

# Evaluation of Auto Parts Industry Cluster in Jiangxi Province

Hui Chen and You-yuan Wang

**Abstract** The formation of industrial clusters to strengthen the contact each enterprise in the cluster and reduce transaction cost. Auto parts industry cluster is new power of the development of the auto industry. Industrial cluster competition will effectively promote the development of auto industry. In this paper, combining with the basic theory of industrial cluster, evaluation on the auto parts industry cluster in Jiangxi province by using the geographic concentration index of industrial cluster, then gives some countermeasures.

**Keywords** Auto parts • Geographic concentration • Industrial cluster

## 1 Introduction

The formation of industrial cluster will strengthen the relationship all related enterprise, reduce the cooperation between the various costs. Industrial cluster is drive regional growth engine [1]. Industrial cluster is beneficial to form regional innovation system, improve the regional competitive advantage and promote regional economic development [2]. Industrial cluster development pull function on the regional economic growth can be achieved by improving the enterprise's productivity and optimize the allocation of resources.

Chinese auto parts industry cluster in got great development in recent years, however, compared with foreign counterparts, there are big gap. As the demand for cars and car production is growing, also in the rapidly growing demand for auto parts, but the core components depends heavily on foreign imports. According to

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customs statistics, foreign brand market share accounted for about 70 %. Foreign brands are dominant position in the high-end market [3].

Independent components of enterprise manufacturing capacity 90 % were focused on the parts of the low-end products, only 10 % of the enterprises producing high technology content of components in the domestic auto parts market, But the most part this 10 % of high-end, is also the foreign joint venture production [4]. Low technology content and low profit of low-end products for the domestic auto parts industry is hard to get fast development. Most building or have built auto parts industry cluster are in low stage of development, product added value is not high in China [5]. Domestic scholars believe that the evolution of the industrial cluster and the cluster there are inverted u-shaped relationship between [6]. Cluster development is divided into four stages: the early stage, the rapid growth stage, the steady development stage and decline stage.

Automobile industry cluster has developed to a certain period, but, as with other domestic industry, it is difficult to achieve breakthrough in Jiangxi province. Now, analyze the present situation of auto parts industry cluster in Jiangxi province to determine the stage of development, found the problem, and prompt improvement. Making full use of the unique advantages in Jiangxi province, developing the auto parts industry, makes it the power to promote the development of economy in Jiangxi province. It is significant to the revitalization and realize the rise of central of Jiangxi province.

## **2 Auto Parts Industry Cluster in Jiangxi Province**

### ***2.1 The Present Situation of the Auto Parts Industry Cluster in Jiangxi Province***

Jiangxi province automobile industry started earlier, it began in the 1950s. Now Jiangxi has grown into the industry cluster area. The Nanchang, Ganzhou, Fuzhou three automobile industry cluster has formed. According to the statistical yearbook analysis in Jiangxi province And after calculation, from 2010 to 2013 the industrial contribution rate are 7.8, 11.4, 12.12 and 17.70 in Jiangxi province automobile industry. Mainly auto parts industry in the rapid development of automobile industry in Jiangxi province, Production of automobile type is more widely, from light, medium to large passenger cars, cars. Automotive market segments have sprung up Quanshun, Lufeng, Changhe and a series of popular models.

In order to take the initiative to adapt to the new normal economic development, in-depth implementation of the five functional areas in Jiangxi province development strategy, based on the new urban development function, firmly seize development does not relax, vigorously promote the new industrialization and urbanization, adhere to the incremental tuning structure, promoting the upgrade with innovation, to speed up cultivating new economic growth point, and strive to create

distinctive modern industrial clusters. After long time of development, the center of Nanchang city XiaoLan accessories parts radiation industry cluster has been initially formed in Jiangxi province another local auto parts industry is a pillar industry.

2.2 Jiangxi Province Auto Parts Industry Cluster Identification

In many of the literature in foreign countries, industrial cluster identification is usually based on location quotient. Wang [7] think regional commercial method can pass the location quotient coefficient to judge whether the regional industrial agglomeration. Location quotient is also called specialization rate, its economic meaning is refers to the industry occupies a share of a given area occupies the share ratio of the industry and the economy as a whole.

Location quotient in between 0.85 and 1.15, the industry location quotient of the coefficient is not significant in statistical sense, can be regarded as equal to 1.

LQ = (X\_{jm} \div X\_m) \div (X\_{jk} \div X\_k) (1)

It is the calculation formula of location quotient, this paper USES the production output value to calculate the coefficient of location quotient. On this equation, *LQ* means Location quotient, *X* means output value, *m* said a region, *k* said a national region, *j* said the industry, *X<sub>jm</sub>* represents the output value of a certain area industry, *X<sub>m</sub>* means one regional output value, *X<sub>jk</sub>* means the production value of *k* national *j* industry, *X<sub>k</sub>* means *k* country's total output value.

Identify the auto parts industry cluster in Jiangxi province by location of commercial. To this end, we choose nine auto industry development mature provinces, location quotient coefficient calculated using the formula (1), then compared with Jiangxi province. Refer to obtain ‘China statistical yearbook 2014’ and the provincial statistical yearbooks data and calculation. The following Table 1

Table 1 Part domestic province automobile industry cluster coefficient of location quotient in 2014 [8]

Number	Region	LQ
1	Beijing	2.431238704
2	Liaoning	1.53467411
3	Shanghai	3.278786355
4	Jiangsu	1.413301243
5	Zhejiang	0.89686092
6	Shandong	1.470377792
7	Hubei	2.944260467
8	Guangdong	1.098215417
9	Chongqing	3.450335155
10	Jiangxi	0.849994927

According to Table 1: the location quotient coefficient of Zhejiang, Guangdong and Jiangxi are small, between 0.85 and 1.15, no significant in statistical sense. The gap is bigger in Jiangxi province and other provinces. In other parts of the industrial cluster has formed, but Industrial cluster is not obvious in Jiangxi province. It means that the automobile industry cluster development in the region has yet to mature, It needs to further promote the development of cluster.

### 3 Evaluation of Auto Part Industry Cluster Concentration in Jiangxi Province

#### 3.1 Evaluation Method

Scholar Krugman On the basis of the average degree of Lorenz curve in measuring distribution, many empirical studies of industrial concentration degree and theoretical method to measure the degree of equity of distribution, He has done a lot of empirical research on industrial agglomeration [9]. But Ellision and Glaeser [10] point out the defects of Spatial Gini coefficient. He thinks that when the space Gini coefficient is lager than zero, there is not necessarily the phenomenon of industrial cluster. Because it was not considered that account the scale of the enterprise and regional differences may be said there is a deviation on the degree of industrial concentration.

To solve the defect of space Gini coefficient, Ellision and Glaeser [10] built industrial geographic concentration index to measure the degree of industrial geographic concentration, It is calculation formula.

$$\gamma = \frac{\sum_{i=1}^M (S_i - X_i)^2 - (1 - \sum_{i=1}^M X_i^2)H}{(1 - \sum_i X_i^2)(1 - H)} \quad (2)$$

$$H = \sum_{j=1}^N Z_j^2 = \sum_{j=1}^N \left( \frac{X_j}{X} \right)^2 \quad (3)$$

Formula (3) means that there were  $N$  enterprises in the industry in one economic entity, The economy is divided into  $M$  a geographical area, the  $N$  enterprise distribution in  $M$  area.  $S_i$  means that  $i$  output value of the regional industry accounted for the proportion of the full value of the industry.  $X_i$  means  $i$  the full value of the area proportion of the total output value of economy.  $H$  is Hector fender index,  $X_j$  means  $j$  enterprise scale,  $X$  represents the total market size, what  $Z_j$  had represented the first  $j$  enterprise's market share,  $N$  is the number of companies within the industry.

3.2 Auto Parts Industry Cluster Concentration Calculation

Refer to obtain ‘China statistical yearbook 2014’, ‘China automotive industry yearbook 2014’ and the provincial statistical yearbooks data and calculation. The following Table 2.

Based on Ref. [11] method to calculate H. Computation formula is as follows:

$$H = \left(\frac{b}{a} * \frac{1}{Y}\right)^2 * a \tag{4}$$

The *b* on behalf of the regional industry output value. A is the number of companies in this area. *Y* represents the industry output value.

According to the data in Table 2, after get H value was calculated by the formula (4), Industrial geographic concentration index was calculated by the formula (2). The following Table 3:

If the industrial geographic concentration index is higher, the concentration of industrial clusters would be greater. It can be seen from Table 3 that automotive industrial geographic concentration index is higher, the industry cluster development more mature in Shanghai and Hubei. Zhejiang and Jiangxi’s geographic concentration index is low, industrial cluster has not yet ripe. Compared with other provinces and cities who’s auto industry development more ripe, the number of automobile enterprises, enterprise scale is a gap. But, the car industry has a greater contribution to Jiangxi economic development indeed. The development of the auto parts industry cluster will be an opportunity to accelerate economic development in Jiangxi.

Table 2 Automobile industry related date and parts in the whole country in 2014

Number	Region	Auto industry output value (\$ten thousand RMB)	GDP(One hundred million RMB)	The number of the car industry enterprises
1	China	392,254,000	568,845.20	11599
2	Beijing	32,692,487	19,500.56	216
3	Liaoning	28,655,000	27,077.65	433
4	Shanghai	48,840,800	21,602.12	554
5	Jiangsu	57,656,600	59,161.75	1305
6	Zhejiang	23,233,900	37,568.49	1623
7	Shandong	55,445,347	54,684.33	1301
8	Hubei	50,083,200	24,668.49	1306
9	Guangdong	47,076,000	62,163.97	620
10	Chongqing	30,113,047	12,656.69	678
11	Jiangxi	8,404,141	14,338.50	176

**Table 3** Parts industrial geographic concentration index in 2014

Number	Region	$\gamma$
1	Beijing	0.002378049
2	Liaoning	0.000636911
3	Shanghai	0.007471832
4	Jiangsu	0.001851361
5	Zhejiang	0.000044440
6	Shandong	0.002048454
7	Hubei	0.007109956
8	Guangdong	0.000093362
9	Chongqing	0.002965177
10	Jiangxi	0.000011697

#### 4 Countemeasures

According to current situation of auto parts industry cluster development in Jiangxi province, we put forward the following suggestions:

1. Auto parts enterprises need enhance effective cooperation through clusters and other enterprises and research institutions to protect its market competitiveness of products and services. A cluster is a good platform for communication between enterprises. The cooperation and exchanges between enterprises and research institutions can promote and improve product and service quality, and further promote the automotive parts industry matures, constitute a virtuous circle.
2. Colleges and universities and research institutions can learn more about auto industry development needs in production practice. It will be more convenient to access to the application of scientific research resources, and enhance the level of industry from technical angle, so as to achieve a competitive advantage in the auto parts industry in Jiangxi.
3. Government's departments can promote the characteristics of the local economy can be formed in the region, with car brand advantage to attract more investment. From the data we can see that the number of auto parts enterprises there is a gap in Jiangxi province and the scale of the automobile industry in the more developed provinces, which requires the joint efforts of the government and the market.

#### 5 Conclusion

Jiangxi Province should actively promote the development of industrial clusters. Cluster strategy can unite competitive enterprises, the formation of key industries, the use of the relevant departments and growth opportunities in sectors of the

economy, is conducive to the region's ability stark features, core strengths and radiation strength, attracting all kinds of investment, business and professional talent to embody the province open clusters, automobile network forms of organization. Jiangxi province for various actors in the cluster network has enough power to participate in the cooperation in the cluster. We should seize the opportunity to promote Jiangxi Province Poyang Lake Ecological Economic Zone and the rapid development of the automotive industry and accelerate the cluster development of auto parts industry in Jiangxi Province, Jiangxi Province to promote the realization of economic takeoff.

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