Portfolio of Development Strategy in Cluster of Economic Interests

Alexander Ivanovich Afonichkin

Department Volzhskiy University named after Tatischev, Togliatti, Russia

Dmitry Gennadevich Mikhalenko

Department Volzhskiy University named after Tatischev, Togliatti, Russia

Michał Flieger

Adam Mickiewicz University, Law and Administration Faculty, Poznań, Poland

Abstract

The paper focuses an economic cluster, its definition and systematization. Its defines a class of economic cluster of strategic interests, considers integration of economic systems models into operational activity of a cluster, and forms an approach to cluster control on the basis of development portfolio. The structure and elements of development portfolio model are being defined and, a complex of tasks for coordinated control of development portfolio is being formalized in this paper.

Key words: development portfolio, economic cluster, cluster development strategy, cluster development portfolio, portfolio model, tasks of coordinated control of development portfolio.

Introduction

Under the current economic conditions in majority of production and regional economic systems existing as business units of a certain economic structure (regional, federal, global) associate their own development with a long-term socio-economic development policy ensuring competitive status within the frames of activity segment.

Therefore, for serious and detailed study of this issue a concept of strategic area of management, cluster, business-unit and other management instruments of complex economic systems is often used.

Recently, for instance, in regional economics a theory of cluster mechanism has been widely used. This cluster concept underlies this theory. The theory covers a wide range of tasks as for management of attraction, personnel infrastructure, employment increase and thereafter budget tax revenues.

1. Cluster definition

In generalized view a cluster means a group of objects with related properties, introduced into scientific usage of management processes by M. Porter[1], widening this witch the processes of production concentration by A. Lösch, U. Ayzard, A. Marshall and others and using it as a compact object management of competitive advantage.

A. Marshall explaining the reasons for concentration of small-sized and medium-sized companies with increased competitiveness[2] has mentioned three basic factors defining their competitive position: common market of experienced labour; local inter-companies trade, local inter-companies differentiation of labour.

It is here where a cluster is defined as a tool of formation of synergy effect, achieved through «saving» effect at the expense of rational interaction with resources and material suppliers, equipment suppliers, contractors, group of highly specialized labour.

In the paper of Dahmen E. the availability of "developmental block" is emphasized as well as its importance for fixing of connections between the capability of one sector to grow and the capability to make progress in another sector that gives the possibility to gain competitive advantages[3].

A cluster approach to research economic processes of competitiveness formation is used in a number of other theories. Thus E. Leamar considered export type clusters, J Tolenado and D. Soulie used "diamond die" concept as an analogue of technological chains, based on the technological connections between industries and economic sectors for realization of their potential

[1] Porter M., *On Competition,* Publishing House, Williams 2002.

[2] Marshall A., *Principles of economics:* In 3 volumes, V1, 1993.

[3] Dahmen E., *Entrepreneurial Activity and the Development of Swedish Industry,* 1919–1939, Stockholm, 1950.

advantage[4].

However the most recognized theory is a cluster theory of M. Porter, according to which a cluster is "a group of *geographic concentration* of interconnected companies (suppliers, producers, intermediates and interconnected companies and institutions in a particular field"[5]. Ipso facto the following cluster characteristics are outlined: geographical location (across a region up to international level), technological interconnections (material, goods, finished product, division of economic entities by industrial and economic sector composition (producers, suppliers, specialized production of associated components, components, services, financial institutions and others).

Depending on availability and degree of such factors development different types and kinds of clusters can be formed. To this end various cluster schemes are used. In detail a cluster theory is analysed in the paper of L.A. Karyakina[6]. In this paper there is given a review of approaches, methodology of organizing, purposes of cluster management.

However, the factors controlling and increasing level of production chains are the key factors A simple congestion of companies operating in allied industries across one region cannot be defined as a cluster. Between companies financial and economic flow interrelations must be developed and they should be balanced including branched network structures of such flows generating other types of interconnections.

So a cluster concept allows to manage entrepreneurial climate which defines regional business competitiveness. Moreover the primary role in competitiveness increase is not given to the certain industries but it is given to geographical and competitive concentration of companies, suppliers and other business institutions connected by technological chains of companies, suppliers and other business structures.

Other approaches to a territorial division of industries into local segments are associated with "territorially-production complex" concept (TPC) and strategic zone of economic activity (SZEA).

[4] Soulie D., *Filieres de Production et Integration Vertical*, Annales des Mines, Janvier 1989, pp. 21–28.

[5] Porter M., *On Competition*, op. cit.

[6] Karyakina L.A., *To the issue about clusters*, Herald of Volzhskiy University named by V.N. Tatischev Series "Economics" Nineteenth issue, 2009, pp. 44–48.

2. Clusters formation

In particular clusters and TPC differ from each other by forming methodology. The former are formed by market mechanisms using competitive attractiveness of independent companies of different types in order to voluntarily combine certain results. The latter are formed in line to the plan and strictly regulated methods with well-defined functions, production, interconnections where sector companies are the key enterprises.

So outlining cluster as an integration of varied interests driving strategic activity aims at certain economic systems. One can say the cluster is a concentration and a system of strategic interests of economic project. Moreover, the system of strategic interests is determined in the form of balanced integrated process and development of certain strategic factors of competition where the integration process should be formally defined.

Thus, in the paper an analysis of integration process is given and the term is defined. A definition analysis is based on the following integration features[7]:

- purpose of integration association building should be an integration of property, processes, technologies or any other assets of economic systems;
- integration is a pool of legal entities or legal entities and individuals (economic subjects) the number of which is more than two;
- integration is a system of interconnections between participants including economic, financial, civil legal relations and other relations;
- owners of integrated property and other assets can be participants of integrated process.

As a result of integration an integrated economic system (IES) is formed. It has its own production structure and a management structure. Their elements are interrelated; their system is defined independently and it depends on type, kind and aims of integration, established property relations and management processes.

Under legal regulations, in the IES structure it is possible to outline the systems complying with statutory requirements, and the systems organizing its integrated structures on the contract (unlawful) basis.

In compliance with legislation of the RF, the following forms of legal entities associations are provided:

[7] Dodonova S.V., *Integrated amalgamations of economic entities*, "Herald of Finance Academy" 2003, No. 1(250).

– associations and unions (provision 121 Civil Code), including lending agency (provision 3 Federal law "On bank and banking activities");
– general partnerships (provision 1041 Civil Code), including private partnerships (provision 1054 Civil Code);
– joint-stock companies with subsidiaries (item 1 provision 6 Federal law "On joint-stock companies");
– holding companies and finance holding institutions (the Decree of President of the Russian Federation "On Measures for Implementing the Industrial Policy During Privatization of State Enterprises");
– banking groups (provision 4. Federal law "On bank and banking activities");
– banking holdings (provision 4 Federal law "On bank and banking activities");
– financial and industrial groups (provision 1 Federal law "On financial and industrial groups");
– non-profit partnerships (provision 8 Federal law "On non-profit organizations");
– holdings (Federal law "On holdings").

In practice to build up such complex economic systems on the basis of integration processes, different interconnections are used depending on the concrete type of integrated economic systems and various integrated economic structures with different legal statuses[8]:

– integrated structures of holding type, incorporated in the form of legal entities, established on the basis of shareholders' (participants') agreement. In this case the interconnections between EIS managing centre and corporate centre have the status of mandatory directives;
– integrated structures of associative type with legal organizational form stipulated joint activity without forming of legal entity; in this case control actions of corporate centre have recommended but obligatory character.

Thus, a broad concept of integration and integrated process assumes the formation of a certain comprehensive whole with all the properties integration participants provided it with. Having focused the strategic aims of participants of economic or socio-political integration as integration assets it is possible to say about relations between strategic goals systems of a certain economic project and the opportunities (potential) of a certain group of territories (cluster) to achieve these goals.

In this connection one can outline a cluster of strategic interests among other possible cluster types.

[8] Tsikhan T.V., *Cluster theory of economic development*, "Problems of Management Theory and Practice" 2005, No. 5.

3. Modern cluster approach

Let us consider in detail a cluster concept as the subject of economic management.

The analysis of a cluster concept and its types are examined rather sufficiently in the papers[9].

In the available theoretical material on the analysed problem there are outlined three broad definitions of clusters in the cluster theory:

1. "Cluster" concept is considered as regionally limited forms of economic activity within related sectors usually tied to these or those scientific establishments and closely interacting with each other for collective competition enhancement.

2. "Cluster" concept is defined as vertical production chains, networks, which are formed around head companies and are linked through buyer--supplier, supplier-buyer relationships, and common chains of purchasing or distribution.

3. "Cluster" concept is interpreted as sectors of industry defined on the high level of aggregation (e.g. "metallurgical cluster"), sectors' collection at higher level of aggregation (e.g. "agro-industrial cluster"), pool of regions with similar socio-economic status.

In view of our conclusions about the possibility of territorial concentration of strategic purposes of a complex economic system, one can speak about availability of *the forth group of clusters*, i.e. about clusters of strategic interests. A system of offshore territories can be given as one of the practical samples of interests concentration. In this connection a cluster concept can be interpreted in the following way.

4. "Cluster" concept is defined as a potential of territory and economic objects (sectors, international or territorial) concentrated in this territory for the satisfaction in strategic interests of a certain economic system integrated into a cluster structure.

The key definitions of "cluster" concept outlined in this research allowed to systematize scientists' views in economics concerning its essence. However in isolated cases, it is difficult to draw a unique conclusion on adherence of the author to one of the outlined versions. Nevertheless a variety of approaches to the interpretation of "cluster" category testifies the intensity of development of

[9] Soulie D., *Filieres de Production et Integration Vertical*, "Annales des Mines", Janvier 1989, pp. 21–28.

cluster mechanism theory in foreign and domestic practice as well.

In connection with the possibility to consider a cluster as the potential for satisfaction of strategic interests of economic project it is necessary to outline the possible approaches to development of such type of a cluster. As the cluster interests are reflected by a great number of strategic goals which form the competitive advantage and require development of assets of different type, property, technology and others balanced in cluster structure and provide synergetic effect one can use the methodology of the coordinated development portfolio[10].

Let us define the primitive features of development portfolio and formulate the principles of managing process of it in the activity of economic systems working in the cluster of strategic interests and name such portfolio as an investment portfolio of development (IPD) as it reflects the system of development factors, their priorities, correspondence to strategic goals, degree of accessibility, development management budget, etc.

4. Portfolio model

On the basis of the goals of all cluster elements, reflecting a corporate nature of economic system, we can define a forming procedure for this portfolio model.

A generalized cluster model potentially meeting strategic interests of integrated complex structured economic systems can be presented as a set of elements (value creation chains acting in cluster) combined in the overall technological process of IES[11]. In each chain there are assets, property, production factor, finances, etc. integrated by different economic systems within the cluster. It means that each chain element has its own competition process in the content of basic value chain. Such elements aggregation actually gives the opportunity in the cluster structure to get synergy effect resulting in strategic interests achievement.

Thus the operation of this integrated technological chain in a cluster includes the following components:

[10] Geraskin M.I., *Coordination of economic interests in corporate structures*, RAS. Publishing house, Anko. 2005, p. 293.

[11] Vasiliev P.V., Afonichkina E.A., *Control of the integrated economic systems development portfolio*. Monograph. Publishing house Volzhsky University named after Tatischev, Togliatti 2009, p. 408.

– interacting elements *and* certain IES – participants of technological chain. The total amount of them in chain is K, $\{u_1, u_2, u_3,\ldots,u_K\}$, $k = 1\ldots K$.
– a participant of the acting IES in the cluster area defined as a IES managing centre (for corporate systems of holding type) let us identify it as index $k = 0$. Such a participant controls and coordinates other elements.
– a complex of operations to perform operational actions in chain. These operational actions in a chain are run by a local actions' participant in a cluster, a k cooperation participant has a number of operations equalling to N_k, $n = 1,2,...$ Nk. index is given to a corresponding participant.
– external companies not integrated into IES interacting with cluster elements chain. Their quantity is T_k, index k identifies IES system element, which has such interaction $t = 1,2,... T_k$.

Then if we determine the cluster model by its possible conditions to a certain extent reflecting the achievability of strategic interests and indicate the condition as S_{IES}, then we can say that each element is defined by command vector $u = \{u_k \cdot k = 0–K\}$, $\{u_0\, u_1,\ldots\, u_K\} \subseteq S_{IES}$, and each element of a cluster chain has its own target command vector z_k which also provides the achievement of system-wide (cluster) targets z^O.

So a target vector of interests of cluster chain elements is defined as $zk = z^O + z^k$. In this case we assume that a target vector of element can be reached by realization of projects development complex oriented to the development of chain element and system-wide development. So we think that z^k is defined by projects vector $\{p_1, p_2,\ldots,p_n\}$, but z^O is defined by vector of system-wide (cluster) projects $\{p^O1, p^O2,\ldots, p^Ok\}$, where k index characterizes a part of system-wide project of each element.

For achieving of the whole target complex of interests, the total complex of projects on all elements of cluster chain is defined by

$$u = f(x)\,,\; U\sum_{k=1}^{K} u_k + u^o\,,\; z_k = z^O + z^k\,,\; z^k = f(\{p_1, p_2, \ldots, p_n\})\,,$$
$$z^O = f(\{p_1^o, P_2^o, \ldots, p_k^o\})$$

Taking it into account, we find that a cluster development is defined by a complex of projects of this type

$$U = \sum_{k=1}^{K} z^k + u^o = \sum_{k=1}^{K}\sum_{n=1}^{N} p_{kn} + \bigcap_{k=0}^{K} p_k^o\,, \tag{1}$$

Therefore, formula (1) defines a model of a cluster development portfolio as a set of chain elements working in a cluster.

The target of a cluster operation is defined as maximization of generalized vector criteria

$$R = \{u^k \cdot U, p_k, p^o, E^k\}, \tag{2}$$

the components of which are the individual criteria of efficiency E^k on each project of each cluster element.

Interpreting managing problem of the cluster development for some chain elements of a cluster and separate managing sections of IES working in a cluster we can formulate the following tasks.

For central element (IES managing) the task of an effective development is to determine the control vector maximizing criterion (2), with regard for existing limitations for resources, investments and initial potential of each element. And the level of economic potential is consistent with cluster development and cannot be bigger than cluster resource for this kind of potential (for example, manpower resources, budget investments etc.)

Let us determine the coordination problems of cluster development projects. To this end we will consider cluster economic structure and then analyse the basic cluster element interactions in accordance with goal oriented system predetermining strategic goal management and feasible region of management (region of component interests co-ordination).

1. Task for horizontal coordination of participants in technological chain in cluster. In this interaction the scheme elements are in industrial-engineering relationships which define horizontal interactions, maximizing performance criteria of participants integrated into the chain. The area of coordination covers capital flows, volume of recourses and goods deliveries circulated within the frame of the technological chain. Accordingly the volumes of in-house financing of IES activity and its turnover are the control parameters in this case. Particularly, in-house coordination of interests is based on the selection of agreed values for the following control parameters:

- volume of financial resources transferred, attracted and allocated in the chain and in-house prices (rates) for attraction and allocation of resources;
- volume of transferred products and recourses produced within the frames of separate manufacturing operation of products, works, services and in-house costs of contracts for transfer of corresponding values, assets, technological tooling etc.;
- volumes of turnover among wholesale and retail market sectors, including in-house market, cost (extra-charge) of contracts for transferring of appropriate values are the control parameters for chain participants, who sell final output;

- volume, stock, cost of purchasing, optimized for technological cycle of each operation are the control parameters for chain participants, who purchase material, raw material, components, etc.

Unit profits of operational areas in IES companies-participants, control centre, cluster structure represented by control bodies are performance criteria for coordination of horizontal interactions inside IES.

2. Task for vertical in-house coordination of chain participants' interests. The task is to manage the process organization by way of in-house interactions which maximize performance criteria of managing process in IES and a cluster. Coordination covers management of information flow and the system of feedback indicators, financial results and their redistribution within frames of contracts for sharing results between IES and a cluster. In this case control parameters are:

- volume of in-house and cluster financing by means of investments, assigned by owners (shareholders), a part of cluster budget, etc. to the development of chains which are in IES and working in cluster;
- cluster potential, selected by certain chains for operation as necessary;
- amount of dividends allocated to owners (shareholders) of IES itself from profit received;
- financial results, obtained by IES and distributed inside the system.

Performance criteria for coordination of in-house interactions are – on the one hand – a local profit and development assets which are at the disposal of organizations-participants of the chain and the owners of IES after dividend payment to the owners (shareholders) $R = \{R_0^k, (R_1^k, R_2^k, \dots R_N^k)\}$, on the other hand dividend amount $\{R^0\}$, received by the corporate owners (IES shareholders). A complex efficiency criterion of vertical in-house interactions is of following form $R = \{R^0, [R_0^k, (R_1^k, R_2^k, \dots, R_N^k)]\}$.

3. Task for horizontal coordination of external organizations' interests and participants of cluster economic processes. The task is to control horizontal interactions of external organizations which are attracted to the certain sub-processes and maximize their performance criteria together with participants included into a cluster chain structure. Co-ordination covers financing volume, volume of delivery of resources and goods, circulating among chains' participants of different kinds of companies – either autonomous, state companies or in the structure of other corporations (IES). Accordingly, in this case the control parameters are the volume of inter-company turnover. Particularly inter-company coordination of interests proposes a selection of co-ordinated values of the following control parameters:

- in organizing and functioning of chains – volume of financial resources attracted and allocated in the area of their attention and inter-company prices (rates) for attraction and allocation of resources;
- in economic activity – volume of rendered services, timing and inter-company prices for transmitting services;
- in purchasing – purchasing volume, timing, purchasing nomenclature, services, tracking services and in-process cost of transferring of the corresponding values to the next technological operation;
- in interaction between trade partners on selling goods, volumes of transferred products, works, services, cost of promotion and logistics are the control parameters.

In the capacity of performance criteria for co-ordination of horizontal interactions between external organizations, participating in execution of certain processes of integrated chain in forming prices are profits of interacting external companies, corporate part of cost and profit of internal corporate participants which are equal to aggregate profit of all chain participants in form of

$$R = \sum_{n=1}^{N} R_n^k ,$$

Complex efficiency criterion of horizontal inter-corporate interaction of chain participants, a number of which is *t*, is in form of

$$R = \left\{ \sum_{n=1}^{N1} R_n^k , \ldots , \sum^{N} tR_n^{Kt} \right\}$$

IES managing centre carries out the direct coordination of such horizontal interactions either being a participant of integrated economic structure or an allocated amalgamated IES managing centre. Sometimes in order to meet cluster interests cluster observers are included into the center body.

Conclusions

Thus as we see in this paper there is formulated a concept of economic cluster potentially expressing strategic interests of economic systems operating in the cluster. There is given a general enunciation of control problem in a cluster of strategic interests. A concept of development portfolio in respect to a cluster of

such a type is substantiated. A mechanism of cluster management in the way of co-ordinated portfolio of development strategies is defined. Formalization of problem in selection of development lines and problem of co-ordination of development cluster portfolio structure and elements working in the cluster are also provided.

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Резюме

Стратегия развития в кластерах и экономическая эффективность

Предметом настоящей статьи являются экономические кластеры. Автор представляет их дефиницию, а также предпринимает попытку систематизации. Экономический кластер дефиирован как элемент со стратегическим значением, касающийся интеграции экономических систем, а также их моделей в одну, действующую систему. Возможно применение разных подходов, связанных с управлением кластерами и контролем их функционирования. Для этой цели служит портфолио развития кластеров. В статье приведена дефиниция модели портфолио развития и дополнительно представлены сложные задачи, вытекающие из координации действий кластеров.

Ключевые слова: экономический кластер, стратегия развития кластеров, портфолио развития, модель портфолио.

Alexander Ivanovich Afonichkin. Doct.Sc, the professor, department of Marketing and ITE. The basic scientific problems lying in sphere of scientific interests: management of innovative-investment development of the enterprises, acceptance of optimum decisions in management of the enterprises, modelling of control systems with active elements.

Dmitry Gennadevich Mihalenko. Vice-president of JSC "AUTOVAZ", Ph.D., senior lecturer at the Department of Marketing and ITE. Trained on a number conducted foreign автомобилестроительных in the enterprises (Toyota, Subaru, Mazda, BP, MAZAK, Jaguar). The basic scientific problems lying in sphere of scientific interests: optimization of organizational structure of management in large industrial complexes, methodology of designing and formation of the balanced corporate structure, modelling of the coordinated management in corporate organizational systems.

Michał Flieger. Ph.D., lecturer at Adam Mickiewicz University in Poznań. The basic scientific interest is process management in local offices, modern management concepts in public organizations, human resources management in public sector.