

Method of Classifying County-Scale Regions according to the Locational Characteristics of the Industrial Bases of County

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Physiographic and economic geographical conditions and the locational potential of industrial bases of the county are crucial factors of considering county development. Therefore types of county-scale regions can be classified according to the locational characteristics of the industrial bases on the basis of these factors.

This paper presents the classification method of county-scale regions according to the locational characteristics of the industrial bases.

This method is based on the principle of analogy evaluation of analogy synthesis analysis. That is, on the basis of calculating the indices for evaluating a certain county, decision is made first on how much the figures are similar to the figures of the classification indices of main types of county-scale regions which had been confirmed in previous calculations, and then which type of county-scale region the county belongs to.

Below is given the calculation procedure [1] and [2].

① Basic data for calculating the figures of main types of county-scale regions according to the locational characteristics of the industrial bases are given.

The data is confirmed by giving marks to the standard figures of main types of county-scale regions (Table 1 and 2).

Table 1. Regional county type

Type	Land height		Average proportion							
			Agricultural region		Forest area		Paddy square		Field square	
	Standard value	Point	Standard value	Point	Standard value	Point	Standard value	Point	Standard value	Point
Mountain area	400≤	1	20%≥	1	60%≤	1	20%≥	1	70%≤	1
Midland area	100~400	2	20~55%	2	26~60%	2	20~60%	2	30~70%	2
Plains	100≥	3	55%≤	3	26%≥	3	60%≤	3	30%≥	3

Table 2. Sectional county type

Type	Number of employees in industrial areas		Number of employees in agriculture areas		Number of distributed industrial bases	
	Standard value	point	Standard value	point	Standard value	point
Industrial	60%≤	3	40%≥	3	4<	3
Industry and agricultural	40~60%	2	40~60%	2	2~3	2
Agricultural	40%≥	1	60%≤	1	1	1

According to the number of employees in mining, processing and local industries, the county is given 3 – 1 points, marks reducing as the percentage decreases. Also, according to the distance to the major industrial sectors and major traffic knots, the county is given 3 – 1 points.

And then, the data types of standard figures are marked as follows:

$$\{x_{ij} | i = \overline{1, 24}, j = \overline{1, 13}\}$$

② The data of the county to be evaluated is calculated.

$$\{x_{ok} | j = \overline{1, 13}\}$$

③ The similarity between evaluation object and main types is calculated as follows:

First, find the remainder (Δ_{ij}) between evaluation object and main type index by index

$$\Delta_{ij} = |x_{ij} - x_{oj}|.$$

Next, find the analogy coefficient of values

$$l_{ij} = \frac{\Delta \min + p \cdot \Delta \max}{\Delta_{ij} + p \cdot \Delta \max}, (i = \overline{1, 24}, j = \overline{1, 13}),$$

where, $\Delta \min = \min_i \min_j \{\Delta_{ij}\}$, $\Delta \max = \max_i \max_j \{\Delta_{ij}\}$; p ; identification coefficient ($0 < p < 1$), it takes the value of 0.5.

Next, find the value of analogy index between evaluation object and main types.

$$r_i = \frac{1}{13} \sum_{j=1}^n l_{ij}, (i = \overline{1, 24})$$

④ It is time to decide on which type the evaluation object belongs to based on r_i .

According to characteristics of the regions, it can add weight to index values of main types.

We applied this method to Region Z.

This region is mountainous with little plain. A county alone has many mountains and the height above sea level fluctuates heavily. There are 18 county-scale areas in this region.

The basic data for calculating the index values of different types of county-scale areas of Region Z is given in Table 3.

Table 3. Basic data for calculating the index values of different types of county-scale areas of Region Z

County	Quantification value of data												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	5.70	91.1	10.2	89.8	2	2	1	1	1	2	3	3
2	3	13.50	80.0	52.3	47.3	3	1	3	3	2	1	1	1
3	2	30.70	55.8	54.0	46.0	2	2	3	3	2	2	2	1
4	2	28.50	57.3	55.1	44.8	2	2	3	2	1	3	2	1
5	3	24.80	67.3	70.3	29.7	1	3	1	1	2	3	2	1
6	3	18.30	74.8	27.7	72.3	3	1	1	1	2	3	2	1

County	Quantification value of data												
	1	2	3	4	5	6	7	8	9	10	11	12	13
7	1	12.40	81.7	43.6	56.4	1	3	1	1	3	2	2	2
8	1	8.30	87.3	27.3	72.7	3	1	2	1	3	2	2	3
9	1	4.10	88.4	0	100.0	2	2	1	1	1	3	3	3
10	1	4.10	93.6	0	100.0	2	2	1	3	1	1	3	3
11	2	14.90	74.1	30.9	69.0	3	1	3	1	3	2	2	1
12	3	32.10	48.4	28.6	71.4	3	1	3	1	3	2	1	1
13	3	24.50	64.9	47.0	53.1	2	2	2	1	2	3	2	2
14	2	6.57	88.7	25.0	75.0	2	2	1	1	3	2	3	1
15	3	18.30	72.7	34.0	66.0	3	1	2	2	3	1	2	1
16	1	4.61	92.6	3.6	96.0	2	2	1	3	1	2	2	2
17	1	9.40	85.5	21.6	78.4	3	1	3	3	2	1	1	1
18	2	13.00	80.0	3.2	96.7	3	1	3	3	1	2	2	1
Weight	0.29	0.011	0.011	0.011	0.011	0.015	0.015	0.015	0.1	0.1	0.1	0.015	0.21

In table 3, the value of indices was calculated using hierarchical analysis method, considering the physiographic and economic conditions and characteristics and the potential of distribution of industrial bases.

And initial values of indices 2 – 5 are given marks according to Table 1 and used in calculation.

As can be seen in the result, County 2 belongs to the second type (seaside plain area where industry is primary and the processing industry is predominant), County 5 belongs to the fifth type (seaside plain area where agriculture is primary and the processing industry is predominant), County 13 belongs to the sixth type (seaside plain area where industry and agriculture are primary and the local industry is predominant) and Counties 11, 12 and 18 belong to the 10th type (midland area where industry is primary and the processing industry is predominant), Counties 3, 4, 6 and 15 to the 13th type (midland area where industry and agriculture is primary and the local industry is predominant), Counties 10 and 16 to the 20th type (mountainous area where industry and agriculture are primary and the processing industry is predominant), County 14 to the 21st type, County 1, 7 – 9 to the 22nd type (mountainous area where industry and agriculture are primary and the local industry is predominant).

Therefore, Region Z can be divided into 9 types of county-scale areas according to the physiographic and economic conditions and its potential, and there is no county where agriculture is the main sector of industry.

This clearly shows the topographical characteristics and distribution of the industry and basis of industrial development, and the present industrial foundation of the county.

Conclusion

This method can be effectively used for evaluating the current state of the county and long-range development trend.

References

- [1] 김영남; 공업배치계획, 김일성종합대학출판사, 127~165, 주체99(2010).
- [2] 陈才; 区域经济地理学, 科学出版社, 64~170, 2009.