Thoughts on the development of e-commerce in poor rural areas from the perspective of precision poverty alleviation [J]. Internet Commerce, 2019, 12: 234-234.

[3] Jinlan Quan, Xiaolin Bi, Guanghe Piao. Research on rural e-commerce cooperation based on game theory [J]. Modern Marketing, 2016, 12: 165-166.

[4] Baodeng Lin, Liping Chen. Analysis of Rural E-commerce Credit System Based on Game Theory [J]. Value Engineering, 2019, 30:271-274.

[5] Qunzhou He, Jiawei Shi. The realization of rural e-commerce innovation path based on evolutionary game [J]. Business Economics Research, 2020, 06: 138-140.