Evaluation of Township Competitiveness in China: A Case Study of Zhenjiang City

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Abstract Based on relevant theories about competitiveness, we establish a set of theoretical evaluation indicator system of township competitiveness, in accordance with the township characteristics. We rank 41 towns in Zhenjiang City in terms of comprehensive competitiveness, using factor analysis method and entropy method. Compared with other towns across the country, we find that the township development in all districts (cities) is highly uneven; the township development within urban district of Zhenjiang City is not so rosy; the township features are not prominent; the number and scale of the township enterprises is not enough; individually-run enterprises never get anywhere. Then, the corresponding countermeasures are put forth for the development of agriculture-based towns and industry-based towns: for agricultural town, it should accelerate the development of modern high-efficiency agriculture, develop characteristic agriculture, and promote quality of agricultural products; for industrial town, it can make full use of the advantages in transport and geographical location, consciously draw on the driving role of urban economy, take actions that suit local circumstances to develop characteristic economy, vigorously develop the private economy and export-oriented economy to enrich people, and strengthen the government service function to create efficient government.

Key words Township competitiveness, Factor analysis method, Entropy method, Countermeasures

The Yangtze River Delta, as the world's sixth largest urban agglomeration and China's first largest urban agglomeration, plays an important role in China's economic development. In this important area, 15 core cities have created more than 20% gross domestic product (GDP), using 10.9% of China's population and 2.2% of China's land. It becomes a leading engine of China's rapid economic growth. Zhenjiang City, as one of important central cities in the Yangtze River Delta, has great geographical location advantages, economic and cultural advantages. However, in recent years of development, the urban competitiveness of Zhenjiang City has not stood out like its geographical location. In the context of economic globalization and regional economic integration, Zhenjiang City should seize the opportunity to develop the industrial zone along Yangtze River to drive the dramatic development of entire city, basically achieving modernization and substantial improvement of the urban competitiveness by 2015, which is a very urgent task. Township, as a part of the city, to a certain extent affects the urban social and economic development. Especially since the Twelfth Five-Year Plan, Zhenjiang City has taken the creation of entrepreneurial city as development goal, focused on social and economic development in township, so the research on the township competitiveness will have a huge impact on socio-economic development in Zhenjiang City. Through the evaluation of competitiveness of towns in Zhenjiang City, we find out the shortcomings of Zhenjiang's economic development, and fully understand the status, environment, advantages and shortcomings of each town in Zhenjiang City, so as to adjust the existing competition and development strategies, drive social and economic development in Zhenjiang City on the whole.

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1 Township competitiveness indicator system

1.1 The concept of township competitiveness So far, there are no research institutions or scholars having made a clear definition of township competitiveness, and this study draws on the meaning of urban competitiveness. The majority of scholars so far still diverge on the connotation and concept of "urban competitiveness". Cheshire Cheshire, *et al.* pointed out that urban competitiveness is that a city within its borders can create more income and employment than any other city[1]. Scholar Douglas Webster in Stanford University pointed out that the urban competitiveness is that a city can produce and sell the products better than other cities[2]. The non-trading labor is also an important component of competitiveness. According to the actual situation in China, the domestic scholars add in the factor of society, and conduct in-depth study of urban competitiveness. Ni Pengfei pointed out that urban competitiveness is one city's comparative advantage of the economy, culture, infrastructure, systems and policies in comparison with other cities in the process of development and competition, and its ability to create wealth and value, provide the welfare to the residents[3]. Zhang Jingxiang, *et al.* believe that urban competitiveness is one city's ability to create wealth and promote the region, country or the world to create more economic and social wealth, in comparison with other cities in the domestic and foreign market[4]. Tao Xiaoyan believes that urban competitiveness is one city's ability to attract, compete for, control resources, and carry out optimal allocation and integration of resources in a certain area, reflecting the city's comprehensive

development capacity in economy, society, technology, and environment[5].

In summary, as far as we are concerned, the understanding of township competitiveness is as follows: the township is the basic administrative unit and economic unit in China, the administrative geographical concept. The township competitiveness mainly includes two aspects: the village's economic strength and township social environment. The township economy is a branch of regional economics in applied economics and a concept of regional economy, a comprehensive concept that corresponds to the urban economy. The township economy should include both the main economic pillar in the township-the township enterprises, and the agriculture and service industries in the township. The township social environment includes the township education, public security, and life. The township competitiveness can be defined as follows: it is one township's stronger ability to create wealth, improve people's income, improve quality of life, and promote the sustainable development of society in the process of development and growth, in comparison with other townships.

1.2 Establishment of township competitiveness indicator system The township is the most basic unit of rural areas, thus the evaluation of its comprehensive competitiveness helps to understand the real situation of the rural society and economy, and grasp the trend of social and economic development in rural areas, to develop reasonable guidelines and policies and promote the building of new socialist countryside. Following four principles of scientificity, systematicness, comparability and operability, we select a series of corresponding indicators to establish the township competitiveness evaluation indicator system, with reference to *World Competitiveness Yearbook*, *China Urban Competitiveness Report*[6], the basic modernization evaluation indicator system in Jiangsu Province[7] and the requirements of the Twelfth Five-Year Plan. The system consists of 5 first-level subsystems, 19 second-level subsystems and 32 major evaluation indicators, which are specifically shown in Table 1.

Table 1 Township competitiveness evaluation indicator system

First-level subsystem	Second-level subsystem	Order number	Indicator	Reference
The scale of development	The scale of production	1	GDP	A
		2	Township industrial added value	A
		3	Township third industry added value	A, C
		4	Export product delivery amount	B, C
	The scale of investment	5	Fixed assets investment	A
	Circulation scale	6	Retail sales of social consumer goods	C
	Allocation scale	7	Government fiscal revenue	A, B
		8	Government fiscal expenditure	A, B
		9	The balance of the savings deposits	A, B, C
The level of development	Level of production	10	Per capita GDP	A
		11	Per capita township industrial added value	A
	Level of consumption	12	Per capita retail sales of social consumer goods	C
	Level of allocation	13	Per capita financial revenue	A, B
		14	Farmers' per capita net income	C, D
		15	Rural residents' per capita balance of savings deposits	C, D
Development structure	Industrial structure	16	The proportion of secondary industry added value to GDP	A, C
		17	The proportion of tertiary industry added value to GDP	A, C
	Allocation structure	18	The proportion of financial revenue to GDP	A, B
		19	The proportion of township industrial taxes to fiscal revenue	A, B
Development benefits	Quality of life	20	Number of mobile phone per 100 people	C
	Comprehensive benefits	21	GDP created by each employee in society	C
	Industrial efficiency	22	Taxes created by per 10 000 yuan of township industrial added value	A, B, C
	Agricultural efficiency	23	The agricultural added value created by each agricultural labor force	C, D
Harmonious society	Sustainable development	24	Standard energy consumption of 10 000 yuan of industrial added value	A, B, C, D
	Rural poverty eradication	25	The proportion of rural poor population at the end of year to total population	C, D
	Education and health	26	The labor forces' average years of schooling	A, B, C, D
		27	Rate of joining rural cooperative medical insurance	C, D
	Social security	28	The incidence of public order cases	C, D
		29	The incidence of criminal cases	D
	Production safety	30	Number of grave accidents	D
		31	The number of deaths in the grave accidents	D
	Family planning	32	Family planning rate	D

Note: The reference A in the table stands for *World Competitiveness Yearbook*, B stands for *China Urban Competitiveness Report*, C stands for basic modernization evaluation indicator system in Jiangsu Province, D stands for requirements of the national 12th Five-Year Plan.

The major role and caliber range of main evaluation indicator system is as follows.

(i) The subsystem of development scale. This subsystem reflects the overall strength of township economy, and comprehensively reflects the important aspect of the township economic development status, including 4 second-level subsystems (the scale of production, the scale of investment, circulation scale and allocation scale), which reflect the overall strength of the township economy from production, investment, distribution, allocation, respectively.

(ii) The subsystem of development level. This subsystem to a certain extent reflects the modernization degree of the township economy, including 3 second-level subsystems (level of production, level of consumption, level of allocation), manifested by the per capita value, conducive to the mutual comparison between indicators.

(iii) The subsystem of development structure. The development structure is an important symbol reflecting the level of development of the township economy, and mainly reflecting the structural condition of the township economy from industry, distribution, and life quality structure.

(iv) The subsystem of development benefits. Development benefits are the main purpose of the production and business activities, including 4 second-level subsystems (quality of life, comprehensive benefits, industrial efficiency and agricultural efficiency).

(v) The subsystem of harmonious society. Harmonious society is the purpose of social development, including 6 second-level subsystems (sustainable development, rural poverty eradication, education and health, social security, production safety and family planning).

2 Empirical analysis of township competitiveness of Zhenjiang City

2.1 Indicator selection and data source The reason for selection of the representative indicators includes the following aspects. First, in order to calculate conveniently, the most representative indicators in each first-level subsystem are chosen; second, when selecting the representative indicators, the statistical standards are required to be unified. According to the survey data of Zhenjiang Bureau of Statistics, we simulate and filter the data repeatedly using SPSS, and ultimately select the following 8 indicators as research indicators from Table 1: X_1 (GDP); X_2 (The proportion of secondary industry added value to GDP); X_3 (The proportion of tertiary industry added value to GDP); X_4 (The balance of savings deposits); X_5 (Export product delivery amount); X_6 (Government fiscal revenue); X_7 (Government fiscal expenditure); X_8 (Number of mobile phone per 100 people).

This study adopts the data on towns of Zhenjiang City in 2007. These data are basically obtained from the survey and research by the Statistics Bureau of Zhenjiang City, and some data are arranged based on this. The derived data ensure the consistency of statistical standards, and enhance the comparability of indicators between towns, thereby more conducive to the comparison of competitiveness between towns.

2.2 Research method First, we obtain the composite score and ranking of 41 towns in Zhenjiang City, using the factor analysis method; then calculate the assessment value of competitiveness of 41 towns using the entropy method, and conduct clustering of the sequencing results.

2.3 Results and analysis

2.3.1 Factor analysis.

(i) KMO and Bartlett sphericity test. We conduct KMO and Bartlett sphericity test on the original data, using SPSS13.0. The results show that KMO = 0.7, close to 1; Bartlett sphericity statistic = 192.443, and sig = 0. It shows that the data selected by us are suitable for factor analysis.

(ii) Commonality analysis. Variable commonality portrays the contribution of all common factors to the total variance of each variable, indicating the percentage of the original variable information reflected by total common factors. According to the operating results of SPSS13.0, the information concerning variable commonality can be shown in Table 2.

Table 2 Variable commonality

Variable	The initial value	Extracted value
X_1	1.000	0.870
X_2	1.000	0.946
X_3	1.000	0.949
X_4	1.000	0.598
X_5	1.000	0.735
X_6	1.000	0.769
X_7	1.000	0.783
X_8	1.000	0.770

From Table 2, we can find that after the common factors are extracted, the commonality of variable "GDP" is 0.870, that is, the common factors extracted make 87% of contribution to the variance of GDP. From the numerical value in the column of extracted value, we know that the commonality of 3 variables (GDP, the proportion of secondary industry added value to GDP, the proportion of tertiary industry added value to GDP) is large, but the commonality of other variables is relatively small, indicating that the effect of the factor analysis is not particularly desirable, but it is quite significant.

(iii) Finding common factors. We process the standardized data, using the SPSS13.0 software. According to the principle of cumulative variance contribution rate greater than 0.80, we select 3 common factors, and the cumulative contribution rate is 80.24% (Table 3).

From Table 3, we can find that the eigenvalue of the first principal factor is 3.697, and the eigenvalue of the second, third principal factors is 1.618 and 1.103, both greater than 1. The variance contribution rate of the first principal factor reaches 46.219%, and the cumulative variance contribution rate of the first, second and third principal factors has reached 80.24%, greater than 80%, thus we can believe that the three principal factors reflect most of information of the original variables.

Table 3 The total variance explanation

Variable	The load of initial variance			The load of square of maximum variance		
	Eigenvalue	Variance contribution rate//%	Cumulative variance contribution rate//%	Eigenvalue	Variance contribution rate//%	Cumulative variance contribution rate//%
X_1	3.697	46.219	46.219	3.697	46.219	46.219
X_2	1.618	20.229	66.448	1.618	20.229	66.448
X_3	1.103	13.792	80.240	1.103	13.792	80.240
X_4	0.694	8.680	88.920			
X_5	0.413	5.158	94.078			
X_6	0.263	3.286	97.364			
X_7	0.134	1.671	99.036			
X_8	0.077	0.964	100.000			

(iv) Analyzing the load matrix. From the initial factor loading matrix, it can be found that the structure of loading matrix is not simple, the typical representative of each factor is not very prominent, and the load value on the original variable is difficult to be explained. Therefore, the factor loading matrix needs to be rotated, to achieve the purpose of structural simplification, so that each variable has high load on one certain factor, but medium load on the remaining factors. The most commonly used method of rotation is the maximum variance orthogonal rotation method. The rotated factor loading matrix using the maximum variance orthogonal rotation method can be seen in Table 4.

Table 4 Rotated factor loading matrix

Variable	F_1	F_2	F_3
X_1	0.826	0.262	0.345
X_2	0.233	0.912	0.245
X_3	−0.028	−0.972	0.047
X_4	0.652	0.289	0.297
X_5	0.771	0.225	−0.301
X_6	0.740	0.036	0.469
X_7	0.875	−0.106	−0.076
X_8	0.048	0.100	0.870

We know from Table 4 that the first principal component has big load on GDP (X_1), the balance of the savings deposits (X_4), export product delivery amount (X_5), government fiscal revenue (X_6), government fiscal expenditure (X_7), reflecting the development level of the township economy, which can be defined as the economic aggregate factor (F_1); the second principal component has big load on the proportion of secondary industry added value to GDP (X_2) and the proportion of tertiary industry added value to GDP (X_3), both above 0.9, which can be defined as the industrial structure factor (F_2); the third principal component has big load on number of mobile phone per 100 people (X_8), to some extent reflecting the township residents' quality of life, which can be defined as quality of life factor (F_3).

(v) Calculating the factor scores. Using the regression method, we calculate the factor scores of each principal component, and calculate the composite score F. The calculation formula is as follows:

$$F=(46.219\ F_1+20.229\ F_2+13.792\ F_3)/80.24$$

Composite score and ranking of 41 towns in Zhenjiang City are calculated, which can be seen in Table 5.

Table 5 Composite score and ranking of 41 towns in Zhenjiang City based on factor analysis

Town name	District (city)	F_1	F_2	F_3	Composite score	Ranking
Houxiang Town	Danyang City	4.370 1	1.253 8	−0.940 1	2.671 7	1
Yunyang Town	Danyang City	2.867 8	−1.598 5	−0.086 6	1.234 0	2
Xinba Town	Yangzhong City	1.285 9	0.237 7	1.353 4	1.033 2	3
Sanmao Town	Yangzhong City	0.831 8	−0.297 4	2.084 5	0.762 4	4
Xiangshan Town	Jingkou District	0.149 1	1.884 2	0.687 6	0.679 1	5
Jiepai Town	Danyang City	0.586 3	−0.239 2	1.356 6	0.510 6	6
Xinqiao Town	Danyang City	0.448 9	−0.266 6	1.359 7	0.425 1	7
Situ Town	Danyang City	0.769 6	−0.304 9	−0.221 7	0.328 3	8
Xinfeng Town	Dantu District	−0.299 1	1.638 2	0.144 1	0.265 5	9
Huangtang Town	Danyang City	0.529 5	−0.212 7	0.043 8	0.258 9	10
Gaozi Town	Dantu District	−0.497 4	0.962 3	1.718 4	0.251 5	11
Guyang Town	Dantu District	0.023 9	0.526 6	0.533 5	0.238 2	12
Picheng Town	Danyang City	0.028 0	0.065 7	0.764 3	0.164 1	13
Youfang Town	Yangzhong City	0.117 0	0.802 1	−0.696 8	0.149 8	14
Daoshu Town	Danyang City	−0.245 8	0.521 5	0.795 7	0.126 7	15
Lucheng Town	Danyang City	0.617 4	−0.383 2	−1.054 7	0.077 7	16
Jianbi Town	Jingkou District	−0.418 8	−0.134 7	1.662 9	0.010 6	17
Huayang Town	Jurong City	−0.167 6	0.441 7	−0.255 2	−0.029 0	18
Tianwang Town	Jurong City	−0.333 9	1.335 3	−1.203 6	−0.062 6	19
Xiashu Town	Jurong City	−0.497 5	0.962 5	−0.261 9	−0.088 9	20
Yanling Town	Danyang City	0.142 7	−0.606 3	−0.356 7	−0.132 0	21
Guozhuang Town	Jurong City	0.154 6	0.241 3	−1.739 0	−0.149 0	22

(Table 4)

Town name	District (city)	F_1	F_2	F_3	Composite score	Ranking
Fangxian Town	Danyang City	0.067 8	−0.404 1	−0.586 5	−0.163 6	23
Houbai Town	Jurong City	−0.442 5	0.878 6	−0.803 1	−0.171 4	24
Biancheng Town	Jurong City	−0.710 8	0.905 0	−0.397 3	−0.249 6	25
Baitu Town	Jurong City	−0.719 4	0.369 4	0.409 4	−0.250 9	26
Baqiao Town	Yangzhong City	−0.584 6	0.167 5	0.236 2	−0.253 9	27
Er'ling Town	Danyang City	−0.214 2	−1.206 3	0.704 3	−0.306 4	28
Jiangqiao Town	Runzhou District	−0.728 0	−0.943 8	1.843 3	−0.340 4	29
Huangmei Town	Jurong City	−0.323 6	0.642 3	−1.956 5	−0.360 8	30
Shangdang Town	Dantu District	−0.520 6	0.374 7	−0.907 6	−0.361 4	31
Lingkou Town	Danyang City	−0.075 4	−0.594 7	−1.044 3	−0.372 9	32
Baohua Town	Jurong City	−0.563 5	−0.035 8	−0.597 2	−0.436 3	33
Gaoqiao Town	Dantu District	−0.789 7	0.133 2	−0.189 2	−0.453 8	34
Baoyan Town	Dantu District	−0.673 6	−0.757 6	0.555 1	−0.483 6	35
Xilaiqiao Town	Yangzhong City	−1.003 7	0.068 4	0.148 2	−0.535 4	36
Maoshan Town	Jurong City	−0.268 6	−1.714 3	−0.002 2	−0.587 3	37
Yaoqiao Town	Zhenjiang New Area	−0.828 5	−0.079 3	−0.755 8	−0.627 1	38
Dinggang Town	Zhenjiang New Area	−1.086 1	0.242 1	−0.857 1	−0.711 9	39
Dalu Town	Zhenjiang New Area	−0.756 0	−1.221 6	−0.034 9	−0.749 4	40
Shiye Town	Dantu District	−0.241 4	−3.653 0	−1.452 9	−1.309 7	41

The effect of factor analysis in the study is not good, KMO value is too small, the variable commonality is not high enough, and the cumulative contribution rate of the three main factors has not yet reached 85%, so the final score ranking of factors is only for reference.

2.3.2 Entropy method. Entropy is originally a physical concept in thermodynamics. The information entropy in the information system is the measure of information degree of disorder, while information is the measure of system degree of order. The absolute value of the two is equal, but the sign is opposite. The smaller the information entropy, the lower the information degree of disorder, the greater the utility value of information, and the greater the weight of indicators; on the contrary, the greater the information entropy, the higher the information degree of disorder, the smaller the utility value of information, and the smaller the weight of indicators. Accordingly, the information entropy can be used to reflect the system information degree of order and the utility value of information, to conduct objective weighting and comprehensive evaluation.

There are 41 evaluation objects, and 8 evaluation indicators, forming the following initial data matrix of the evaluation system:

$$X = \{X_{ij}\}_{41\times 8} (0 \leqslant i \leqslant 41,\ 0 \leqslant j \leqslant 8)$$

where X_{ij} is the value of evaluation indicator j of sample i. Using the entropy method, the steps of comprehensive evaluation are as follows:

(i) Standardization processing of data. Due to differences in the dimension of each indicator, order of magnitude, positive and negative orientation of indicators, we need to standardize the initial data. We use the following formula to get standardized data:

$$x'_{ij} = \frac{X_{ij} - X_{j\min}}{X_{j\max} - X_{j\min}} (0 \leqslant i \leqslant 41,\ 0 \leqslant j \leqslant 8),\ y_{ij} = \frac{x'_{ij}}{\sum_{i=1}^{41} x'_{ij}},\ 0 \leqslant y_{ij} \leqslant 1.$$

(ii) Calculation of the indicator information entropy e and information utility value d. The information entropy value of indicator j is as follows:

$$e_j = -K\sum_{i=1}^{m} y_{ij} \ln y_{ij}$$

where $K = \frac{1}{\ln m} = \frac{1}{\ln 41} = 0.269\ 3$.

d_j is defined as the information utility value of indicator j, then $d_j = 1 - e_j$.

According to the above formula, the information entropy value and information utility value of 8 indicators are calculated (Table 6).

Table 6 The information entropy, information utility value and weight of each evaluation indicator

Indicator	e_j	d_j	w_j
X_1	0.920 6	0.079 4	0.101 9
X_2	0.987 2	0.012 8	0.016 4
X_3	0.939 7	0.060 3	0.077 4
X_4	0.922 2	0.077 8	0.099 7
X_5	0.775 3	0.224 7	0.288 3
X_6	0.889 2	0.110 8	0.142 1
X_7	0.820 0	0.180 0	0.230 8
X_8	0.966 1	0.033 9	0.043 4

(iii) Definition of evaluation indicator weight. Using the entropy method, we estimate the weight of each indicator. The essence is to calculate using the value coefficient of this indicator information. The higher the value coefficient, the greater the importance of evaluation (or the greater the weight, the greater the contribution to the evaluation results). The weight of indicator j is $w_j = \frac{d_j}{\sum_{j=1}^{n} d_j}$. The weight of 8 indicators calculated is included in Table 6.

(iv) Calculation of the sample evaluation value. The product of weight of indicator j is w_j and x'_{ij} is regarded as the evaluation value f_{ij} of X_{ij}, namely $f_{ij} = w_j \cdot x'_{ij}$.

The evaluation value of sample i $f_i = \sum_{j=1}^{n} f_{ij}$.

The evaluation value of competitiveness of 41 towns are

Table 7 Evaluation value and ranking of 41 towns in Zhenjiang City in terms of competitiveness based on the entropy method

Town name	District (city)	Evaluation value	Ranking	Town name	District (city)	Evaluation value	Ranking
Houxiang Town	Danyang City	0.864 5	1	Xinfeng Town	Dantu District	0.180 6	22
Yunyang Town	Danyang City	0.595 2	2	Jiangqiao Town	Runzhou District	0.178 1	23
Xinba Town	Yangzhong City	0.399 6	3	Lingkou Town	Danyang City	0.158 6	24
Sanmao Town	Yangzhong City	0.359 3	4	Maoshan Town	Jurong City	0.149 4	25
Jiepai Town	Danyang City	0.324 3	5	Xiashu Town	Jurong City	0.142 6	26
Situ Town	Danyang City	0.314 9	6	Tianwang Town	Jurong City	0.138 5	27
Xinqiao Town	Danyang City	0.311 6	7	Baitu Town	Jurong City	0.138 5	28
Huangtang Town	Danyang City	0.278 3	8	Baqiao Town	Yangzhong City	0.137 5	29
Lucheng Town	Danyang City	0.257 5	9	Houbai Town	Jurong City	0.135 9	30
Picheng Town	Danyang City	0.244 0	10	Baoyan Town	Dantu District	0.129 8	31
Guyang Town	Dantu District	0.243 7	11	Baohua Town	Jurong City	0.124 5	32
Xiangshan Town	Jingkou District	0.243 4	12	Huangmei Town	Jurong City	0.118 6	33
Yanling Town	Danyang City	0.215 5	13	Biancheng Town	Jurong City	0.114 4	34
Youfang Town	Yangzhong City	0.210 6	14	Gaoqiao Town	Dantu District	0.104 0	35
Jianbi Town	Jingkou District	0.210 1	15	Shangdang Town	Dantu District	0.102 2	36
Daoshu Town	Danyang City	0.205 8	16	Dalu Town	Zhenjiang New Area	0.097 5	37
Er'ling Town	Danyang City	0.204 2	17	Shiye Town	Dantu District	0.088 9	38
Fangxian Town	Danyang City	0.198 8	18	Xilaiqiao Town	Yangzhong City	0.085 5	39
Guozhuang Town	Jurong City	0.198 7	19	Yaoqiao Town	Zhenjiang New Area	0.070 4	40
Gaozi Town	Dantu District	0.191 3	20	Dinggang Town	Zhenjiang New Area	0.038 3	41
Huayang Town	Jurong City	0.190 3	21				

calculated, and sequenced in descending order, which can be seen in Table 7.

According to the evaluation value of competitiveness in Table 7, we conduct the cluster analysis of 41 towns in Zhenjiang City, and the results are as follows.

The first category: Houxiang Town.

The second category: Yunyang Town.

The third category: Xinba Town, Sanmao Town, Jiepai Town, Situ Town, Xinqiao Town.

The fourth category: Huangtang Town, Lucheng Town, Picheng Town, Guyang Town, Xiangshan Town, Yanling Town, Youfang Town, Jianbi Town, Daoshu Town, Er'ling Town, Fangxian Town, Guozhuang Town, Gaozi Town, Huayang Town, Xinfeng Town, Jiangqiao Town, Lingkou Town, Maoshan Town, Xiashu Town, Tianwang Town, Baitu Town, Baqiao Town, Houbai Town, Baoyan Town, Baohua Town, Huangmei Town, Biancheng Town, Gaoqiao Town, Shangdang Town, Dalu Town, Shiye Town, Xilaiqiao Town, Yaoqiao Town, Dinggang Town.

2.3.3 Analysis of evaluation results.

2.3.3.1 Comparison of township competitiveness of Zhenjiang City using factor analysis method and entropy method. Comparing Table 5 and Table 7, we can find that the rankings of 41 towns in Zhenjiang City are basically the same, but there are also slight differences. The ranking of top three towns is the same. In 2007, among the city's 41 towns, the town with the highest score of competitiveness is Houxiang Town (Danyang City); the runner-up town is Yunyang Town (Danyang City); the town ranking third is Xinba Town (Yangzhong City). The rankings of other towns among top 10 are slightly different, but basically the same. The ranking of Lucheng Town is quite different (ranking No. 16 in the factor analysis results, but moving up to No. 9 in ranking results using the entropy method), which is related to high weight of the indicator of export product delivery amount when measuring the weight using the entropy method. The export product delivery amount of Lucheng Town is indeed high in the 41 towns. In Table 4, Danyang City has 6 seats in the top 10, and in Table 10, Danyang City has 8 seats in the top 10, fully indicating that in terms of economic development level, the towns in Danyang City are much higher than towns in Zhenjiang City. It is consistent with the fact that Danyang City is among top 100 counties (cities) in China in terms of comprehensive economic strength.

3 towns in the Zhenjiang New Area are among the bottom 10 towns in terms of comprehensive competitiveness of the township economy in whole city, and Dantu District also occupies three places. These two districts are the urban areas of Zhenjiang City. Zhenjiang New Area is also a provincial economic development zone, but its ranking of township competitiveness is so poor, not consistent with its status. It indicates that the township development in districts of Zhenjiang City is extremely unbalanced.

2.3.3.2 Analysis of clustering results. Each indicator of Houxiang Town in the first category is far ahead of that of other towns. Houxiang Town is located in Danyang's northeast along the Yangtze River, whose added value of the secondary industry accounts for more than 80% of GDP and added value of the tertiary industry only accounts for 15%. It is a town based on industry. Houxiang, known as "Town of Instruments in China", is forming the world's largest production base of high-speed tool steel and twist drill, East China's largest production base of the connector, and the world's largest production base of airbag. Its delivery amount of export product in 2007 amounted to more than 5.7 billion yuan, showing good development

momentum of export-oriented economy.

Each indicator of Yunyang Town in the second category is also relatively high, but in comparison with Houxiang Town, there is still a gap. Yunyang Town is the seat of Danyang municipal government, with developed industry. However, its main feature is reflected in some industries, such as the tertiary industry, catering industry, service industry, logistics industry, and construction industry. The GDP of these industries accounts for nearly 40% of the township GDP, and the tax paid by them has been more than 50% of the total local tax, playing a significant role in promoting the development of the township economy.

The third category of towns include Xinba Town, Sanmao Town, Jiepai Town, Situ Town, and Xinqiao Town. The total GDP of these towns is at the middle level, with developed industry. The proportion of secondary industry added value to GDP is 60% –70%, and the proportion of tertiary industry is about 30%. There are no particularly prominent indicators in the fourth category of towns. The industry is not developed enough, and the service industry does not reach a certain size. In comparison with the first three categories of towns, there is a large gap and these towns need to vigorously develop economy.

In the first three categories of towns, the industrial base is good and the tertiary industry is also developed, so these three types of towns are classified as industrial towns; for the fourth categories of towns, the number is also large, and the industry and service industry are underdeveloped, so they are classified as agricultural towns. After classification, on the basis of the previous factor analysis and entropy analysis, this article puts forward the countermeasures for improving township competitiveness, according to the different characteristics of agricultural towns and industrial towns.

3 Countermeasures for enhancing the township competitiveness in Zhenjiang City

3.1 Countermeasures for agriculture-based towns For the towns based on agriculture, such as Jiangqiao Town in Runzhou District, Picheng Town and Yanling Town in Danyang City, they should pay attention to the following aspects to promote competitiveness.

3.1.1 Accelerating the development of modern high-efficiency agriculture. It is necessary to actively promote the use of new varieties, new technologies, and new modes, to speed up the formation of efficient agricultural technology system with characteristics of Zhenjiang City; accelerate the introduction, demonstration and promotion of improved varieties; research and develop deep processing, facility agriculture, standardized production and other major technologies; break through a number of fertilizer-saving and pesticide-saving recycling agriculture and other key technologies; focus on the promotion of 20 new breeding and farming technologies, such as water-saving cultivation and ecological farming.

3.1.2 Developing characteristic agriculture. In accordance with the respective location advantages, climate advantages and geographical advantages, each town should take actions that suit local circumstances to develop the characteristic agriculture suitable for itself, create its own agricultural brand, and take a road of relying on characteristic agriculture to enrich the people and build up the town.

3.1.3 Improving the quality of agricultural products. Based on the market needs of agricultural development, under the premise of maintaining high yield, it should strengthen the nurturing of high quality varieties, research and development of technology for improving existing varieties quality; vigorously carry out the construction of standardized planting and breeding bases, and application work of green, pollution-free agricultural products; develop a set of quality standards of agricultural products, including quality indicator of agricultural products, preservation processing, packaging, measurement, *etc.*; establish various types of agricultural standardization demonstration area.

3.2 Countermeasures for industry-based towns We put forward the following countermeasures in order to promote competitiveness of the industry-based towns, such as Jianbi Town in Jingkou District, Sanmao Town and Xinba Town in Yangzhong City, Houxiang Town and Huangtang Town in Danyang City.

3.2.1 Making full use of the advantages in transport and geographical location and consciously drawing on the driving role of urban economy. Zhenjiang is located in the Yangtze River Delta, and southern Jiangsu economic zone, having convenient transportation and good geographical advantages. The practice shows that good geographical location and convenient transportation conditions will play a role in promoting the township socio-economic development. Each town should be fully aware of and take advantage of this advantage, and consciously draw on the driving role of economic development of the surrounding cities, to further promote the economic strength of Zhenjiang City.

3.2.2 Taking actions that suit local circumstances to develop characteristic economy. Characteristics lead to advantages, advantages bring competitiveness, and competitiveness results in benefit. For example, Houxiang Town, known as "Town of Instruments in China", is the world's largest production base of high-speed tool steel and twist drill, East China's largest production base of the connector, and the world's largest production base of airbag. In 2007, it became the first town with industrial sales more than 10 million yuan in Zhenjiang City, thus it should continue to take the road of using industry to build up the town, and give play to its advantages. For another example, Situ Town is the hometown of Chinese glasses, and the glasses industry is the basic industry of the town. In the development of characteristic economy, firstly, it should give full play to its advantages in resources, to vigorously develop various kinds of traditional characteristic industry; secondly, it should use the industrial transfer of the surrounding towns or cities, to establish the processing areas with its own characteristics; thirdly, it should make full use of surplus rural labor to vigorously develop the labor-intensive industries.

3.2.3 Vigorously develop the private economy and export-oriented economy to enrich people. The township economy is

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without letting farmers go outside. Secondly, it is proposed to develop agricultural product processing industry, to fully utilize rural raw materials and realize value preserving and appreciation of agricultural products[4]. Thirdly, it is preferred to develop labor-intensive industry and transfer rural surplus labor. For example, Qian'an of Tangshan City develops labor-intensive enterprises, which provide 110 000 jobs for farmers. Fourthly, it should develop rural building industry. Hebei is a large province with developed building industry. In 2010, workers engaged in building industry reach three million. It indicates that building industry is a major channel for transferring rural surplus labor and main source for rural areas increasing revenues. New socialist countryside construction should consider farmers' willingness, and build in the original place or improve original public facilities. (iii) Villages with low income and weak collective economy take the agriculture as major part, and infrastructure and environment are relatively bad. In these areas, the new socialist countryside construction should include two aspects: firstly, rectifying infrastructure that concerns people's livelihood, such as water for villagers, road hardening, cable TV, and village commune hospital, *etc*; secondly, further developing labor economy, combining government guidance and market operation, increasing labor training effort, perfecting service organization for labor export management, and transferring rural surplus labor, to increase farmers' income.

4 Conclusions

New socialist countryside construction is a long-term task. Although Hebei Province has made significant achievements in new socialist countryside construction, there are still many problems that should not be neglected. To promote further rural development, Hebei Province should take measures in the light of the realities, make breakthrough by classifications, and select cutting point and key points on the basis of stage, level and diversity of new socialist countryside construction. Villages with solid economic foundation and high quality farmers can be used as pilot villages. Besides, it is proposed to increase support for poor villages and households.

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livelihood economy in a sense. Therefore, on the basis of enriching and stabilizing people, it should mobilize the enthusiasm and creativity of the broad masses to accelerate the development of township economy. First of all, it should deepen market orientation, and further stir the tremendous growth potential of the private economy. Secondly, it should further expand opening-up, and expand space for development of township economy; seriously learn from the successful opening-up experience of the trailblazer areas, enhance the awareness of opening, optimize the investment environment, form new opening-up road that suits local circumstances, and give full play to late-development advantage.

3.2.4 Strengthen the government service function to create efficient government. It should optimize the administrative environment; carry out the construction of office efficiency; strengthen the construction of working style in administration offices; effectively transform the government functions toward economic regulation, market supervision, social management and public service; strive to improve the operating mechanism of government.

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