OLD NEIGHBOURS – NEW POLICIES: RESEARCH-DRIVEN CLUSTERS IN THE DANUBE REGION

Svetla Boneva

INTRODUCTION

The objective of the paper is to present the essence and importance of industrial clusters for regional development, for enhancing the competitiveness of the companies in the cluster and for improvement of the business climate at regional, local and national levels. With Austria being the leader in effective and successful clusters in the Danube region, a good practice has been identified (on the case of "Eco World Styria" cluster, founded in 2005) and key success factors for the development of clusters have been formulated.

DEVELOPMENT AND THEORETICAL FRAMEWORK OF THE CLUSTER CONCEPT: AN OVERVIEW

Clusters represent geographic concentrations of trades and industries and have been a part of national, regional and macro-regional economic systems in the last two (and even three) centuries. The first economist who had described their essence and way of functioning was Cambridge professor Alfred Marshall (Marshal, 1920). In 1890 he noticed for the first time the trend that specialised companies concentrate their activities in what he called "industrial districts".

Later on, another great economist, Schumpeter (Schumpeter, 1934) developed his ideas in his popular works on the role of entrepreneurs and the "creative forces of destruction" in economic activity, and noted the evidence of clustering of innovation activities.

Years later, Michael Porter's (Porter, 1990) reflections on the competitive advantage of nations explain why in some countries there are

concentrations of many competitive firms thus bringing the concept of industrial clusters to the attention of analysts and policy-makers. Porter presents the competitive advantage of firms as a result of the operation of a "diamond" of four interacting forces—factor conditions, demand conditions, firm strategy, structure and rivalry, and related and supporting industries. The last of these directs us towards the importance of location and explains the success of Silicon Valley in electronics, Hollywood in the film industry, or the lobbying business in Brussels. As Porter said: "Today's economic map of the world is dominated by *clusters*—critical masses, in one place, of unusual competitive success in particular fields. Clusters are a striking feature of virtually every national, regional, state and even metropolitan economy, especially in more economically advanced nations. Clusters are not unique, they are highly typical, and therein lies a paradox: the competitive advantages in a global economy lie in local things - knowledge, relationships, motivation" (Porter, 1990: 78). This is one of the most cited definitions of clusters worldwide.

Enright contributes to the cluster literature development with his analysis of the change of the focus from the company performance to inter-firm linkages. In the knowledge economy, industry specific knowledge is becoming cumulative and embedded in a particular region or area rather than in a specific firm (Enright, 1998: 322).

Clusters reveal a mutual dependence and collective responsibility of business, knowledge organisations and government for creating the conditions for productive competition (Porter, 1990). The distinction between public and private investment is becoming increasingly blurred:

- Companies, no less than universities, have a stake in education;
- Universities have a stake in the competitiveness of local businesses; and
- Governments can achieve a lot through information dissemination and intermediary facilitation.

The idea of industrial clustering is closely connected with the study of economic geography. Benefits can accrue to an area from the activities of firms in that area. These benefits arise from the fact that a firm cannot capture all economic benefits from its innovation process (i.e. bringing

its products to market). There could be spillovers arising from firms that benefit the community if there are suitable structures to take advantage of them. For example, people with expertise leave firms to work for other firms or to set up their own firms. Capturing these spillovers leads to the establishment of new capabilities and more growth in the community.

With the shift to the "new economy", sub-national regions around the world are setting in place infrastructure and mechanisms supporting technology-intensive industrial development. This phenomenon is known as knowledge-based industrial clustering. Examples include Silicon Valley in California, Boston's Route 128 in the USA; the regions of Rhône-Alpes, France, Baden-Wurttemberg, Germany, Lombardy, Italy and Catalonia, Spain, in Europe; the 26 clusters set up under Japan's Technolopolis Law of 1983, etc.

With globalization and the shift to knowledge-based world economy, time-to-market and just-in-time delivery become more critical (Voyer, 1997). This encourages the clustering of capabilities in regional centers to support the innovation process and thus to minimize the "leakage" of external benefits outside the community. Firms are attracted to communities that can provide the key functions needed to bring their products or services to market rapidly.

Few regions around the world have clusters having more than 100,000 people working in them. After more than 50 years of development, the Silicon Valley in California is such a cluster concentrated in the information technology and related microelectronics area, with more than 1 million people in more than 6,000 firms. Such a cluster is self-sufficient, it has all the essential technical, business, financial, legal, etc. capabilities needed to sustain the economic activities in the cluster. The more firms and the more people work in a cluster, the more it tends to be self-sufficient, i.e. fewer outside resources are needed. The growth of clusters follows the general principles of local level economic development. As noted by Jane Jacobs: "Economic life develops by grace of innovating: it expands by grace of import replacing. These two master economic processes are closely related both being functions of city economies." (Jacobs, 1985: 39)

The concepts of "industrial clustering" and "systems of innovation" are supported by the emerging model of economic development known

as *"new growth" theory* which incorporates socio-economic characteristics left out of the neo-classical model of the economy. As noted by Richard Lipsey: "Although the neo-classical model of self-interested, maximizing behaviour has enormous predictive power, it is inadequate in explaining the behaviour of firms, workers, and governments [...], we need to augment the neo-classical model of decision making with a model that includes such motives as fairness, status, love, honour, hate, duty, envy and national pride. The difficult problem is to integrate these motives in a systematic way so what results is a predictive model [...]" (Lipsey, 1991: 20).

The search for this new model, called "new growth theories", has led to a surge of writings whose main characteristics are:

- first and foremost, these new theories recognize technological innovation as an endogenous process;
- second, these theories show innovation as idea-based and thus to provide its benefits freely to others than those who paid to develop them. This results in *increasing returns* to investment. Increasing returns offset the tendency, found in both classical and neo-classical growth models, for decreasing returns to bring the growth process to an inexorable end in a world of static, per capita real incomes;
- thirdly, since the existence of increasing returns is incompatible with perfect competition, aggregate growth models now use models of imperfect competition (Lipsey, 1991: 9).

In the neo-classical model, where the rate of technical change is exogenous and common to all countries, any given country or region tends to converge towards some (moving) equilibrium level of per capita GDP. In contrast, the new growth theories imply the possibility of sustained differences in both levels and rates of growth of income. Because of externalities or productivity gains due to technology, there are no diminishing returns to human and capital inputs, and the reasons for convergence disappear. Proximity and linkages spur the capture of externalities. In summary, the "new growth" theories indicate increasing returns on investment in knowledge-based sectors. High-technology clustering in industrialized countries fits these theories.

DEFINITIONS OF CLUSTERS

Clusters are used to pursue a wide variety of objectives and that's why their definitions are quite diverse. Some emphasise location, some industry sector, and others innovation. Most popular definitions of clusters belong to Porter, Rosenfeld, Marceau and the OECD. While Porter's definition puts the accent of clusters on their geographical proximity and scope of activities, Rosenfeld's definition is more focused on the benefits from a cluster, Marceau accents on clusters as networks and as an alternative way to organise the value chain, and the OECD's definition of clusters is more focused on the knowledge dimension. The common idea in all definitions is that the links between firms and other organisations provide the economic value of clusters.

Porter has defined a cluster as: "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities" (Porter, 1990: 199). "The geographic scope of a cluster can range from a single city or state to a country or even a network of neighbouring countries. Clusters take varying forms depending on their depth and sophistication, but most include end-product or service companies, suppliers of specialised inputs, components, machinery, and services; financial institutions; and firms in related industries. Clusters also often include firms in downstream industries; producers of complementary products; specialised infrastructure providers, government,... universities and standard-setting agencies." (Porter, 1990: 199)

Rosenfeld's (Rosenfeld, 2000) definition of a cluster is close in sense: "A geographically bounded concentration of similar, related or complementary businesses, with active channels for business transactions, communications and dialogue, that shares specialised infrastructure, labour markets and services, and face common opportunities and threats."

The OECD definition emphasises the knowledge dimension: "Clusters are characterised as networks of production of strongly interdependent firms, knowledge-producing agents and customers linked to each other in a value-adding production chain." (OECD, 1999: 157) Therefore, the synergy resulting from the combination of knowledge from different sources drives

the formation of clusters. The benefits of clusters are enhanced innovation arising from interactive learning processes based on knowledge exchange and interaction and cooperation among the members of a value chain.

Clusters can be viewed as a subset of networks, as: "Open system of inter-connected firms and institutions with related interests. Networks offer a rich web of channels, many of them informal, and have the advantage of high source credibility: experiences and ideas arising from within the network are much more likely to be believed and acted upon than those emerging from outside." (Marceau and Dodgson, 1999) Relationships in the network include social relationships based on trust, market relationships based on contracts, and exchange relationships based on alliances.

Notwithstanding, clusters differ from networks because the companies involved in a cluster are linked in a value chain: "Clusters are an alternative way of organising the value chain. Compared with market transactions among dispersed buyers and sellers, the proximity of companies and institutions in one location and the repeated exchanges among them, fosters better coordination and trust [...] A cluster of independent and informally linked companies and institutions represents a robust organisational form that offers advantages in efficiency, effectiveness and flexibility. (Porter, 1990: 80)

Other less commonly used terms explaining clusters are "chains of production" where the economic structure is composed of chains of interlinked companies, and "complexes", made up of formal and informal networks of cooperation between firms, public sector research organisations, users and regulators. (Marceau, 1994)

As every economic phenomenon and organism, clusters appear, then develop, mature, bring competitive advantages and profits to their respective cluster members and finally die or survive. Clusters can operate for decades if they are supported by a continuous process of renewal. And like any company, if they become rigidified and inward looking, they can be swept away by change. As the Australian professor Ron Johnson (Johnston, 2003) notes merely a century after Marshal: "In particular, technological discontinuities may render a cluster's assets - market knowledge, technical expertise, staff skills, etc. irrelevant."

And finally, where are the cluster's boundaries? One of the tries for an answer comes from Porter: "Drawing cluster boundaries is often a matter of degree, and involves a creative process informed by understanding the most important linkages and complementarities across industries and institutions to competition. The strength of these 'spillovers' and their importance to productivity and innovation determine the ultimate boundaries." (Porter, 1990: 202)

TYPES OF CLUSTERS.

Several generations of clusters exist. The *"first generation" clusters* are a result from the economic transactions between firms and benefit mostly from the economies of agglomeration. First generation clusters usually consists of a large demanding purchaser, such as a major multinational firm or a public body, surrounded by many of suppliers. "Agglomeration economies consist of a local concentration of customers sufficient to permit suppliers to achieve economies of scale in production, great enough for local firms to [...] realise specialised local division of labour." (Porter, 1998: 213)

The *"second generation" clusters* emerged in the knowledge economy. Roelandt (1999) has shifted to learning and knowledge access: "Innovation [...] is a dynamic process that evolves successfully in a network [...] between those 'producing' and those 'purchasing and using' knowledge. As a result, there is an increasing focus on the efficiency and efficacy with which knowledge is generated, diffused and used, and on the dynamics of the related networks of production and innovation. (Roelandt and den Hertog, 1999)

When speaking about the great emphasis on the geographical proximity of the companies in the cluster we should know that it may support but it does not guarantee close interaction and collaboration between the companies. Many technology parks and business incubators failed, because propinquity cannot guarantee effective interaction between the companies in these technology parks and commercial value. The development of the Information and telecommunication technologies (ICT) and the global distribution systems created the possibility for the

formation of *"virtual clusters"*. Virtual clusters are mostly international; they are based on emerging technologies and represent "communities bonded by values which create an ability to share ideas easily across great distances". (Howard, 2000: 34)

Marceau has developed the following typology of clusters (Marceau, 1999):

- "horizontal clusters" between small and medium-sized firms in an industry sector that both compete and collaborate with each other;
- "web clusters" between large firms and their core suppliers;
- "virtual clusters", where physical co-location is not important; and
- "emerging clusters', where firms have a common resource base or resource needs, but have only emerging relationships in production and innovation.

Another differentiation of clusters is according to whether they are *trade-driven* or *knowledge-driven*. Trade-driven clusters are based on the business opportunities in the cluster—through direct trade, pooling resources to support the access to export markets. Knowledge-driven clusters are based on opportunities for learning from a variety of knowledge sources. Knowledge-driven clusters include clusters which develop around knowledge-producing institutions such as universities and public or private research organisations and include inter-linked firms, suppliers and customers, where the primary benefit for all is the sharing of knowledge and learning.

Trade-driven clusters can be grouped in two major types: *horizontal* clusters, in which members operate in the same end-product market and cooperate in pre-competitive activities such as R&D, collective marketing or purchasing; and *halo* clusters, in which a powerful purchaser such as a big multinational company or public organisation (for example defence or healthcare institution) attracts a variety of suppliers. It's important to note that OECD regards horizontal clusters as *networks*. (OECD, 1999: 12)

Knowledge-driven clusters can also be grouped in two types: clusters related with knowledge held by firms and clusters related with knowledge generated by public bodies. However, as the latter are increasingly operating commercially, this distinction may become increasingly blurred.

Industrial clustering is central to the analytical framework used by Michael Porter in his analysis of the competitiveness of nations. (Porter, 1990) He has popularized the concept by observing that nations do not usually succeed across a whole range of industries but "in clusters of industries connected through vertical and horizontal relationships". Clusters of related and supporting industries can be created through the demand for products, rivalry and cooperation among firms as well as specialized factors or inputs such as skilled personnel or natural resources. The key characteristics of *industrial clusters* are:

- strong formal and informal linkages among firms and the supporting technological and business infrastructure in a region or locality stimulate the innovation process and the growth of the cluster;
- geographic proximity of firms, educational and research institutions, financial and other business institutions enhances the effectiveness of the innovation process;

the larger the cluster (e.g. large number of firms and workers) the higher the level of self-sufficiency; i.e. less need to get key functions (e.g. supplies, financing) supplied from outside; that is there is less "leakage" outside the cluster.

Another classification of clusters groups them as *local/regional, international* and *virtual* clusters. Ron Johnson (Johnston, 2003) has classified them in a 2x3 (or 4x3) matrix (Table 1).

Table 1. Types of clusters

	Local/Regional	International	Virtual
Trade-driven Horizontal Halo			
Knowledge-driven Private Public/private			

Source: Johnston, Ron, Clusters: A Review prepared for the 'Mapping Australia's Science and Innovation System' Taskforce, Department of Education, Science and Training, The Australian Centre for Innovation Limited, March 2003

Research of the OECD Focus Group on Clusters (OECD, 1999: 409-410) suggests that advanced technology-based clusters are "boundaryless" and international, whereas mature clusters typically function at a national or regional scale. Of course, clusters could work in high-technology areas as well, if appropriately inked to the global industry.

There is no single, standard model of clusters. Every country and region has a different set of clusters, shaped by historic background, national characteristics, the strength of the knowledge base, size, connectedness, R&D intensity and share of innovative products. (Den Hartog, Bergman and Charles, 2001)

BENEFITS OF CLUSTERS

Clusters are a powerful organisational tool for enhancing economic competitiveness. Porter emphasises that comparative advantage has less power under the conditions of global competition—it is competitive advantage, based on a superior (in terms of efficiency and effectiveness) use of inputs that is crucial. At the same time: "The sophistication with which companies compete in a particular location is strongly influenced by the quality of the local business environment". (Porter, 1990: 80)

As Porter has shortly defined: "A cluster allows each member to benefit *as if* it had a greater scale or *as if* it had joined with others formally, without requiring it to sacrifice its flexibility." (Ibid.)

*Clusters affect competition i*n three ways:

1. firstly, by *increasing the productivity of companies within the cluster.* "Being part of a cluster allows companies to operate more productively in sourcing inputs; accessing information, technology and needed institutions; coordinating with related companies; and measuring and motivating improvement." (Porter, 1990: 81) The productivity improvements are achieved through:

- improved access to specialised and experienced employees and high quality supplier base;
- improved access to specialised market, technical and competitive information;

- complementary products to meet customer needs, coordination to optimise collective profitability, in marketing, and in the breadth and scale of market which attracts buyers;

2. secondly, by *managing the pace and direction of innovation*. The characteristics that enhance productivity can have an even more dramatic effect on innovation. Companies within a cluster have access to better information about changing customer needs, evolving technology, service and marketing concepts. They are flexible to respond rapidly to these changes, through lower cost experimentation. "Reinforcing the other advantages for innovation is the sheer pressure—competitive pressure, peer pressure, constant comparison—that occurs in a cluster. Executives vie with one another to set their companies apart. (Porter, 1990: 82)

3. thirdly, through *stimulation of new businesses formation.* The cluster itself represents a significant local market and the potential to identify new business opportunities, resources, skills and to find investment capital to establish a new enterprise is great.

Clusters can be seen as *a mini-innovation system*. OECD studies have suggested that an industrial cluster is a "reduced national innovation system" (NIS) in which the essential elements stimulate the emergence of specific innovations in various segments of a national economy. (OECD, 2001: 8)

Clusters incorporate the important dimensions of modern innovation:

- the importance of increasing returns to knowledge accumulation;
- recognition that this accumulation process is non-linear and shaped by the interplay of market and non-market forces;
- the importance of organisational innovation to design institutions and procedures to handle complex interdependencies;
- the role of trust in avoiding escalation of transaction costs resulting from increased specialisation; and
- the role of cultural and institutional variety in boosting creativity. (OECD, 2002: 25)

Therefore, clusters provide the multi-facet environments in which firms, intermediaries and knowledge organisations operate and innovate.

National/regional/local innovation systems include: "[...] the elements and relationships which interact in the production, diffusion and use of new, and economically useful knowledge [...] and are either located within or rooted inside the borders of a nation state." (Lundvall, 1992)

National innovation systems (NIS) have qualitative and quantitative characteristics:

- user-producer relationships;
- sub-contractor networks;
- science-technology networks;
- R&D – production linkages;
- reverse engineering;
- skills and tacit knowledge;
- consultancy system and markets;
- technology import capability; and
- numbers of skilled people.

A common feature of these characteristics is that they are about capabilities and relationships.

NIS have regional and local components which in themselves have the characteristics of systems of innovation. The concept "national innovation system" has been criticized for not paying enough attention to the regional dimension. As noted by David and Foray: "There is a significant spatial dimension to many kinds of learning activities which can substantially confine them within national boundaries. Particular industrial agglomerations create environments in which production experience can be accumulated, exchanged and preserved in the local workforce and entrepreneurial community. The ability to assimilate and transfer scientific and technological knowledge that is not completely codified, likewise, is greatly affected by the opportunities for direct personal contact among the parties involved. Informal and formal networks of association, linking scientists and engineers in private companies, and research workers in educational and public research institutions constitute important

channels for the distribution of knowledge." (David and Foray, 1994) Capabilities, flows of knowledge and links among players are common to both industrial clustering and systems of innovation.

The OECD Focus Group on Clusters has identified the success key factors in cluster development:

- supportive framework conditions acting though market-based incentives;
- high levels of interdependency between firms;
- outsourcing to existing or new firms (the key determinant of cluster demography)
- innovation-friendly financial systems, in particular venture capital;
- corporate governance that favours innovation;
- supportive education and training systems;
- market-oriented innovation policy; and
- regional specialisation. (OECD, 2001: 28)

Many private consultants involved in cluster projects have identified basic success factors for a cluster. For example the Nordicity Group Ltd. has defined eight factors for success of a cluster (the Nordicity Group Ltd., 1996):

1. the recognition of the potential of knowledge-based industries by regional/local leaders;
2. the identification and support of regional strengths and assets;
3. the catalytic influence of local champions;
4. the need to have an entrepreneurial drive and sound business practices;
5. the availability of various sources of investment capital;
6. the cohesion provided by both informal and formal information networks;
7. the need for educational and research institutions; and most importantly,
8. the need to have "staying power" over the long term.

Underlying al these factors is, of course, the need for sustained economy activity.

The cluster approach offers an advance on the traditional sector-based analysis of industrial performance. Standard industrial classification systems fail to capture a great deal of the interaction that occurs in clusters, and as such may provide a very misleading picture of industrial performance. New forms of analysis, and data collection, may be necessary.

The nature and role of clusters are also provide a useful framework for development of new forms of governance, moving away from direct intervention towards forms of indirect inducement, facilitating networks and market-induced cluster formation and operation.

IDENTIFYING CLUSTERS IN AN INTERNATIONAL CONTEXT

A variety of tools, taken from economics or geography, have been applied to identify clusters. Different tools capture various aspects of cluster activity, but at the same time each of them has some limitations.

The main factor for the decision of a choice of technique has been the availability of data. Use of existing national and international data sources is limited for cluster analysis, because these data are not designed to capture all relations between different industries, or to measure dynamic interactions and links between industries and companies. However, as the limitations of these tools have emerged, a number of new approaches are in development.

The most commonly used technique is *input-output analysis*, based on measuring trade links between industry groups. Data has been collected and analysed for (OECD, 1999 and OECD 2001) Australia, Belgium, Finland, Norway, Spain, Switzerland, and USA. However, only a few countries have a level of disaggregation sufficient to identify clusters accurately. In addition, trade data can only identify trade-based clusters, not knowledge-based ones.

Another commonly used analysis is the *correspondence analysis* (for example, factor analysis, principal component analysis, multi-dimensional scaling and canonical correlation) which aims to identify groups of firms or industries with similar innovation styles. This analysis has been used in Germany to follow the development of measures of innovation intensity, knowledge base and sources of technological opportunities of firms, based on survey data. (OECD, 1999: chapter 4)

The *graph analysis* is used to develop innovation interaction matrices based on survey, or estimated, data on the flows of major innovations of using and supplying industries. (OECD, 1999: chapter 2) This approach is promising, but limited to 'major' innovations only.

A fourth type of analysis is based on *analysis of geographic concentration and economic activity.* (OECD, 2001: chapter 14)

The most commonly used type of analysis are the qualitative *case studies* based on Porter's approach. Qualitative studies are revealing in descriptive terms, as evidenced by Porter, but the lack of quantitative data limits the analysis.

An interesting national cluster identification study has been carried out in Finland (OECD, 1999: chapter 15) in 1992. It followed closely Porter's approach, but with local adaptation. Export statistics over time, as a measure of international competitive advantage, was combined with industry knowledge, to identify "cluster skeletons" the members of which were mapped. Consultations with experts, followed by study of every member of the clusters with an emphasis on inter-linkages, identified ten clusters: forestry (classed as strong), base metals and energy (fairly strong), telecommunications, environment, well-being, transport and chemicals (potential clusters) and construction and foodstuffs (latent or defensive clusters). An international survey of cluster identification shows that most OECD nations have embarked on this exercise in one form or another (Table 2).

Table 2. Basic tools for identification of clusters

	Level of analysis			**Mapping technique**			
Country	**Micro**	**Meso**	**Macro**	***input-output analysis***	***graph analysis***	***correspondence analysis***	***case studies***
Australia		X				X	X
Austria		X	X			X	X
Belgium	X				X		
Canada		X	X	X			X
Denmark	X	X		X	X		X
Finland	X	X					X
Germany	X	X		X		X	
Italy		X		X			
Mexico		X	X				X

Netherlands		X	X	X			X
Norway		X	X	X			X
Spain		X		X			X
Sweden		X					X
Switzerland	X	X				X	X
UK	X	X					X
USA		X		X			X

Source: Johnston, Ron, Clusters: A Review prepared for the 'Mapping Australia's Science and Innovation System' Taskforce, Department of Education, Science and Training, The Australian Centre for Innovation Limited, March 2003

Based on the cluster identification techniques, different OECD countries focus on different industrial clusters (Table 3).

Table 3. Major clusters by economic sector in OECD countries

Nation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	**18**	**19**	**20**	**21**	**22**
AUS			X				X			X	X	X	X									
AUT									X	X				X		X			X		X	
BEL					X								X		X	X						
DK	X				X	X	X			X	X		X	X								
FNL	X	X			X	X	X			X	X		X	X					X			
GER		X			X			X		X			X		X							
NL	X	X	X	X	X	X	X	X	X	X	X											
NOR	X				X		X		X		X											
SP													X									
SWE	X				X		X			X			X	X		X				X	X	
USA	X	X			X		X	X		X			X	X	X						X	X

1-Construction. 2-Chemicals. 3-Commercial services. 4-Non-commercial services. 5-Energy. 6-Health. 7-Agro-food. 8-Media. 9-Paper. 10-Metal-electro. 11-Transport & Communication. 12-Biomedical. 13-ICT. 14-Wood & paper. 15-Biotechnology. 16-Materials. 17-General supplier. 18 Consumer goods/leisure. 19-Environmental. 20-Machinery. 21-Transport. 22-Aerospace.

Source: Johnston, Ron, Clusters: A Review prepared for the 'Mapping Australia's Science and Innovation System' Taskforce, Department of Education, Science and Training, The Australian Centre for Innovation Limited, March 2003

An example of a cluster, identified by the case study method, has been presented in Text Box 1. The example presents one of the most fast-developing and flexible green clusters identified in Austria and in the Danube region.

Text Box 1: Example for a successful cluster in the Danube region

Green light for green clusters

Everyone has heard of business clusters, where interconnected companies join forces in order to boost performance. The Austrian town of Graz is an example with its cluster specialised in green technology. It's the most efficient in the world, with 6,000 jobs created in the past five years alone. KWB is one of Europe's leading companies in biomass heating. It produces machines that run on granules, wood chips or logs. Using wood reduces a heating bill by half. KWB joined the cluster in 2005. In the past eight years, it has grown from 100 to 400 employees, and turnover has doubled, reaching nearly 75 million euros in 2012.

"The cluster provides us with an ideal platform to meet new partners, to stay in touch with innovation, and to bring out new products into the market," says KWB's co-founder Erwin Stubenschrott.

Each year, the company invests 10 percent of its turnover into research and development. It's an investment which benefits the entire cluster.

"The cluster provides us with opportunities to find new partners, it gives us a wider perspective and helps us make the right decisions to find the products of the future," says Erwin Stubenschrott.

This cluster includes 160 companies. It is one of the few to have obtained the European Cluster Excellence Initiative Gold Label. The companies within the cluster enjoy an average growth rate of 18 percent, nearly twice the market average. This is thanks to the services the cluster provides to help them put in place the right strategies, obtain funding and of course innovate in the field of green technology.

"For example, Eco World Styria is helping one company develop a new solar thermal collector that is nearly invisible on the roof. And we also helped companies develop the first solar, thermally-cooled wine in the world," says Bernhard Puttinger, General Manager of the Eco World Styria cluster.

Founded in 2005, Eco World Styria is not limited to the European market. The cluster has clients around the world. "The companies in our cluster export nearly 90% of their goods to the international markets. That is why we started early on to cooperate with international clusters like Denmark, Singapore, China or the United States," says Bernhard Puttinger.

Erwin Stubenschrott has this advice for any company thinking of joining a cluster: "The keys to success for a company which is part of a cluster are openness, honesty, and you must be prepared to be actively involved in the cluster."

Source: http://www.euronews.com/2013/02/08/green-light-for-green-clusters/

CONCLUSION

In the contemporary business world, both fast changing and truly competitive, clusters are an important and effective mechanism for enhancing competitive advantages at company, sectoral, regional, national and macro-regional levels. This is why in recent years many governments and macro-regions worldwide have developed mechanisms to identify and stimulate the development of existing and potential clusters. Clusters enhance economic performance through increases in the productivity of member organisations, driving the pace and direction of innovation, stimulation of the formation of new businesses, and access to new knowledge and learning. On the other hand, clustering is evident in the corporate strategy of many fast-growing companies in the Danube region and worldwide. The EU has recognised the importance of clusters and supports their development.

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