CLUSTERS – A WAY TO ECONOMIC DEVELOPMENT IN CENTRAL AND EASTERN EUROPEAN COUNTRIES

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Clusters can be localized in almost every economy. Criteria used during cluster mapping allow to localize concentrated enterprises and other entities which might created a cluster. It is helpful in fostering cluster-based economic development.

Europe tends to rank high on the quality of institutions, but low on its ability to mobilize these inputs through entrepreneurship and new firm formation.

Europe also tends to rank high on R&D spending and scientific capacity but low on its ability to turn research into economically valuable innovations. Clusters have the potential to transform outcomes in both dimensions: healthy clusters provide an accessible network of skills and capabilities, i.e. a microeconomic business and innovation environment that enable entrepreneurs to move from an idea to a business activity. And healthy clusters provide an efficient environment to move from a scientific advance or a new business concept to a market test.

Central and Eastern Europe on countries are a special region with the planned economy in their history. Clusters might be a good solution for their problems, they can be "engines" of the economy if they grow in the right environment. But we mustn't expect that the second Silicone Valley appears in our neighbourhood. Clusters develop over time, and clusters in Central and Eastern European countries are still labour-intensive, not technology-intensive ones. And a unique history of the region, which is part of its path of development, determines its future. So, the question "Are clusters a right way of economic development for the CEEC?" deserves a positive answer. But it is worth noting that the unique conditions create unique solutions, so clusters – yes, but different than in Western Europe and probably never that effective.

Keywords: *clusters, cluster-based development, competitiveness*

Cluster-based economic development has nowadays become the most attractive way to speed up economies. Central and Eastern European countries are the subject of many national projects which aim at turning them to the cluster-based economic development. The question which is worth asking here is: "Are clusters the proper solution for everybody?" Although the positive answer to this question might seem to be obvious, there comes

another one: "Clusters – yes, but for what price, and for what purpose?" Are the economies – heavily experienced by the planned economy – ready to adopt the solutions created in a different world – world of capitalistic private property, productivity fights and competition?

Clusters in developed economies are mostly the result of evolution, years of co-existence between different entities (like enterprises, R&D institutions, scientific centres, authorities etc.). Central and Eastern European Countries do not have a long-time cluster tradition. There have been many trials to find the cluster-like structures of enterprises, and there have also been many national projects the goal of which was to create clusters. The goal of this article is to show the process of cluster creation in Central and Eastern European Countries, their unique profile and the level of development and transformation concerns. The data concerning cluster activities in the CEEC are taken form the Europe Innova Cluster Mapping Report "Clusters in the 10 new Member Countries" and "Cluster Initiatives in Developing and Transition Economies", a publication by Center for Strategy and Competitiveness, Stockholm. Methods used in the article are mostly comparative analysis of statistical data and literature research.

1. Clusters and economic performance

Clusters are groups of companies and institutions co-located in a specific geographical reigon and linked by interdependencies in providing a related group of products and services (Porter, 1998). The proximity among these groups – both in terms of geography and activities – makes clusters cause the economic benefits. These are, for example: access to specialized human resources and suppliers,

knowledge spillovers, pressure for higher performance in head-to-head competition and learnings from close interaction with specialized customers and suppliers (Ketels, 2003).

Clusters differ in many dimentions: the type of products and services they produce, the locational dynamics they are subject to, their stage of development and the business environment that surrounds them.

Clusters develop over time; they are not a phenomenon that just appears or disappears overnight. For many clusters, the roots of their development go back many years. The steel industry around Pittsburgh, for example, owes its existence to the deposits of coal in the region that provided affordable energy (Porter, 1998). Today, there is still a huge cluster of steel and other production technology companies located around the city, although the local coal deposits are of little remaining importance. Natural factors like resources or the location at a major trading route or river can have effects on the presence of specific clusters that are felt many years after they have lost their direct influence. Another root for cluster development can be the existence of initial institutions, such as companies or universities, which over time act as an anchor for the cluster spinning-off new businesses and attracting the investment from companies outside the region. In San Diego, for example, the presence of the U.S. Navy with a leading communications research facility provided the ground for the development of a dynamic telecommunication cluster around Qualcomm. In North Carolina, the network of universities in the Research Triangle in the 1960s led to the development of one of the leading biotech clusters in the United States (Ketels, 2003).

The existing research shows that the evolution of clusters can take many years, often decades. Many clusters have developed

without the presence of any dedicated efforts to upgrade them. The inherent economics of proximity have been enough to over time attract increasing numbers of companies and other institutions, leading to a selfreinforcing cycle that was often started by a chance event. But other clusters have developed much faster because of the determined action of regional leaders that had spotted the potential of their region for the cluster (Porter, 1998).

Clusters develop and are important because they create economic benefits. The benefits of a cluster come in three dimensions (Porter, 1998). First, companies can operate with a higher level of efficiency, drawing on more specialized assets and suppliers with shorter reaction times than they could in isolation. Second, companies and research institutions can achieve higher levels of innovation. Knowledge spillovers and the close interaction with customers and other companies create more new ideas and provide intense pressure to innovate while the cluster environment lowers the cost of experimenting. Third, the level of business formation tends to be higher in clusters. Start-ups are more reliant on external suppliers and partners, all of which they find in a cluster. Clusters also reduce the cost of failure, as entrepreneurs can fall back on local employment opportunities in many other companies in the same field. These benefits are important both for cluster participants and for public policy. For companies, they create additional value that outweighs the often-higher costs of more intense competition for specialized real estate, skills, and customers at the location (Porter, 1998; Ketels, 2003). They are thus the reasons why clusters emerge naturally from profit-maximizing decisions. For public policy, higher productivity and innovation in clusters are critical because they are the factors that

in the long term define the sustainable level of prosperity in a region.

The performance of a cluster at a specific location is driven by the business environment that the cluster is operating in. "Business environment" is a broad and naturally vague term: almost everything – from the quality of the schools to the strategies of local competitors – matters for the level of productivity and innovation that companies in the cluster reach at this specific location. To organize this complexity, Michael Porter has in 1990 introduced the so-called "diamond" as an analytical tool to assess business environments (Porter, 1990). The diamond includes the four elements – factor conditions (e. g., physical infrastructure, skills, etc.), demand conditions (e.g., sophistication of local customers, product and consumer regulation), the context for strategy and rivalry (e.g., taxation structure, competition laws, and the strategies of competing local companies), and the presence of related and supporting industries (e.g., the breadth and depth of the cluster). These elements interact in their impact on specific companies and clusters; they exhibit system-effects where the weakest element often tends to have the strongest impact on the overall quality. The diamond can be used to analyse the general quality of the business environment at the national or regional level.

2. The importance of clusters for European competitiveness and innovation

Clusters and the broader patterns of economic specialization across geographies have become an important concern for European policy makers. One motivation is the set of ambitious goals on productivity growth and innovation. Europe tends to rank high on the

quality of institutions, but low on its ability to mobilize these inputs through entrepreneurship and new firm formation. Europe also tends to rank high on R&D spending and scientific capacity, but low on its ability to turn research into economically valuable innovations. Clusters have the potential to transform outcomes in both dimensions: healthy clusters provide an accessible network of skills and capabilities, i.e. a microeconomic business and innovation environment that enable entrepreneurs to move from an idea to a business activity. And healthy clusters provide an efficient environment to move from a scientific advance or new business concept to a market test (Ketels, Lindqvist, Solvell, 2006).

Another motivation is the impact of globalization on the nature of competition among regions. The falling transport and communication costs and the reduction of trade barriers have exposed larger segments of regional economies to global competition. Improvements in business environments and company practices in many parts of the world, too, have increased competitive pressure. With an increasing number of locations providing attractive conditions for investments, regions in Europe (as in other parts of the world) need to define the unique value they are offering to companies looking for a perfect location for their business activities. Clusters have a potential to be the key dimension of a region's value proposition: healthy clusters provide a higher value for companies that are active in the economic fields in which they operate.

The regions of Central and Eastern Europe have been exposed to these changes with an exceptional force. Their level of productivity and innovation still lags significantly behind Western Europe. A low cost position gives them currently an edge in attracting new investment, but it is ultimately a sign of the long path that these countries have ahead of themselves to fulfil their citizens' desires for standards of living at the level of Western Europe. Low wages are over time inconsistent with the aspirations to achieve catch-up to the prosperity levels of the old EU member countries. This goal will only be reached if the new EU members create the conditions for rapid productivity growth. The Central and Eastern European regions have a past as planned economies in which economic activities were based on political much more than on economic considerations. The transition to high-productivity economies involves increased levels of geographical specialization. Clusters and cluster-based economic development migth be the right answer to the new EU members needs, but considering the factors mentioned above – it will surely be a long and complicated way to follow.

3. Cluster mapping

Systematic empirical analysis of the evolution of clusters is still in its infancy. Cluster mapping is a relatively new approach to derive a better understanding of the presence, profile and the economic performance of clusters. The use of the word "mapping" relates to two aspects of this research method: first, cluster mapping is based on the mapping of industrial classification code into clusters, and second, cluster mapping data allow the mapping of clusters across geographies, indicating which clusters are present where.

Cluster mapping efforts are differentiated by the approach used to allocate individual industries to specific cluster categories. In the past, this was often done on a case-by-case basis based on the knowledge of industry experts who were assumed to have a good sense

of the level of linkages between industries. Other studies tried to look more systematically at specific types of spill-overs, for example, by using input–output relationships, the movement of key individuals, or the evidence on knowledge spill-overs as evident in patent filing.

There surely are advantages and disadvantages of cluster mapping. The most important advantage is comparability across different regions. But the key disadvantages in the cluster mapping approach are those related to limitations inherent in the data. Those are, for example, definitions not adequate to the region-specific dimensions of the cluster in (Ketels, Lindqvist, Solvell, 2006).

4. Importance of clusters in Central and Eastern Eurpean countries

Clusters as "engines" of regional economy have become the most often found solution for regional development in Central and Eastern Europe Countries as much as in Western Europe. In the report on clusters in the new 10 Member Countries (Ketels, Solvel, 2006), 41 regions were taken into consideration. These regions were subdivided according to the NUTS system, a nomenclature of territorial units for statistics. As a hierarchical classification, the NUTS system subdivides each EU member country into NUTS 1 regions, each of which is in turn subdivided into NUTS 2 regions. In this report, the concept of NUTS 2 regions was used, including 41 regions in the 10 countries studied (see Figure 1).

Six (Cyprus, Estonia, Latvia, Lithuania, Malta, and Slovenia) out of the 10 new member countries only have one NUTS 2 region, meaning that this region equals the whole country. Slovakia has four NUTS 2 regions, Hungary seven, the Czech Republic

eight, and Poland sixteen. The size of the regions in the new EU member countries varies significantly from Malta with a population of some 400,000 to Warszawa, Poland with more than 5 million inhabitants.

Overall, the cluster sector accounts for 32% percent of all employment across the 10 new EU member countries (Ketels, Solvell, 2006). This is remarkably similar to the relative size of this sector of economy in other countries.

The cluster sector is often described as the 'engine' of a regional economy. In the USA, the cluster sector records significantly higher wages, productivity levels, and innovation rates than the average of the economy (Porter, 2003).

Looking across the 41 NUTS 2 regions of the ten new EU member countries, the share of the cluster sector in total employment varies between 47.6% (Slovenia) and 23.5% (Lublin, Poland) with the median region at 36.4% (Cyprus). The overall distribution is pretty uniform (see Table 1).

Two factors are important for the differences across regions: first, the cluster sector is overall relatively manufacturing-driven with pretty much of all manufacturing industries allocated to the cluster sector. Regions that have not developed a strong manufacturing presence, independently of specific clusters, tend to have a lower cluster sector share (and vice versa). Second, the cluster sector competes with the natural resource-driven industries for employees that leave the local industries. Regions that have strong natural resource deposits or are otherwise strong in natural resource-driven industries register less employment in the cluster sector.

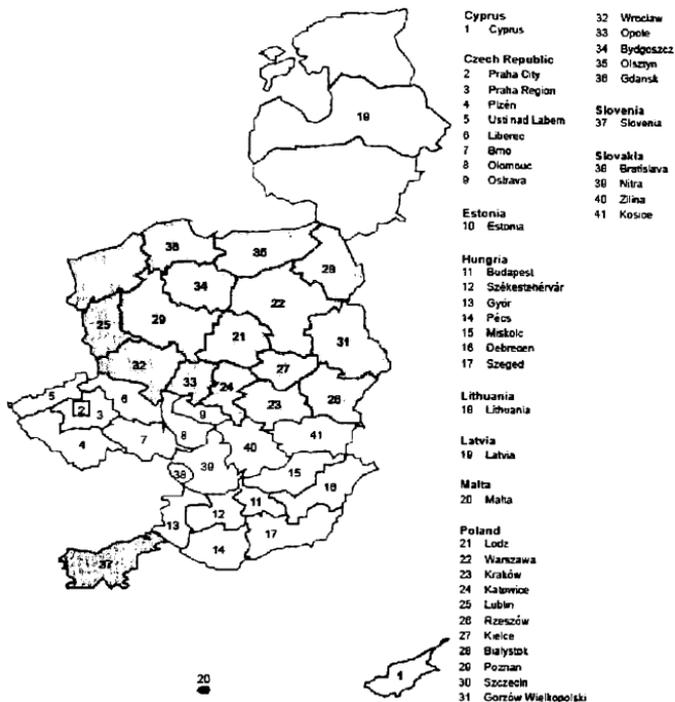The report cited in this article (Ketels, Solvel, 2006) shows the 38 cluster categories and

Cyprus
1   Cyprus

Czech Republic
2   Praha City
3   Praha Region
4   Plzèn
5   Ustì nad Labem
6   Liberec
7   Brno
8   Olomouc
9   Ostrava

Estonia
10   Estonia

Hungria
11   Budapest
12   Székestehérvár
13   Györ
14   Pécs
15   Miskolc
16   Debrecen
17   Szeged

Lithuania
18   Lithuania

Latvia
19   Latvia

Malta
20   Malta

Poland
21   Lodz
22   Warszawa
23   Kraków
24   Katowice
25   Lublin
26   Rzeszów
27   Kielce
28   Bialystok
29   Poznan
30   Szczecin
31   Gorzów Wielkopolski

32   Wroclaw
33   Opole
34   Bydgoszcz
35   Olsztyn
36   Gdansk

Slovenia
37   Slovenia

Slovakia
38   Bratislava
39   Nitra
40   Zilina
41   Kosice

Figure 1. NUTS 2 regions in the EU 10

Source: (Ketels, Solvell; 2006).

Table 1. Distribution of relative size of the cluster sector, EU-10 regions, 2004

Share of cluster sector in regional employment	Number of regions
30% or less	5
30% to 35%	10
35% to 40%	14
40% to 45%	9
45% or more	3

Source: (Ketels, Solvell, 2006).

their distribution across the EU-10 countries. During cluster mapping made by authors, some factors had been considered. Those were the size of employment and changes in it, and geographic concentration. Figure 2 shows the examined cluster categories and total employment in them.

Regional clusters in the largest category (processed food) employ close to 1 million people throughout the EU-10, while in the smallest category (tobacco) less than 10,000 peop-
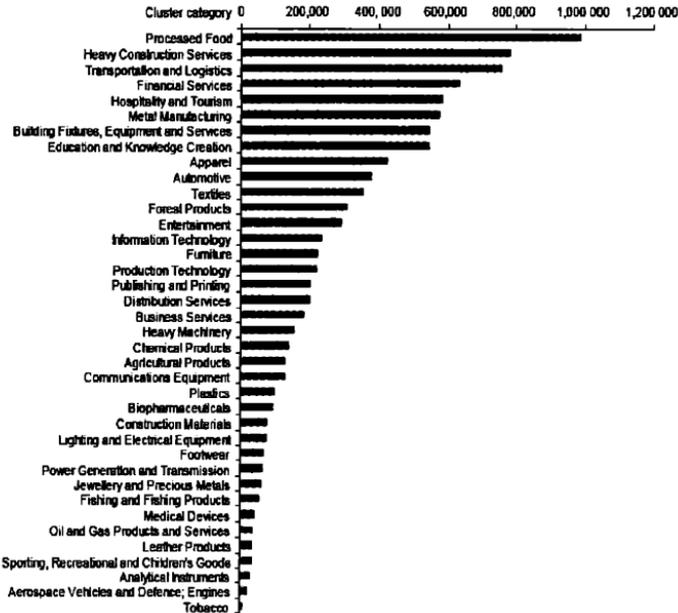
Figure 2. Total employment by cluster category, EU-10, 2004

le are employed. The distribution of employment across cluster categories is slightly one-sided, with a larger number of small employment cluster categories and a relatively smaller number of large employment cluster categories.

The data lited in Table 2 show the EU-10 countries to be significantly more specialized in labour-intensive cluster categories like textiles, apparel, footwear, and processed food. Conversely, employment in the EU-10 is much lower in advanced manufacturing like analytical instruments, aerospace and defence, and medical devices and advanced services like business services – a cluster category that accounts for 13.6% of USA's cluster sector employment, 6.7% of Swedish employment in this category, but only 1.9% of the EU-10 cluster sector employment.

Conclusions

The EU-10 has a specialization profile that remains distinct from more advanced economies. The EU-10 still has a far stronger natural resource-driven sector than other economies. And the EU-10 has within the cluster sector a much stronger bias towards labour-intensive and manufacturing-driven cluster categories, while being relatively weak

Table 2. Cluster categories ranked by total employment across countries

Sorted by difference EU-10 vs. US & Sweden	EU-10	USA	Sweden
Apparel	9	18	32
Textiles	11	23	27
Footwear	28	38	38
Building Fixtures, Equipment and Services	7	16	16
Furniture	15	25	20
Information Technology	14	14	19
Agricultural Products	22	30	28
Processed Food	1	9	7
Construction Materials	26	32	30
Jewellery and Precious Metals	30	34	35
Forest Products	12	24	8
Financial Services	4	2	11
Fishing and Fishing Products	31	36	31
Heavy Construction Services	2	6	2
Hospitality and Tourism	5	3	9
Leather Products	34	33	37
Transportation and Logistics	3	7	1
Heavy Machinery	20	22	19
Chemical Products	21	20	21
Metal Manufacturing	6	8	3
Biopharmaceuticals	25	31	17
Sporting, Recreational and Children's Goods	35	35	33
Lighting and Electrical Equipment	27	27	23
Production Technology	16	17	12
Tobacco	38	37	36
Automotive	10	10	5
Entertainment	13	11	10
Oil and Gas Products and Services	33	27	34
Power Generation and Transmission	29	29	24
Publishing and Printing	17	12	15
Education and Knowledge Creation	8	4	4
Communications Equipment	23	21	14
Medical Devices	32	26	25
Plastics	24	13	18
Distribution Services	18	5	13
Aerospace Vehicles and Defence; Engines	37	19	26
Business Services	19	1	6
Analytical Instruments	36	15	22

Sources: Institute for Strategy and Competitiveness (2005), Sölvell/Malmberg/Lindqvist (2005).

in advanced services and knowledge-intensive cluster categories.

The EU-10 exhibits a much lower specialization on specific regional clusters within regions and a much lower geographic concentration on specific regions within cluster categories than the U.S. economy. If higher levels of specialization and concentration enable higher productivity and innovation, this is a serious concern.

The economies of the EU-10 countries have undergone a period of tremendous structural change, and this change creates both chances and threats for them. Clusters created in Central and Eastern Europe an countries carry on the consequences of the economic transformation. It makes them different from those in Western Europe or the United States.

The qualitative studies that have accompanied the quantitative cluster mapping data analysis have provided additional context to the observations above. In particular, they have helped to identify a number of key factors in the evolution of the 10 new EU member countries, the eight former planned economies in particular (Ketels, Solvell, 2006):

> a relevant factor to understand the development of competitive industries and regional clusters is the way the privatisation process has been organized. In Slovenia, for example, the privatisa-

tion process favoured management buyouts that allowed local companies to tap into established networks of contacts in their respective regions. In other countries, for example, in Estonia, the privatization process was much more focused on attracting new foreign owners. This created quick inflows of new capital and know-how, and provided linkages to many global markets. The development of regional clusters, however, might take more time as new foreign-owned subsidiaries will need to build linkages and learn to work together and with local partners to increase and leverage cluster effects;

the second relevant factor in ex-communist countries is how the Academy of Sciences, the main research body in all of these countries, has evolved. In 57 countries where the Academy has continued to be protected and supported, there remains a wide gap between research and commercial applications. In other countries where the scientists ran out of budget overnight, for example in Lithuania, researchers have been forced to either start companies or reach out to the business community to secure funding. A large number of studies indicate that all EU-10 countries suffer from a low innovative capacity.

REFERENCES

1. Brodzicki, T., Szultka S. (2002). Koncepcja klastrów a konkurencyjność przedsiębiorstw, *Organizacja i Kierowanie*, nr 4(110).

2. Ketels, C. (2003), The development of the cluster concept – present experiences and recent developments, Prepared for the NRW Department of Economics Workshop at the Institute for Industry and Technology, Duisburg.

3. Ketels, C. (2004), *European Clusters* – Harvard Business School, Boston MA, USA, Habgarth Publications.

4. Ketels, Solvell. (2006), *Clusters in the EU-10 New Member Countries*, Europe Innova Cluster Mapping.

5. Solvell, Lindqvist, Ketels (2003), *The Cluster Initiative Greenbook* – Ivory Tower: Stockholm.

6. Solvell, Lindqvist, Ketels (2006), *Cluster Initiatives in Developing and Transition Economies* – Center for Strategy and Competitiveness, Stockholm.

7. Porter, M. (1998). *On Competition* – Harvard Business School Press.

8. Porter M. (2005), Business Competitiveness Index, *World Economic Forum, The Global Competitiveness Report 2005/06*.

9. Porter M. (1990), *The Competitive Advantage of Nations* – Free Press.

10. Porter M. (2003), The economic performance of regions. *Regional Studies*, Vol. 37, Nos. 6-7.