

METHODOLOGY FOR THE ANALYSIS OF COMPETITIVE POSITIONS OF TERRITORIAL SYSTEMS

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Terminology and conceptual apparatus of the competitiveness of territory systems were considered. The analysis of evaluation methods was done and interval scale to score competitive position was offered. The algorithm of obtaining the general indicator of competitiveness in consideration of static and dynamic components was developed.

Competitiveness methodology is constantly in the center of attention of scientists, politicians and businessmen. It is one of the most difficult generalized areas of research. It is determined by width and versatility of researched concept, debatable character of the developed approaches. The main problem - is the absence of accurate system of indicators and estimation algorithm. The initial concepts of competitiveness also demand uniform terminology. Competitive positions with its plot are private characteristics of separate parameters of territorial system functioning. Competitive positions as the term are wider than competitive advantages as they contain both positive and negative gradation. To our mind the term competitive positions is more universal, applicable both to economic subjects, and to territorial systems.

The concept «territorial system» is more certain in comparison with economic system which can be micro- and macrolevel. The territorial system can be only meso- or macrolevel.

The territorial system is shown through competitive positions in different aspects (spheres) of public work. The community of these spheres which are coordinated on one hand and are non-uniformed on the other hand, demands the differentiated approach for aggregating.

Let's consider the order of forming a generalizing estimation of territory competitiveness in the form of stages sequence.

1. Territorial system is divided into the necessary number of subsystems. Depending on

research objectives it can be industrial, social, demographic sphere, ecosystem, innovative, investment, foreign trade environment and etc.

Each subsystem is considered by us in three connected and ordered groups of indicators (fig. 1).

In structure A, B and C each indicator is represented in two forms: qualitative (comparable) and quantitative (initial).

2. On each indicator in the quantitative form the value on the scale should be calculated. The scale is necessary at revealing the degree of safety of the indicator. Scale borders are formed by finding in aggregate compared territories of the minimum and maximum levels of the demanded indicator. In some cases, more often in demographic sphere, marginal levels, and also a safety limit are known in advance. But for the majority of indicators of public work and furthermore for quantity indicators, the safety limit can be defined only in empirical way.

Rationing is usually spent on a basis of

standard deviation: $Z_{ij} = \frac{x_{ij} - \bar{x}_j}{\sigma_{x_j}}$; seldom the

method of "Pattern" is used; and the method of

relative differences: $Z_{ij} = \frac{x_{ij} - x_{\min}}{x_{\max} - x_{\min}}$. In the

first method rationing values can accept any values, including negative. This property doesn't approach for competitiveness research, as it supposed the account of dynamic components,

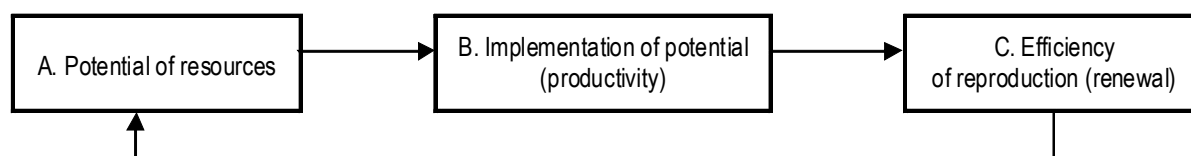


Fig. 1. Formation of a generalizing indicator of competitiveness

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which is impossible at negative levels. Other methods give the exact estimations which are not assuming the gradation and consequently dispersion of rationing values is defined only by extreme levels. For gradation of the scale of competitiveness we suggest to use structural average: sextile. In the interests of results differentiation we can also use quartiles, quintiles, decile, percentile and similar indicators.

The safety point on the scale is defined by median value. The use of arithmetic mean (or other form of mean) for these purposes is inexpedient proceeding from its properties. The mode as the average level indicator is absent in the majority of difficult social and economic processes.

Thus, the competitiveness scale should be rationing and contains not less than 4 intervals.

Let's consider graphically the competitiveness scale on the example of sextile (fig. 2).

Intermediate borders of intervals are considered on the basis of received sextile in the multiple form from the maximum level in aggregate. Borders of intervals, in an offered scale are sixtiles, which are considered under the formula:

$$S_n = x_{Q_n} + i \frac{\frac{n}{6} \sum f - S_{Q_{n-1}}}{f_{Q_n}},$$

where n - is a serial number of sextile (accepts values from 1 to 5); x_{Q_n} - the bottom border of the interval containing n -th sextile, i - interval size, $S_{Q_{n-1}}$ - cumulative frequency of an interval previous an interval containing n -th sextile, f_{Q_n} - the frequency of an interval containing n -th sextile.

In conclusion using the scale we will receive a vector of the values characterizing dif-

ferentiation (competitive positions) of territorial systems on any private indicator in the quantitative or qualitative form, and also in a cut potential-productivity-renewal.

It makes useful to consider competitive positions from the point of safety of levels in the following:

◆ matrix $\begin{pmatrix} z_{11} & z_{12} & \dots & z_{1k} \\ z_{21} & z_{22} & \dots & z_{2k} \\ \dots & \dots & \dots & \dots \\ z_{n1} & z_{n2} & \dots & z_{nk} \end{pmatrix}$, characterizing

differentiation of competitive positions of territorial systems on private parameters during the stages A , B and C (potential, productivity, renewal);

◆ matrix $\begin{pmatrix} z_{A1} & z_{A2} & \dots & z_{An} \\ z_{B1} & z_{B2} & \dots & z_{Bn} \\ z_{C1} & z_{C2} & \dots & z_{Cn} \end{pmatrix}$, estimating

equation (competitiveness) of territories on any parameter.

If studied indicators are unique, vectors and matrixes of reference values can be used for interpretation of extensive competitive advantages, characterizing scale effect.

Vectors and matrixes of qualitative indicators are the cores at the analysis of the competitiveness of territorial systems.

3. Consideration of interconditionality of stages A , B and C on the basis of competitive positions (scale indicators) is necessary. According to the model of "national diamond", which was offered by M. Porter for the country, it will allow not to aggregate competitiveness sources. We believe that national or regional levels of territorial systems possess basic similarity that supposes possibility of application of model for region level. It is possible to research the role of the region in making

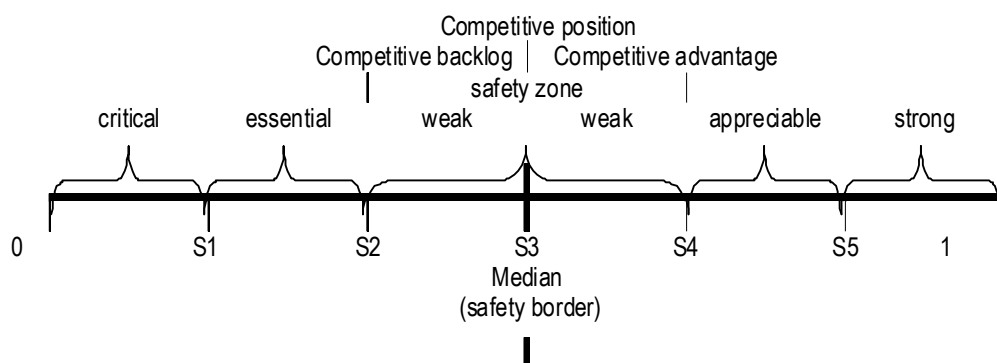


Fig. 2. The scheme of competitiveness scale

competitive advantages in four interconnected directions (determinants) forming “the regional diamond”:

1) factorial conditions: human and natural resources, scientifically - information potential, the capital, an infrastructure, including factors of life quality;

2) conditions of internal demand: quality of demand, conformity to the tendencies of demand development in the world market, development of the volume of demand.

3) adjacent and serving branches (cluster branches): spheres of raw materials supply and semi finished products, spheres of the equipment supply, sphere of using raw materials, equipment, technologies.

4) strategy and structure of firms, an inter-branch competition: the purposes, strategy, ways of organization, management of firms, intra-branch competition.

In turn each of the determinant is analyzed on components, on degree of their influence on competitive positions of territory, and also of necessity of their developments.

Four development stages of competitiveness are distinguished: a competition on the basis of manufacture factors; competition on the basis of investments; competition on the basis of innovations; competition on the basis of riches.

The first three stages provide economic growth, the latter causes depreciation.

Competitive advantage of territorial system is provided:

◆ At the first stage - with the help of manufacture factors such as: natural resources, favorable conditions for goods production, qualified labour (it is provided with one determinant);

◆ At the second stage - on the basis of aggressive investment (basically national firms) in education, technologies, licenses (it is provided with three determinants);

◆ At the third stage - at the expense of creating new kinds of production, organizational decisions and other innovations by action of all “diamond” components;

◆ At the fourth stage - at the expense of already created capital which is also relied on all determinants which are not completely used.

Interaction on the level of competitive positions on stages *A*, *B* and *C* promotes the definition of the type of competitive advantages,

it can give six variants of inequalities, various both under the semantic maintenance, and on consequences for territory competitiveness:

1) $A > B > C$; 2) $A > C > B$;

3) $A > B < C$; 4) $A < B > C$;

5) $A < B < C$; 6) $A < C < B$.

When we speak about inequalities we can use expressions more (less) or equally, that in practice seldom meet enough and does not influence basic conclusions of the analysis.

In categories of the economic theory the competitiveness basis is productivity, that is stage *B* in the investigated private parameters.

4. Generalizing level of the competitiveness of economic systems in statics is defined. For this purpose private competitive positions, which were formed in stage *B* are aggregated. The competitive positions which were received in stages *A* and *C* have auxiliary information character. Nevertheless, the importance of stage *C* shouldn't be underestimated: the actions directed on the renewal of potential, define the prospects of territory competitiveness. Aggregation can be spent to generalizing indicator in several ways. The most used in actual statistical practice - averaging (multidimensional means) or summation (a method of the sum of places). In our opinion, the priority among the specified approaches should be given to the method of the sum of places as in it extreme levels are not repaid, and the analysis of the contribution of private parameters is also possible.

The account of priority factors, defining the competitiveness of territorial system, is made by the use of weight factors. We offer the iterative-adaptive approach consisting in calculation of the pair factors of correlation of each private indicator with productive. Iterations of adaptation of a generalizing indicator are carried out by calculation of the product of private indicators weighed on received absolute values (without a sign “minus”) indicators of narrowness of communication with the root extraction, which degree is equal to the sum of absolute values of the pair factors of correlation.

In other words, the first iteration of the reception of the corrected generalizing competitiveness is spent on the basis of weighed geometric mean where as scales we use the modules of pair correlation coefficient of each private indicator with the productive act:

$$Y_i = \sum_j |r_j| \sqrt{\prod z_{ij} |r_j|},$$

where r_j - is correlation coefficient between j -th and the productive (rating) Y_i , taken on absolute size.

The use of the module for each factor of correlation is caused by negative values of them, in the case when some private indicators are connected with rating inverse relationship, with each subsequent iteration opposite influence him.

Further updating of the indicator of competitiveness proceeds calculation of pair correlation coefficients between scale private indicators and the generalizing indicator of competitiveness corrected on the first iteration.

The second iteration, and if it is necessary the subsequent iterations which are carried out by averaging of private indicators on the basis of geometric mean, with the scales which are defined on counted factors of correlation. Criterion of sufficiency of iterations is stabilization calculated on the basis of correlation coefficients weightiness factors f_j , where

$$f_j = \frac{|r_j|}{\sum_j |r_j|}. \text{ Thus } \sum_j f_j = 1,0. \text{ The process of}$$

stabilization of factors of weightiness of private indicators can proceed during 3-10 iterations.

Competitiveness on stages A and C is considered in a similar way.

The reached generalizing levels on A , B and C are checked on the system of inequalities, thus is spent typology of sources of competitiveness and its prospects.

5. Competitiveness of territory - is a changeable size, generated under the influence of a complex of non-uniform, changing factors. Therefore management of development, strategic planning of competitive positions demands the detailed analysis of the saved up tendencies and historically developed interdependence.

At the concrete moment of time for several territorial systems competitive positions can appear too close, however cumulative dynamics of one assumes falling, another - growth, the third - stagnation, their coincidence at a present situation does not reflect objective prospects of development.

One of the most important factors defining dynamics of competitiveness of territory, is the management psychology. It is caused by "historical memory" each link of territorial system which are guided by the results reached in the past which have proved algorithms of actions, and inertness of self-determination is characteristic for manufacturers, and for the population, and for the government. Hence, the competitiveness of the territory which is in the stage of depreciation, even at the best parameters of potential will be low.

Implementation of the mechanism of accounting the dynamic component in a generalizing indicator of competitiveness consists of the following stages.

a) beginning with the level scale private parameters dynamics of rates for stages is compared A , B and C . The conclusion about the reasons of different directed dynamics of quantitative and qualitative forms of private indicators are the integral part of research deepening informative possibilities.

The set of possible types of dynamics is considered:

- | | |
|------------------|------------------|
| 1) $A^+B^+C^+$; | 2) $A^+B^+C^-$; |
| 3) $A^+B^-C^+$; | 4) $A^+B^-C^-$; |
| 5) $A^-B^+C^+$; | 6) $A^-B^+C^-$; |
| 7) $A^-B^-C^+$; | 8) $A^-B^-C^-$. |

Such typology is necessary for the analysis of the dynamics of the levels of initial indicators and at research of dynamics of competitive positions. In other words, dynamics type on the level of the studied indicator and type of dynamics for the place (rank) taken by territory is compared. The type of competitiveness on the basis of generalizing indicator is similarly defined.

6) Inclusion in a summary mark of competitiveness dynamic components is carried out on the basis of geometric mean:

$$z_{ij} = \left(1 + \frac{a_{ij}}{\max_i a_{ij}} \right) \left(\frac{a_{ij}}{\max_i a_{ij}} \right) \cdot \left(\frac{a_{ij}}{\bar{a}_{ij}} \right) \div \left(\frac{a_{ij}}{\bar{a}_{ij}} \right)_{\max_i} \left(\frac{a_{ij}}{\max_i a_{ij}} \right),$$

where z_{ij} - is scale value j -th private indicator for i -th territory; a_{ij} - reference value of the scale indicator; \bar{a}_{ij} - is average value of i -th private indicator for j -th territory.

al system, which is calculated for an investigated time interval.

6. The major stage of the implementation of administrative decisions on the improvement of competitive positions of territory, and as consequence of competitiveness, is the cause and effect analysis of a current situation.

While analyzing the factors defining the dynamics of competitive positions, it is important to separate internal and external influences.

For the research of internal reasons forming competitiveness, it is expedient to apply the methods of dynamic shift-share analysis. The use of the method of active and passive components making shift-share .

In the analysis of competitive positions there are shares of each territorial system in the sum of values scale private parameters of all set of territorial systems.

The generalizing indicator of competitiveness by means of active and passive compo-

nents making share shifts can be analyzed in two ways:

- ◆ revealing the competitive positions (private parameters), forming the competitiveness of territorial system;

- ◆ search of the territorial systems possessing the greatest capacity in the dynamics of competitiveness.

At the analysis of the influence of external factors traditional methods of multidimensional correlation-regression analysis and forecasting are used.

Thus, the considered algorithm of forming the generalizing indicator of the competitiveness of territorial system will allow to receive the exact mark of its condition at any moment, taking into account the saved up tendencies of the development of private competitive positions and structural changes in a generalizing indicator at different stages of reproduction.

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