

USING VALUE-ADDED HIERARCHY METHOD  
TO ANALYZE INDUSTRIAL SPATIAL PATTERN  
IN THE BACKGROUND OF ECONOMIC  
TRANSITION -- A CASE OF GUANZHONG PLAIN  
URBAN CLUSTER IN CHINA

XueYan Wang<sup>1</sup>, YeYuan Zhou<sup>2</sup>

<sup>1</sup>College of Architecture and Urban Planning, Tongji University, 501332552@qq.com

<sup>2</sup> College of Architecture and Urban Planning, Tongji University, 913525267@qq.com

**Abstract:** The "Belt and Road" strategy shoulders the important mission of promoting economic transition among nations and regions. The Guanzhong Plain urban cluster, located in the inland center of China, is an important gateway to the western region. The industrial division of Guanzhong Plain urban cluster will be conducive to further promoting the economic network along the "Belt and Road". In 2018, the "Guanzhong Plain Urban Cluster Development Plan (2017-2035)" and the implementation plans of three provinces were compiled to define the industrial division mainly based on the geographical proximity. This paper probes into the rationality of industrial spatial pattern of Guanzhong Plain urban cluster in the perspective of urban division and cooperation. By the statistical data of 11 cities related in the Guanzhong Plain urban cluster in 2017, the research divides all cities into five categories by using the method of value-added hierarchy, reveals the characteristics of industrial spatial pattern, and compares the industrial policies and position defined in the relevant plans. The result finds that the planning does not take the current advantages of industries and urban characteristics into account. Based on this, the paper put forward some optimization suggestions to coordinate development and promote the economic construction.

**Keywords:** economic transition; industrial spatial pattern; value-added hierarchy; Guanzhong Plain urban cluster

## 1. Introduction

In the report of "the Nineteenth National Congress", Xi Jinping pointed out the strategy of coordinated regional development. In November 2018, the "Opinions of the Central Committee of the CPC and the State Council on Establishing a New Mechanism for More Effective Regional Harmonious Development" put forward the idea of establishing a new mode of urban cluster development which is led by central cities and promote regional development, in order to promote the integration between regions. It can be seen that the urban cluster is of great significance in the regional coordination strategy, and it can achieve the optimal allocation of resources and enhance the leading role of radiation in a wider range. The "Belt and Road" strategy in China shoulders an important mission to promote economic transition among nations and regions. The latest rising urban cluster, Guanzhong Plain urban cluster, is the starting point of the ancient Silk Road, giving full play to its geographical advantages of connecting the East with the West and connecting the North and the South, which is conducive to

leading and promoting the development and opening up of the northwest area, optimizing the radiation effect of the urban cluster in the western region, and promoting the construction of the “Belt and Road”.

This paper discusses the industrial spatial pattern of urban cluster and takes the Guanzhong Plain urban cluster as an example. It compares and analyses the current industrial spatial pattern and related industrial planning requirements by using the method of value-added hierarchy and explores the rationality of industrial layout policy in the urban cluster development planning and tries to put forward optimization suggestions.

## 2. Research Basis and Background

### 2.1 Theoretical basis

Under the background of economic globalization, capital, technology, human resources and other factors of production flow around the world, resulting in the transformation of the spatial economic structure from “*industrial chain*” to “*value chain*”. Through different but interrelated production and operation activities, enterprises constitute a dynamic process of value creation (Fujita M. Krugman P. and Venables A. J. 1999). Logitech's “*Smiling Face value chain*” is just a typical case, in which research and development (R&D), assembly, marketing, management and other behaviors cooperate in the value chain. These behaviors are scattered in different enterprises in different places, and the final production is distributed in various intermediary behaviors in different enterprises (Henderson, J.V. 1974). Value-added hierarchy is the link that produces different values in the value chain.

In the world urban system made by the international labor division of transnational corporations, the horizontal spatial economic structure characterized by “*industry sector*” is changing into the vertical spatial economic structure characterized by “*value sector*”, forming an obvious hierarchical system based on value sector. In the global production network, cities are located in different value zones of international labor division, thus forming a world urban system characterized by “*value zones*”.

By using the method of “*value-added hierarchy*”, Zilai Tang investigates the evolution characteristics of urban system in the Yangtze River Delta urban cluster and analyses the evolution of industrial structure in different regions. Then some scholars do the research of the advantages and disadvantages of the value sections of Jing-jin-ji urban cluster, Yangtze River Delta urban cluster, Pearl River Delta urban cluster and some other urban clusters.

### 2.2 Background of Urban Cluster Development

Guanzhong Plain urban cluster is the latest national-level urban cluster proposed now in China. It is an important gateway to the western region and an important fulcrum of the Eurasian Continental Bridge. It has a unique strategic position in the pattern of modernization and all-round opening up. The construction background of the “Belt and Road” has promoted the important role of Guanzhong Plain urban cluster in coordinating regional development in economic globalization. Therefore, it is necessary to apply scientific method to analyze its industrial spatial pattern, so as to explore the optimization of relevant industrial planning requirements.

Guanzhong Plain urban cluster radiates outward from Xi'an as the center and is the second largest urban cluster in the western region. It is positioned as a national-level urban cluster with international influence and a new highland of inland reform and opening up. According to the actual development, Guanzhong Plain urban cluster is not bounded by the administrative scope of prefecture-level cities. The specific scope is shown in the table below (Table1). The total land area is 107,100 square kilometers.

Shaanxi Province		Shanxi Province		Gansu Province		
Xi'an, Baoji, Xianyang, Tongchuan, Weinan, Yangling demonstration zone	Shangluo	Yuncheng	Linfen	Tianshui	Pingliang	Qingyang
	Shangzhou District, Luonan County, Danfeng County and Zhashui County	Except Pinglu County and Yuanqu County	Yaodu District, Houma City, Xiangfen County, Huozhou City, Quwo County, Yicheng County, Hongdong County and Fushan County		Kongtong District, Huating County, Jingchuan County, Chongxin County and Lingtai County	Qingyang urban area

Table1: Scope of Guanzhong Plain urban cluster (source: author sort out according to the Planning)

### 3. Industrial Spatial Pattern of Guanzhong Plain Urban Cluster

#### 3.1 Statistics of industrial data

This paper uses the analysis method of industrial value-added hierarchy proposed by Tang Zilai and other scholars for reference. The first thing is to do the statistics of industrial data of Guanzhong Plain urban cluster.

Statistical objects are 5 prefecture-level cities (Xi'an, Baoji, Xianyang, Tongchuan and Weinan) in Shaanxi Province and 6 prefecture-level cities (Shangluo City, Yuncheng City, Linfen City, Tianshui City, Pingliang City, Qingyang City) where more than 20 districts and counties are located in three provinces in Guanzhong Plain urban cluster planning scope (Figure1).

It should be noted that: 1) The use of prefecture-level cities as research units takes into account the consistency of statistical caliber and the availability of data.; 2) Yangling Demonstration Area in Shaanxi Province was originally located in Xianyang City. It was in 1997 a national agricultural high-tech demonstration area was set up independently there so that it has become a prefecture-level city. But its total economic volume is relatively low, so it is classified into Xianyang City in statistics. 3) The data are selected from the statistical yearbook of cities in 2017(i.e. data of year 2016), which is also the base year of the “*Guanzhong Plain Urban Cluster Development Planning (2017-2035)*” (Hereinafter referred to as “*the Planning*”).



Figure1: Planning boundary of Guanzhong Plain urban cluster and administrative boundary of 11 prefecture-level cities (source: author draw according to “the Planning”)

Drawing on the classification method of industrial types (Tang Zilai, 2010), the industrial types are divided into eight sectors (Table2). Among them: the construction industry has its particularity and is generally not considered; cities with a large proportion of mining industry accounts for other industrial categories are considered separately as special types. The ranking of the six industrial sectors included in the classification ranges from low to high is: agriculture, other services, labor-intensive manufacturing, capital-intensive manufacturing, technology-intensive manufacturing and producer services.

Industry	Industry sectors	Classification of National Economic Industries	
<b>Primary industry</b>	Agriculture	Agriculture, forestry, animal husbandry and sideline Fisheries .	
<b>Secondary industry</b>	Manufacturing industry	Labor-intensive Manufacturing Industry	Agricultural and sideline food processing industry, food manufacturing industry, textile industry, textile and apparel, shoes and hats manufacturing industry, leather, fur, feather and its products and shoes manufacturing industry, wood processing and wood, bamboo, road, brown and straw products industry, furniture manufacturing industry, paper and paper products industry, printing and record media reproduction, cultural and educational sports goods manufacturing industry, rubber products industry, plastic products industry, non- Metal Mineral Products industry, Metal Products industry
		Capital-intensive Manufacturing Industry	Beverage Manufacturing, Tobacco industry, Petroleum Processing industry, Coking and Nuclear Fuel Processing industry, Chemical Raw Materials and Chemical Products Manufacturing, Chemical Fiber Manufacturing, Black Metal Smelting and Calendering industry, Nonferrous Metal Smelting and Calendering industry, General Equipment Manufacturing, Special Equipment Manufacturing, Transportation Equipment Manufacturing
		Technology-intensive Manufacturing Industry	Pharmaceutical Manufacturing, Communication Equipment, Computer and Other Electronic Equipment Manufacturing, Instrument and Instrument Manufacturing, Culture and Office Machinery Manufacturing
	Other industries	Petroleum and natural gas mining industry, power and thermal production and supply industry, gas production and supply industry, water production and supply industry, non-metallic mineral mining and dressing industry, non-ferrous metal mining and dressing industry, coal mining and dressing industry, ferrous metal mining and dressing industry, and other mining industries	
	Construction business	Construction business	
<b>Tertiary industry</b>	Productive Services	Financial insurance, real estate, leasing and business services, information transmission, software and information technology services, scientific research and technology services, water conservancy, environment and public facilities management	
	Other services	Agriculture, forestry, animal husbandry and fishery services, transportation, storage and postal services, information transmission, computer services and software industries, wholesale and retail businesses, accommodation and catering industries, residential services and other services, education, health, social security and social welfare industries, culture, sports and entertainment industries, public administration and social organizations	

Table2: 8 Industry sectors based on value-added hierarchy (source: according to Tang Zilai, 2010)

According to statistics, the proportion of added value of six major industrial sectors in the gross domestic product of each city is obtained. (Table3)

Province	City	Agriculture	Other services	Labor-intensive Manufacturing Industry	Capital-intensive Manufacturing Industry	Technology-intensive Manufacturing Industry	Productive Services	GDP (¥100 million)
Gansu Province	Qing	14.2%	25.9%	0.4%	16.5%	0.1%	9.6%	598
	Pingl	28.1%	30.4%	18.2%	1.6%	4.6%	16.7%	367
	Tians	16.8%	38.8%	1.4%	8.0%	4.9%	11.3%	590
Shaanxi Province	Baoji	8.9%	19.6%	11.1%	11.8%	2.6%	7.6%	1932
	Xian	14.4%	18.6%	18.2%	12.0%	4.8%	8.1%	2396
	Tong	7.7%	27.2%	23.7%	4.2%	2.6%	11.9%	312
	Xi'an	3.7%	42.0%	2.4%	8.4%	7.7%	18.9%	6257
	Wein	15.1%	28.6%	8.7%	9.5%	2.4%	10.1%	1489
	Shan	13.9%	24.7%	12.9%	1.2%	6.9%	7.9%	699
Shanxi Province	Yunc	16.4%	32.3%	3.0%	7.1%	4.8%	13.4%	1222
	Linfe	8.0%	29.8%	-0.5%	-5.8%	0.1%	15.5%	1205

Table3: Statistics of the proportion of added value to GDP (source: author)

### 3.2 Analysis of value-added hierarchy

#### 3.2.1 Data-based Urban Classification Analysis

Using SPSS software to cluster the data of the proportion of added value to GDP of six major industries in each city, the results of urban classification are obtained (Table4).

Type	City
Type 1	Xi'an
Type 2	Shangluo
Type 3	Qingyang, Baoji and Yuncheng
Type 4	Xianyang, Tongchuan and Weinan
Type 5	Pingliang, Tianshui
Special Type	Linfen

Table4: Cluster analysis and classification results (source: author)

Then, using the statistical method of mean deviation from standard deviation (STD) multiple, the value segments of various cities are characterized by the 'eigenvalue T'. The calculation method of industrial 'eigenvalue T' for each region is shown in formula (1). Among them, 'x' is the average of the proportion of added value of certain industry in GDP of a certain type of city, ' $\bar{x}$ ' is the average of the proportion of industry added value in each type of city, and STD is the standard deviation of the proportion of industry added value in each type of city. If the

eigenvalue of the ‘m-sector’ in the ‘type-n city’ is greater than 1, then the ‘m-sector’ has obvious characteristics in the ‘type-n city’.

$$T = \frac{x - \bar{x}}{STD} \quad (1)$$

According to the statistics and calculation results of 2016 (Table5), the division of urban industry characterized by value-added hierarchy in Guanzhong Plain urban cluster has been formed, but it is not significant yet.

Type	Agriculture	Other Services	Labor-intensive Manufacturing Industry	Capital-intensive Manufacturing Industry	Technology-intensive Manufacturing Industry	Productive Services	* Other industries
Type 1 (Xi'an)	-1.50	1.51	-0.79	0.26	1.58	1.62	-0.69
Type 2 (Shangluo)	0.08	0.31	0.46	-0.90	1.26	-0.10	0.01
Type 3 (Qingyang, Baoji, Yuncheng)	-0.03	-0.42	-0.50	0.81	-0.51	0.46	0.46
Type 4 (Xianyang, Tongchuan, Weinan)	-0.15	-0.58	0.93	0.29	-0.21	-0.49	-0.09
Type 5 (Pingliang, Tianshui)	1.40	0.80	0.09	-0.32	0.41	0.55	-1.28
*Special Type (Linfen)	-0.84	0.12	-1.14	-2.03	-1.50	0.95	2.14

Table5: Calculations of the eigenvalues of five types of cities (source: author)

Type 1 cities: There is only Xi'an in this type, which shows the obvious characteristics of technology-intensive manufacturing, producer services and other services (deviating more than one-fold).

Type 2 cities: Shangluo is in this type, whose technology-intensive manufacturing industry is significant, and other services and labor-intensive services are higher than the regional average.

Type3 cities: Qingyang, Baoji and Yuncheng in this type, whose various sectors are not obvious, only capital-intensive. The concentration type is relatively high (0.81 times deviation from the average).

Type 4 cities: Xianyang, Tongchuan and Weinan, each of which is not obvious, and the labor-intensive manufacturing industry is close to one-fold deviation (0.93).

Type 5 cities: Pingliang and Tianshui, and their agricultural ministries are significant, while the two types of services are higher than the average by more than 0.5 times.

It is worth noting that Linfen's manufacturing industry characteristic value is less than - 1, which shows the weakness of manufacturing industry in the region is very significant. However, Linfen's other industrial ministries are very significant (deviating more than two times), and the obvious characteristic is that it's a resource-based

city depending on the development of mineral mining industry, which should be taken into account in industrial planning.

### 3.2.2 Spatial Analysis Based on Urban Classification

The spatial distribution characteristics of the 5 types of cities can be observed when they fall into space (Figure2):

On the whole, it presents a circle model with Xi'an as the center. The core circle of Xi'an service industry and high-end manufacturing industry occupies the first place in the region.

Xianyang, Tongchuan and Weinan, which are close to Xi'an, are the second circle, and are all type 4 cities where the lower-end manufacturing industry, labor-intensive manufacturing industry, is more prominent. These cities rely on the location advantages of neighboring Xi'an and the convenience transportation network around Xi'an. So they have gathered a large number of labor-intensive enterprises.

The third circle composed of Qingyang, Baoji, Yuncheng and Shangluo, which belongs to type2 or type3 cities, with prominent middle and high-end manufacturing industries. These cities are often rich in oil and gas mineral resources (Qingyang is rich in oil, Baoji and Yuncheng are rich in non-metallic minerals), which have resource advantages for the development of capital-intensive manufacturing industries.

It is the fourth circle composed of Tianshui, Pingliang and Linfen. In this circle, Pingliang and Tianshui have limited mineral resources, mainly agriculture and low industrial value, while Linfen presents the phenomenon of excessively single industrial structure that other industrial sector is abnormally prominent and the manufacturing level is far behind the regional average.



Figure2: Industrial pattern of Guanzhong plain urban cluster based on value-added hierarchy (source:author)

### 3.3 Summary

Based on the analysis of the current situation of 11 prefecture-level cities based on industrial data, the five-level classification of cities is obtained, and the industrial value section of urban cluster is interpreted as a circle structure in space. It is found that the surrounding cities of Xi'an develop low-end manufacturing mainly by means of resource adsorbing power of core cities, and the cities farther away from Xi'an develop capital-intensive manufacturing, agriculture or other industries mainly by means of local resources. The industrial division system between cities is more obvious, and the industrial spatial pattern has taken shape preliminarily.

## 4. Comparison of Industry Orientation and Current Situation

### 4.1 Planning interpretation

In February 2018, the National Development and Reform Commission approved “the *Guanzhong Plain Urban Cluster Development Planning (2017-2035)*” (hereinafter referred to as *the Planning*). The Planning period lasts until 2035. The spatial layout and industrial system of Guanzhong Plain urban cluster are clearly defined in “*the Planning*”: Taking the construction of National Central City and regional key node city, Xi'an, as the carrier to accelerate the development axis and growth pole and build the overall pattern of ‘one circle, one axis and three belts’ (Figure3). And build an important base of advanced manufacturing industry, strategic emerging industries and modern service industry in China, promote the industry from the low end of the value chain to the high end, and promote the development of northwest and surrounding areas by radiation. While deepening the core functions of Xi'an, it also emphasizes accelerating the development of regional coordination.



Figure3: Spatial pattern of Guanzhong Plain urban cluster (source: translate according to the *Guanzhong Plain Urban Cluster Development Planning*)

With the development of Guanzhong Plain urban cluster rising to national strategy, Shaanxi Province, Shanxi Province, Gansu Province have also issued Implementation Planning to further clarifying the industrial positioning

and planning requirements of each city. According to the related description of the planned industrial positioning, the author sums up the cities' industry sector according to the leading industry function of each city. (Table6)

Province	City	Industry Sector
Gansu Province	Qingyang	Agriculture
	Pingliang	Capital-intensive Manufacturing Industry
	Tianshui	Other services
Shaanxi Province	Baoji	Productive Services
	Xianyang	Other industries
	Tongchuan	Labor-intensive Manufacturing Industry
	Xi'an	Productive Services
	Weinan	Other industries
	Shangluo	Agriculture
Shanxi Province	Yuncheng	Other industries
	Linfen	Other industries

Table6: Industrial sector of cities in Guanzhong Plain urban cluster (source:author)

According to “the Planning” and the implementation schemes of Shaanxi, Shanxi and Gansu Provinces, as well as the industrial sectors summed up before, the urban classification of the planning is obtained. (Table7)

Type	City
Type 1	Xi'an
Type 2	Baoji
Type 3	Yuncheng, Tianshui
Type 4	Xianyang, Weinan, Tongchuan, Pingliang and Linfen
Type 5	Qingyang, Shangluo

Table7: Urban classification under relevant planning oindustry requirements (source:author)

## 4.2 spatial analysis

Based on the above-mentioned planning interpretation of industrial system and urban classification, return the classification to the space, and it is found that the pattern centered on Xi'an is still obvious, but the regional industrial system presents a distinct banded structure (Figure4). Compared with the current spatial pattern of Guanzhong Plain urban cluster (Figure3), the overlap degree between industrial division of labor among cities and the main axis of regional development is relatively high, especially in the western section from Xi'an to Tianshui, which is obviously higher than that of surrounding cities and decreases in a ladder shape. On the one hand, such a zonal industrial structure is conducive to the division of labor and dislocation between cities, and to the formation of a spatial economic structure characterized by value-added hierarchy with good "political rationality"; on the other hand, the subjective interference of such zonal structure is intense, and whether it has "technological rationality" is worth further verification.



Figure4: Industrial pattern of Guanzhong Plain urban cluster based on “the Planning”(source:author)

### 4.3 Discussion on the Rationality of Orientational Industrial Spatial Pattern

#### 4.3.1 Type1 City

According to the relevant planning interpretation, only one city in Xi'an is a first-class city. Its current situation has the advantages of high value sector industry department, and its future leading position in the development of urban cluster industry can be maintained. (Figures5 and 6)



Figure5: Distribution of eigenvalues of technology-intensive manufacturing industry in 2016 (source:author)

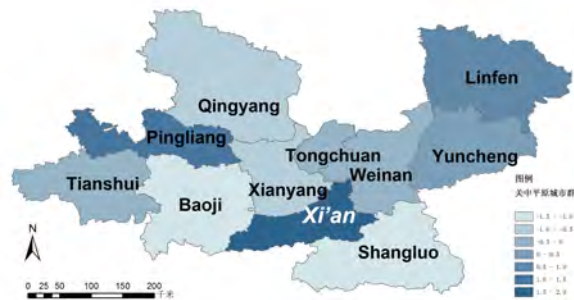


Figure6: Distribution of eigenvalues of productive services in 2016 (source:author)

#### 4.3.2 Type2 City

According to the planning, Baoji is the second type of city in Guanzhong Plain urban cluster. In the planning, Baoji is positioned as a "sub-central city of Guanzhong Plain urban cluster" and a "national comprehensive transportation hub" to develop modern service industry, modern agriculture, automotive parts supporting industries and other productive services and capital-intensive manufacturing industries. According to the author's analysis, the rationality of Baoji's second-class city positioning is insufficient. The reasons lie in:

(1) From the angle of the eigenvalue of industrial sector: the value of its superior industries is relatively low, and capital-intensive manufacturing and labor-intensive manufacturing are higher than the regional average, but not significant (less than 1 times). Therefore, from the point of view of the current industrial structure, Baoji City does not have prominent superior industrial sectors.

(2) From the angle of the Population Growth: Comparing the growth rate of permanent population in Baoji City and Shaanxi Province from 2010 to 2016, we can find that the growth rate of population in Baoji City has been lower than the average of the whole province since 2010, which shows that the current population attraction of the city is low, and the urban agglomeration is insufficient, and it is difficult to support the goal of the sub-center. (Figure7)

(3) From the angle of traffic planning: “The Planning” puts forward the schematic plan of traffic planning for urban cluster at the end of the planning period (Figure8). Compared with Tianshui on the west side of Baoji, only one more general railway is under construction, while Tianshui has a civil airport. Therefore, the target taking Baoji as a national comprehensive transportation hub is too high, which is slightly inappropriate as a second-class city.

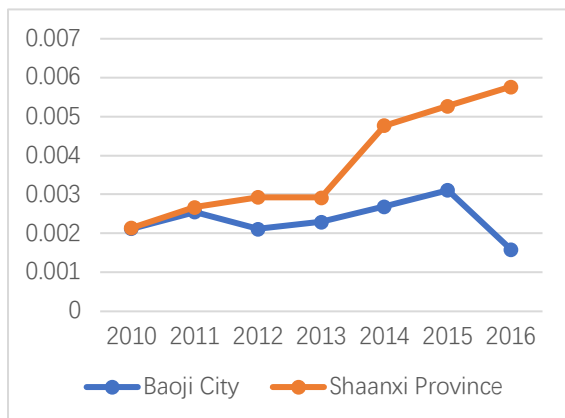


Figure7: Population Growth Rate of Baoji and Shaanxi Province (source: author draw according to the Statistical Yearbook of Shaanxi Province in 2016)



Figure8: The traffic network planning of Guanzhong Plain urban cluster (source: author draw according to “the Planning”)

#### 4.3.3 Type3 City

According to the planning, Yuncheng and Tianshui are the third type of cities in Guanzhong Plain urban cluster. Yuncheng and Tianshui, which belong to Shanxi Province and Gansu Province respectively, are important node cities on the East and west sides of urban agglomeration.

The planning of Yuncheng is reasonable.

The relevant industrial planning of Tianshui requires the development of microelectronics design, electronic information and other industries, and the establishment of national advanced manufacturing and high-tech industry transformation base. These requirements correspond to the technology-intensive manufacturing industry. However, as a national historical and cultural city and an excellent tourist city in China, Tianshui has significant characteristic values of other services (including accommodation, catering and other tourism-related industries). (Figure9) Although agricultural and technology-intensive manufacturing industry is higher than the regional average, it has not become the dominant one. Therefore, it is difficult for Tianshui City to transform into a technology-intensive manufacturing industry in the future.



Figure9: Distribution of eigenvalues of Other Services in Guanzhong Plain urban cluster in 2016 (source: author)



Figure10: Distribution of eigenvalues of Labor-intensive Manufacturing Industry in Guanzhong Plain urban cluster in 2016 (source: author)

#### 4.3.4 Type4 City

According to the planning, the fourth type of cities are Pingliang, Xianyang, Tongchuan, Weinan and Linfen.

Pingliang, Xianyang and Tongchuan have remarkable labor-intensive manufacturing industry, which has a relatively good industrial foundation. It is reasonable to continue to develop manufacturing industry in the future. It is worth noting that these three cities have the same prominent industrial sectors and geographical proximity (Figure10). Consideration should be given to avoiding homogeneous competition. It is suggested that Pingliang, where the current agriculture sector is very significant, should speed up the development of high-quality agriculture in the future.

Weinan's current situation does not show superior industries, and its industrial orientation is also vague, such as "the development of traditional Chinese medicine", "photovoltaic leader base", "circular economy park", "global tourism", involving different types of industry sectors. Therefore, Weinan can consider undertaking the industrial transfer of Xi'an and Yuncheng on both sides of the East and west, and gradually clarify the industrial division in the region in future development.

Linfen is a relatively special. It is a resource-based city with a single industrial structure. Its disadvantage in agriculture and manufacturing is obvious. However, other single industrial sector is outstanding, deviating from the average value by more than two times. Its transformation should gradually change from the situation of over-reliance on resources to the direction of resource-based development of capital-intensive manufacturing. However, the positioning according to the planning has low relation to resources, ignoring its resource endowment. Therefore, the author believes that Linfen's industrial planning should be adjusted appropriately.

#### 4.3.5 Type5 City

According to the planning, the fifth category of cities is Qingyang and Shangluo.

Qingyang has oil and gas resources, and its exploitation and processing technology has been relatively mature, gathering capital-intensive enterprises (Figure 11). Future development should continue to maintain its advantages, and gradually climb to high-value areas. There is a certain degree of irrationality in the development of agricultural by-products in the planning industry.

Shangluo's industrial planning mainly centers on "agricultural product development", "circular economy demonstration area" and "agricultural product quality demonstration area". However, as for Shangluo's current industry, its technology-intensive manufacturing industry has reached a high level in the region (Figure. 5). It

forms a technology-intensive industry cluster area with Xi'an. The planning requires that its industry return to agriculture is counter-trend and unreasonable.



Figure 11: Distribution of eigenvalues of capital-intensive manufacturing industry in Guanzhong Plain urban cluster in 2016 (source: author)

## 5. Comparison of Industry Orientation and Current Situation

Based on the industrial spatial pattern of Guanzhong Plain urban cluster in 2016 and the related industrial positioning requirements, the above discussion finds that the industrial planning has not taken into account the current industries and the characteristics of the city. According to the analysis, the following suggestions are put forward for the industrial development direction of some cities:

- It is suggested that Baoji should focus on the development of capital-intensive manufacturing industry in the near future and clarify the dominant industries.
- It is suggested that Tianshui tap tourism resources to make up for the shortcomings of manufacturing industry with the development of high-quality service industry;
- It is suggested that Pingliang develop high-quality agriculture, combine agriculture with service industry, and avoid falling into the competition of homogenization with labor-intensive manufacturing industry in surrounding cities.
- It is suggested that Linfen attach importance to mineral resources, gradually transform into capital-intensive industries related to mineral processing, and gradually optimize the urban industrial structure.
- It is suggested that Shangluo change its industrial orientation of vigorously promoting agricultural development, respect its manufacturing development status, strive to upgrade the transformation of manufacturing industry and climb to a higher value zone.

The Guanzhong Plain urban cluster is proposed to make use of the urban agglomeration to drive the regional coordinated promote the integration between the regions. At every stage of development, the industrial division system should be suitable for the urban cluster, and the industrial spatial pattern of the region should be clearly defined, so as to better grasp the opportunity of the "The Belt and Road " and promote the development of the western region in the new stage.

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