



The Research of Logistics Industrial Cluster: Concept, Characteristic and Function

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Abstract: Logistics industrial cluster is one of the economic geography phenomenon, which includes a large number of logistics enterprises and agencies related closely, besides, logistics industry plays the role of leading industry is the point. Under the background of economic globalization, logistics industrial cluster is shaping and developing with a high speed all over the world. Logistics industrial cluster is an effective way to develop the regional economic, to adjust the industrial structure, to form the economic strategic layout and so on. However, the current academic research of logistics industrial cluster is scanty especially in China. Based on these reasons, a complete and rigorous theory system of logistics industrial cluster will try to be established. Firstly, the paper defines the logistics industrial cluster. Secondly, the paper makes an elaborate analysis of the Characteristic. Finally, the paper explores its essential function. The aim of the theory system of logistics industrial cluster is to provide a reliable theoretical system to the people who are interested in logistics industrial cluster, and to build a solid theoretical foundation for the future academic research.

Keywords: Logistics, Industrial Cluster, Concept, Characteristic, Function

1. Introduction

Logistics industry has made sustained development in China since the reform and opening up over the past thirty years. According to the international authority of Statistics, China is the world's second largest economy country and logistics plays an important role. The total sum of social logistics in China reached 220 trillion yuan, compared with 88.82 trillion yuan 7 years ago with the growth of about 147.7%. Seven years ago, the total social logistics costs accounted 18.3% of GDP, and now the cost is expected down to 16%. The total number of logistics employees has reached 30 million, which is the fastest growing industry in the whole real industry. [1, 2] However, compared with the developed countries, the development of logistics industry in China still has a big gap. The total logistics cost of China in the past year accounted for about 18% of the GDP. According to the longitudinal comparison, this ratio is generally showing a downward trend but slow. According to the horizontal

comparison, this ratio is higher than the United States and Japan about 9.5 percentage points, and it is also higher than the global average of about 6.5 percentage points. [3] The Low level of socialization, serious fragmentation and asymmetric information has been hampered the development of logistics industry China.

With the deepening of the labor division and diversifying of logistics demand, logistics industrial cluster comes to the fore with a rapid speed conforming to the requirements of the times in the whole world. Logistics industrial cluster has significant competitive advantages than the traditional logistics industry. Firstly, Logistics industrial cluster creates new and better jobs. For examples, the port of Rotterdam employs 55,000 people directly and 90,000 more indirectly; the Memphis International Airport is responsible for 220,000 jobs in the local economy, more than one out of three jobs in the metro Memphis area, etc. Secondly, Logistics industrial cluster is benefit to create logistics enterprises. An October 2011 article in the *Miami Herald* makes the point that "hundreds of small trade logistics companies give South Florida a competitive

edge in international commerce as a 'one-stop-shop' for companies moving products and improving their supply chain.” Thirdly, Logistics industrial cluster makes the regional economic becoming diversity. For example, Louisville is a distribution hub for aircraft spare parts, cell phones, repair parts for office equipment, industrial products, digital cameras, shoes, pharmaceuticals, and many other products. Last but not the least, it has been found that logistics industrial cluster has made a positive contribution to the development for regional economy. Approximately 10 percent of the Netherlands's GDP is generated by logistics activities; the port of Rotterdam adds about €22 billion annually to the Dutch economy. Similarly, Memphis Airport's cluster creates \$28.6 billion in annual economic impact, 95 percent of which arises from airfreight. The foreign logistics industrial clusters get well developed. [4] However, the developing of Chinese logistics industrial clusters still in the early stage, it hasn't formed the intensive, ecologic and informational features. Therefore, grasping logistics industrial cluster as a significant support will have an important significance to promote the upgrading of the industrial structure, form a new economic growth pole and promote the development of regional economic integration.

2. The Concept of Logistics Industrial Cluster

Logistics refers to the physical movement of goods from the supplier to the demander, including transport, storage, handling, packaging, distribution processing, distribution, information processing and other activities. [5] The goal of logistics is to deliver the goods to the designated location in the appropriate time. The purpose of logistics management is to provide the most satisfactory logistics services for the customers with the lowest cost, in order to achieve the maximum operating efficiency of enterprise. With the evolution of globalization and post Fordism, the new requirements to logistics services were put forward for social activities. Logistics industrial cluster is the result of this requirement, it is a new form of logistics industry, and it is the inevitable result of the deepening social labor division.

Industrial cluster derived from the species concept in biology. There are many scholars devoted themselves to the research of industrial cluster since last century. Due to the different perspective, method, focus, purpose and so on, a lot of industrial cluster theories were put forward. However, the most popular define was put forward by Michael E. Porter in *Competitive Advantage of Nations* “The existence of a cluster of several industries that draws on common inputs, skills, and infrastructure also further stimulates government bodies, educational institutions, firms, and individuals to invest in relevant factor creation or factor-creating mechanism. Specialized infrastructure is enlarged, and spillovers are generated that upgrade factor quality and increase supply... The resulting pool of skilled human resources, knowledge, scientific centers, and specialized infrastructure

is benefiting the whole group of industries and is spilling over to benefit other industries that depend on information technology.” [6]

There is no authoritative definition of logistics industrial cluster. According to the literatures, the main points of view are as follows. Wang Yan described the logistics industrial cluster from the forming law, operating mode and promoting regional economic development. Wang Yan thinks the logistics industrial cluster is a Horizontal integrated logistics system model. In this model, logistics industry takes the lead with the related industries are organized together by the operating mechanism of “competing — cooperating — coordinating”. [7] Guo Qiang described the logistics industrial cluster from the leading industries, operation mechanism as well as the logistics service goal and so on. He thinks that logistics industrial cluster is a group network which is based on the principle of scale and specialized division of labor. [8] Zhou Xiaoye described the logistics industrial cluster from combining with the characteristics of the industrial cluster and the network organization. Zhou Xiaoye thinks the logistics industrial cluster is an aggregate phenomenon that is led by logistics industries (Including transport, storage, loading and unloading, packaging, processing and distribution industry, logistics information, postal services, etc.) as well as the related service industry (Including manufacturing industry, circulation industry, scientific research and Development Organization) in a certain range of space. Besides, these enterprises and units are interdependent, competing mutually and promoting each other, resulting bring economic benefits. [9]

Through the above analysis, it is not hard to find that these definitions are same basically. They all use the definition of Michael E. Porter on the industrial clusters, but the different focuses depend on the scholars. Overall speaking, in this paper, the logistics industrial cluster is an economic geography phenomenon with the core logistics industry in a particular area, as well as gathering lots of related organizations and the activities. The goal of logistics industrial cluster is to gain sustainable competitive advantage. In order to annotate the concept of logistics industry cluster more complete and clear, the plotting shown in Figure 1.

Facing the increasingly fierce and vagaries market competition environment, many enterprises agglomerate around logistics industrial cluster. It is conducive to integrate kinds of resources in different places. These resources including tangible resources (Human resources, goods resources, land, capital, infrastructure, etc.) and intangible resources (Information, technology, knowledge, policy, social relations, etc.). The organization members of the logistics industrial cluster are mainly as the following: (1) logistics enterprises, (2) related closely with the logistics enterprises, such as the manufacture enterprises, (3) the relevant supporting institutions such as government departments, financial institutions, trade associations, intermediary organizations, research institutions, educational institutions and so on. The comprehensive utilization of resources will be more effective to improve the competitiveness of enterprises,

finally forming the competitive advantages.

Logistics industrial cluster is the result of deepening social division of labor. Actually, logistics industry is the core. The enterprises with different sizes, different types of service gather together in order to content the diversified service needs of the markets, these enterprises sharing the logistics infrastructure (roads, railways, airports, ports, transportation hubs, etc.), public service system and logistics information

platform, etc. Through sharing these resources, these enterprises set a relation of competing and cooperating, so kinds of activities of logistic (transportation, storage, loading and unloading, packaging, distribution processing, distribution, information processing, value-added services, etc.) are developing effectively. Logistics industrial cluster is more conducive to achieve low-cost, high efficiency of the integrated business objectives for the logistics enterprises.

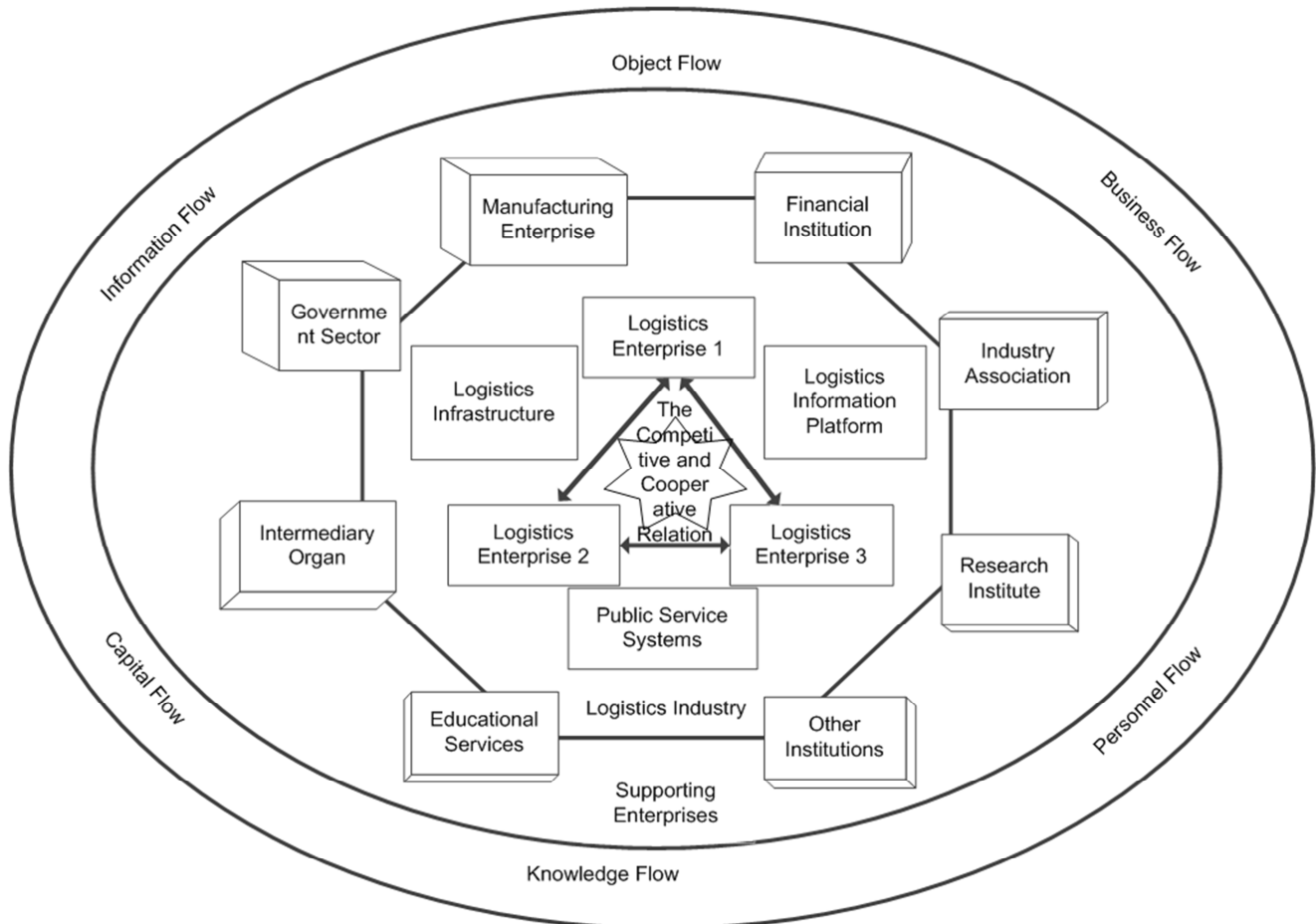


Figure 1. Sketch plot of logistics industry cluster.

The value of logistics industrial cluster comes from the cooperation among enterprises, inside, six key flow have significant impact. They are goods flow, business flow, personal flow, knowledge flow, capital flow and information flow (they are in the outermost circle in Figure 1). Logistic industry as the lead industry, enterprises in the cluster have the direct or indirect relation with logistic, so ensuring the efficiency and improving the efficiency of logistics industry are significant measures for promoting the development of logistics industrial cluster.

Overall, the concept of logistics industrial cluster contains three basic elements. (1) The logistics industry as the leading industry, gathering a large number of organizations and activities. (2) The relation of enterprises in the industrial cluster is competing or cooperating. (3) Gaining sustained competitive advantages.

3. The Characteristics of Logistics Industrial Cluster

As one type of industrial cluster, the logistics industrial cluster has the common characteristic with the other industrial clusters, and it also has the characteristics of logistics industry itself.

3.1. The General Characteristics of Logistics Industrial Cluster

3.1.1. Geographical Features of Spatial Agglomeration

Spatial clustering is one of the most prominent features of industrial clusters. From the geographical point of view, logistics industrial cluster is an agglomeration in space dominated by the logistics industry (including transport industry, warehousing industry, loading and unloading

industry, packaging industry, processing and distribution industry, logistics information industry, postal services industry, etc.), based on the logistics infrastructure (such as ports, airports, railways, highways, freight station, transportation hubs and others) and logistics information platform. In this cluster, enterprises with close relations to the logistics, financial institutions, government departments and intermediary organizations are competing and cooperating mutually. [10]

3.1.2. Flexible Specialization of Service Features

Logistics industrial cluster of enterprises linked closely through vertical industrial division of labor and horizontal economic cooperation rather than simply gathered together, on this account to achieve the service of diversified and efficient logistics service. Therefore, the logistics industry cluster has specialized characteristics. Besides, with the development of economic globalization and post Fordism evolution, enterprises reform from system structure, operation mode, organization personnel and marketing, so as to promote the system to achieve greater operational efficiency. The characteristics of enterprises in logistics industrial cluster service flexible specialization has significance for promoting the development of regional economy.

3.1.3. Social Network Characteristics

The network of industrial clusters is based on value chain. Enterprises in the industrial cluster are linked forwardly, backwardly and laterally. [11] The links in logistics industrial forward and backward due to the logistics development, such as the backward and forward linkages among raw material suppliers, manufacturers, distributors and consumers. The lateral relationship is the impact among logistics industry and other industries and the development of other industries, such as government departments, financial institutions, research institutions, industry associations, etc. Enterprises in the logistics industrial cluster form a network structure through long term communication and cooperation. This network consists of formal and informal networks, formal network relationship is a long-term and stable cooperative relationship between enterprises in clusters through formal contracts. On the contrary, the stable relationship between informal interactions, such as interpersonal relationships, local grounding, credibility, and so on. The characteristic of logistics industrial cluster has an important impact on improving the agglomeration and promoting the overall development of enterprises in the logistics industry cluster.

3.1.4. Regional Embeddedness Characteristics

Enterprises within industrial clusters are related not only in geography but also the local culture. This characteristic is called regional embeddedness characteristic, embeddedness is the critical factor that supporting cluster production system, it is the localization of resources, culture, knowledge, systems, geographical location and other elements. [12] The regional embeddedness of industrial cluster is conducive to promote the communication and cooperation among

enterprises in the cluster, to enhance the trust and tacit understanding among the enterprises and institutions in the cluster. In addition, embeddedness is conducive to realize the spillover of knowledge and technology, so as to improve the agglomeration effect and economic benefits of industrial clusters. The characteristics of the industrial cluster is hard to copy once the regional embeddedness is formed.

3.1.5. Accumulating Continuously Characteristics

Economies of scale and regional play an important role in the formation and development of industrial clusters. A large number of investigation was attracted because of sharing the infrastructure and service system, as well as the spillover of knowledge, technology and economic etc. The growth of industrial clusters is conducive to form regional economic competitive advantages. The enterprises and related institutions will increase investment, the aim is to strength the regional economic competitive advantage, and to promote the further development of industrial clusters, which is the unique "positive feedback" recycling mechanism of industrial clusters. On the contrary, if there is a block in the industrial cluster, it will hinder the "positive feedback" mechanism of the cluster. In addition, Poor accumulation may lead to decline or even finish the cluster. It is an effective way to promote the development of logistics industrial cluster through grasping the law of sustainable development of logistics industry cluster correctly.

3.1.6. Innovative Features

In the book of *Competitive Advantage of Nations*, Professor Michael E. Porter pointed out that "The presence of an entire cluster of industries magnifies and accelerates the process of factor creation that is present where is a group of domestic rivals. Firms from an entire group of interconnected industries all invest in specialized but related technologies, information, infrastructure, and human resources, and numerous spillovers occur." [13] As the information is more unimpeded and the atmosphere of innovation is spreading more quickly, the innovation relationship between the industrial clusters naturally. New competitive products are created by new competition idea, new competition opportunity, new talents, new technology and new wisdom. This kind of dynamic innovation capability is the key factor to win the competition of logistics industrial cluster. [14]

3.2. The Special Characteristics of Logistics Industrial Cluster

3.2.1. Industry Dependence

The logistics industry is a service industry with the characteristics of industry dependence, and it develops with the development of other industries. The aim of logistics management can be summarized as "7R", these are transferring the right products to right customer at right place with right quantity, right quality and right cost in right time. The existence of logistics industrial cluster is to ensure conveniently providing the guarantee for production and service.

3.2.2. Regional Selectivity

The choice of logistics industrial cluster location mainly displays in two aspects: one is the geographical position selectivity, the other is the choice of the logistics infrastructure. The location of logistics industrial cluster can reduce the risk of investment and operating costs, as well as promote the coordinated development of enterprises and supporting institutions.

3.2.3. Competition and Cooperation Among Enterprises

Enterprises in the industrial cluster generally focus on a certain production process or mass production of certain products in order to improve their competitiveness and reduce production costs. So the rapid development of industrial clusters makes the social division of labor within the same industry more detailed. However, enterprises in the logistics industrial cluster is slightly different, they based on logistics industry chain to cooperate horizontal among logistics enterprises and divide the work vertical in logistic activities. Therefore, the logistics industrial cluster has a unique competitive and cooperative relationship among enterprises.

3.2.4. Multi Center Feature

In order to provide integrated logistics services, logistics service suppliers need to integrate and optimize external resource on the basis of integrating the resource themselves. The integrated logistics service supplier can be more, so the logistics industrial cluster has the characteristics of multi center. [15]

4. The Function of Logistics Industrial Cluster

Throughout many domestic and foreign logistics industrial cluster, their function is different from features of the service demand, infrastructure and economic development strategy, however, there are many common features, and these are the basic functions of logistics industrial cluster.

4.1. Promoting Regional Economic Development

The logistics industrial cluster has an important significance from the economic development in the region. Logistics industrial cluster has the advantage of attracting national transportation infrastructure and social capital investment. It is the energy to expand domestic demand, promote the coordinated development of other industries and inter regional economic. From the perspective of long-term development, the logistics industrial cluster will bring benefits to the society and satisfied service. The logistics industrial cluster also will increase the employment opportunities, promote the stable growth of economy, restructure and upgrade the economy. It is a powerful driving force to achieve development driven by green and innovation. [16]

4.2. Enhancing the Competitiveness of the Market

There are many logistic enterprises and infrastructure gathering in cluster, it must bring the increase of logistic, capital flow, people flow and fiscal levy, finally forming growth pole. In addition, as the infrastructure of the region or country, the logistics industrial cluster drives resources flow in different space and the upgrade and transfer of the international industry, even the international political relationship. Therefore, the construction of logistics industrial cluster enhance the regional competitiveness must from a strategic and long-term perspective.

4.3. Achieving Optimal Allocation of Resources

Developing the logistic industrial cluster need to put into infrastructure, land resources, labor, capital, information, technology, knowledge, policy and so on. On the one hand, logistics industrial cluster is conducive to the concentration and distribution of resource factors. On the other hand, the logistics industrial cluster is conducive to realize the integration of resources. In the logistics industrial cluster, the high coupling of logistics networks, social networks and information networks advances the proliferation of trade information, science, technology and new knowledge. That's propitious to decrease the transaction cost and integrate resources.

4.4. Ensuring the Stable of Market Supply and Price

With the popularity of the globalization of procurement and production of zero inventory, the market demand for logistics service becomes larger, which brings a severe test to the operation activities and the control of facilities equipment. Logistics industrial cluster condense a large number of logistics enterprises and supporting mechanism linked closely, they share infrastructure and information technology platform. That is conducive to exchange and cooperate among enterprises. In addition, logistics industrial cluster creates a fully competitive market environment, the competition among enterprises makes for forming the reasonable and stable price level.

4.5. Promoting the Development and Improvement of Industrial Policy

In recent years, the logistics industrial cluster is a hot spot in many countries and regions. Most of them follow the model is "guiding by the government to co-ordinate + market-oriented + the flexible participation of enterprises". Establishing good communication among the government, logistics enterprises and logistics industry associations has great significance. The successful experience of logistics industrial cluster in Zaragoza Spain, Singapore, Panama, showing that the development of logistics industrial cluster needs logistics infrastructure, expanded land resources and long-term assets investment. Certainly, the support of government on trade, tax and regulatory policy is necessary. Therefore, the formation and development of logistics

industrial cluster need to formulate develop guidelines and policies by the government and the logistics industry association. [17]

4.6. Expanding Employment and Promoting Innovation

Logistics industrial cluster is different from high tech industrial cluster. It supplies multiple levels of employment from gold-collar, blue collar and so on. In addition, logistics industrial cluster is benefit to create logistics enterprises. The resources are beneficial to provide opportunities for innovation in the logistic industry cluster.

4.7. Promoting the Construction of Ecological Civilization

Facing the resource constraints and serious environmental pollution, the logistics industrial cluster adhering to protect ecological civilization. The operating cost especially the consumption of fuel will reduce through sharing infrastructure and combining different ways of transportation. Generally speaking, the development of logistics industrial cluster is beneficial to reduce the energy consumption of the whole society and the emission of environmental pollutants. In order to increase the efficiency of enterprises, they develop the circular economy and use advanced technologies actively to promote energy-saving task. Because of this, logistics industrial cluster has become the active builders of ecological civilization and the practitioner of green technology.

5. Peroration

Logistics industrial cluster is a product of economic development to a certain stage, and it is a new type of industrial ecosystem. The formation and development of logistics industrial cluster can not only realize low cost and high benefit, but also can optimize the industrial structure, promote the development of logistics industry and related industries. Logistics industrial cluster has very important significance for improving the competitiveness of China's logistics industry, forming a reasonable layout of the logistics industry, promoting the regional coordination of logistics and promoting the development of regional economic integration.

This paper establishes a relative complete academic concept system on the basis of related notion. From two angles of the general and special, the attribute function of logistics industrial cluster is discussed from development of regional economic, competitiveness of market, resource allocation, supply and demand chain and ecological civilization construction. In the future, with the development of logistics industrial cluster, the key research direction and content will be the forming mechanism, growing path, developing model, managing plan and servicing innovation mechanism of logistics industrial cluster.

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