

Explore the Influencing Factors of Manufacturing Industry Agglomeration

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Abstract: As the result of the amount of greenhouse gas emission, many countries has developed green economic that achieve sustain economy and protect environment. Sustainable economic development has become a trend, and an important part of it's industrial agglomeration. There are theoretical and practical implementation of industrial agglomeration. This paper is going to talk about the industrial agglomeration of manufacture. Industrial agglomeration refers to firms in the same industry locating in the same geographic area. The regional similarity of their location results in so-called industrial externalities, referred to as external economies of scale by Marshall and localization externalities by Henderson. In this paper, the factors that cause industrial agglomeration of manufacture will be discussed. First of all, the raw materials is one of the factors. Raw materials are the resources used to make goods. Secondly, the labor market is also an important factor of industrial agglomeration. Thirdly, the policy will have a great impact on the industrial agglomeration in a certain region. The policy refers to the directives and targets set by the state, government and enterprises. In the case study, this paper has chosen California, which is famous for its home industry, and confirmed the above three influencing factors.

Keywords: industry agglomeration, manufacture, green economy

1. Introduction

As the result of the amount of greenhouse gas emission, many countries developed green economic that achieve sustain economy and protect environment. In the America, the development of green economy in the United States can be divided into energy conservation and efficiency, new energy development, climate change and other aspects. The development of new energy is the core of its Green New Deal. In February 2009, the American Recovery and Reinvestment Act with a total amount of 787 billion dollars took the development of new energy as one of the main areas. At the same time, the United States also vigorously promotes the development of green economy and strives to vigorously develop low-carbon economy through a series of energy-saving and environmental protection measures. Such as issuing green bonds and practicing green lending principles.

Sustainable economic development has become a trend, and an important part of it is industrial agglomeration. The definition of agglomeration was first put forward by Alfred weber [1], an economist of industrial location. He believes that enterprises can reasonably combine regional

factors and agglomeration factors to minimize costs and freight. On the other hand, with the spatial agglomeration of enterprises, enterprises can get the benefits of cost saving, and industrial clusters can share public facilities such as roads, gas and water.

There are theoretical and practical implementation of industrial agglomeration. Firstly, from the perspective of theoretical implementation, Industrial agglomeration provides a new perspective to study the relationship between sustainable economic development and environment. Secondly, industrial agglomeration plays as factor of the green economy. Thus, this can provide a help that this variable or concept can serve as a precursor to some other research and extend to literature. From the perspective of practical implementation, industrial agglomeration can provide managed suggestion and people can be beneficial to manufacture industry. For future articles and research at the same time, industrial agglomeration can serve as a potential variable or an outcome variable to inspire more discussion on this topic in the future. Through such research, we can also be inspired to do a good job in regional planning.

This paper is going to talk about the industrial agglomeration of manufacture. The second part is literature review, the third part is discussion of factors that cause industrial agglomeration, the fourth part is case study and the fifth part is conclusion.

2. Literature Review

2.1. Concept of the Industrial Agglomeration

Industrial agglomeration refers to firms in the same industry locating in the same geographic area. The regional similarity of their location results in so-called industrial externalities, referred to as external economies of scale by Marshall and localization externalities by Henderson [2,3].

The theory of location of the industrial developed the concept of industrial agglomeration [1]. The reasonable combination of location factors minimizes the cost and freight of the enterprise, and the enterprise will place its place in the most economical place in production and circulation according to this idea. The spatial agglomeration of industries can promote the specialization of labor organization, and industrial clusters can avoid middlemen and save transaction costs. That is to say, with the spatial agglomeration of enterprises, enterprises can get the benefits of cost saving, and industrial clusters can share public facilities such as roads, gas and water.

2.2. Recent Work of Industrial Agglomeration

The theory of natural resource based view has been proposed by Hart [4]. This theory expounds the interrelation among the resources, competitive advantage and capability of an enterprise, and points out that it is better for an enterprise to look for the source of competitive advantage inside the enterprise than outside the company.

For this reason, the theory holds that enterprises gain competitive advantage by conserving resources and developing capabilities to solve environmental problems such as pollution minimization, green product design and recycling technology.

Many research studied the causes of the industrial agglomeration [4,5]. The researcher test Marshall's theories of industrial agglomeration by examining which firms were geographically closer to each other, or coagglomerate. The researcher constructed pairwise coagglomeration indices for US manufacturing industries from the Economic Census. Marshall's three agglomeration theories have been recognized and supported by evidence, and input-output ratio is the most important among them.

Some researchers thought that other factors impact the industrial agglomeration. The purpose of this paper is to test which theory best explains the geographical concentration of Java Island, where most of Indonesia's medium-sized manufacturing industry is located. The researcher compared the

three major grand theories of geographic concentration: Neo-Classical Theory (NCT), New Trade Theory (NTT) and New Economic Geography (NEG). Using the regional specialization index as a measure of geographic concentration of manufacturing industry and pooling data over the period 1991-002, the researcher's econometric analysis integrates the perspectives of industry, region (space) and time. The nature and dynamics of industrial agglomeration in Java are further explored by researchers through the study of a number of key variables. More importantly, the results suggest that there is a synergy between thickness of market and agglomeration forces [6].

3. Discussion

In this section, the factors that cause industrial agglomeration of manufacture will be discussed.

3.1. Raw Material

First of all, the raw materials are one of the factors. Raw materials are the resources used to make goods. These raw materials are processed and refined to make goods that are ultimately sold. For examples, cotton, crude oil, and coal. The raw material is necessary to produce goods, so it affects the firms to produce good. Many raw materials lead to high transportation costs, such as ore and coal. The cost of mining these raw materials accounts for a portion of the enterprise's costs, but it is more in the cost of transportation. The goal is to reduce costs and increase efficiency, enterprises will choose to set up factories in areas with abundant raw materials in order to reduce transportation costs. Rosenthal, et al [7]. explained the factor by example of furniture industry. The result shows that the United State that do have employment are not randomly scattered across the country. They are disproportionately located in the western part of North Carolina and in other nearby locations. Clearly, furniture is an industry that makes use of particular raw materials, especially wood. Forestry is an important industry in North Carolina and elsewhere in the Southeast, so the location is sensible because of the access it offers to raw materials.

3.2. Labor Market

Secondly, the labor market is also an important factor of industrial agglomeration. The labor market, also known as the job market, refers to the supply of and demand for labor, in which employees provide the supply and employers provide the demand. And the salaries of employees account for a large proportion in the operation of a business, so an effective labor market can help enterprises to maximize the marginal product labor. Human capital is closely related to innovation ability. If a labor market has high mobility, it will lead to abundant human resources. Therefore, many enterprises will choose tht area that had labor market to recruit talents. And the cost of the business will be reduced. Because of this, a perfectly competitive market would be established in a highly mobile market, where each firm could only employ a small fraction of the total number of workers in the industry, and this would have no effect on the market wage because the firm would have to pay its employees at the rate determined by the market. This factor is supported by researcher [5]. Industry attributes are used to construct measures of the relevance of each of Marshall's three theories of industry agglomeration to each industry pair: (1) agglomeration saves transport costs by proximity to input suppliers or final consumers, (2) agglomeration allows for labor market pooling, and (3) agglomeration facilitates intellectual spillovers.

3.3. Policy

Thirdly, the policy will have a great impact on the industrial agglomeration in a certain region. The policy refers to the directives and targets set by the state, government and enterprises. Whether it is

tax policy, environmental policy or industrial policy, it will have a great impact on the regional industrial form. National or regional policies are an external factor affecting industrial agglomeration. Because these policies will directly affect the decision-making of enterprises. Such as targets that must be met, such as carbon emissions. This factor is supported by many researchers [8,9]. The researchers investigated the causes and trends of geographical concentration in China's manufacturing industry by examining data from large Chinese enterprises between 1998 and 2005. It is found that the extent of industrial agglomeration in China, measured by the Ellison-Glaeser index, has increased steadily throughout the sample period, though it is still much lower than those of selected developed countries such as France, the United Kingdom, and the United States. It is also found that local protectionism among China's various regions obstructs the process of geographic concentration of manufacturing industries. These local protectionism means the tax policy, such as tariff and quota. Other researchers consider the appropriate spatial scale of industrial policy by providing an overview of the literature and identifying a two-part literature that strongly supports the centralist side. They don't think this approach is based on mature theory and experience. In contrast, they suggested that more attention should be paid to the appropriate spatial scale for horizontal interventions. Finally, the researchers considered the possibility that some of the policy objectives of horizontal industries might be better achieved through specific regional classifications and decentralized design.

3.4. Environment Impact of Industry Agglomeration

Industrial agglomeration has a great impact on the environment. Because many enterprises are clustered in a certain area, there are many factors that can cause environmental pollution. First, raw materials. If many enterprises cluster in the same area to develop the same raw materials, it will lead to over-exploitation, which will seriously affect the quality of land and the sustainability of raw materials. Especially non-renewable energy sources like coal. Second, the Labour market. A mobile Labour market requires lots of transport, such as subways and highways. And the amount of greenhouse gases, such as carbon dioxide, produced by people commuting also increases. Finally, both environmental policies and tax policies aim to adjust the macro-objectives of enterprises. Because the purpose of enterprises is to make profits, they will reduce costs and increase efficiency, and do not put environmental protection in the first place. Government policies are designed to make companies think about environmental issues as well as profits. Generally speaking, the regulation means of environmental policies are taxation and the establishment of emission targets. This increases the cost of environmental pollution for enterprises, and enables enterprises to pay attention to this part of the cost, so as to develop green economy.

4. Case Study

This paper will take the furniture industry in the America as an example. With the development of global economy and the improvement of people's living standards, people's demand for home is growing. The home industry is the second largest manufacturing industry, but it also has a great impact on the environment. Such as the demand for wood and pollution from factories. The furniture industry in the United States is remarkable. They are disproportionately located in the western part of North Carolina and in other nearby locations.

According to the report from U.S. Census Bureau, in the first four months of 2022 alone, the United States exported more than \$3.2 billion worth of furniture to the rest of the world. Giving Assistant, a cash-back shopping company, crunched data from the U.S. Census Bureau to find out which states have exported the most furniture by value so far this year. All export data are from the period January 2022 to April 2022. The survey covers furniture, bedding, mattresses, cushions and

other filler furniture, as well as lamps and fittings based on the World Trade Classification. Forney, Carolina, is the nation's third largest exporter of furniture at \$298 million. The reason why California can be ahead of the curve in furniture industry and environmental productivity is closely related to the following three points.

Firstly, home furnishing industry is an industry that needs specific, large quantities of raw materials. Lumber, for example. Forestry is an important industry in North Carolina and elsewhere in the Southeast, so the location is sensible because of the access it offers to raw materials. Wood is also expensive to transport, so companies will agglomerate in North Carolina to reduce transportation costs.

Secondly, there are have a labor market that had high mortality. California's transportation is very developed advanced and completely in road, rail, sea, air facilities. Then state highway infrastructure is perfect and accessible, the car is the main means of transportation in the state. That means workers can easily commute. And there are many higher universities in California, such as California Institute of Technology, Stanford University and so on. So the labor market here is exceptionally excellent.

Thirdly, America has taken out some policies to protect the environment. Such as legal prevention, the United States Congress has also enacted a series of environmental protection laws on air protection, water pollution prevention, and endangered species protection, forming a relatively complete legal system for environmental protection. In this way, many furniture companies will choose relative-cutting rather than clean -cutting to get wood, because clean-cutting will harm biodiversity. In addition, the government also has a tax mechanism about the pollution. Such as the tiered water-pricing systems that a water allocation system that charges rates that increase with the amount of water consumed. So most home furnishing companies can not waste and pollute water easily.

Because an abundance of raw materials, a mobile Labour market and environmental policies, so the furniture industry has grown in California and its environmental performance is under control. For example, many home furnishing companies have been upgraded.

5. Conclusion

5.1. Findings

This paper first finds several factors related to manufacturing industry agglomeration by reading literature, and finds the relationship between industrial agglomeration and environmental protection. Later, the essay explains these three factors that are raw materials, mobile labour markets and policies. Then the paper takes the furniture manufacturing industry in California as an example to further confirm the relationship between these three factors and industrial agglomeration and environmental performance. This paper proposes the framework of industrial agglomeration and explains the mechanism affecting manufacturing industry agglomeration.

5.2. Contribution

This paper studies the factors affecting the agglomeration of manufacturing industry. And there are two implementations about industrial agglomeration, namely theoretical and practical implementation. From the perspective of theoretical implementation, Industrial agglomeration provides a new perspective to study the relationship between sustainable economic development and environment. Secondly, industrial agglomeration plays as factor of the green economy. Thus, this can provide a help that this variable or concept can serve as a precursor to some other research and extend to literature. From the perspective of practical implementation, industrial agglomeration

can provide managed suggestion and people can be beneficial to the manufacturing industry. This paper can be used as a variable and factor in the future research on sustainable economy.

5.3. Limitation and Future Work

There are some limitations to this article. Firstly, the example given at the end of the paper is a single case, and the paper can use random sampling of multiple cases to increase its universality. Secondly, the paper mainly discusses the theoretical mechanism and lacks empirical evidence. Due to the different research topics involved in the scope of manufacturing industry agglomeration literature is also relatively limited. Therefore, the research gap leads to the lack of preliminary research on the research topic.

When the literature on the topic is insufficient, a new research framework or theory may have to be developed. In this case, the insufficiency of the past literature can instead serve as an opportunity to develop the research gap. Therefore, in the future study of manufacturing industry agglomeration, the research direction can be closer to production factors that are land, labor, capital, enterprise and environmental damage. The empirical evidence mentioned above can also be strengthened. Third, only three influencing factors are explained in this paper, and there are other potential influencing factors that have not been considered, which can also be confirmed in subsequent work.

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