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THE CLUSTER'S COMPETITIVENESS ANALYSIS

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Abstract. In the last two decades the growth of national economies competitiveness was mainly based on regional development and growth of regional clusters competitiveness. The development of a new "integrative competitiveness management for clusters" and of the basic structural-functional models in this transdisciplinar area is a priority in Romania and European Union. The purpose of the paper is to contribute at the development of systemic model and method of competitiveness analysis, useful for the radical / continuous improvement and optimisations of the companies and clusters performances. The managerial analysis of cluster's competitiveness (A_{KC}) is a new, original, complex, dynamic quantitative analysis method and a stage of the integrative cluster's competitiveness management. The implementation of the cluster's competitiveness analysis and of integrative management for clusters will assure the competitiveness increase at micro, mezo and macro levels.

Keywords: cluster, competitiveness, competitiveness analysis

1. Introduction

In the last two decades the growth of national economies competitiveness was mainly based on regional development and growth of regional clusters competitiveness. The development of a new "integrative competitiveness management for clusters" [1] and of the basic structural-functional models in this transdisciplinar area is a priority in Romania and European Union.

The clusters are multi-dimensional networks of organizations made of production / services and sales companies, universities, vocational schools, research and development institutes, banks, government institutions, professional organizations, other non-government organizations etc. which

- ► are potentially long lasting competitive on the national and global market,
- ► develop inside the networks both competition and cooperation relationships (coopetition) between the component organizations,
- ► in the XXIst century, determine more and more the evolutions of the regional, national and continental competitiveness,
- ► contribute to raising the welfare standards in the countries where they are located.

So far the cluster's competitiveness analysis is an unsolved problem [2, 3, 4].

The purpose of the paper is to contribute at the development of systemic model and method of competitiveness analysis, useful for the radical / continuous improvement and optimisations of the clusters and companies performances.

2. The Characterisation of the Competitiveness Analysis

Generally, the analysis is the study and the cognition of a system, preceded by his decomposition in component parts. The managerial analysis (A) is a complex predecessor activity for all managerial functions of the organizations and clusters. The managerial analysis (A) is incorporated in the "foresight" (planning) function of the enterprises / cluster, at all-hierarchical levels.

The managerial competitiveness analysis (A_K) is a new, original, complex quantitative and dynamic analysis method (criteria: integrated aim and performances within the time-horizon specific for the analysed entity). (A_K) have the following characteristics [5]:

- the competitiveness evaluation (total competitiveness K_{tot}, competitiveness profile, position / value in the market and environment defined by the relation global quality level N_{gi} / price P_{vi} of the assortment i and so on) in all analysis stages, and, of need, computer aided evaluation,
- the integration a lot of managerial analysis methods (the classical diagnosis analysis, SWOT analysis, portfolio analysis, benchmarking, etc.)

to broadly ground the diagnosis and the competitiveness forecast,

- the strong, pragmatic, rigorous orientation towards competitiveness on unlimited term, through the competitive-ness analysis A_K conclusions and proposals,
- the development of the A_K conclusions and proposals in the following stages of the management of competitiveness.

The managerial competitiveness analysis has two component parts:

- the research of the cluster, network, company, business, assortment competitiveness, of the factors and determinative causes of the competitiveness, followed by
- the identification of the internal reserves and of the external opportunities, of the way to increase competitiveness in the future periods, within the target markets, niche and environments.

3. The Standard-Method of the Cluster's Competitiveness Analysis

The managerial cluster's competitiveness analysis A_{KC} is developed into four stages, in the reverse succession of the real process development:

(1) the establishment of the category of the competitiveness analysis A_{KC} (object E_K: cluster C, Network of firm RF, Firm F; type, period),

(2) the achievements identification and the competitiveness K forecasts for the analysed object (with forecast methods, complex SWOT method, portfolio methods, benchmarking etc.) in ± 3 years (-3 years …. +5 years) time-horizon, characterizing the achievements trough competitiveness ratios I_K.

The ratios I_K consider for the competitiveness K the effective values (ef), planned (pl), effective in a base-period (b, usually, the first year of the multiyear period of the analysed performances):

I_{Kp} – the ratio of achievement of the planned competitiveness:

$$I_{Kp} = \frac{K_{ef}}{K_{pl}} \quad 100\% \qquad (1)$$

I_{Kc} – the ratio of comparative competitiveness, versus the competitors "c" in the target market / segment / niche:

$$I_{Kc} = \frac{K_{ef}}{K_{cef}} \quad 100\% \qquad (2)$$

I_{Kd} – the dynamic ratio of competitiveness, versus the previous achievements of the analysed entity in a fundamental-period "b" (for example, five years ago):

$$I_{Kd} = \frac{K_{ef}}{K_{bef}} \quad 100\% \qquad (3)$$

(3) the competitiveness K diagnosis, starting from the state magnitudes {x} in the analysed period, using: correlations between results (effects) and causes, calculation of the influences on the performances and competitiveness,

(4) the conclusions and proposals for the increase of competitiveness K .

Based on the principles of the CEMATT method [6] we develop the standard – method of the cluster's competitiveness analysis which correlates the general stages described (1) …. (4) with the phases I ….V of the standard – method A_{KC} :

I. Information and primary analysis; this phase partly combines the (1) and (2) A_{KC} stages,

II. The identification of the diagnosis criteria [c], structured in accordance with the integrative model "the competitiveness cycle" 1+(10) [7]; this phase partly combines the (2) and (3) A_{KC} stages,

III. The competitiveness diagnosis upon d diagnosis directions 1+(10), within the stage (3) of A_{KC},

IV. The global competitiveness diagnosis of E_K, in the stage (3) of A_{KC},

V. Conclusions and preliminary proposals for the competitiveness K development of E_K, in the stage (4) of A_{KC}.

I. Information and primary analyses

This phase partly combines the (1) and (2) A_{KC} stages, in the -3 ears …. +5 years time-horizon for the competitiveness analysis object E_K (cluster, company, function of company, business strategic unit etc.):

- the analysis team is selected and its plan of work is drawn, questionnaires, interviews and other documents drafts are elaborated,
- inquests are done on the basis of the questionnaires / type charts and interviews are taken to key persons within the cluster and enterprises,
- necessary visits in the cluster and enterprises are done, - information are gathered, controlled and processed primarily from the synthesis reports (for the General Assembly of the Shareholders / Associations; reports of / for Managing Board; censors' reports; audit reports, etc.) statistical reports, answers to questionnaires, interviews, accountant evidence documents, technical and technological documents, registrations, etc.

- complex SWOT analysis is performed with check list „1 + (10)" expended, in need, for all the 7 media and 7 resources [5]; if necessary, analyses with portfolio methods / benchmarking etc. are used,
- first directions of strategic / tactic actions are qualitatively formulated, with quantitative benchmarks are formulated to increase the competitiveness of the analysed object E_K.

II. Identification of criteria [c] for competitiveness diagnose

This phase partly reunites stages (2) and (3) of A_{KC} and has the structured criteria [c] following the integrative model „1+ (10)". Out of the group of the general criteria with broadest extension, for a production and commerce cluster / enterprise, the specific criteria for the analysed object must be selected:

(+1) Competitive managerial power takes into consideration 4 diagnosis and the reserves of the internal environment, external environment opportunities respectively:

(+1.1) Leadership (process and team)

(+1.2) Optimisation / sub-optimisation of the decisions and reglementation at all levels, for all time-horizon (strategic, tactic, effective) and for all risks within the cluster / organization / analysed entity

(+1.3) Organisation / cluster culture of the analysed entity E_K

(+1.4) Motivation of the E_K personnel

(1) Availability of the performant resources necessary for the start of the new functioning cycle (for the structuring / restructuring of the analysed competitive entity E_K) takes under consideration 7 diagnosis criteria and the reserves in the internal environments, the opportunities offered by external environments respectively:

(1.1) human resources (RU); (1.2) social resources (RS); (1.3) natural resources (RN); (1.4) material resources (RM); (1.5) informational resources (RI) (knowledge, management, know-how, etc); (1.6) financial resources (RF); (1.7) time (t).

(2) Foresight and performant purchase of the assortments $\{i, i_K\}$ requested by the markets / segments / niche for E_K takes under consideration 7 diagnosis criteria and the reserves in the internal environments, the opportunities in external environments respectively:

(2.1) foresight; (2.2) foresight – previsional marketing; (2.3) company / businesses / functions strategies; (2.4) business planning; (2.5) negotiation and performant purchase of the contracts with clients and suppliers of the company; (2.6) activities planning; (2.7) efficient planning of tasks and operations,

(3) Performant organisation / reorganisation for E_K takes under consideration 5 diagnosis criteria and the reserves in the internal environments, opportunities in the external environments respectively:

-in engineering: (3.1) general structure / general plan; (3.2) structures of integrated processing from initial suppliers to final clients; (3.3) structures for work places specific for the entity E_K;

-in management: (3.4) organisational structures; (3.5) informational systems of the E_K

(4) Performant positioning (value V) on market / segments / niche of the assortments $\{i, i_K\}$ offered by E_K and E_K itself, takes under consideration 4 criteria of diagnosis and reserves from the internal environments, opportunities from the external environments respectively:

(4.1**)** best quality insurance $N_{i\ opt,}$ through quality management; (4.2) minimal complete costs $C_{ci\ min,}$ through cost management; (4.3) optimal selling prices negotiated $P_{vi\ opt}$ for E_K, efficiently using the reserves in the internal environments, opportunities from the external environments of E_K respectively; (4.4) ensuring the ecological standards for the enterprise through environmental management

(5) Performant assimilation of the new competitive assortments $\{ i_K \}$ offered by E_K on the market / segments / niche with solvent demand efficiently using the reserves in the internal environments, opportunities in the external environments of E_K respectively takes under consideration 3 diagnosis criteria:

(5.1) innovation of competitive assortments $\{i_K\}$; (5.2) innovation of competitive technological systems $\{S_{TK}\}$ in production, logistics, commerce, financial activities, human resources, etc; (5.3) computer integration of innovation, production, commerce and management

(6) Performant purchase of resources in customary cycles of the enterprise, efficiently using the reserves in the internal environments, opportunities in the external environments of E_K respectively, takes under consideration 4 diagnosis criteria:

(6.1) purchasing material resources (substance type, energy); (6.2) purchasing informational resources; (6.3) purchasing necessary human resources; (6.4) insuring financial resources,

(7) Performant production of the assortments $\{i\}$, $\{i_K\}$ with solvent demand on the market / segments / niche, efficiently using the reserves in the internal

environments, opportunities in the external environments of E_K respectively, takes under consideration 3 diagnosis criteria:
(7.1) production / basic services for external clients; (7.2) production / auxiliary services (tools production, maintenance, turning of waists, etc.) for internal clients; (7.3) internal logistics (handling, transportation, depositing),
(8) Performant selling of the assortments {i}, $\{i_K\}$ with solvable demand on the market / segments / niche, efficiently using the reserves in the internal environments, opportunities in the external environments of E_K respectively, takes under consideration 3 diagnosis criteria:
(8.1) operational marketing; (8.2) distribution and selling systems in the market / segments / niche; (8.3) external logistics (handling, transportation, depositing)
(9) Self-financing, financing and performant credits necessary for development / for the entity on the market, efficiently using the reserves in the internal environments, opportunities in the external environments of E_K respectively, takes under consideration 10 diagnosis criteria [6]:
(9.1) share of borrowed capital in the turnover; (9.2) evolution of net circulating funds; (9.3) profitableness of activity; (9.4) financial profitableness; (9.5) invested capital productivity; (9.6) evolution of net debts; (9.7) personnel salaries; (9.8) ratio of financial autonomy; (9.9) patrimonial liquidity; (9.10) speed of production stocks rotation and of non-recovered invoices,
(10) Needs total fulfilment and long-term loyalty of the clients {Cl} and of the suppliers in the market / segments / niche, efficiently using the reserves in the internal environments, opportunities in the external environments of E_K respectively, takes under consideration 3 diagnosis criteria:
(10.1) long-term loyalty of the clients; (10.2) long-term loyalty of the suppliers; (10.3) long-term co-operation with the community and public administration.

It is as evident that the flexibility of the method [6] allows for a permanent embittering of the criteria structure of diagnosis of the competitiveness. In principle, the system of criteria must be considered as being open: when considered necessary the experts may add some other criteria considered as relevant for the case under analysis; in the same time experts may give up some of the criteria, considered to be irrelevant for the case (in this situation it appears, inevitably, the difficulty of comparisons with competitors).

III. Competitiveness diagnosis on d diagnosis directions 1+(10)

This is the first step in the stage (3) of the analysis of competitiveness A_{KC}. Step III quantifies the levels of performance and competitiveness using two categories of measuring / evaluations:

- determination of an aggregated mark (score) for the accepted diagnosis criteria,
- determination of competitiveness (total competitiveness K_{tot}, partial competitiveness, position / value on the market or in the external environment evaluated through the ratio quality N_{gi} / price P_{vi} etc.) under the situations and for the criteria where this is possible.

Evaluation process with marks (score) is the following:
- For every evaluation criteria c of diagnosis there are 7 evaluation steps established, giving the rating N_{ec}, using the scale 1-7 scores. The interval of measuring represents, as a rule, the difference between a situation of complete non-adaptability (or almost complete) to the requests of the competition in the market economy (one score) and a situation of competitiveness at a very high level – international – (seven scores).
- To justify the taking over of one of the seven steps specific for each criterion c, a description, of 1-2 pages concerning the evolution of the enterprise prospective from the point of the analysed criterion, is done by the evaluation team. The description is supposed to have a very practical character, offering some specialists the possibility to make their own opinion.
- For each criterion c it is also given a degree of importance, to which a coefficient of importance K_{ic} is attributed as follows:
$K_{ic} = 5$ – criterion c is very important
$K_{ic} = 2$ – criterion c is important (major)
$K_{ic} = 1$ – criterion c has reduced importance
- For major and important criteria, a supplementary „alarm threshold P_{ac}", under which there is the major risk that, for this single reason, the „enterprise situation" to deteriorate quickly (irrespective of score obtained for the rest of the criteria c). This alarm threshold is declared when the following two conditions are simultaneously present:

(a) one important criterion was evaluated with $N_{ec} < 2$ (on the scale of the 7 steps) or an important (major) with $N_{ec} = 1$,

(b) in addition, taking into consideration the situation and the specific of the enterprise, as well as the inter-independence of the evaluation

criteria, it is appreciated that a major risk occurred (so that not all situations that satisfy condition (a) are automatically considered to be under „the alarm threshold P_{ac}").

Obviously, within the strategies of competitiveness, within the programme of corrective actions respectively, „ wick link" revealed by the alarm threshold P_{ac}, are ment to undergo prioritary corrective operations.

From the evaluation mechanism presented, to a certain degree, exceptions are the 10 criteria from the direction of diagnosis d_9 „Financing", where because of their intrinsic nature, the evaluated measures do no longer need a ratio on the 7 steps scale.

- On the bases of the marks N_{ec} and of the ratios of importance K_{ic} we can calculate the aggregated mark N_d for each of the 11 directions d of diagnosis of competitiveness:

$$N_d = \frac{\sum_{c=1}^{n} K_{ic} \quad N_{ec}}{\sum_{c=1}^{n} K_{ic}} \text{ [points]} \qquad (d = 1+ 10) \qquad (4)$$

IV. Global diagnosis of competitiveness

This is the second step within stage (3) of the competitiveness analysis A_{KC}. Step IV quantifies levels of performance and competitiveness of the cluster / enterprise / …. E_K using two categories of measures / evaluations:

~ determination of an aggregated mark (score) for the actual state of the enterprise,

~ determination of competitiveness (total competitiveness K_{tot}, partial competitiveness, competitiveness profile, position / value on the market or in the external environment evaluated through the ratio quality N_{gi} / price P_{vi} etc.) where this is possible.

The process of evaluation with marks (score) is the following:

- On the basis of the 11 aggregated marks N_d, obtained for each of the directions of competitiveness analysis, the global estimator of performance is calculated (state of the entity E_K) S_E, as a balance mean:

$$S_E = \sum_{d=1}^{11} N_d \bullet p_d \text{ [points]} \qquad (5)$$

where p_d (d = 1,....11) represents the balance coefficients of the directions of diagnosis of competitiveness, adopted so that the condition of rate setting to be satisfied:

$$\sum_{d=1}^{11} p_d = 1 \qquad (6)$$

- On the basis of the global performance estimator (state of the entity E_K) S_E, the mark is settled to be given to the analysed enterprise, in accordance to the „scale of the 7 stars" (Table 1).

To finish the global diagnosis of competitiveness the conclusions of complex SWOT analysis are also used, of the portfolio analysis, benchmarking, respectively.

V. Conclusions and proposals to increase competitiveness

The conclusions of competitiveness analysis must be concise, clear, real, using the structural – functional directions known in the management of competitiveness and value. Some of the main solutions are shown in Table 1.

On the basis of the three ways of analysis (global performance estimator – state of entity S_E; portfolio analysis; complex SWOT analysis) one can give, up to the most detailed hierarchy levels, the directions of activity and phasing proposals to increase competitiveness.

Availability of a competitiveness analysis (complete or quick) A_{KC} corresponds to the interval from the moment of A_{KC} and the moment of the financial exercise conclusion, but not more than a year. Beyond this deadline, three categories of events can greatly modify the state of the enterprise S_E:

- Changes in the macro-economic internal or international environment, changes in the governmental economic policies are included (fiscal, monetary policies, restructuring programmes etc.),
- Unexpected changes in the market segment / niche where the enterprise is present (as for example, getting a major and favourable contract, finding an important foreign partner, actions of the competitors etc.),
- The management of enterprise or other important internal events.

Some aspects of the company „image" with structural or inertial character will still be valid beyond the availability of the competitiveness analysis.

4. Conclusions

Clusters of firms and related organisations in a range of industry specialisations are a striking feature of the economic landscape in all countries. Their growth and survival depends on internal

processes of specialisation, co-operation and rivalry, and knowledge flows that underpin the competitiveness of the firms within them. Cluster building, cluster competitiveness management is now among the most important economic development activities in EU countries and beyond.

A new integrative management of competetiveness and value [1] of cluster needs the development of a new method of managerial analysis.

The competitiveness analysis of a cluster / network / company has several steps:

I. Primary information and analyses

II. Identification of diagnosis criteria [c] for competitiveness

III. Competitiveness diagnosis on directions d of diagnosis "1+(10)"

IV. Global diagnosis of competitiveness. To the definition of global diagnosis of competitiveness, conclusions from complex SWOT analysis and of portfolio analysis / benchmarking respectively [5] are used

V. Conclusions and proposals to increase competitiveness (Table 1).

Availability for a cluster competitiveness analysis (complete or quick) A_{KC} corresponds to the interval between the moment A_{KC} and the moment of financial exercise conclusion, but no more than a year.

Table 1 The synthesis of the entity E_K (cluster, network, firm, ….) classification on the 7 position scale

Position S_E of the enterprise	Characteristic Competitiveness K	Examples of the recommended strategies for industrial and commercial restructuring
1*	Masked bankruptcy	-The profit centres identification, -Proceedings for the enterprise secession / merger, -Bankruptcy procedure and conserving patrimony actions
2*	Critical global situation	-Radical restructuring, -Emergency actions to surpass the " alarm threshold ", -Important decrease of activities and offer / market changes, -Important capital / know-how influx
3*	Difficult global situation	-Important restructuring and drastic economisation, -New objectives on short / medium term, -Management and marketing improvement, -Capital / know-how influx
4*	K in regional market	-New objectives and competitive strategies, -"Freezing" of the no profitable businesses, -Temperate capital / know-how influx
5*	K in national market	-Competitive strategies for E_K (businesses, firms, networks, clusters), -Partial restructuring, -Investments for the increase of the competitive capacity
6*	K in continental market	-Competitive strategies for E_K (businesses, firms, networks, international clusters), -Investments for the increase of the competitive capacity
7*	K in global market	-Competitive strategies for E_K (businesses, firms, networks, international multi / transnational clusters), -Investments for the increase of the competitive capacity, -Adequate restructuration on a short / medium term

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