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Abstract

Moravia Silesia region of the Czech Republic passes through deep restructuring of traditional industries accompanied by huge unemployment. Clustering seems to be one of the ways out of current transformation in the region´s development. After the introduction to the cluster theory a methodology of cluster research in the region is explained and the regional engineering cluster is presented including its development strategy.

Key words: regional clusters, cluster map and cluster diamond, cluster support programmes.

JEL Classificatuion: O32, R10, R58

1. Moravia Silesia region key issues

The Moravia Silesia region is the former heartland of Czechoslovakia's coal, steel and heavy engineering industries. It has a population of 1.3 million and employment of 530,000. Over the past decade, its main industries have had to adjust to three major changes. First, they have had to cope with the transition from a planned to a market economy. Second, they have experienced the collapse of their main former markets in Eastern Europe and especially in Russia. And, finally, as in all western market economies, the region has had to deal with the massive restructuring of the coal and steel industries.

Moravia Silesia has not found the adjustment process easy. Employment in the coal industry has declined from over 100,000 in the early 1990's to around 19,000 today. Over the same period, employment in steel has fallen from 90,000 to 22,000. Further job losses in steel and heavy engineering are inevitable.

Nevertheless, over the past decade much progress has been made including major improvements in the physical environment and the reduction of pollution. New employment has been created in the expanding service sector. While inward investment has made a major contribution to restructuring the Czech economy, Moravia Silesia has attracted relatively little greenfield foreign direct investment. The region's ongoing problems are reflected in the level of unemployment. Compared to a national average of 9,4 %, Moravia Silesia's unemployment stands at 15,5 % (as in September 2002) with 17,0% in Ostrava City and 19,3% in district Karviná.

Recognising these problems, the region has been identified by the Czech Government as a priority for regional economic development. A number of regeneration projects are already underway to contribute to the region's redevelopment. In 2001 the Regional Development Plan for Moravia Silesia region was approved by regional assembly, in 2002 a special attention was given to "cluster approach" in regional economic development policies /1/.

Clustering has become the topics of two development activities in the region, in which the author of the paper was involved. The first was carried out within the research project in the department of Regional economics of Faculty of economics VSB-Technical university

Ostrava, and it is described in /2/, /3/ and /4/. The second comprised the preparation of feasibility study to identify industry groupings in Moravia Silesia for targeted aid scheme support, the project funded from the EU's Phare programme. The paper summarizes the key findings of both developments.

2. Theoretical background

Regional clusters have attracted growing interest among both academics and policy-makers during the last decades. In the 1970s and 1980s clusters established a strong position in the world market for both traditional products (e.g. "Industrial districts" in Italy consisting of networks of SMEs in mainly traditional manufacturing sectors) and high technology products (e.g. Silicon Valley in USA representing huge ICT firms concentration). During 1990s clusters were widely recognised as important settings in stimulating productivity and innovativeness of companies and the formation of new businesses. The influential writing of Michael E. Porter Competitive advantage of nations (1990) describes the tight relationship between cluster participation and the competitiveness of firms and industries. The concept of regional clusters is hence seen to catch at least parts of the mechanism´s underlying dynamic industrial development in some places.

Regional clusters refer to geographically bounded concentrations of interdependent firms and may be used as a catchword to older concepts like industrial districts, specialised industrial agglomerations and local production systems. In this paper we will use the cluster model proposed by M. Porter, who defined regional clusters as „*geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular that compete but also co-operate.*" The clustering of firms is considered as the main source of regional competitiveness. Clusters are a driving force in increasing exports and magnets for attracting foreign investment. They constitute a forum in which new types of dialogue can, and must, take place among the firms, government agencies and institutions /5/.

For cluster description Porter uses four types of characteristics: Context for firm strategy and rivalry, factor (input) conditions, demand conditions and related and supporting industries. An additional feature is also government engagement. The graphical representation of these characteristics is called Porter diamond.

The basic argument that successful clusters enhance the performance of individual firms and drive economic development has been demonstrated though many examples in the US and Europe. From the perspective of the individual company being in a strong cluster can reduce the cost of doing business, make innovation easier, less risky and more rapid and increase the possibility of being ahead of the competition and improve access to specialist skills, research, knowledge, technology, customers, distribution channels, suppliers and specialist services. At the same time, it is likely to be a highly competitive (and, therefore a rather uncomfortable) environment. Consequently, to survive, companies need to innovate.

From an economic development perspective, it has been found that policies which promote strong clusters will also, inter alia, create the conditions which enable greater new firm formation and innovation, enable internationally competitive businesses to emerge and, therefore, stimulate exports and attract high quality inward investment (eventually without the need for large government grants) because global companies feel the need for a presence

in strong clusters (an example might be the Czech automotive cluster). Ideally, policy that uses clusters as a basic tool sets in motion a process of cumulative growth/causation.

3. Methodology

The process of cluster development comprises the two main stages: cluster identification, i.e. detailed industry analysis, and cluster mobilization, i.e. cluster strategy preparation and implementation. The first stage aims to find those industries which are currently competitive or with at least some cluster characteristics. More specifically, the analysis should identify:

- Industries with some degree of critical mass with export potential or, preferably, an established record of exporting.
- A range of interdependent supporting and related industries including customers, suppliers and companies sharing common technologies or skills.
- Good specialist factor conditions (such as raw materials, labour skills, infrastructure) including a strong research and knowledge infrastructure.
- Intra-regional linkages and spillovers which enhance (or could enhance) competitive advantage.

In addition, the analysis should to identify opportunities within the clusters via, for example, foreign direct investment.

Our methodology for Moravia Silesia clusters analysis had two distinct components:

1. *Data and statistical analysis:* this used 5 digit NACE employment data and regional location quotients calculated from the employment statistical data. A location quotient illustrates whether, compared to the Czech industrial structure, an industry is under or over represented in the region (ratio of regional and national industry employment). An industry with an LQ of 1 has the same share of employment as for the Republic. For clusters the industries with LQ higher than 1.2 and employment above one thousand were considered. As an example manufacture of Iron and Steel (NACE 27100) has an LQ of 9.01 in Moravia Silesia, well above the national average. As the Czech statistical data do not provide employment figures for 5 digit NACE, Albertina companies database was used to present a detailed description of the regions industrial structure.
2. *Company interviews and Focus Group discussions:* these were used to identify the extent of real inter-relationships, any important industries not identified by the statistical analysis and softer cluster characteristics and development potential. At the end of this stage a number of potential clusters were identified, which covered Wood & Furniture & Paper, Textiles, Industrial Equipment, Metal Products, Construction & Civil Engineering, Chemicals & Plastics, Automotive Components. Following discussions with number of knowledgeable regional experts it was decided to focus further efforts more specifically on the Engineering cluster, which shows the biggest potential for future regional development and impact on employment in Moravia Silesia.

4. The Findings of Engineering Cluster Analysis

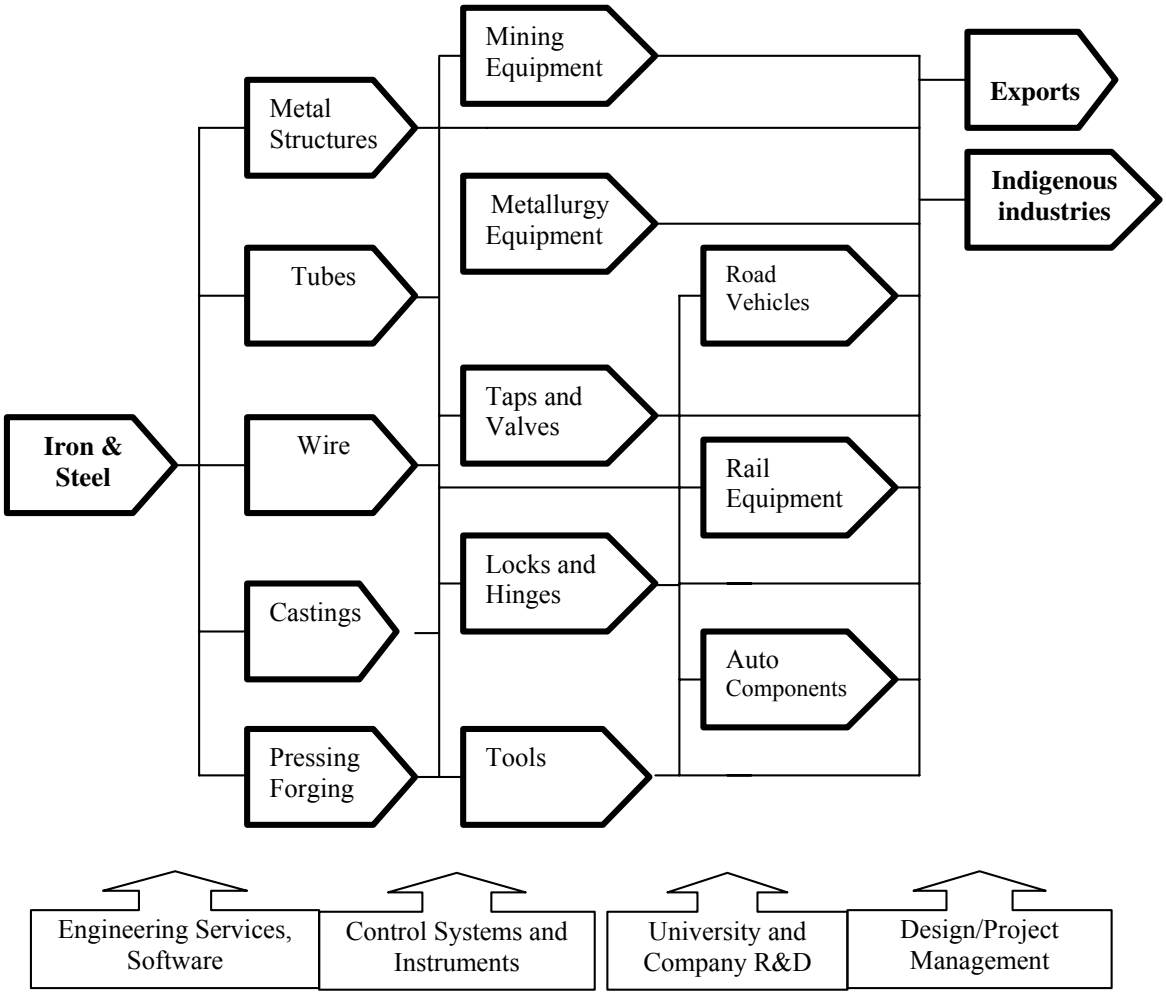
This cluster encompasses a significant part of the region's traditional manufacturing base. It is clearly experiencing substantial change and its restructuring process is not yet complete. The cluster employs directly above sixty thousand and together with related industries almost 100,000 people in over 800 companies which represents about one third of private sector employment in the region. Much of the employment is in the 'front end' of the steel making process. Core industries in the cluster are shown below in Table 1 below. The map for the engineering cluster is shown in Figure 1.

Table 1: Core industries in metallurgy and engineering

NACE	Core Industries	Firms	Jobs	LQ
27100	Man. of Iron and Steel	7	22510	9.01
29510	Man. of Machinery for Metallurgy	5	3130	7.57
27340	Wire Drawing	2	4650	6.42
27220	Man of Steel Tubes	2	2250	5.68
29130	Man. of Taps and Valves	8	1980	3.89
27500	Casting of Metals	12	2290	3.10
28620	Man. of Tools	22	1380	1.21
29520	Machinery for Mining/Construction	14	2770	3.05
35200	Man. of Railway Equipment	5	2420	2.53
28110	Man. of Metal Structures and Parts	68	4170	2.34
28400	Forging and Pressing of Metals	20	1380	1,21
28630	Man. of Locks and Hinges	454	5140	1.37
34100	Man. of Road Vehicles	4	2760	1.34
34200	Man. of Automotive Components	10	5410	1.29
	Total	633	62240	

Source: Albertina

Figure 1: Moravia Silesia Engineering Cluster Map

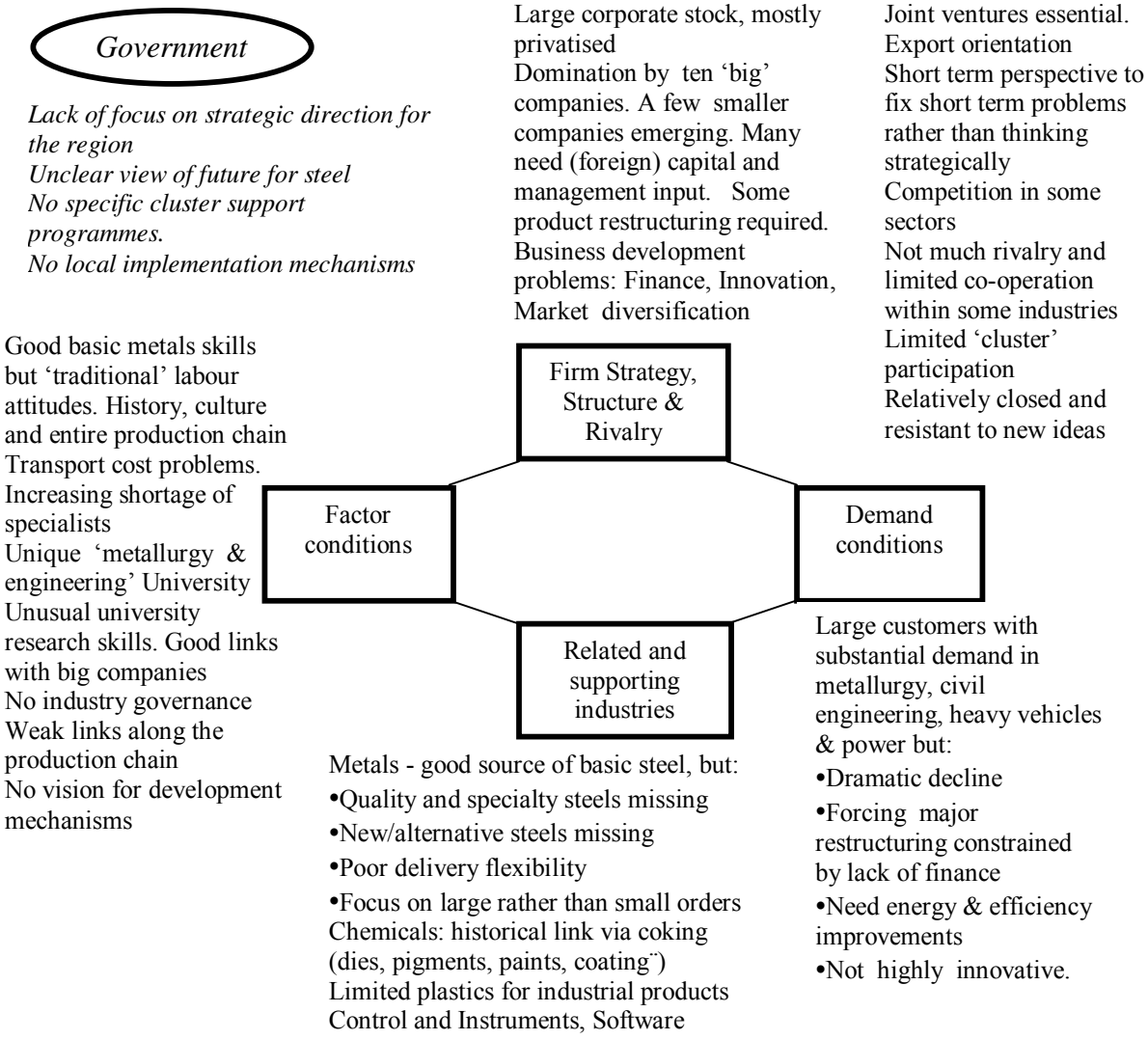


A review of the industries involved in a potential cluster and some of its key companies indicates that:

- The engineering cluster is a critical component of the regions economy that will have a direct influence on future prosperity.
- The future of the local steel industry will have a major impact on the development in the cluster. They are closely linked and the presence of steel production adapted to the needs of the cluster is a key potential source of competitive advantage.
- There are many internationally competitive companies operating in the region, some leaders in their field.
- A key competitive advantage is currently the low cost base due to low wage rates. This is unsustainable in the medium term.

The cluster characteristics are described in cluster diamond shown in Figure 2.

Figure 2: Moravia Silesia Engineering Cluster Diamond



5. Engineering Cluster Strategy

The implementation of cluster development strategies varies considerably in different regions. The recommendations can be given for regional clusters establishment and regional cluster strategies based on best practices under certain conditions /6/ and /7/. The proposed strategy is concerned with long-term cluster and economic development. It has two strategic objectives:

- **International Competitiveness**. The aim is to create a cluster serving international markets while simultaneously supporting increased real wages and living standards (i.e. its competitiveness is not simply derived from relatively low wage costs).

- **Diversification and New Industries**. Building on current strengths and exploiting market needs and technology developments, the aim is to enable the emergence of new industries. At the same time, it is recognised that region´s existing industries are important. However, they will need to change.

In the process of establishing a regional cluster, three basic issues have to be dealt with:
1. determine the basic organisational principles in a regional cluster;
2. decide on available business support services;
3. set up a know-how management and communication structure.

The basic organisational principles of a regional cluster are determined by answering the following questions:

- Which partners are to be involved in the cluster? Which associations, public bodies and institutions are to be integrated?
- Who assumes the role of cluster co-ordinator? Which institutional organs (e.g. advisory committees) ensure the consultation of partners and a balance of interests, in order to reach synergies and added value for the users?
- How shall the cluster and its services be financed?

A successful cluster has to be geared towards bringing the greatest possible benefit to as many partners as possible. The following services and activities are provided in various regional clusters:

- information and communication;
- support to co-operation projects;
- support to training;
- support to internationalisation;
- PR and marketing.

The concrete range of services and actions depends on local cluster conditions and the key players involved in the clustering process. The following Table 2 outlines some broad ideas for programmes that can, with appropriate management, to start cluster mobilisation and growth.

Whatever actions are chosen there are two key issues that need to be addressed. The first is f*inance for programme.* International experience argues, that *w*ithout public sector finance the strategy implementation process cannot start. The second concerns d*esign and delivery*. Both these issues be addressed through the creation of the Engineering cluster federation, funded by a "Competitiveness Fund" using structural funds and matching contributions from

national government and the private sector. Such a trade body will be helpful, if not essential in taking the cluster strategy forward.

Table 2: Proposals for Engineering Cluster Support Programmes

Cluster Driver	Program or Initiative
1. Internationalisation	• Export market diversification programme for existing exporters • Export strategy development and support programme for new exporters
2. Foreign Investment	• Regional marketing strategy for Moravia Silesia focusing on genuine competitive strengths of the region. • Development of an engineering cluster capacity register (both paper based and eventually on-line) • Run and promote an Engineering Cluster conference in the Region
3. New Business Strategies	• MS Engineering Supply Chain Competitiveness initiative - several sub programmes including Product Development Initiative, Market intelligence service, International Marketing Support, Competitiveness Audits, Six Sigma, Lean manufacturing, Corporate strategy development, Human resources/skills development
4. Automotive Industry	• MS Automotive components supplier initiative • New materials initiative – work with local companies plus the university to review, research and develop, link into existing MS research work in EU to develop or tap into new materials or processes of relevance to the cluster
5. Strengthening of the R&D capacity in VSB-TUO	• VSB-TUO commercialisation Initiative – three year plan to increase non-state revenues through improved marketing, development and sale of new consulting, R&D and training products • VSB spinout initiative – aims to review existing and/or potential patents held within university and fund implementation
6. The Environment	• Develop the Environmental Technologies Centre at VSB-TUO and help it to become a marketing and R&D clearing house
7. New Firms and Entrepreneurship	• Creation of a MS Technology Venture fund
8. New Engineering Technologies	• Welding centre Initiative. Creation of a central European centre of excellence in conjunction with VSB-TUO.
9. Capital Investment	• MS Capital Equipment Fund to the financing of new technology investments in the cluster.
10. Image of the Cluster	• MS Schools Education Programme for schools children of all ages to explain the opportunities available in the Cluster.
11. Further Cluster development	• Engineering Cluster Development Programme • Further research into sub clusters and other clusters in the region and development of appropriate support programmes.

Note: MS Moravia Silesia, VSB-TUO Technical university Ostrava
Source: Feasibility Study to Identify Industry Groupings in Moravia Silesia for Targeted Aid Scheme Support. A Draft of Executive Summary, Ostrava, September 2002

6. Conclusions

A number of states and regions, in their economic development efforts, are using the approach of identifying key industry clusters. The concept of regional or industry clusters is one that may be useful to regional development authorities as they formulate strategies to support existing industries and attract new businesses to their region. The paper aims to present the outline of a methodology and its use for cluster identification and strategy

development based on concrete case of Moravia Silesia region in the Czech Republic, which deserves the urgent solution of restructuring issues. The outcomes argue this is engineering cluster which can become the vehicle of regional development in the next decade.

7. Bibliography

1. Regional clusters in Europe. Observatory of European SMEs 2002/No. 3. European Communities, 2002. ISBN 92-894-3560-7
2. Skokan, K.: Industry Clusters v regionálním rozvoji. Ekonomická revue, roč. V, č. 2, Rok 2002, str. 50 – 60, ISSN1212-3951
3. Skokan, K.: Industry clusters - Odvětvová seskupení firem v rozvoji Moravskoslezského kraje. In: Sborník: V. mezinárodní kolokvium o regionálních vědách, Ekonomicko-správní fakulta MU Brno, Pavlov 28.5.2002
4. Skokan, K.: Determinanty růstu konkurenceschopnosti regionů. In: Sborník mezinárodní vědecké konference Ekonomické a adaptační procesy 2002, sekce S4: Regionální politika ČR před vstupem do EU. Ostrava, VŠB-TU Ostrava, Ekonomická fakulta, 11 stran, ISBN 80-248-0126-4
5. Porter, M.: Location, Competition, and Economic Development: Local Clusters in a Global Economy. Economic Development Quarterly, Vol. 14, No. 1, February 2000, pp. 15 – 34
6. Methodology for regional and transnational technology clusters. European Commission, Enterprise Directorate-General. Promotion of entrepreneurship and SMEs. Business co-operation and Community business support network development March 2001
7. Stuart A. Rosenfeld : A guide to cluster strategies in less favoured regions. The Directorate General for Regional Policy and Cohesion of the European Commission. April 2002

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