Development of SME within the Regional Cluster

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Abstract

Existing cluster policies, which are being implemented in some developing countries, tend to be directive and inflexible; moreover, artificial clusterization may lead to suppression of SME in a region and to decrease in social welfare. Therefore, cluster strategy modernization is of a great significance.

1   Introduction

This article provides some negative aspects of mass and enthusiastic cluster initiatives, taking place in developed, as well as in developing regions. Notably, the formers have some significant experience of industrial agglomeration and clusterization; in addition, a sufficiently free and competitive market is at their disposal that enables effective structures to emerge and evolve. The latters tend to carry out activities, aiming to build working clusters "from scratch". Directive measures, however, cannot provide the development of internal communication networks, which is part and parcel of a positive agglomeration effect. We aim to reveal the inefficiency of existing administrative cluster policies (e.g. in Russia)

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and to bring forward some recommendations for the new cluster strategies creation.

2   Methods and Models

2.1 Comparison

Basically, there are two general models of cluster policies' implementation: an Anglo-Saxon and a continental. Within the Anglo-Saxon model the enterprises are enabled to integrate under the influence of market forces ("lassez-faire" model). The continental model implies an extensive presence of governmental initiatives in cluster formation.

2.2 Cluster data

Some data, provided the European Cluster Observatory (available at http://www.clusterobservatory.eu/) were used. Particularly, the information about an average firm size in a cluster and regional GDP was studied. Methods used include grouping, growth rate calculation and logical analysis. The objective consisted mainly in Type I errors withdrawal. In the further investigations we plan to carry out a substantial mathematical analysis.

3   Background

Some certain negative global phenomena, taking place in view of the cyclicity of the world economy development, indicate the inflexibility of sectorial industry structure, its instability and incapability of responding to abrupt market changes and trade recessions. Crisis wave, along with modernization policies, proclaimed by developing countries' governments, brought to life numerous attempts to cultivate cluster initiatives (based on the western model).

Industrial clusters tend to be concerned as a panacea by many theorists and researches of regional economic development who claim that clusterization process can help to overcome the gap between industrial and informational economic setups, to create a competitive advanced economy based on the innovative technology [6].

However, there are numerous side effects of clustering described in literature, including environmental deterioration (especially in the case of heavy industrial agglomerations), reduction of marketing flexibility through the obsolete and inertial cooperation patterns, technological unification on the basis of informational spillovers, skilled workforce rotation within the cluster [7]. We think it is fundamentally wrong to shift the main focus of regional development

policies to the processes of clusterization in view of the specific nature of integration and territorial industry structures' formation.

4   Prerequisites for Cluster Effectiveness

4.1 Evolutional character

Existing experience of clusterization indicates that the most effective clusters have evolved evolutionally, engaging related and complement industries in its structure, including businesses which are capable of competition and cooperation at the same time – thereby increase in manufactured products' quality and cost reduction are caused by the agglomeration effects. But synergy, which is inherent in "naturally grown" industrial structures, cannot be observed in case the enterprises are grouped under the overall resources and strategic basis within the implementation of "the state cluster policy concept". [9]

Suggesting a notion of cluster we adhere the approach of M. Porter. In accordance with his fundamental paper "Competitive Advantage of Nations" clustering is a process, mediated with the compulsory presence of competitive advantages of the territory or the industry. By M. Porter [8], cluster is a "geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field", which is "considered to increase the productivity with which companies can compete, nationally and globally".

4.2 Heterogeneity

As regards the lack of synergy within the administratively formed structures, it may also be attributed to the theory of M. Porter, who concludes the positive nature of clusterization from its most fundamental feature – being a vehicle for a maintaining diversity and overcoming the inward focus, inertia, inflexibility, and accommodation among rivals that slows or blocks competitive upgrading. However, for the positive externalities to arise, it is necessary to gather a critical mass of business and social organizations within the cluster. Another important phenomenon is an informational or technological spillover, as it influences a lot on the processes of agglomeration and convergence – in a positive, as well as in a negative way, leading to standardization and unification of technological base and a lower level of competition [7].

5   The Role of SME

We are coming forward suggesting two negative aspects of regional industrial clustering, aiming to prove the inadmissibility of cluster concept as a

universal solution to all the issues related to regional economic development: (1) negative effect owing to the strong cluster's influence on the market powers; (2) inadequate cluster policy, which is mainly directive and does not meet the terms of effective agglomeration processes.

5.1 Clusterization risks

Strange as it may seem, the risks of creating a regional cluster result from its particular strengths, namely: high competitiveness and adaptability in comparison with a separate entity. Even when still taking shape, a young cluster tends to occupy the leading positions in an industry. As a result, the competition as an incentive to develop and improve business strategies stops working [1].

A strong cluster suppresses the enterprises, which remain beyond the borders of cluster infrastructure, taking away their market shares due to the essential advantages in costs and product innovations. There is little doubt that such outsiders are represented by small and medium enterprises (so-called SMEs), not to mention micro-businesses, which are hardly to survive in such a "neighbourhood". It may be attributed to the concept of cluster policy in Russia: it is focused undoubtedly on the introduction and modernization of advanced technologies, while only large-scale business can afford the elaboration and application of R&D, to a considerable extent [3].

Bearing in mind that extensive presence of SME in a region is a key factor of poverty reduction, artificial clustering could lead to paradoxical decline in living standards within some social segments while improving economical indicators "per capita" (e.g. regional GDP). Not in the least this subjects to making private entrepreneurship less attractive; another factor is the distortion of prices following the irrational policy of resource allocation [11]. The process of artificial clusterization may lead to the emergence and deepening of regional underdevelopment whirlpools in the areas around the major clusters [5].

5.2 Studying the data

This estimate is consistent with a set of data examined while studying the clustering processes in the European regions (Table 1).

As seen from Table 1, by reducing an average size of the firm in cluster, especially in an innovative one (as an example we have studied the data on the chemical industry and IT), as a rule, one can observe an increase of regional gross national product per capita. Although the very data cannot serve as a direct proof of positive effects that the involving of SME in cluster patterns has on their productivity and regional wellbeing, they still allow rejecting the Type I error in foregoing provisions.

Table 1: Presence of SME in clusters and per capita GDP dynamics

Region	Year	GDP per capita, €	An average firm size within the cluster (average number of employees)		Growth rate, %		
					Firm size		GDP
			Chemistry	IT	Chemistry	IT	per capita
Austria	2002	25855,4	47,7	8,7	-	-	-
	2003	26308,8	42,5	7,2	-10,90	-17,24	1,75
	2004	27459,5	43,4	7,1	2,11	-1,39	4,37
	2005	27959,7	38,9	7,1	-10,36	0,00	1,82
	2006	29423,7	40,4	6,7	3,85	-5,63	5,24
	2007	30563,5	38,2	6,2	-5,44	-7,46	3,87
	2008	30563,5	48,6	6,9	27,22	11,29	0,00
	2009	30563,5	48,6	6,9	0	0,00	0,00
Belgium	2002	25654,3	87,6	17,5	-	-	-
	2003	25568,9	82,9	16,2	-5,37	-7,43	-0,33
	2004	26240,6	94,8	17	14,35	4,94	2,63
	2005	26925,1	96,7	17,2	2,00	1,18	2,61
	2006	27836,5	93,5	16,3	-3,31	-5,23	3,38
	2007	28803,3	89,8	16,6	-3,96	1,84	3,47
	2008	28803,3	92,2	15,8	2,67	-4,82	0,00
	2009	28803,3	92,2	15,8	0,00	0,00	0,00
Cyprus	2002	18300	13,3	10	-	-	-
	2003	18400	12,9	10,3	-3,01	3,00	0,55
	2004	19600	15,4	10,5	19,38	1,94	6,52
	2005	20400	9,8	10,7	-36,36	1,90	4,08
	2006	21400	10,2	11,3	4,08	5,61	4,90

	2007	23300	9,5	10,9	-6,86	-3,54	8,88
	2008	23300	6,5	8	-31,58	-26,61	0,00
	2009	23300	6,5	8	0,00	0,00	0,00
Finland	2002	23498,8	28,6	8,4	-	-	-
	2003	23363,1	28,2	8	-1,40	-4,76	-0,58
	2004	25128,4	29	7,6	2,84	-5,00	7,56
	2005	25615,3	26,2	7,7	-9,66	1,32	1,94
	2006	27162,1	28,5	7,6	8,78	-1,30	6,04
	2007	29365,3	28,7	8,1	0,70	6,58	8,11
	2008	29365,3	27,3	7,7	-4,88	-4,94	0,00
	2009	29365,3	27,3	7,7	0,00	0,00	0,00
France	2002	24041,5	48	20,6	-	-	-
	2003	23450,4	46,6	19,2	-2,92	-6,80	-2,46
	2004	24098,9	47	18,9	0,86	-1,56	2,77
	2005	25150	47,6	18,8	1,28	-0,53	4,36
	2006	26016,3	46,7	18,9	-1,89	0,53	3,44
	2007	27336,5	45,9	17,3	-1,71	-8,47	5,07
	2008	27336,5	46,6	17,4	1,53	0,58	0,00
	2009	27336,5	46,6	17,4	0,00	0,00	0,00
Lithuania	2002	9000	26	13,5	-	-	-
	2003	10200	26,4	15,9	1,54	17,78	13,33
	2004	10900	24,9	18,3	-5,68	15,09	6,86
	2005	11900	22,5	20,4	-9,64	11,48	9,17
	2006	13100	24,3	14,6	8,00	-28,43	10,08
	2007	14800	23,6	9,9	-2,88	-32,19	12,98
	2008	14800	23,6	9,9	0,00	0,00	0,00
	2009	14800	23,6	9,9	0,00	0,00	0,00

	2002	24813,6	21,9	3,4	-	-	-
	2003	25422,1	19,4	3	-11,42	-11,76	2,45
	2004	27032,2	18,6	2,8	-4,12	-6,67	6,33
Sweden	2005	27035,5	18,4	2,7	-1,08	-3,57	0,01
	2006	28669	19,2	2,8	4,35	3,70	6,04
	2007	30596,3	19,5	2,8	1,56	0,00	6,72
	2008	30596,3	19,9	2,6	2,05	-7,14	0,00
	2009	30596,3	19,9	2,6	0,00	0,00	0,00

6   Some Recommendations for Developing Cluster Strategies

At the present time, it is not possible to withdraw from the benefits of clustering facing its "weak points", but the urgent modernization of cluster policies is needed in many developing countries, including Russia. Directive measures should be replaced by the support of potentially effective structures that are in an embryonic state.

Analysis of local markets and individual companies should be based on the created (but not on the inherited) factors of production. Moreover, it should not be focused on the cluster leaders, as the preceding experience indicates, that the major GDP is being created in the small and medium-sized enterprises (Table 2) [2]. In the developed countries (e.g. UK, Germany, USA, Italy, France and Japan) this share exceeds 50 per cent. Therefore, clustering should be based rather on the business establishment and the integration by means of facilitating the access to private capital and the outlets than on the infusion of federal, regional and local funds in the existent firms.

Small businesses represent an important element in the cluster structure, promoting the competition and ensuring the flexibility, rapid response to the emergence of new market needs [4]; SMEs are a distinctive "ground" for innovation, as start-ups with small capitalization generate ideas that can be either bought or supported by large-scale members of a cluster core.

The status and role of big-sized enterprises and SMEs is one of bone of contention, which is the so-called dispute of "Schumpeter's assumption". The origin of that dispute lies in the contradiction between technological innovation vigor and technological innovation economy of scale. Positive analysis by Roy Rothwell and Mark Dodgson et al. (1993) show that big-sized enterprises possess more sufficient innovative resource and have "resource advantage" thus can get more benefits from economy of scale in technological innovation. Their

organization rigidity and market monopoly position, however, will prevent them from innovating. On the contrary, SMEs have stronger innovative consciousness and are more sensitive to new technology because of flexibility of their system and competitive pressure. Furthermore, they act more quickly thus have obvious "behavior advantage" due to their lower technological shift cost. But excessive competition and weak economic and technological base makes technological innovations difficult to realize within rational scale for SMEs. Therefore, either big-sized enterprises or SMEs seem to be faced the dilemma in technological innovation: the former have innovative economy of scale but lack of innovative vigor, and the latter is just the reverse.

Table 2: Number of enterprises, employment and gross value added in EU-27, by size class, 2010 (estimates) [2]

	Micro	Small	Medium	SMEs	Large	Total
			Enterprises			
Number	19,198,539	1,378,401	219,252	20,796,192	43,034	20,839,226
%	92,1	6,6	1,1	99,8	0,2	100
			Employment			
Number	38,905,519	26,605,166	21,950,107	87,460,792	43,257,098	130,717,890
%	29,8	20,4	16,8	66,9	33,1	100
			Gross value added			
EUR Millions	1,293,391	1,132,202	1,067,387	3,492,979	2,485,457	5,978,436
%	21,6	18,9	17,9	58,4	41,6	100

Some of the problems/ challenges the SMEs facing are:

(1) Unable to capture market opportunities, which require large production facilities and thus could not achieve economies of scale, homogenous standards and regular supply.
(2) Experiencing difficulties in purchase of inputs such as raw materials, machinery and equipment, finance, consulting services, new technology, highly

skilled labor etc.

(3) Small size hinders the internalization of functions such as market research, market intelligence, supply chain, technology innovation, training, and division of labor that impedes productivity.

(4) Emphasis to preserve narrow profit margins makes the SMEs myopic about the innovative improvements to their product and processes and to capture new markets.

(5) Unable to Compete with big players in terms of product quality, range of products, marketing abilities and cost.

(6) Absence of a wide range of Financing and other services that are available to raise money and sustain the business.

(7) Absence of Infrastructure, quality labor, Business acumen and limited options / opportunities to widen the business.

(8) Poor IT and Knowledge infrastructure.

Therefore, the need to integrate small and big businesses (aiming to make the whole system more effective) is nowadays realized and actively supported. J. - L. Truel [12] points out a dramatic increase in a number of SME within the French clusters, which had been keeping a traditional focus on the large corporations for a long time. Since 2005, small and medium-sized companies became paramount numerically as well as in gaining support. Forms of cooperation include mostly the outsourcing of short-run production, cooperation in research, but there are some examples of independent small-scale enterprises' incorporation in the large corporations' organizational structure [10]. Evolutionally, a planetary subsystem is taking shape: while cluster core acquires a resource "gravitational field", which attracts small businesses, they endeavor to engage in this field (Figure 1) [2].
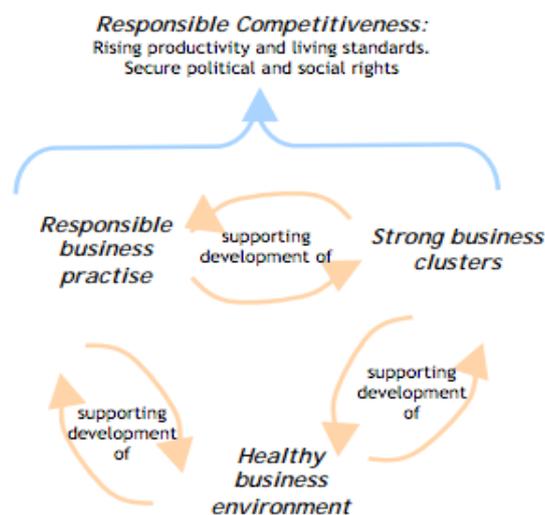

Figure 1: Responsible competitiveness

Evolutionary character seems to be a paramount feature, which defines the effectiveness of the whole integration process [4]. Under the conditions of a free market and without any administrative pressure or other artificial clustering policies carried out in a region, large firms naturally seek to fill in the lack of flexibility establishing less competitive and more cooperative relations with small business. Otherwise, efficient allocation of resources among all the players does not take place.

Enterprises are the main undertakers of technological innovation, and SMEs with most vigor account for much of these. With the coming of knowledge economy and the development of high and new-technology industries all over the world, the role of SMEs in technological innovation is more and more important.

Assessing the cluster's knowledge transfer capacity one can found that performance is very mixed between firms within the cluster. Basically, there are four main types of firm: knowledge sources, mutual exchangers, absorbers and isolated firms (Table 3). Core firms had higher absorptive capacity and 'tend to transfer knowledge more often within the core. As expected, they are also identified as sources of knowledge by peripheral firms.

Table 3: Main types of firms considering knowledge transfer capacity

	Low openness	Medium openness	High openness
Source			Technological gatekeepers
Mutual exchanger		Mutual exchangers	
Absorber			External stars
Isolated	Isolated firms		

The most main disadvantage of SMEs is lack of economy of scale in technological innovation. But now, it's clear that this point of view is considered just only from the perspective of internal economy of scale. According to the theory of external economy of scale, when numerous interconnected innovative SMEs concentrate together to form enterprise cluster, external economy of scale of technological innovation happens. Cluster, the organizational foundation of external economy of scale, is built on intermediate organizations, which is similar to Williamson's so-called "bilateral governance", and is a medium between pure market organization and pure hierarchy organization (Figure 2). Those enterprises in the same cluster are easy to establish stable cooperative relation because of geographic concentration and industrial relevancy. As the horizontal and vertical cooperative relation is built continuously, the whole cluster can develop into a net of value chain groups based on complementary resource and resource-sharing.
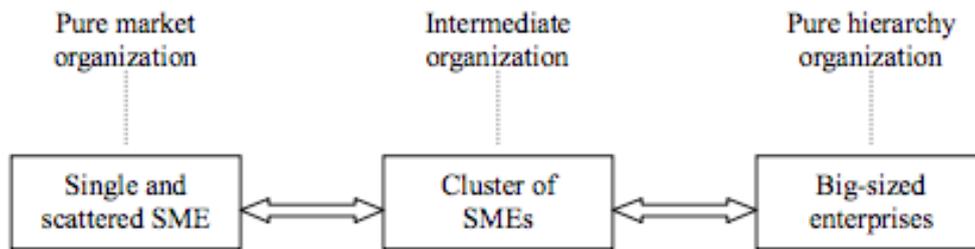
Figure 2: The pedigree of enterprises

On the basis of studying the western experience of clustering a strategic algorithm for promoting regional cluster activities was drawn up (Figure 3). The ultimate goal of its implementation is the construction of infrastructure, building of the close cooperative relations between the competing (either directly or indirectly) players.

The programme of activities includes three main stages: (1) Cluster environment analysis; (2) Cluster development policy-making and a cluster infrastructure planning; (3) Introduction of a regional clusterization strategy, including efficiency monitoring and prognostication activities.
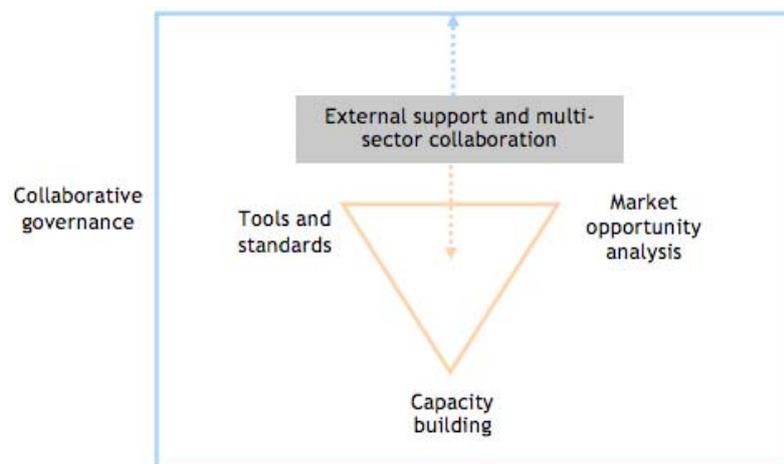

Figure 3: A framework for developing responsible clusters

One of the results reported should be an effective participation of the administrative structures in the cluster development by means of an effective support strategy and feedback channels creation. An important aspect of the work consists in promoting small and medium-sized business participation within the cluster at all stages of its formation and evolution.

7   Conclusion

In developing countries, making the SMEs more competitive is particularly pressing as trade liberalization and deregulation increase the competitive pressures and reduce the direct subsidies and protection that Governments offer to SMEs. If our SMEs are to be competitive enough to withstand and fight back the foreign MNC products, they have to be nurtured. According to Porter, "the only meaningful concept of competitiveness at the national level is Productivity, which is the value of outputproduced by a unit of labor or capital. Productivity in turn depends on both the quality and features of products (which determines the prices that they can command) and the efficiency with which they can be produced. Productivity is the prime determinant of a nation's long-run standard of living; it is the root cause of national per capita income". Further, " to find answers, we must focus not on the economy as a whole but on specific industries and industry segments. We must understand how and why commercially viable skills and technology are created, which can only be fully understood at the level of particular industry".

International trade and foreign investment can both improve a nation's productivity as well as threaten it. They expose the nation's industries to the test of international standards of productivity. An industry will lose out if its productivity is not sufficiently higher than its rivals to offset any advantage in the local wage rates. As wage rates in developing countries are sufficiently less to attract multi-nationals, the only way is to increase the productivity of local small industries. This means, the increase in the productivity of labor i.e. human resources, the productivity of capital and that of the process, which in turn relates to the use of technology that yields quality and innovative products.

References

[1]   W.D.C. Chung, Positive aspects and risks of cluster zones' formation in the civil aviation, *Moscow State Technical University of Civil Aviation Bulletin*, **167**, (2011), 100-104.
[2]   S.A. Mirosedi, Small business as a strategic resource of the Russian Economy, *Saratov State Technical University Bulletin*, **2**(1), (2009), 233-241.
[3]   E.G. Popkova et al., Economic growth in the context of developing economies, *Proceedings of the conference Problems of development of worldwide economy in after crisis period*, Graduate School of Management, France, (2010), 75-80.
[4]   E.G. Popkova et al., New Quality of Economic Growth Concept, *JEPA 2009 Papers, Center for National University of Finance and Management*, Tokyo, (2009), 1-11.

[5]   E.G. Popkova et al., *Underdevelopment whirlpools. The analysis of the economic growth disproportions in the Russian regions*, LAP LAMBERT Academic Publishing GmbH & Co, 2011.

[6]   S.V. Orlov, Economic and Legal Foundations of clustering in Russia, *Kaliningrad MIA Law Institute Bulletin*, **3**, (2010), 76-80.

[7]   M.K. Romanova, Intellectual spillovers in cluster as a factor of R&D cost-effectiveness, *Proceedings of the V International Students' Scientific-Practical Conference,* Novosibirsk, **2**, (2011), 238-244.

[8]   M.E. Porter, The Competitive Advantage of Nations, *Harvard Business Review*, March, 2009.

[9]   P. Andriani, Challenging Clusters: The Prospects and Pitfalls of Clustering for Innovation and Economic Development, *Summary Report from an AIM Management Research Forum in Cooperation with the Welsh Economy Research Unit,* (2005).

[10] J. Haagedorn and N. Roijakkers, Small entrepreneurial firms and large companies in inter-firm R&D networks, *MERIT, Faculty of Economics and Business Administration, University of Maastricht*, 2000.

[11] A. Rodriguez-Clare, Coordination Failures, Clusters and Microeconomic Interventions, *Research Network Working papers, Working Paper*, **544**, (2005).

[12] J.– L. Truel, *Implementing a successful cluster policy: some clues from the French experience*, Université Paris 12, 2011.