Study on the Synergy and Co-agglomeration of Producer Services and Manufacturing Industries in Jiangxi Province

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Abstract

By measuring the industrial association and industrial spatial synergy between Jiangxi producer services and manufacturing industries, this paper draws the industrial-spatial four quadrants and scattered points distribution map of Jiangxi producer services and manufacturing industries. It finds that the industrial combinations with high industrial association and high spatial co-agglomeration, and the industrial combinations with low industrial association and high spatial co-agglomeration account for a lower proportion. while the industrial combinations with low industrial association and low spatial co-agglomeration account for a higher proportion. It is suggested that enterprises with strong industrial relevance should make good use of the external economy which comes from industrial spatial co-agglomeration, share knowledge and labor pool, and reduce operating costs. It is necessary to speed up the upgrading and transformation of traditional manufacturing industries, and improve the industrial association between producer services and manufacturing industries, and promote greater effectiveness in industrial spatial co-agglomeration, and improve regional industrial competitiveness.

Keywords

Producer services; Manufacturing industries; Synergy; Co-agglomeration; Jiangxi

Introduction

The more developed the economy of a country or a region, the higher the proportion of its services, especially producer services. In recent years, no matter from the perspective of countries or regions, the trend of integration and coordinated development of producer services and manufacturing industries has become increasingly prominent, and the characteristics of agglomeration of producer services and manufacturing industries have also emerged in space. Countries and regions have also issued corresponding policy support. Jiangxi Province

put forward in the "14th Five-Year Plan" to speed up the construction of a modern industrial system integrating advanced manufacturing and modern service industries. Therefore, based on the current situation of synergy and co-agglomeration of Jiangxi producer services and manufacturing industries, this paper explores the path of synergy and co-agglomeration development of Jiangxi producer services and manufacturing industries.

The research on industrial synergy can be traced back to Marshall (1890) who put forward the theory of industrial agglomeration, and Marshall pointed out that the reason of enterprise agglomeration mainly came from the externality caused by knowledge spillover. Ellison & Glaeser (1997) thought that industrial synergy would promote the close connection between upstream and downstream industries, which was beneficial to industrial development. In recent years, the research on the synergy and co-agglomeration of manufacturing industries and producer services had become a research hot issues in academic circles. Andersson (2004) found that the two industries with similar distance were convenient for information transmission and professional communication, and emphasized the importance of synergy and co-agglomeration of producer services and manufacturing industries. Lanaspa et al. (2016) pointed out that producer services played an important supporting role in manufacturing industries, so the industrial policies of manufacturing industries and service industries should be coordinated with each other. In China, Chen (2012) found that industrial association had an impact on the synergy and co-agglomeration of the secondary and tertiary industries, and they were showed regional differences. Hu (2015) analyzed the panel data of 252 prefectural panel data in China and found that the synergy and co-agglomeration effect between producer services and manufacturing industries was obvious. Deng (2019) believed that the deep integration of service industries and manufacturing industries was an objective requirement to cope with the decline of factor endowment advantage and the change of trade environment, and he indicated that it was also an important way to promote the high-quality development of manufacturing industries. Luo & Sun (2021) took manufacturing industry companies as samples and investigated the impact of the agglomeration and integration of producer services and manufacturing industries on the total factor productivity of manufacturing enterprises, and put forward that it was necessary to establish a market mechanism oriented model of synergy and co-agglomeration around the development needs of manufacturing industries, so as to attract related producer services to gather independently.

Some scholars have made some explorations on the relationship between producer services and manufacturing industries in Jiangxi. Rao & Li (2012) which based on the interactive relationship between producer services and manufacturing industries, stressed that Jiangxi should accelerate the development of producer services, and put forward some policy suggestions to promote the development of Jiangxi producer services agglomeration. Gao (2016) analyzed the interactive relationship between manufacturing industries and services in Jiangxi Province through simultaneous equation model, which showed that there was a significant interaction influence between manufacturing industries and services in Jiangxi Province, and the promoting effect of manufacturing industries on the development of services is greater than that of services on the development of manufacturing industries, and the promoting effect of consumer services on manufacturing industries is greater than that of producer services on manufacturing industries. Recently, Hu (2021) analyzed the development status of Jiangxi's manufacturing industries and producer services, and pointed out that the traditional productive services could promote the manufacturing industries as a whole, while the emerging producer services could only promote the manufacturing industries and she suggested that the two industries should be integrated and developed. Huang et al. (2021) based on the development reality of Jiangxi producer

services and manufacturing industries, quantitatively analyzed the coupling between manufacturing industries and producer services by establishing an empirical model combining grey correlation degree and entropy weight method, and found that software, information technology and financial industry had the greatest impact on manufacturing industries.

However, in the existing researches, there were few literatures on the development of Jiangxi producer services and manufacturing industries from the aspects of industrial association and spatial synergy co-agglomeration. It is worth mentioning that Jiang et al. (2014) and Zhao et al. (2018) made a more in-depth studies on the collaborative agglomeration development of regional producer services and manufacturing industries, which provided ideas for the research of this paper. On this basis, this paper explores the path of coordinated development between Jiangxi producer services and manufacturing industries from the aspects of industrial association and spatial co-agglomeration.

The Use of Data and the Selection of Measurement Indicators

According to Jiangxi Input-Output Table in 2012 and Economic Census Database in 2013, this paper measures the synergy co-agglomeration of producer services and manufacturing industries in Jiangxi from two dimensions of industrial association and spatial co-agglomeration. The specific industries involved in manufacturing and producer services are classified with reference to National Economic Industry Classification Standard (2011) and Producer Services Classification (2015). In the selection of measurement indicators, this paper uses the arithmetic mean of direct input coefficient and direct distribution coefficient of producer services and manufacturing industries to measure the industrial association between producer services and manufacturing industries in Jiangxi. According to Devereux et al. (2004), the simplified E-G synergy co-agglomeration index is used to measure the degree of industrial spatial co-agglomeration between producer services and manufacturing industries in Jiangxi province. In order to analyze the measurement indexes together, this paper standardizes these two measurement indexes. Instructions of detailed data usage and measurement indicators can be made reference to Huang (2021).

The Analysis of Industrial Association and Spatial Synergy Co-Agglomeration Between Jiangxi Producer Services and Manufacturing Industries

Theoretically, the industrial relationship between producer services and manufacturing industries is closer, the spatial distribution of their industries is closer in geographical position, which reflects a higher degree of industrial spatial synergy co-agglomeration. Based on the data of industrial association and industrial spatial co-agglomeration of Jiangxi producer services and manufacturing industries measured by this paper, it investigates the industrial collaborative development of Jiangxi producer services and manufacturing industries by using the relationship quadrant distribution diagram. The specific analysis idea is to match the industrial association combinations of producer services and manufacturing industries with the industrial spatial co-agglomeration combinations. There are 372 pairs of industrial combination points, which are distributed in the industrial-spatial four-quadrant scatter distribution map of Jiangxi producer services and manufacturing industry, which takes the standardized industrial spatial co-agglomeration degree as the horizontal axis and the

standardized industrial association degree as the vertical axis and the "0" scale as the origin of coordinates. These combination points are shown in Figure 1.

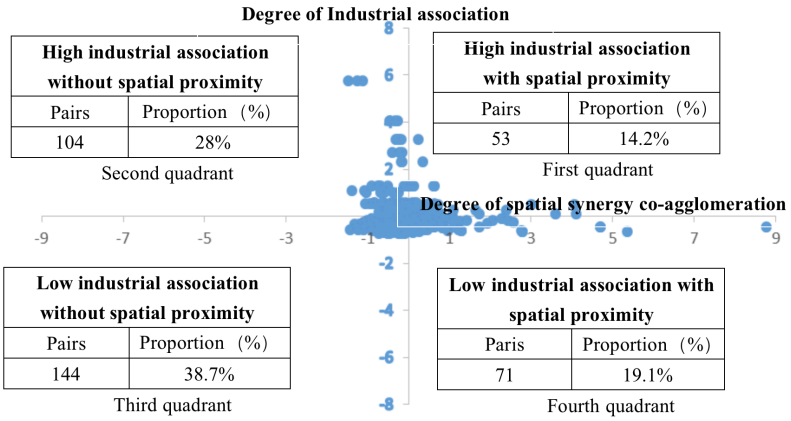


Figure 1. Industrial-spatial four-quadrant scatter distribution map of producer services and manufacturing industries in Jiangxi Province

In Figure 1, 372 pairs of combined data of industrial association and industrial spatial synergy co-agglomeration between Jiangxi producer services and manufacturing industries are distributed in four quadrants. According to the characteristics of these four quadrants, this paper divides the industrial synergy between Jiangxi producer services and manufacturing industries into four types such as "high industrial association-high spatial co-agglomeration", "high industrial association-low spatial co-agglomeration", "low industrial association-low spatial co-agglomeration" and "low industrial correlation-high space co-agglomeration".

In the first quadrant, there are 53 pairs of industrial combinations with high industrial association and high spatial co-agglomeration, which are accounting for 14.2% of the total industrial combinations. By counting the frequency of various industries in the industrial combinations, it is found that the producer services such as warehousing, postal services, research and experimental development, professional and technical services, business services and finance which appear frequently. While capital and technology-intensive manufacturing industries such as printing and recording media reproduction, pharmaceutical manufacturing, computer, communication and other electronic equipment manufacturing which appear frequently. It can be seen that the main reason for promoting the economic association and spatial proximity of these industries is that these industries have a relatively close input-output relationship. These industries can reduce the production and management costs of enterprises and promote industrial development through the advantages of labor pool, transportation cost, capital advantage and knowledge sharing caused by industrial spatial co-agglomeration.

In the second quadrant, there are 104 pairs of industrial combinations with high industrial association and low spatial synergy co-agglomeration, which are accounting for 28% of the total industrial combinations. Among the 104 pairs of industries combinations, the producer services such as transportation, science and technology popularization and application services, postal services, warehousing, leasing, finance and professional technical services, which appear frequently. While the capital and technology-intensive manufacturing industries such as paper and paper products, culture, education, industry and beauty, sports and entertainment products manufacturing, chemical raw materials and chemical products manufacturing, chemical fiber manufacturing,

which appear frequently. Although there is a close economic relationship between producer services and manufacturing industries in this quadrant, the spatial distribution of these industries is scattered because of the higher cost of factors of spatial agglomeration.

In the third quadrant, there are 144 pairs of industrial combinations, which are accounting for 38.7% of the total industrial combinations. The industrial combinations located in this quadrant lacks industrial and spatial correlation.

In the fourth quadrant, there are 71 pairs of industrial combinations, which are accounting for 19.1% of the total industrial combinations. Among the 71 pairs of industries combinations, the producer services such as software and information technology services, telecommunications, radio and television and satellite transmission services, Internet and related services, business services and finance, which appear frequently. At the same time, capital and technology-intensive manufacturing industries such as general equipment manufacturing, automobile manufacturing, railway, shipbuilding, aerospace and other transportation equipment manufacturing, special equipment manufacturing, computer, communication and other electronic equipment manufacturing, metal products industry, which appear frequently. And labor-intensive manufacturing industries such as tobacco products industry, textile and garment industry, clothing industry, food manufacturing industry and agricultural and sideline food processing industry, which appear frequently. In this quadrant, producer services and manufacturing industries have stronger spatial co-agglomeration effect and weaker industrial association effect. According to the external economic theory of industrial spatial co-agglomeration developed by Marshall's (1920), it can be known that producer services and manufacturing industries located in this region mainly benefit from knowledge spillover and labor pool in production, operation and management activities.

Conclusions and Suggestions

This paper combines the industrial association and spatial co-agglomeration of producer services and manufacturing industries in Jiangxi Province, and analyzes the spatial distribution of producer services and manufacturing industries in four quadrants by measuring the industrial association and spatial co-agglomeration degrees of producer services and manufacturing industries in Jiangxi Province. It is found that the industrial combinations with high industrial association and high spatial co-agglomeration, and the industrial combinations with low industrial association and high spatial co-agglomeration are accounting for a low proportion. while the industrial combinations with low industrial association and low spatial co-agglomeration and the industrial combinations with high industrial association and low spatial co-agglomeration are accounting for a higher proportion.

Therefore, in order to promote the coordinated development of producer services and manufacturing industries in Jiangxi, it is necessary to strengthen the industrial spatial layout with strong industrial relevance.On the one hand, it is necessary to promote enterprises with strong industrial relevance to make good use of the external economy brought about by industrial spatial co-agglomeration, share knowledge and labor pool, and reduce operating costs, in order to form a benign interactive situation. On the other hand, it is necessary to accelerate the transformation of traditional manufacturing industries and improve the industrial relevance between producer services and manufacturing industries, and promote industries to play a greater role in spatial

co-agglomeration, and enhance regional industrial competitiveness.

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