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METHODICAL APPROACH TO CLUSTERING OF REGIONS OF CHINA BY THE DEGREE OF MANIFESTATION OF COMPETITIVE ADVANTAGES

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The article proposes clustering, the essence of which is to group the regions of China on the basis of the degree of manifestation of their competitive advantages by technological-innovative, educational-intellectual, economic-infrastructural, tourist-cultural groups. The methodical approach of permits to assess territories is not only from the side of administrative division, it identifies specific territories that may have similar marketing management strategies in order to achieve a high degree of competitive advantage and affect the competitiveness of the region as a whole. Management of competitive advantages of regions, taking into account the cluster approach, allows not only to assess the current situation to a more complete and specific extent, but also to effectively use the resources necessary for harmonious development. The application of the cluster approach in the coordination of the activities of territories will create a high-quality competitive territorial brand that will have positive consequences in the social, economic and other spheres of society.

Key words: *clustering, regions, cluster approach, competition.*

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Problem statement. Grouping of China's regions by competitive advantages can be carried out on the basis of various criteria, such as the level of economic development, innovation potential, infrastructure, access to resources, industry specialization, and others. Since competitive advantage is a complex phenomenon, it is important to consider several factors when grouping regions. For example, highly developed northern megacities, such as Beijing, Shanghai and Guangzhou, have large economic resources, developed infrastructure, access to innovative technologies and a large consumer market [1]. They are defined as leaders in the development of new technologies, financial services, international trade, and cultural industries. Industrial areas in eastern China, such as Jiangsu Province, Zhejiang Province, Shanghai and Guangzhou Free Trade Zones, have a high level of industrial development, and their competitive advantage lies in strong production capabilities, well-developed infrastructure, and access to global markets. Technology and innovation parks also provide significant competitive advantages. Special economic zones and parks such as Shenzhen and Hangzhou are becoming hubs for innovation and start-ups. They attract highly qualified personnel, investment in research and development, which contributes to the development of advanced technologies and new industries. Western regions such as Sichuan, Yunnan, Guizhou and others have the potential for growth and development due to access to resources, including natural resources and low labor costs [3]. Special economic zones and regions that attract significant foreign investment and government support may have competitive advantages in access to foreign markets, new technologies and management practices [4]. Tourism is an important industry for China, these competitive advantages help China maintain its popularity as one of the world's leading tourist destinations and attract tourists from different countries. It is worth noting that competitive advantages may change over time, and regions may develop new advantages depending on the economic, technological, and political context.

Research methods and methodology. To determine the factors influencing the competitiveness of territories, we propose to use the following groups of competitive advantages for clustering the regions of China according to the degree of manifestation of competitive advantages:

Group 1: technological and innovative competitive advantages;

Group 2: educational and intellectual competitive advantages;

Group 3: economic and infrastructural competitive advantages;

Group 4: Tourism and Cultural Competitive Advantages.

The proposed sequence of stages of clustering of China's regions by the degree of manifestation of competitive advantages provides for the development of economically justified tools in order to form a matrix of clustering of China' s regions by the degree of manifestation of competitive advantages, the use of which will allow to divide the regions of China into appropriate groups and propose strategies for the coordinated development of the formed groups of regions based on the established basic ones competitive advantages.

To this end, it is proposed to apply factor analysis – to rank informative features of the division of regions of China; the method of cluster analysis – to divide into clusters; matrix method – to determine alternative ways in the strategic development of the obtained regional clusters. The sequence of stages of clustering of China's regions according to the degree of manifestation of competitive advantages is presented in Figure 1.

According to the proposed sequence, at the first stage of clustering of China's regions by the degree of manifestation of competitive advantages, it is necessary to form a system of indicators that will comprehensively characterize clusters by the degree of manifestation of competitive advantages.

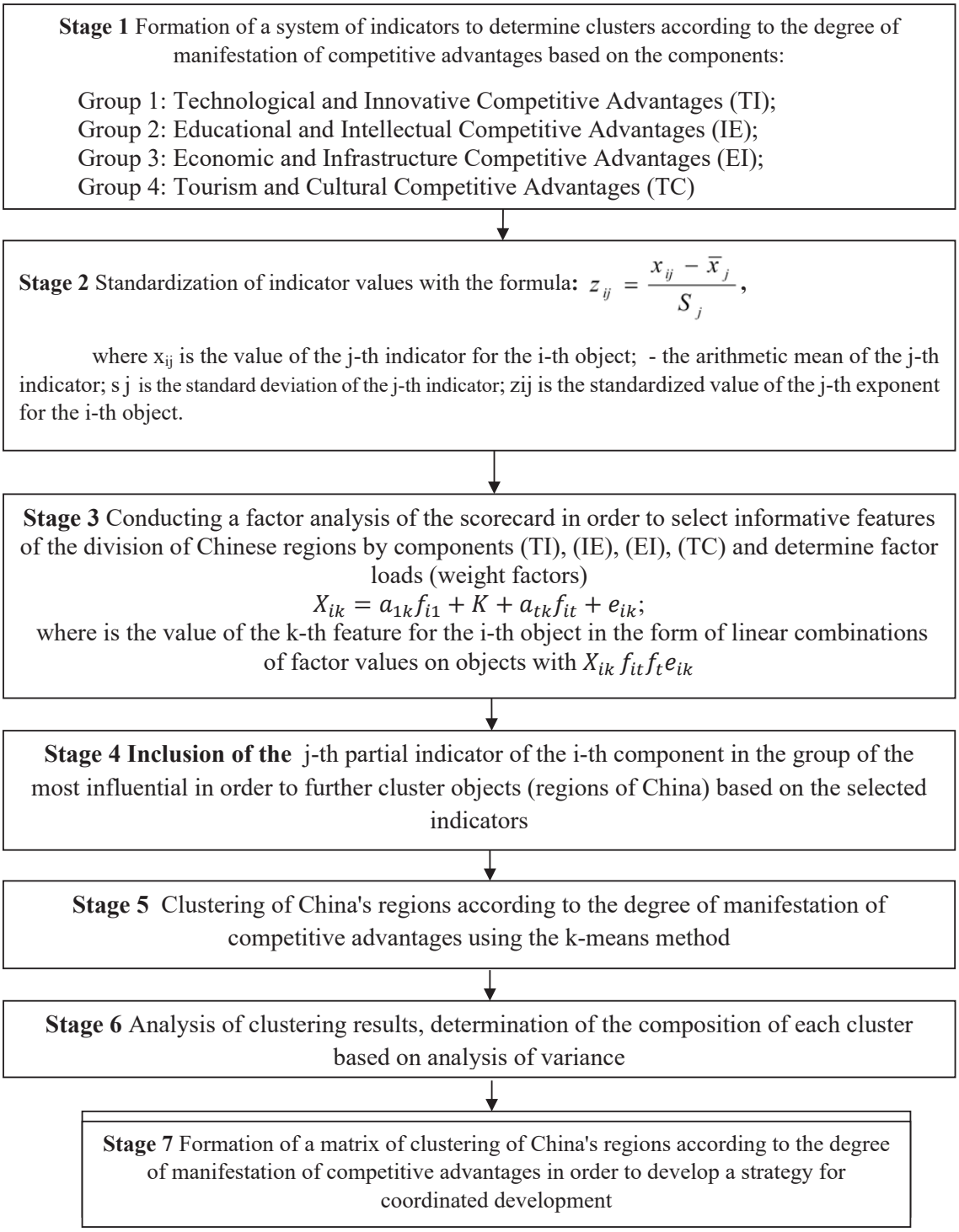

Figure 1 – Sequence of stages of clustering of regions of China according to the degree of manifestation of competitive advantages

Each of the identified groups of competitive advantages is characterized by a system of indicators that provide a comprehensive assessment of each group (Table 1).

The system of assessment indicators should comprehensively reveal four groups of competitive advantages (Technologically Innovative, Educational and Intellectual, Economic and Infrastructural, Tourist and Cultural), which form the competitiveness of regions (Table 1). It consists of two levels. The first is the dimensional level, and the second is the indicator level. The third column contains the symbols of the indicators, and the fourth column contains the units of measurement.

The necessary data for the clustering of China's regions were taken from China's statistical yearbook for 2010–2020 [8].

It should be noted that the system of indicators that characterize the division of China's regions by groups of competitive advantages is presented in different units of measurement. In order to bring the entire scorecard to a single

Table 1 – A system of indicators for clustering regions of China according to the degree of manifestation of competitive advantages

Level 1	Level 2	Conventional designations	Units of measurement
Technologically Innovative	Number of R&D Projects	TI1	unit
Technologically Innovative	Number of Patent Applications	TI2	unit
Technologically Innovative	Transaction Value in Technical Markets	TI3	yuan
Technologically Innovative	Expenditure for Science and Technology	TI4	yuan
Technologically Innovative	Projects for New Products Development	TI5	unit
Technologically Innovative	Sales Revenue of New Products	TI6	yuan
Educational and Intellectual	Average Education Enrolment per 100000 population Secondary Education	IE1	person
Educational and Intellectual	Average Education Enrolment per 100000 population Higher Education	IE2	person
Educational and Intellectual	Total Population	IE3	person
Educational and Intellectual	Expenditure for Education	IE4	yuan
Educational and Intellectual	Number of Students Degrees Conferred	IE5	unit
Educational and Intellectual	Number of Higher Education Institutions	IE6	unit
Economic and Infrastructural	International Trade in Goods	EI1	yuan
Economic and Infrastructural	Quality of Products by Region	EI2	%
Economic and Infrastructural	Employed Persons	EI3	person
Economic and Infrastructural	General Public Budget Revenue	EI4	yuan
Economic and Infrastructural	Growth Rate of Total Investment in Infrastructure	EI5	%
Economic and Infrastructural	Growth Rate of Total Investment in Manufacturing	EI6	%
Tourist and Cultural	Expenditure for Culture, Tourism	TC1	yuan
Tourist and Cultural	Number of public Museums	TC2	unit
Tourist and Cultural	Earnings from International Tourism	TC3	yuan
Tourist and Cultural	Number of Overnight Inbound Visitor Arrivals	TC4	unit
Tourist and Cultural	Number of Corporate Enterprises (Hotels)	TC5	unit
Tourist and Cultural	Number of Corporate Enterprises (Catering Services)	TC6	unit

dimension, the standardization procedure [6] of the initial data matrix (stage 2) was applied according to formula 3.1.

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j} \quad (1),$$

where x_{ij} is the value of the j-th indicator for the i-th object;

$\bar{x}_j$ – the arithmetic mean of the j-th indicator;

S_j is the standard deviation of the j-th indicator;

z_{ij} is the standardized value of the j-th exponent for the i-th object.

The third stage consists in the selection of informative features of the division of regions of China into groups of competitive advantages on the basis of factor analysis and determination of factor loads (weight factors) of each factor.

In our study, the factors reflect the groups of competitive advantages of China's regions. The analysis of the factors was carried out using the STATISTICA application package. Indicators that have an impact on the object under study are highlighted in red in the program listing, and those that do not affect are highlighted in black. In general, the studied object is described as a dependence on four groups of competitive advantages: Technologically Innovative, Educational and Intellectual, Economic and Infrastructural, Tourist and Cultural (formula 2):

$$\text{Compet}_j = \sum_{i=1}^{N} F_i \quad (2)$$

where *Competj* is an integral indicator of the competitive advantages of the j-region;

Fi – i-th group of competitive advantages;

N is the number of groups of competitive advantages.

The value of each group of competitive advantages is determined according to formula 3.3:

$$F_i = \frac{1}{Expl.F_i} \times \Sigma(a_{ij} \times X_{ij}) \quad (3)$$

where *Expl.Fi* is the factor load of *the i-th group of competitive advantages*; *aij* is the value of the *Xij indicator; Xij* is *the ij-th indicator*.

The results of the multivariate analysis are shown in Table 2.

According to Table 2. The system of indicators of competitive advantages was divided into 4 groups of factors.

Research results. The first factor includes indicators that characterize such groups of competitive advantages as Technologically Innovative, Educational and Intellectual, Economic and Infrastructural, Tourist and Cultural, they explain 62.97% of the variance, and indicate the dominant role of these indicators for most regions of Ukraine in the development of their competitiveness. The most influential indicators include: in the group of competitive advantages Technologically Innovative – Number of R&D Projects (TI1), Number of Patent Applications (TI2), Expenditure for Science and Technology (TI4), Projects for New Products Development (TI5), Sales Revenue of New Products (TI6); in the group of competitive advantages Educational and Intellectual – Total Population (IE3), Expenditure for Education (IE4), Number of Students Degrees Conferred (IE5), Number of Higher Education Institutions (IE6); in the group of competitive advantages Economic and Infrastructural – International Trade in Goods (EI1), Employed Persons (EI3), General Public Budget Revenue (EI4); in the group of competitive advantages Tourist and Cultural – Expenditure for Culture, Tourism (TC1), Number of public Museums (TC2), Earnings from International Tourism (TC3), Number of Overnight Inbound Visitor Arrivals (TC4), Number of Corporate Enterprises (Hotels) (TC5), Number of Corporate Enterprises (Catering Services) (TC6).

The second factor includes three indicators that reflect the group of competitive preferences Educational and Intellectual – Average Education Enrolment per 100000 population Secondary Education (IE1) and the group of competitive advantages – Economic and Infrastructural – Quality of Products by Region (IE2), Growth Rate of Total Investment in Manufacturing (EI6), they explain 10.74% of the total variance.

Table 2 – Results of Factor Analysis of the System of Indicators for the Division of Regions of China by Groups of Competitive Advantages and Determination of Factor Loads

Variable	Factor Loadings (Unrotated) (Spreadsheet9)Extraction: Principal components(Marked loadings are >,700000)			
	Factor	Factor	Factor	Factor
TI1	-0,91673	0,128692	-0,115985	0,109331
TI2	-0,93674	0,014464	-0,213607	0,153732
TI3	-0,62996	-0,530257	0,086868	-0,337944
TI4	-0,95306	-0,164108	-0,025761	0,033095
TI5	-0,91269	0,059392	-0,200494	0,137898
TI6	-0,93427	0,036571	-0,071980	0,093975
IE1	0,34065	0,743968	-0,140373	0,226068
IE2	-0,04153	-0,535167	0,605003	0,016827
IE3	-0,85038	0,435880	0,219515	-0,007731
IE4	-0,96268	0,199535	0,022922	0,009705
IE5	-0,79065	0,329633	0,448066	-0,130994
IE6	-0,79961	0,284526	0,474575	-0,099506
EI1	-0,91035	-0,280106	-0,197162	0,061026
EI2	-0,57210	-0,482014	0,385153	-0,114840
EI3	-0,88052	0,404940	0,179603	0,009527
EI4	-0,96822	-0,139407	-0,047383	-0,012581
EI5	0,19871	-0,006920	0,445644	0,789242
EI6	-0,04401	-0,440825	0,166101	0,504366
TC1	-0,94159	-0,092221	-0,079651	-0,082775
TC2	-0,71161	0,424488	0,242155	-0,111760
TC3	-0,80133	-0,275173	-0,306355	0,142773
TC4	-0,77173	-0,113479	-0,363911	0,213301
TC5	-0,94191	0,054552	-0,041956	0,001734
TC6	-0,96182	-0,141416	-0,095949	0,005748
Expl.Var	15,11428	2,577899	1,723238	1,237050
Prp.Totl	0,62976	0,107412	0,071802	0,051544

Source: calculated by the author: listing of the STATISTICA12 program

The third factor includes the groups of competitive advantages Technologically Innovative – Transaction Value in Technical Markets (TI3) and Educational and Intellectual – Average Education Enrolment per 100000 population Higher Education (EI2). The dispersion is 7.18%.

The fourth factor includes only one indicator Growth Rate of Total Investment in Infrastructure (EI5) from the Economic and Infrastructural group. The dispersion is 5.15%.

Thus, according to the results of the factor analysis, the most significant influence on the formation of competitiveness of regions is exerted by the group of competitive advantages of Technologically Innovative, since its contribution to the overall variance of the first factor (the factor with maximum variance) is the largest. The technological and innovative competitive advantages of a region are the features and resources that give regions an advantage over other regions through the use of advanced technologies and innovations. These benefits can be key to attracting investment, growing businesses, improving quality of life, and creating new jobs. Regions that invest in the research and development of new technologies can create new products, processes, and services, leading to a competitive advantage. Regions that adapt quickly to changes in technology and market conditions have a greater chance of maintaining and expanding their competitiveness.

At the fourth stage, the j-th indicator of the i-th group of competitive advantages is included in the most influential ones in order to further cluster objects (regions of China) on the basis of the selected indicators. In accordance with this stage, the clustering of China's regions was carried out taking into account significant indicators attributed to the groups of competitive advantages.

The fifth stage is the clustering of China's regions according to the degree of manifestation of competitive advantages.

The use of cluster analysis makes it possible to differentiate objects not by one parameter, but by a certain set of indicators (indicators), while the following task is performed: on the basis of the data that are part of the set X, divide the set of objects *G* into m clusters (subsets) *Q1,Q2,...,Qm* so that each object *Gj* belonged to only one subset, and objects belonging to the same cluster were similar, while objects belonging to different clusters should be heterogeneous. Using this method, 31 regions of China were divided into clusters according to groups of competitive advantages. It should be noted that the clustering of regions was carried out in 2 substages:

Table 3 – Variance Analysis of the Results of Clustering of Chinese Regions by the Degree of Manifestation of Competitive Advantages on 4 Clusters

Variable	Analysis of Variance					
	Between	df	Within	df	F	signif. (p-level)
TI1	27,63819	3	2,36181	27	105,3192	0,000000
TI2	22,85776	3	7,14224	27	28,8033	0,000000
TI3	18,64380	3	11,35620	27	14,7756	0,000007
TI4	23,16232	3	6,83768	27	30,4871	0,000000
TI5	25,69812	3	4,30188	27	53,7632	0,000000
TI6	26,74689	3	3,25311	27	73,9976	0,000000
IE1	15,77575	3	14,22425	27	9,9817	0,000134
IE2	4,65130	3	25,34870	27	1,6514	0,200944
IE3	21,92472	3	8,07528	27	24,4354	0,000000
IE4	23,61633	3	6,38367	27	33,2954	0,000000
IE5	19,74028	3	10,25972	27	17,3165	0,000002
IE6	21,50102	3	8,49898	27	22,7685	0,000000
EI1	24,72962	3	5,27038	27	42,2297	0,000000
EI2	16,09714	3	13,90286	27	10,4205	0,000099
EI3	23,17919	3	6,82081	27	30,5848	0,000000
EI4	25,26529	3	4,73471	27	48,0257	0,000000
EI5	2,14963	3	27,85038	27	0,6947	0,563354
EI6	3,02043	3	26,97957	27	1,0076	0,404606
TC1	21,89414	3	8,10586	27	24,3093	0,000000
TC2	20,15642	3	9,84358	27	18,4290	0,000001
TC3	13,09282	3	16,90718	27	6,9695	0,001275
TC4	9,69032	3	20,30968	27	4,2942	0,013350
TC5	20,64714	3	9,35286	27	19,8682	0,000001
TC6	21,28133	3	8,71867	27	21,9680	0,000000

1) iterative clustering – in order to confirm the hypothesis of the existence of 4 clusters;

2) by the K-means method using the cluster centroid formula (formula 4):

$$\min\left[\left[\sum_{i=1}^{k}\sum x(j)\in S_i \left\|x^{(j)}-\mu\right\|^2\right]\right], \quad (4)$$

where $x^{(j)} \in R^n$; $\mu_i \in R^n$; μ_i is the centroid for the *Si cluster.*

The centroids of the clusters are chosen according to the principle of maximizing the distances between the clusters. Observations refer to those clusters where the mean (centroid) is the closest. Each observation belongs to only one cluster, even though it can be attributed to two or more clusters. The centroid of each i-th cluster is then recalculated according to the following equation:

$$\mu_i = \frac{1}{S_i}\sum_{x^{(j)}\in S_i} x^i \quad (5)$$

Thus, the k-means algorithm consists of recalculating at each stage the centroid for each cluster obtained in the previous step. The algorithm ends when the values of μi do *not change*: μi step t = μi $^{\text{step t}}$ + 1

Table 3 – The results of clustering the regions of China by groups of competitive advantages by the k-means method are presented. It should be noted that 31 regions of Ukraine were divided into four clusters in three iterations. Analysis of Variance allows to check the adequacy of the results of cluster analysis and the possibility of their practical application in the classification of regions of China by groups of competitive advantages.

The obtained results of the analysis of variance refute our hypothesis about the adequacy of the distribution of China's regions into 4 clusters, since the values of the confidence level (p-level) for the EI5 and EI6 indicators are not statistically reliable. Thus, in order to improve the statistical significance of clustering results, it is expedient to divide regions into a larger number of clusters. According to this, in the next step of our research, we divided all regions of China into 5 clusters. Table 4. The results of clustering of regions of China by groups of competitive advantages by the method of k-means for 5 clusters are presented.

According to Table 4, it should be noted that the values of intergroup variance exceed the values of variances within clusters for all groups that are analyzed. The calculated values of the F-test are greater than the tabular value of this criterion at the appropriate level of significance and the corresponding degrees of freedom. The value of the confidence level (p-level) allows us to conclude that the relationship between the factors found in the clusters is determined

Table 4 – Variance Analysis of the Results of Clustering of Chinese Regions by the Degree of Manifestation of Competitive Advantages on 5 Clusters

Variable	Analysis of Variance					
	Between	df	Within	df	F	signif.
TI1	28,07864	4	1,92136	26	94,99050	0,000000
TI2	23,24525	4	6,75475	26	22,36859	0,000000
TI3	19,14402	4	10,85598	26	11,46245	0,000017
TI4	24,35359	4	5,64641	26	28,03524	0,000000
TI5	26,00945	4	3,99055	26	42,36546	0,000000
TI6	27,41326	4	2,58674	26	68,88439	0,000000
IE1	18,16390	4	11,83610	26	9,97502	0,000050
IE2	8,68067	4	21,31933	26	2,64663	0,056135
IE3	21,77008	4	8,22992	26	17,19403	0,000001
IE4	23,87569	4	6,12431	26	25,34033	0,000000
IE5	21,03471	4	8,96529	26	15,25055	0,000002
IE6	22,29409	4	7,70591	26	18,80527	0,000000
EI1	24,77536	4	5,22464	26	30,82317	0,000000
EI2	19,25778	4	10,74222	26	11,65267	0,000015
EI3	22,68561	4	7,31439	26	20,15977	0,000000
EI4	25,87565	4	4,12435	26	40,78018	0,000000
EI5	15,68586	4	14,31414	26	7,12290	0,000518
EI6	5,57176	4	24,42824	26	1,48256	0,236233
TC1	22,75571	4	7,24429	26	20,41774	0,000000
TC2	22,25298	4	7,74702	26	18,67097	0,000000
TC3	12,44185	4	17,55815	26	4,60596	0,006043
TC4	8,95836	4	21,04164	26	2,76734	0,048535
TC5	20,76342	4	9,23658	26	14,61170	0,000002
TC6	22,22338	4	7,77663	26	18,57515	0,000000

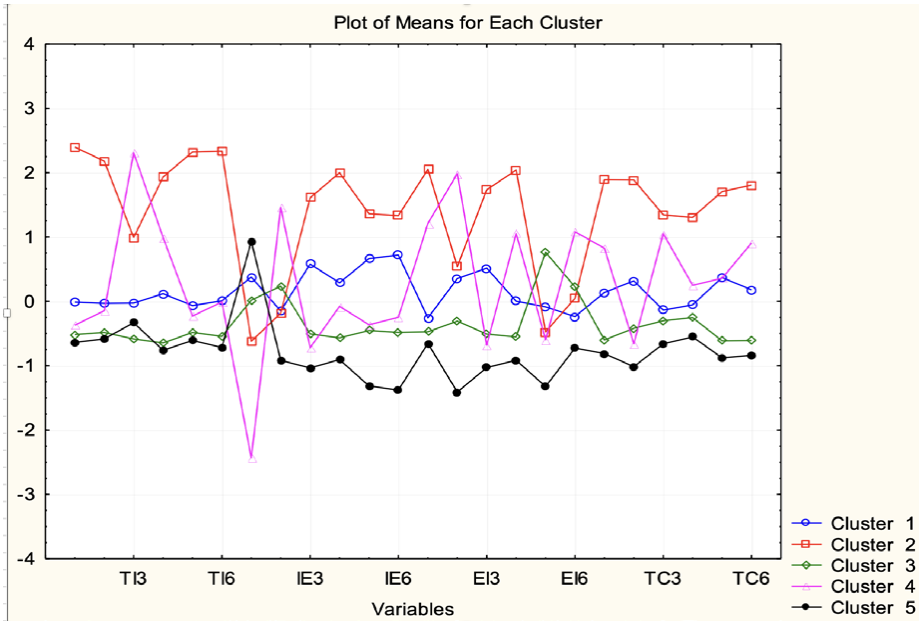

Figure 2 – Average Variable Values for Clusters

by a random feature of this sample with a probability of 1%. Thus, the distribution of China's regions into 5 clusters can be considered statistically reliable and significant.

The average values of the variables for the formed clusters, which correspond to the manifestation of competitive advantages by groups, are presented in Figure 2.

According to the results of clustering, all regions of China are divided into the following groups: Cluster 1 (medium degree of manifestation of competitive advantages); Cluster 2 (high degree of competitive advantage); Cluster 3 (the degree of manifestation of competitive advantages is below average); Cluster 4 (the degree of manifestation of competitive advantages is above average); Cluster 5 (low degree of competitive advantage).

The next stage of the cluster analysis using the k-means method is to determine the composition of the formed clusters and the number of regions included in each cluster. Tables 5 and 6 show the properties of the analyzed objects (regions of China) to the formed clusters, respectively.

Table 5 – Characteristics of the analyzed objects (regions of China) to the formed clusters 1, 2, 4, 5

	Members of *Cluster Number 1* and Distances from Respective Cluster CenterCluster contains 9 cases		Members of *Cluster Number 2* and Distances from Respective Cluster CenterCluster contains 4 cases
	Distance		Distance
Hebei	0,443516	Jiangsu	0,433047
Anhui	0,378116	Zhejianng	0,669289
Fujian	0,486266	Shandong	0,867178
Jiangxi	0,425943	Guangdong	1,505239
Henan	0,582341		
Hubei	0,395559		
Hunan	0,195808		
Sichuan	0,431485		
Shaanxi	0,668548		

	Members of *Cluster Number 4* and Distances from Respective Cluster CenterCluster contains 2 cases		Members of *Cluster Number 5* and Distances from Respective Cluster CenterCluster contains 4 cases
	Distance		Distance
Bejing	0,508499	Guizhou	0,652351
Shanghai	0,508499	Tibet	0,429450
		Qinghai	0,417076
		Ningxia	0,337082

Table 6 – Characteristics of the analyzed objects (regions of China) to the formed cluster 3

	Members of *Cluster Number 3* and Distances from Respective Cluster Center Cluster contains 12 cases
	Distance
Tianjin	0,610641
Shanxi	0,215782
Inner Mongolia	0,384718
Liaoning	0,501008
Jiilin	0,395602
Heilongjiang	0,353332
Guangxi	0,526381
Huinan	0,792655
Chongqing	0,305390
Yunnan	0,510161
Gansu	0,373887
Xinjiang	0,452012

Characteristics of cluster 1. Cluster 1 includes regions with an average degree of competitive advantages. The main direction of formation of competitive advantages for the regions of this cluster is the educational and intellectual direction. The presence of high-quality universities, research centers, and other educational institutions contributes to the development of a talented workforce and contributes to the creation of innovations in the regions. At the same time, the regions of Cluster 1 are characterized by a certain lag in the development of competitive advantages of the economic and infrastructural type. The main competitive advantages of the regions of this cluster are the following:

1) Quality Education: The availability of high-quality educational institutions that provide education at the level of international standards contributes to the training of a skilled workforce and intellectual potential.

2) Highly qualified professionals: Regions where scientists, engineers, researchers, and other professionals with a high level of expertise work have an advantage in the development and implementation of innovations.

3) Research and Development: The presence of active research institutions, laboratories and centers contributes to the development of new technologies, the discovery and study of new scientific questions.

4) Availability of intellectual resources: Libraries, archives, digital resources, and other means of accessing information and knowledge contribute to the development of intellectual activity.

5) Stability of the intellectual elite: Retaining and attracting talented people, intellectuals, academics, and scholars in the regions ensures the sustainability of the intellectual base.

Characteristics of cluster 2. Cluster 2 includes regions with a high degree of competitive advantages. The main direction of formation of competitive advantages for the regions of this cluster is the technological and innovative direction. These benefits are key to attracting investment, growing business, improving the quality of life, and creating new jobs. Another important area of formation of competitive advantages is the economic-infrastructural, tourist-cultural areas. The main competitive advantages of the regions of this cluster are the following:

1) Research and Development: Regions that invest in the research and development of new technologies are able to create new products, processes, and services, leading to a competitive advantage.

2) Entrepreneurship and Innovation Ecosystem: Creating a favorable environment for the development of startups, small and medium-sized businesses, incubators, accelerators, and venture capital funds stimulates innovation.

3) Technology Infrastructure: The availability of high-speed internet, labs, technology parks, equipment, and other resources accelerates the development and adoption of new technologies.

4) Sustainability and environmental care: The use of environmentally friendly technologies creates a positive image of the region and attracts the attention of environmentally conscious consumers and investors.

5) Adaptation to changes: The regions of this cluster are able to quickly adapt to changes in technology and market conditions, have a greater chance of maintaining and expanding their competitiveness.

Characteristics of cluster 3. Cluster 3 includes regions with a degree of competitive advantage below average. The main direction of formation of competitive advantages for the regions of this cluster is the economic and infrastructure direction. These benefits include a variety of economic and infrastructural aspects that provide favorable conditions for entrepreneurial growth, capital attraction and development of the business environment. The main competitive advantages of the regions of this cluster are the following:

1) Transportation and logistics infrastructure: The availability of a well-developed transportation network, well-developed roads, railways, airports, maritime infrastructures, and logistics services contributes to the convenience of moving goods and reduces transportation costs.

2) Energy Efficiency and Availability: Regions with a reliable and affordable supply of electricity, natural gas, and other energy resources attract large enterprises and investors.

3) Availability of infrastructure for foreign investment: The presence of free economic zones, special investment regimes and support for foreign investors creates an advantage for the regions in attractiveness for external capital.

4) Market Access: Locating regions close to or easily accessing key markets can provide access to greater consumer demand and export opportunities.

Characteristics of the cluster 4. Cluster 4 includes regions with an above-average degree of competitive advantage. This cluster is special, as it includes only 2 regions of China: Bejing and Shanghai. The degree of manifestation of competitive advantages of this region is close in its value to Cluster 2. At the same time, the competitive advantages of the regions of this cluster have the highest degree of manifestation among all regions according to such indicators as TI3 (Transaction Value in Technical Markets), IE2 (Average

Education Enrolment per 100000 population Higher Education), EI2 (Quality of Products by Region) and EI6 (Growth Rate of Total Investment in Manufacturing). However, Bejing and Shanghai are not classified as regions with a high level of competitive advantage due to lagging behind IE1 (Average Education Enrolment per 100,000 population Secondary Education) and EI5 (Growth Rate of Total Investment in Infrastructure) indicators. The main direction of formation of competitive advantages for the regions of this cluster is the policy of development of national and technical clusters, which also plays a significant role in the development of the regions of China.

Characteristics of cluster 5. Cluster 5 includes regions with the lowest degree of competitive advantage. These are the regions of Guizhou, Tibet, Qinghai and Ningxia. The main direction of formation of competitive advantages for the regions of this cluster is the tourist and cultural direction. Each of these regions has its own unique cultural heritage, natural attractions, and other factors that make them attractive to tourists and help develop tourism in these areas. These benefits include ethnic diversity, natural beauty, and spiritual heritage. However, the underdevelopment of economic and infrastructural competitive advantages creates obstacles to the effective formation of the tourism and cultural direction.

Conclusions. Thus, the proposed clustering consists in grouping the regions of China primarily on the basis of the degree of manifestation of their competitive advantages by technological-innovative, educational-intellectual, economic-infrastructural, tourist-cultural groups. Such a methodical approach allows you to evaluate territories not only from the side of administrative division, it identifies specific territories that may have similar marketing management strategies in order to achieve a high level of the degree of manifestation of competitive advantages and affect the competitiveness of the region as a whole. Management of competitive advantages of regions, taking into account the cluster approach, allows not only to assess the current situation to a more complete and specific extent, but also to effectively use the resources necessary for harmonious development. The application of the cluster approach in the coordination of the activities of territories will create a high-quality competitive territorial brand that will have positive consequences in the social, economic and other spheres of society.

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МЕТОДИЧНИЙ ПІДХІД ДО КЛАСТЕРИЗАЦІЇ РЕГІОНІВ КИТАЮ ЗА СТУПЕНЕМ ПРОЯВУ КОНКУРЕНТНИХ ПЕРЕВАГ

У статті запропоновано кластеризацію, суть якої полягає у групуванні регіонів Китаю за ступенем прояву їх конкурентних переваг за технологічно-інноваційними, освітньо-інтелектуальними, економіко-інфраструктурними, туристично-культурними групами. Методичний підхід дозволів до оцінки територій полягає не лише з боку адміністративного поділу, він визначає конкретні території, які можуть мати схожі стратегії маркетингового менеджменту з метою досягнення високого ступеня конкурентної переваги та впливу на конкурентоспроможність регіону в цілому. Управління конкурентними перевагами регіонів з урахуванням кластерного підходу дозволяє не тільки більш повно та конкретно оцінити поточну ситуацію, але й ефективно використовувати ресурси, необхідні для гармонійного розвитку. Застосування кластерного підходу в координації діяльності територій дозволить створити якісний конкурентоспроможний територіальний бренд, що матиме позитивні наслідки в соціальній, економічній та інших сферах життя суспільства.

Ключові слова: *кластеризація, регіони, кластерний підхід, конкуренція.*

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