Methodological Approaches to Strategizing of Cluster Development: Diagnostics and Evaluation of Effectiveness

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Abstract The article views a possibility for application of cluster approach at the regional level. The authors offer criteria which characterize current and strategic competitiveness of the cluster and could be a landmark for development of economic policy at the regional level. Evaluation of cluster's profile is conducted on the basis of the matrix of correspondence of these types of competitiveness. According to criretial indicators of qualitative development of the region, basic blocks and indicators of cluster functioning effectiveness are offered. The algorithm of calculation of integral complex evaluation of the profile and effectiveness of cluster is shown.

Key words clusters, cluster model, cluster policy, competitive advantages, economic development of region, effectiveness.

JEL classification **O 18, O21**

1. Introduction

At present, the global economy faces the task of overcoming the crisis and entering the trajectory of economic growth, based on the increase of competitiveness of economy on the whole and its separate components. Thus, significance of the theory and practice of strategic planning and management grows.

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The sense of the theory of strategic management consists in determination of sources and mechanisms of creation and provision of **sustainable competitive advantages,** which provide economic profits that are inaccessible to large rivals. These goals correspond to such tool of economic and territorial policy as cluster model of M. Porter (Porter, 2000; Best, 2001).

2. Materials and methods

2.1. Problems and possibilities of cluster policy evaluation

Necessity to take into account high rate of changes of external environment leads to companies' need for constant adaptation – in order to be effective and lead competition. Such criterion of effectiveness as revenues' exceeding expenses due to entrepreneurial activities states the fact of enterprise's successfulness in the studied period, not guaranteeing it in the planned period. Therefore, traditional treatment of effectiveness of activities as a ratio of result to expenses could be associated only with short-term competitiveness or competitiveness in static environment (Porter, 2001). Therefore, for enterprise to be competitive in the long-term under the conditions of dynamically changing environment, not static possession of some competitive advantages that generate income as of now is required but a possibility to acquire necessary competitive advantages at the moment (Bergman, 2001; Baptista, 2000). This task corresponds to cluster model of development of territory, as it is a tool allowing for creation of new competitive advantages.

That's why this work studies existing methods of evaluation of cluster policy and enumerates methodological and conceptual problems related to application of cluster approach (Rosenfeld, 2005).

The problems are a succession (Table 1) that corresponds to stages of evaluation and "products" emerging at each stage.

Table 1. Problems of evaluation of cluster policy

Policy stages	Stage problems	
Policy goals	Determination of clusters	
Policy products	Measuring cluster activities for network emergence	
Policy results (micro)	Influence of network entities on activities of a separate company	
Policy results (macro)	Influence of cluster work on economic development of the region	Comparing results of work of various clusters

It is necessary to develop special methods of evaluation for each type of competitive advantages – e.g. (three main sources of advantages) special level of qualification, technological infrastructure necessary for innovational capability of cluster, or system of business support that allows new companies to join the cluster (Enright, 2001).

2.2.Establishment of connections between cluster activities and its influence on territory's development

In order to show the differences between cluster policy and policy of territorial development, it is possible to distinguish various "methods of influence" for these types of policy. The sense of policy usually consists in conduct of a series of projects (or measures) which joint influence goes from sub-macro-level (at which separate enterprises or large groups of them, like cluster, are located) to macro-level (Engmann, 1995; Cooke, Morgan, 1998). An essential difference between cluster policy and other types of policy of spacial development consists in importance of intermediary meso-level at which clusters operate (Krugman, 1991). It should be noted that the purpose of cluster policy is influence on targeted clusters, not at separate companies or region's economy on the whole. Its influence on the territorial economy takes place due to effects of overflow that emerge in clusters.

Traditional policy of territory's development is based on the principle of

aggregation which is unsuitable for cluster policy due to several reasons. Firstly, support for cluster development may lead to changes in distribution of economic activity, which is usually not envisaged by other types of policy of territory's development. Acceleration of cluster growth may lead to emergence of deficit of the most important resources for this territory, causing "chain reaction" to this phenomenon in other regions (Gordon, MacCann, 2000; Brown, 2000)

Secondly, special distribution of clusters may strengthen inequality of region's development. For a long time now, policy of territorial development has been faced by the choice between economic effectiveness and equality. This is a dilemma between conduct of policy aimed at provision of growth on the whole with the help of the most effective (profitable) methods (leading to strengthening of inequality between more and less developed regions) and conduct of the policy aimed at development of certain territories in economy (based on ideas of economic and social justice) (Feldman, 2000)

Therefore, the role of evaluation in this case consists not only in determining the growth in clusters but in determining positive influence of this growth on the region's economy (Ellison, Glaeser, 1997) Table 2 shows possible ways for determination of these effects.

Table 2 – Evaluation of influence of cluster development on territory development

Cluster's influence on surrounding territory	Measured influence	Methods of measurement
Distribution of resources	Changes in expenses (accessibility) for resources in other parts of economy	Studies of companies which are not parts of cluster Analysis of resources' cost
Spacial concentration of growth	Spacial distribution of growth effects that are related to cluster	Analysis the growth scheme at the sub-regional level

Effects of territory's overflow	Directs (indirect) effects of cluster growth on other components of economy	Studies of companies related or not related to cluster Compilation of inter-sectorial balance

2.3 Comparison of various types of cluster activities

When cluster policy includes support for many spheres of cluster creation, there is a last problem of evaluation of policy's efficiency - comparing effectiveness of the resources use for various forms of support. For many forms of cluster policy, this support is related only to one cluster which is distributed between a group of cluster on a competition basis. In certain cases, cluster policy consists of several simultaneously conducted programs of support, the purpose of which is totality of previously selected clusters (Feser, Sweeney, 2002).

As a result, various types of clusters require various goals, criteria of development, and growth rates. This is manifested only during comparing the values of the same indicators and during selection of the indicators (Feser, Sweeney, 2000; Feser Sweeney,Renski, 2001).

A second group of problems faced by researchers consists in the fact that there's necessity not only to view the facts that are related to selected clustering spheres but the facts that are not related to the conducted policy (for example, whether the development of these clusters change under the influence of the conducted), but also take into account additional data directly related to the conducted policy (e.g., whether it is necessary to provide support for other clusters together with them or instead of them) (Bergman, Feser, 1999)

3. Results

The results of the research, the purpose of which is realization of the formalized approach to complex evaluation of the level of cluster effectiveness, is methodology of assessment of cluster policy in the region. The offered approach is

based on calculation of the system of interconnected indicators. Each of them is specific for a cluster form.

In our opinion, it is necessary to distinguish two stages of determination of cluster effectiveness.

The first type supposes evaluation of a possibility (profile) of cluster development, while the second stage is aimed at determination of effectiveness.

The notion of profile integrates two aspects: current and strategic competitiveness.

Evaluation of current competitiveness is based on determination of influence that cluster performs on criterial indicators of socio-economic development (Martin, 2001).

At that, the basis includes the following set of criterial indicators of quality of economic complex of the territory which is a landmark for economic policy on the whole and shows its state and growth potential of region's economy (Enright, 1990):

– level of population's employment (availability of jobs as to the number of active population, unemployment level);
– economic provision of living standards (level of income of enterprise's employees; GRP per capita, budget revenue per capita);
– level of income differentiation (differentiation of income, share of population with income that is lower than living wage);
– growth of GRP;
– growth of labor efficiency;
– complexity of economy, internal additional interconnections;
– sustainability (environmental compatibility) of economy;
– dynamics of development (investments per capita, growth of number of jobs, growth of GRP per capita).

Accordingly, evaluation of current competitiveness of cluster for a particular region may use the following factors that reflect the above criteria:

1. Support for general employment;
2. Support for employment of targeted groups;

3. Support for growth of living standards;
4. Support for growth of income and reduction of budget expenses;
5. Support for growth of accompanying spheres;
6. Growth of labor efficiency;
7. Influence on environment;
8. Use of new technologies, renewal of funds;
9. Support for general economic growth.

Each factor is assigned a score according to the following scale: (-2) very low, (-1) – low, (0) – medium, (+1) – high and (+2) – very high.

The following stage includes analysis and evaluation of strategic competitiveness of the above clusters in the region. Factors that are viewed during evaluation include the following (Feser, 1998; Weber, 1995):

- Change of expenses for scientific research
- Change of the share of innovations-active organizations
- Capability for renewal
- Presence of foreign companies
- Growth of export volumes
- Increase of new products
- Change of the share of cluster in GRP
- Change of the share of cluster in the global market.

Each factor has to be assigned with weight coefficients, used during development of composite estimates. Weight coefficients could be received on the basis of expert evaluations.

Composite estimates are calculated in view of weight coefficients in the following way:

$$I = a_1 x_1 + a_2 x_2 + \ldots + a_n x_n \qquad (1)$$

where $a_1, a_2 \ldots a_n$ - weight coefficients which characterize significance of the corresponding factor;

$x_1, x_2 \ldots x_n$ - factors of current or strategic competitiveness, assessed according to five-point scale and taking values (-2);(-1);(0);(+1); (+2).

After determination of composite indicators, a conclusion regarding the level of competitiveness of this complex is made. Here we offer to use the matrix of correspondence between evaluation summary and index of final grouping (Table 3).

Table 3 – Matrix of correspondence of competitiveness scores

Evaluation summary of strategic competitiveness	Evaluation summary of current competitiveness				
	+2	+1	0	-1	-2
+2	NC	HC	HC	N	N
+1	HC	HC	HC	N	N
0	PC	PC	N	N	NC
-1	PC	PC	N	NC	NC
-2	PC	N	N	NC	NC

HC – highly competitive clusters;

PC – potentially competitive clusters;

N – neural clusters;

NC – non-competitive clusters.

Weight coefficients for evaluation of clusters from the point of view of current and strategic competitiveness:

At the second stage, if the conclusion on attractiveness and possibility of development of cluster on this territory is made, effectiveness of its functioning is evaluated directly. An example is innovational and technological cluster with determination of a range of blocks which are basic ones for its evaluation (Table7). For each of this block, indicators and estimate criteria are developed which are expressed in current and forecast values.

Thus, for innovational and technological cluster, it is possible to determine the following set of blocks:

-scientific & technological and research potential;

-educational potential;

-production potential;

-development of infrastructure;

-organizational development.

Discussion

The main sources of formation of competitive advantages of cluster approach are the following: special level of qualification, technological infrastructure, necessary for innovational capability of cluster, and system of business support (Doeringer, Tekla, 1995). Formation of cluster policy and its evaluation should not be limited only by characteristics of growth rates; it is also necessary to evaluate sustainability of created clusters, as this characteristics is a key one in short-term and long-term. Besides, application of cluster policy is impossible without evaluation of cluster competitiveness. Competitiveness could be evaluated according to three basic elements: sustainable position in the market, technological leadership, and capability for self-renewal. Evaluation of cluster policy allows avoiding the effect of "blocking" at which certain cluster spheres attract support within economic policy even when there are no economic foundations for it. Conduct of evaluation allows performing monitoring of clusters that receive support and tracking changes of the potential of totality of clusters from the point of view of economic development. For detailed evaluation of effectiveness of cluster policy, it is possible to use complex approach for evaluation of current and strategic competitiveness. The basis is the set of criterial indicators which characterize current and targeted socio-economic development of the region. As a result, conclusion on cluster's profile is made. Based on this evaluation, managerial decisions on types of support and stimulation of cluster's development are made.

4. Conclusions

The article views the problems of evaluation of cluster policy in detail. Necessity for development of special methods of evaluation of various types of competitive advantages is proved. In part of establishment of connections between activities of cluster and territorial development, the following conclusions are made: 1. Support for cluster development could lead to changes in distribution of economic activity, which is usually not envisaged by other forms of policies of territory development; 2. Special distribution of clusters could increase inequality of economic development of the region. Thus, the methodology that allows evaluating effectiveness of cluster policy is offered. The motion of effectiveness generates two aspects: cluster's profile and direct effect from its functioning. According to this, the model that generates indicators of current and perspective competitiveness of cluster is offered. Criteria that characterize various types of competitiveness are developed. Basic blocks with a set of indicators for evaluation of cluster model's effect are developed as an example for innovational & technological cluster.

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