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Recycle Economy in Industry Aggregation: A View of Institutional Supply

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Abstract

Industry aggregation is based on the division of related industries. This kind of aggregation saves costs of transaction, enhance further innovation and economy of scale, and at the same time, create preconditions for internal recycle economy. Generally speaking, a nice institution can drive division. Therefore, the government should guarantee the institutional supply properly, pushing the division of recycle economy.

Keywords: Industry aggregation, Recycle economy, Division, Institutional supply

1. Introduction

Along with the exhaust of certain key human resources, recycle economy is gradually becoming one of the goals pursued by human being during the development of economy. The idea of recycle economy appeared firstly in developed countries. In 60s 20th century, Boulding, an American economist, thought that the human economy is like an airship flying in the universe, which flies by consuming self energy. In his opinion, if people fail to explore energy rationally and destroy the environment, what lead to a result beyond the bear of the earth, it will be ruined like an airship. Therefore, it is a must to turn the present linear development way that focused on consumption into an ecological development way that focused on feedback. Since the emergence of recycle economy, it has gradually aroused a revolution of regulating the economics in the academic field, and it has permeated into every field of economics, including the industrial economy. Here we will discuss the recycle economy in the industry aggregation.

2. The evolution mechanism of industry aggregation

The germination of industry cluster theory can be initially traced back to Adam Smith's Theory of Division. His discussion on the relationship between division and market scope includes some economic thoughts related with industry cluster. The theory of industry cluster is originated from the "exterior economy" described in Alfred Marshall's Principles of Economics. Thereof, the three key elements are the sharing labor market, the semi-product investment, and the technology overflow. It is Max Weber, an economist in the industrial location field, who firstly put forward the economic concept of aggregation. In his "On Industrial Location" written in 1909, he has developed the theory of industry cluster further. It was the work of Potter and Krugman that made the industry cluster theory become mature and gain popularization and attention in 90s of 20th century. Potter (1990) advanced the industry cluster theory of neo-competitive economics, disclosing the mechanism of the industry cluster's emergence and operation.

Considering the mechanism, social division causes increasing transaction costs. In order to reduce the transaction costs, enterprises choose to integrate with each other in space, which leads to the appearance of industrial cluster. Regional division causes an industry cluster with regional features. Social division causes the emergence of specialized market. And specialized market deepens the social division. The mutually affected mechanism between social division and specialized market pushes the continuous development of industry cluster. There is a positive correlativity between the development of regional industry cluster and the degree of market integration.

Generally speaking, a better mechanism environment can drive division, extend industrial division chain, detail division, reduce production costs, improve production efficiency, reduce transaction costs, improve transaction efficiency, produce industry cluster, and sustain its constant competitive advantage. Reversely, a mechanism environment may restrict division, increase transaction costs, and decrease transaction efficiency, what can not help to generate the industry cluster. Even if there is an industry cluster, but if there is no sufficient mechanism supply, it may reduce the industry cluster's competence or even make it decline or disappear.

As far as the generation path of division is concerned, one is spontaneous, which produces the primary division. It depends on the national or regional internal industry chain, and the advantages of market and system resources, and generates the primary industry cluster. The other is exterior compulsion, which produces the exterior-resource division. It is kind of government-dominated division, which generates the derivative industry aggregation dominated by government policy.

3. The endogenesis of recycle economy in industry aggregation

The recycle economy is an ecological system, similar to its circular path and food chain "producer --- consumer --- decomposer". It creates a path for resources "explorer --- processor and consumer --- waste handler", changing the former closed matter and energy circulation toward the flowing circular economy, namely "resources --- products --- renewable resources --- renewable products", breaking the matters' traditional linear flow, namely "resources --- products --- consumption --- exhaust". The recycle economy, as a new ideal product at the post-industry stage, replaces the "three high" (high consumption, high waste, and high pollution) production way with the "two-low and one-high" (low consumption, low waste, and high quality) production way.

As far as the industry aggregation way is concerned, three reasons contribute to the internal generation of recycle economy in industry aggregation.

3.1 Division leads to recycle economy

A nice system can help to cause industry division. And industry aggregation can extend toward its lower chain further. The waste treatment industry can be derived from the division internally, which is the recycle economy in a sense. The relationship between enterprises in the industry cluster includes specialized division and cooperation. That is the base for clusters. The longer the value chain of one product, the more possible to disintegrate the production procedure technically is. The stronger the connection between different enterprises that focus on different production rings, the easier the industry cluster comes into being. It is the specialized market, that greatly decreases the cost of coordination at the primary stage of division, and helps the division develop further among enterprises. Besides, lots of bargainers choose to focus on specialized production and give up pure trade activities, as they know about relevant industries, master key technologies, and accumulate amount of capitals, or as there is a better investment chance, what also contributes to the expansion of industry aggregation. Here it includes the reuse of waste. Many cases, especially certain industry development modes in China rural areas, have already proved this point. For example, the tin processing industry cluster in Pingyi county, Shandong province, include sorts of waste treatment industries that are based on the tin processing industry. The number of these industries is as follow (Table 1).

Here is another example for the industry aggregation. There is a industry aggregation area in Hei Longjiang province. The power plant uses the lignite to generate power. The waste of slags, cinders produced during the course of coal mining, power generation and chemical processing of coal will be used to produce building material and to restore the ecology of the coal mine area. While the power plant and the chemical processing project are producing, they offer each other resourced needed (electric energy, heat and circulate water, etc.).Then the recycle production is realized. Coter (1997) holds that the enterprise in the ecological region would acquire much more benefit than the total sum of an individual behaviors. This can be regarded as an internal motivation. Yang Jinghui (2004) also holds that the outer economy formed by the interacting system, and the internal representation of the no economy are the internal basis of division. All those examples prove our ideas.

From the above, it is obviously that an industry cluster may include a waste treatment industry, which extends the industry chain further. But this extension is based on certain preconditions. It is the industry aggregation that reduces the space transportation costs greatly, creating favorable conditions for division. Comparing with separate production, the division under the recycle economy in industry aggregation has more advantages.

3.2 Innovation produces recycle economy

According to Potter's theory of industry cluster, the industry cluster with high competence can inspire innovation. Nothing but innovation can create and sustain the necessary competitive advantage in a cluster. An industry cluster can gain its competitive advantages by enterprises' mutual cooperation, competition, and coordination in one cluster in aspects of production costs, products differentiation, regional marketing, and market competition. At the same time, the cluster can promote its innovation ability by means of forming a regional innovation system that is based on the mutual effects between supportive institutions and enterprises. The innovation can drive the reuse of resources, reducing costs. Take some Japanese hotels in tourist regions for example. Before the application of internal recycle economic mode, these hotels have to pay the government 30 million Japanese Yen for burning the waste. In May, 1999, they invented a food recycling machine. This machine can mix the abandoned food together with water, and generate 700 kg high-quality fertilizer that may be sold or used for rose garden. As a result, this invention brings about considerable environmental and economic benefits. Besides, these hotels can wrap uneaten food for guests and retain their wine.

3.3 Scale economy produces recycle economy

Recycling economy needs enterprises to concentrate in a certain space, so as to form an industrial chain cycle, to achieve a regional scale of the recycling use of resources, and then achieve the economies of scale of economic cycle in the region. Therefore, the industrial policy must improve and encourage enterprises to large-scale production. Without the economies of scale, the unit output minimum consumption of resources cannot be achieved. In this sense, the cycle of the economy requires us to continuously push forward the regional concentration of industries, to form larger and

more professional circle of economic enterprises.

For example, the treatment of pollution in the Huai River valley is very difficult. And this difficult is greatly related to the industries' distribution. The distribution is too decentralized and not conducive to the use of recycled water and the integrated treatment of a vital relationship.

However, in Shandong province, small paper mills, whose production capacity of 50,000 tons were shut down years ago. The Government supports the establishment of a group of large-scale paper mills, which have the black liquor treatment and water recycling capacity. The result is an increase of the output of paper, the expansion of the economic scale, such as COD emissions of pollutants has dropped. This example shows that economic growth does not necessarily bring about the increase in the total pollution emissions. Because of industry aggregation, waste treatment enterprises can deal with the waste at a large scale, which reduces costs further. In order to escape from the pollution tax, enterprises choose to associate together to treat the waste, which realizes an economy of scale.

But from a viewpoint of value chain, this extension is based on certain preconditions as follow.

(1) Concession of value chain. Waste treatment has costs. But it is impossible to improve the price of the reusing waste, because only when the reusing cost is lower than the cost of primary use, can enterprises support the mode of recycle economy. However, present technologies can not help to achieve this goal. It means that a price concession is necessary, which can not be realized under the price mechanism.

(2) Growth of green demand. Green demand is an important dynamic source for the recycle economy. Green demand can properly evaluate enterprises' costs for recycle economy, and inspire the industry's further division, driving the generation of waste treatment industry. Therefore, in the process of forming the recycle economy, the market acceptance and demand of enterprises' green products is one of important dynamic sources for developing the recycle economy.

Based on analysis above, although the recycle economy is based on internal factors, its dependence on these factors is limited. Therefore, the government can adopt some effective measures to drive the generation of the recycle economy.

4. The institutional supply of government

(1) Encourage green consumption and pull green demand's institutional supply. The government can advocate green consumption, inspire people's green demand, and enlarge the distance between green consumption and common consumption. And levying consumption tax can solve this distance. Surely, it is impossible for the cultivation of green demand exerting effect at once. The government can adopt a step-by-step way to enhance people's consciousness of green demand.

(2) Reduce waste treatment companies' costs by favorable tax policies. Due to technologies, the high costs for reusing the waste stop enterprises' step toward the recycle economy. The government should provide with favorable taxes for the waste treatment industry. For the waste treatment companies, the government can further decrease the value-added tax, driving the reuse of waste. What is gratifying is that the Ministry of Finance has already begun to make relevant efforts. Li Jinghui, the Ministry of Finance official, says that supporting resource conservation and environmental protection are the important directions of China's future tax reform and adjustment. The Chinese government is planning the reform of income tax and the merge of the domestic and foreign-invested enterprises, and all of these will consider resource conservation and environmental protection. At the same time, China will adjust the import and export tax policies, including the cancellation of some of the resources-products export tax rebates, resource-based products exempt from import tax. He says that Finance Ministry will also promote sewage, waste disposal industry, and market oriented, including the introduction of sewage and waste disposal standards. He points out that China's resource price is too low, and this is one of the important reasons, which lead to high consumption of resources and environmental pollution. Therefore, China will adjust resources prices. Only by price adjustments of resources, financial investment and taxation policies can play an important role.

(3) Encourage scientific and technological innovation, and encourage individuals to make scientific and technological innovation for recollecting and reusing the waste. The government can inspire enterprises to make scientific and technological innovation by legalization. At the same time, enhance the cooperation between enterprises and scientific research institutions. Improve enterprises' ability of scientific and technological innovation.

Science and technology innovation and system innovation is mutually stimulating, and therefore science and technology innovation needs a series of supporting policies, such as intellectual property rights, financing systems and industrial policy, to provide protection. Efforts must be done to enhance government's service function, and then create the comfortable and free system environment for the science and technology innovation. The government is not only the policymaker of the science and technology innovation activities, but also the direct participant of the science and technology innovation. The government's main work should turn from the direct organization and intervention of science and technology innovation to macro-control, creating environment and supplying services, and then supply system guarantee for the science and technology innovation. The main measures include: to make policies for the development of high-tech industry and high-tech support innovative industry; to make policies to encourage high-tech

entrepreneurship personnel; to make policies to support the development of independent innovation of the government procurement; to make policies to encourage scientific and technological innovation of the fiscal and taxation, and improve investment in science and technology policies; to improve strengthening of intellectual property laws and regulations, such as the supervision of law enforcement policy, the establishment of evaluation of the value of science and technology innovation system, and to build technical and social service system.

In addition, the government should concentrate its limited funds and the main force to break through key technology, and plays a guiding role in the direction of guiding scientific and technological enterprises.

(4) Construct and perfect an integrated decision-making mechanism for environment and development. Local government at different levels should set up a management decision-making mechanism for cluster's ecological development, what can help to perfect the ecological management system for cluster. It can organize, coordinate, and supervise the execution of cluster's ecological development strategy. Meanwhile, change the former improper policy and constitute an ecological development strategy. Authorize a field with development priority. Make up a series of measures that encourage individuals, enterprises, and institutions to participate in ecological cluster organization. Build up a production chain that realizes resources share and economic benefits.

(5) Perfect the evaluation system for an ecological cluster. In the aspect of environment protection, it is a must to control it in advance. Therefore, a reasonable standard for environment protection is necessary. The setup of green standards can increase the requirements for products entering market, improving enterprises' motivation in developing new environment-friendly products. Meanwhile, enterprises' pursuit for environment protection can further drive the appearance of division, which can accelerate the development of relevant research institutions and industries. Under the condition with relatively sufficient information, constituting standards is good for enterprises.

5. Conclusion

Apparently, industry aggregation can generate the recycle economy internally, especially in rural areas where there are sufficient labors. Applying the recycle economy thought to the aggregation economy can improve the use efficiency of resources to a great degree, and reduce the exhaust of waste, which contributes to the protection of environment. Meanwhile, it can help to realize a win-win development of enterprises, society and environment. However, this internally generated recycle economy merely exerts limited effects. From a view of division, a nice system can drive further division. As long as the government can provide with necessary institutions, further division of industry aggregation can be realized, and so does the recycle economy. It is necessary to apply the recycle economy thought to the industry aggregation process. At the same time, we should take two facts into consideration that China does not own sufficient resources and enterprises need amounts of resources for further investment.

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Table 1.

Dominant industry	Number
Tin processing industry	11
Waste treatment industry	
Seedcase collecting	3
Cullet collecting	2
Pip collecting	2