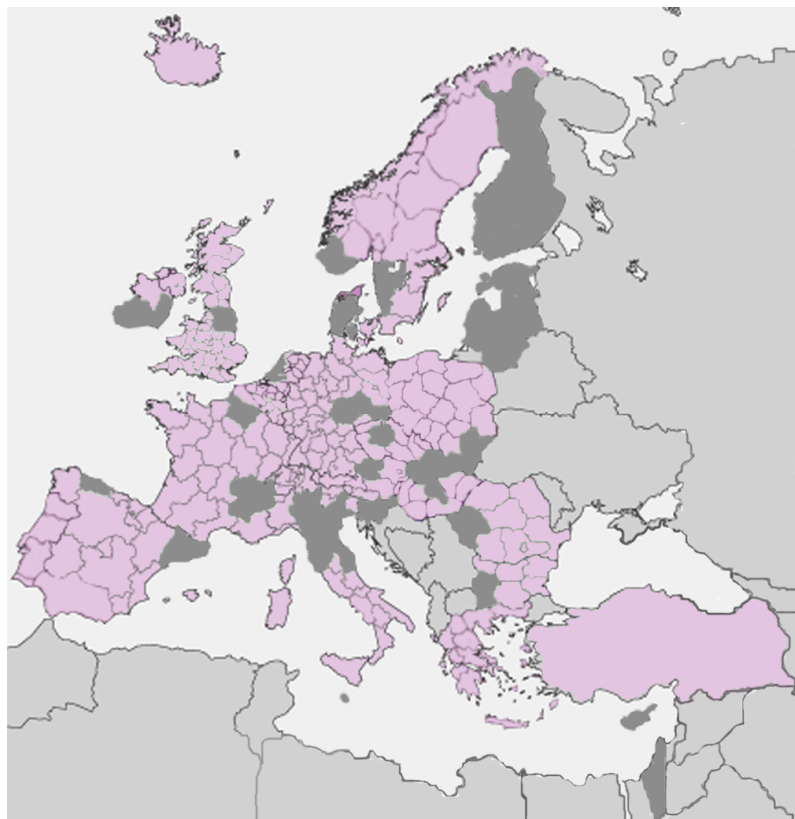




# Case studies of clustering efforts in Europe: Analysis of their potential for promoting innovation and competitiveness\*



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This report has been drafted by the consultancy Competitiveness.com, under the Europe Innova Cluster Mapping Project for the Enterprise and Industry Directorate-General of the European Commission. The views expressed in this report are those of the authors and do not necessarily reflect the opinion or position of the European Commission and in no way commits the institution

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## 1. Objectives of the case studies

Under the 6<sup>th</sup> framework programme, the Enterprise and Industry Directorate General of European Commission has launched a range of projects related to clusters and innovation. In December 2006, the importance of these studies was reinforced by the Competitiveness Council's conclusions, which describe clustering as an area of priority where actions should take place in support of innovation.

These case studies are part of two separate Cluster Mapping projects, driven under the Europe INNOVA programme, that have developed a comprehensive set of data and analysis around clusters, innovation, and related policies.

The objective of the case studies is twofold:

- To complement the statistical analysis of cluster categories developed within the project and published in the Cluster Observatory ([www.clusterobservatory.eu](http://www.clusterobservatory.eu))
- To analyse if the clustering efforts are contributing to address the European innovation and competitiveness gap.

Regarding the first objective, the case studies are intended to be a reality check, since most clustering efforts do not match exactly with the cluster categories classification or the NUTS 2 regional geographic perimeter, both used in the statistical analysis.

As for the latter objective, the case studies aim to help clarify that the application of such a powerful tool like the clustering may not always result in building up favourable conditions for more innovative and competitive companies.

### Addressing the European innovation gap

There have been many efforts to address the European innovation gap, and it is difficult to summarize the actions proposed in one paragraph, but the report *“Creating an innovative Europe”* commissioned to former Prime Minister of Finland, Esko Aho, by the Hampton Court Summit, gives a clear message of the actions required and how clustering efforts could help closing that gap.

The report states in its summary:

*“Achieving an Innovative Europe requires a combination of a market for innovative goods and services, focussed resources, new financial structures and mobility of people, money and organisations. Together these constitute a paradigm shift going well beyond the narrow domain of R&D and innovation policy.”<sup>1</sup>*

The Aho report gives as well a perspective of how clustering efforts can help that paradigm shift:

*“Clusters and, more generally, regional agglomerations are often at the core of innovative development. It is widely recognised that new firms thrive in the proximity with other companies, investors, educational institutions and research centres afforded by clusters particularly in the presence of world class academic institutions. Mobility can be maximised when there is a local labour market that allows regular flows of people from one situation to another, with accompanying diffusion of knowledge. As well as the greater opportunity range it is clear that barriers such as the need to move house or schooling for families are removed. However, it also emphasizes that minimising such barriers more generally will create a more functional society. **It is important to ensure that clusters are defined in terms of the***

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<sup>1</sup> [http://ec.europa.eu/invest-in-research/action/2006\\_ahogroup\\_en.htm](http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm)

*new market and knowledge relationships needed for emerging sectors to thrive. It is even counter-productive to reinforce traditional sectoral clusters as these may inhibit the necessary mobility. Firms in traditional sectors are far **more likely to find innovative growth by forming new linkages and applying new technology to their existing products and services**. This can be facilitated by opening the clusters to cooperation with and learning from other clusters in the same or other sectors.”<sup>2</sup>*

## **Analysing the goals of the clustering efforts**

The case studies of this publication devote a special consideration to the question of whether the analysed clustering efforts have helped move the companies towards **new market and knowledge relationships** or have nearly helped to reinforce or defend acquired positions in traditional sectors.

This is particularly important now that the use of clustering tools is becoming widespread, and not always with the healthy goal of promoting innovation and competitiveness, but in order to defend sectoral interests or expressing the wishful thinking of local politicians.

The latter are generally confusing the tool with the goal, and are creating programmes that institutionalise the list of “officially recognized clusters”, risking that companies, and specially intermediary institutions and associations, see that as an achievement, rather than as an important tool to develop innovation and competitiveness.

In any case, it is not the objective of the case studies to evaluate the results of the different clustering efforts, something for which there still does not exist any commonly accepted methodology, given the difficulties in attributing results to the clustering efforts or to other factors. That is why the analysis of the case studies focuses on their contribution to the three areas that the Aho report points out as necessary ingredients for developing innovation and competitiveness in Europe:

- To contribute to the development of new and lead markets of products and services
- To help redirect resources for R&D&I to new innovative players
- To improve human, financial and knowledge mobility

Therefore the case studies place particular importance in their impact in these following three areas.

### **Contribute to the development of new and lead markets of products and services**

They analyse if the clustering effort has oriented the companies’ strategies towards better business models, transforming their product offering to new lead markets of products and services.

### **Help redirect resources for R&D&I to new innovative players**

The clustering effort can indicate new areas of investment both private (in new areas of the value chain) and public (in specialised infrastructure, research or educational programmes), or could just act as a new way of lobbying to obtain more resources by the traditional players.

### **Improve human, financial and knowledge mobility**

Has the clustering effort helped to remove barriers between the cluster and the neighbouring economy and complementary clusters outside or just reinforced the existing industry links and build walls around it?

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<sup>2</sup> [http://ec.europa.eu/invest-in-research/action/2006\\_ahogroup\\_en.htm](http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm)

- In terms of human mobility, it is important to observe if the clustering efforts have resulted in the attraction of professionals from other areas of Europe and the world, creating a concentration of excellence in the field, or rather has given a label of “excellence” to the already existing pool of talent.
- In terms of financial mobility, the cases look at whether the clustering efforts have been effective in attracting new financial resources to the area, willing to invest in the more innovative strategies and projects, or are just obtaining subsidies to already committed traditional investments.
- In terms of knowledge mobility, have the clustering efforts lifted barriers to facilitate cross-fertilization among clusters, or are they just reinforcing the institutionalisation of traditional pools of knowledge (for example: through the creation of inappropriately defined research institutions).

## 2. The mix of case studies across Europe

### The selection of the case studies

The case studies of this publication are the result of two different mapping projects, the first one “Entrepreneurial innovation in the new member countries” carried out during 2003-2005, and the present “European Cluster Mapping project” still under way (2006-2008). In both cases the consultancy Competitiveness.com has been in charge of the case studies.

The criteria for the selection of the 10 cases studies from the first project was mainly geographic, since at that stage the main interest was to analyse the use of clustering efforts in the ten new member countries to promote innovation and bring their economies up to European standards. Therefore the case study selection included an example from each new member state. The sector within each country was selected by a High Level Advisory group composed by representatives from most of those countries.

The criteria for the selection of the 15 cases of the second project was quite different, looking more at different typologies of clustering efforts, rather than at their geographic diversity.

The cluster case studies address key issues present in cluster analysis, such as innovation capacity, impact of cluster specific policies, imminent cooperation benefits, positive and negative externalities, degree of sophistication, formal and informal linkages between the actors, business creation, etc. In this way, and following the recommendations provided by the members of the High Level Advisory Group, the mix of cases reflected:

- Fast growing regional clusters, as for example Shared Services clustering efforts in Dublin (Ireland)
- Highly innovative clusters, measured by number of patents, R&D spending, etc., such as Microelectronics in Grenoble (France)
- Trans-national clustering efforts, as the one of the Scooter industry Southern Europe (Italy, France, Spain), or the Footwear clustering efforts in Montebelluna (Italy) and Timisoara (Romania)
- Case studies in the new member countries, such as ICT clustering efforts in Sophia (Bulgaria)
- Case studies in the associated countries, as the MAGNET cluster programmes in Israel and Oil equipment industry clustering efforts in Sørlandet (Norway)
- Cases responding to European level challenges highlighted by the High Level Advisory Board (such as Eco-energy clustering efforts in Upper Austria or Seafood industry clustering efforts in the Humber, UK)

## The geographical distribution of the case studies

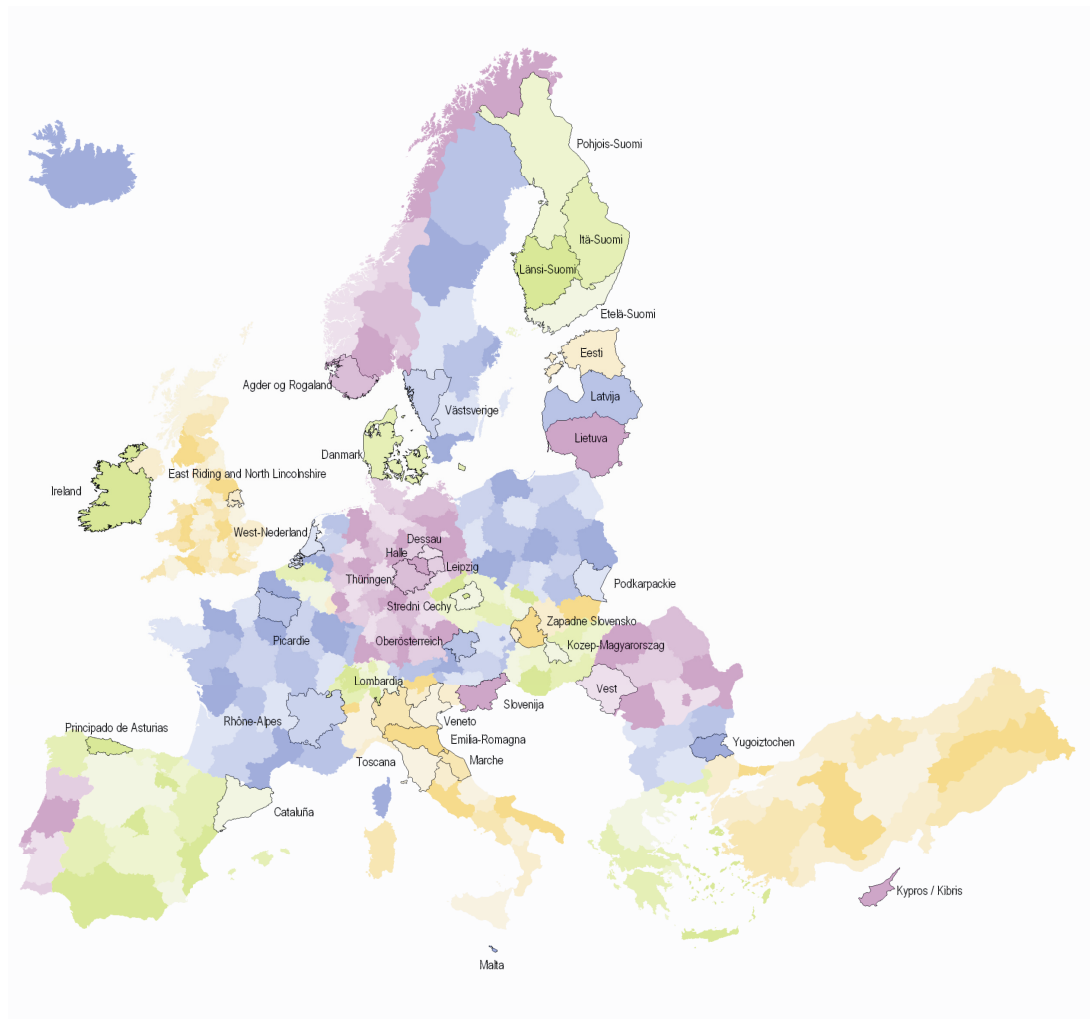


Figure 1 Map of the selected case studies. Source: EU Cluster Observatory ([www.clusterobservatory.eu](http://www.clusterobservatory.eu))

*Nota bene: Israel data not available in Observatory*

## The relationship of the case studies with the data of the cluster observatory

As mentioned before the granularity of the clustering efforts is generally very different from the size of a statistical cluster category or geographical NUTS-2 area used in the Cluster Observatory, but in any case it is interesting to attempt to link each one of the clustering efforts analysed to their corresponding statistical cluster category and geographical areas where they have taken place.

The following table provides that information for the 25 clustering efforts analysed. A word of caution is necessary to avoid extracting any conclusions from this table, other than that the statistical analysis captures the existence of employment in that area and location, and that further study is necessary.



CASE STUDIES	STATE	NUTS II REGION	CLUSTER CATEGORY	EMPL	SIZE	SPEC	FOC	STARS	INNOV	EXPORTS
Eco-energy clustering efforts in Upper Austria	Austria	Oberösterreich	Building fixtures	12 283	0.53%	1.72	2.18%	0		
ICT clustering efforts in Sophia	Bulgaria	Yugozapaden	IT	8 474	0.41%	0.89	1.00%	0		
Financial services clustering in Cyprus	Cyprus	Cyprus	Finance	15 418	0.22%	1.26	4.86%	1	Low	Very strong
Packaging clustering efforts in Prague region	Czech Republic	Stredni Cechy	Automotive	29 511	1.14%	4.02	5.68%	3	Medium	Strong
Food Industry clustering efforts in Southern Denmark	Denmark	Denmark	Food	76 203	1.53%	1.07	2.91%	2	High	Very strong
IT clustering efforts in Tallinn	Estonia	Eesti	IT	2 635	0.13%	0.44	0.49%	0		
Microelectronics in Grenoble	France	Rhône-Alpes	Analytical instruments	7 782	1.46%	1.39	0.40%	1	High	Weak
		Rhône-Alpes	IT	28 066	1.37%	1.3	1.46%	1	High	Weak
Forest industry clustering efforts in Finland	Finland	Itä-Suomi	Forest	6 300	0.37%	2.84	2.59%	1	Medium	Very strong
		Etelä-Suomi		22 858	1.36%	2.11	1.93%	2	High	Very strong
		Länsi-Suomi		19 720	1.17%	3.98	3.64%	3	High	Very strong
		Pohjois-Suomi		5 851	0.35%	2.66	2.43%	1	High	Very strong
Chemical Industry clustering efforts in Central Germany	Germany	Thüringen	Chemicals	2 467	0.26%	0.68	0.36%	0		
		Dessau		3 156	0.33%	4.47	2.34%	1	Low	Strong
		Halle		2 115	0.22%	1.73	0.90%	0		
		Leipzig		1 796	0.19%	1.03	0.54%	0		
Biosciences clustering efforts in Budapest	Hungary	Közép-Magyarország	Biopharma	14 197	1.73%	2.62	1.17%	2	High	Weak
Shared Services clustering efforts in Dublin	Ireland	Ireland	Business services	39 237	0.91%	1.05	2.47%	0		
		Ireland	IT	30 353	1.48%	1.71	1.91%	1	N/A	Very strong
		Ireland	Finance	84 843	1.19%	1.38	5.33%	2	N/A	Very strong
MAGNET cluster programs in Israel	Israel	Israel data not available in Observatory								
Footwear clustering efforts in Montebelluna and Timisoara	Veneto		Footwear	10 641	2.44%	2.27	0.54%	2	Medium	Very strong
	Veneto		Sporting	5 034	2.37%	2.2	0.25%	2	Medium	Strong
	Romania	Vest	Footwear	22 883	5.24%	16.15	3.83%	3	N/A	Very strong
Scooter industry clustering efforts in Southern Europe (Ita, Fra, Spa)	Italy	Emilia-Romagna	Automotive	17 720	0.0068	0.7	0.0099	0		
		Veneto		13 310	0.0051	0.48	0.0067	0		
		Toscana		6 676	0.0026	0.33	0.0046	0		
		Marche		3 515	0.0014	0.41	0.0058	0		
		Lombardia		51 631	0.0199	0.89	0.0126	1	Medium	Weak
	Spain	Catalonia	Automotive	74 086	0.0285	1.64	0.0231	1	Medium	Strong
		Asturias		1 913	0.0007	0.36	0.0051	0		
	France	Picardie	Automotive	9 682	0.0037	1.39	0.0196	0		
		Rhône-Alpes		26 345	0.0101	0.97	0.0137	1	High	Strong
Wood processing clustering efforts in Latvia	Latvia	Latvia	Forest	6 098	0.36%	0.75	0.68%	0		
Laser technology clustering effort in Vilnius	Lithuania	Lithuania	Analytical instruments	1 745	0.0033	0.75	0.0022	0		
Tourism industry clustering efforts in Malta	Malta	Malta	Hospitality and tourism	10 650	0.29%	3.71	7.40%	2	Low	Very strong
Flora industry clustering efforts in the Netherlands	Netherlands	West-Nederland	Agriculture	20 973	0.0251	1.44	0.0065	1	N/A	Very strong
		West-Nederland	Transportation	125 749	0.0204	1.17	0.0391	2	N/A	Strong
		West-Nederland	Distribution	15 330	0.0094	0.54	0.0048	1	N/A	N/A
Oil equipment industry clustering efforts in Sorlandet	Norway	Agder og Rogaland	Oil and gas products	13 572	3.84%	23.08	4.44%	3	N/A	Very strong
Aerospace industry clustering efforts in Rzeszow	Poland	Podkarpackie	Aerospace	6 936	0.0191	9.88	0.0195	2	Low	Weak
Automotive Industry in Slovakia	Slovakia	Bratislava	Automotive	11 468	0.44%	2.79	3.95%	2	High	Very strong
		Západné Slovensko		21 261	0.82%	2.03	2.86%	2	Low	Very strong
Toolmakers clustering efforts in Celje	Slovenia	Slovenia	Metal manufacturing	43 984	1.12%	2.64	5.62%	3	Medium	Strong
Textile industry clustering efforts in Catalonia	Spain	Catalonia	Textile	52 885	2.93%	1.68	1.65%	1	Medium	Weak
		Catalonia	Apparel	38 217	2.13%	1.22	1.19%	1	Medium	Weak
Ventilation industry clustering efforts in Vastra Götaland	Sweden	Västsvrige	Heavy construction services	25 726	0.0039	0.87	0.0311	1	High	N/A
		Västsvrige	Building fixtures	7 750	0.0033	0.74	0.0094	0		
		Västsvrige	Metal manufacturing	14 829	0.0038	0.84	0.0179	0		
		Västsvrige	Construction materials	1 056	0.0018	0.39	0.0013	0		
Seafood Industry clustering efforts in the Humber	UK	E Riding and N Lincs	Fishing	5 215	1.45%	7.37	1.44%	2	Medium	Weak
		E Riding and N Lincs	Food processing	10 487	0.21%	1.07	2.90%	1	Medium	Weak

Figure 2 Selected clusters at a glance. Source: EU Cluster Observatory ([www.clusterobservatory.eu](http://www.clusterobservatory.eu))

**Legend:**

Size=employment relative to EU clusters in same category

Specialization=Concentration of the category relative to average EU, 1 being average

Focus= Share of region's employment of that category

Stars=One star for if 1) More than 15.000 employees, 2) Specialization quotient is higher than 1.75 or 3) Share of regional employment in the cluster category is higher than 7%

This publication contains only a summary version of all case studies. The full versions, including bibliography and sources, are available on line at the Cluster Observatory library [www.clusterobservatory.eu](http://www.clusterobservatory.eu).

A final and complete version of this publication will be posted as well in the same location at the completion of the European Cluster Mapping project, expected by June 2008.

### 3. Eco-energy in Austria: The greening of innovation

#### **Executive summary**

The energy sector in Upper Austria transformed itself from a group of traditional companies to an innovative, environmentally progressive cluster that is poised to have a significant impact on energy innovation beyond its borders. The Eco-Energy cluster in Upper Austria provides evidence that strong political support can create favourable business conditions for cluster development, by using sophisticated regulatory strategies to build and sustain demand for innovative products. In recognition of its transformative work, this cluster was awarded the EU's highest prize for renewable energy sources in 2004.

#### **The problem: An industrial-age sector faces new environmental demands**

Upper Austria, one of the country's nine federal states, is a relatively wealthy industrialized region that has shown strategic foresight not typical of the energy industry beyond its borders. At a time when energy scarcity and pollution reduction were not at the top of the policy agenda elsewhere, the region made a commitment to a green energy policy. In 1998, in order to reduce its dependence on the heavy industry that had typified the region's economy, the former minister of economics of the region initiated the "Upper Austria 2000+ Strategic Programme" (1998-2003), to achieve a sustained improvement in competitiveness based on a cluster-oriented economic and technology policy. The Eco-energy cluster entity (OEC), was created in 2000.

#### **Joint public-private partnership**

The OEC, managed by the Upper Austrian energy agency created in 1991, has so far worked with more than 145 companies and organisations (about 40% being producers of equipment, about 40% active in planning, distribution or consulting, and roughly 20% organisations and institutions involved in R&D, training and related fields). Critically for its success, it divided its focus along two lines: Measures aimed at "creating demand": financial and regulatory incentives, and measures aimed at "meeting demand", i.e. complementary activities to inform, train and build awareness of the emerging opportunities of the newly incentivised market.

The cluster set the following goals within its "Energy 21" Action Plan:

- Increase the share of Renewable Energies
- Raise overall energy efficiency and energy efficiency within the sector by 10%
- Decrease the use of energy for heating by 20%
- Establish 30 new companies in the fields of RES technology and energy efficiency by 2010, thus creating 1,500 new jobs
- 15 new energy RTD research and demonstration projects are planned annually

At the end of 2004, the Upper Austrian Government set the next important step with the energy efficiency strategy "Energie Star 2010", aimed at increasing energy efficiency by 1% (1.5% in the public sector) annually.

#### **Strategic innovation to create a lead market**

Rather than simply grouping the major energy producers and supporting them, which provides an incentive to maintain the status quo, the Eco-Energy cluster set a broad perimeter ranging across the value chain, from production of renewable energies, to management and consumption of energy. These include specialized firms in energy efficiency, management, installation and so forth. The cooperation among such diverse organizations prompted an

R&D focus on market-driven innovation. At the same time, the cluster is comprised of many competing companies, further spawning the drive to develop new and innovative products.

### **Human, financial and knowledge mobility**

The fast growing cluster companies are still encountering problems finding specialised workers to suit their expanding field of renewable energy. Paradoxically, this problem has in fact had a dynamising impact on the region's academic environment: An applied university degree has been created to better respond to the cluster's needs. This intensive programme lasts only 4 years instead of traditional 5 or 6, and aims to bring more high quality employees to the cluster. A new general degree for renewable energies has been created (with some 30 students per year). And the new field is drawing candidates from areas as diverse as agriculture to engineering.

The cluster association has also launched training programmes to develop people with another background than that of the sector to the issues directly related to the cluster companies' business. Between 2003 and 2005, these competence building programmes contributed to the creation of 800 jobs in the Upper Austrian eco energies cluster.

### **Consequences of the clustering efforts**

The development of R&D and technology transfers of recent years have laid the basis for further structural changes. Upper Austria is a top European Region in the fields of technology, education and employment. It is also a European leader in energy sector innovation, 30% of total power demand being covered from renewable sources. Upper Austria is in the process of realising the "Toronto targets" and is also well advanced with regard to environmental policy. A situation evidenced by the fact that Linz, the capital, is one of the cleanest industrial cities in Europe.

In 2006 alone, the cluster companies invested more than 100 million Euro in new infrastructure and created more than 500 new jobs. Today, they represent an accumulated turnover of more than 1,6 billion Euro and 4,000 employees.

### **Spreading specialised knowledge beyond the cluster**

Prior to joining the EU, Austria had already been working on setting up co-operation in the field of energy policy with the countries of Central and Eastern Europe, especially since 1989. Among the focal points of these efforts have been the use of renewable sources of energy on the one hand and increased energy efficiency on the other. Thus the cluster was well positioned to engage its EU partners in extending its innovation.

At an international level, the cluster has ties to some 23 clusters. Also neighbouring regions outside Austria are involved in cluster development, comprising partner companies/institutions with Upper Austria, for example in the Czech Republic. An interesting cross-regional "cluster initiative", based on the economic guideline of the Federal State of Tyrol, started in 2003.

The cluster's influence is being felt through EU-wide programmes and through attendance of cluster members at seminars and other industry-specific meetings at which policy recommendations are handed up the EU hierarchy. Similarly, the Regional Energy Agency of Upper Austria is co-ordinating a project with partners from 9 countries called "RES-e Regions - Boosting green electricity in 11 European regions" (2005-2007). The objective of the project is to identify administrative obstacles, public opposition, grid access, lack of information, frequent changes in funding regimes, etc. and address them by well targeted information and promotion activities.

## 4. The ICT clustering efforts in Sofia: A strong IT legacy in transformation

The Bulgarian ICT cluster has enjoyed government support, effectively defined and established itself within a broad range of organisations from business to infrastructure to education, and was launched with an agreement among ICT actors on the need for progress and active policy work at the government level. Nevertheless, the expected strategic innovations are not yet forthcoming, as the cluster faces several obstacles, ranging from insufficient dialogue with government, lack of effective cluster management, and weak linkages with educational institutions.

### **The challenge: Diversifying a once strong IT industry**

Bulgaria's recent economic and political history seems to place the Balkan nation in a solid position for technology innovation. During the Soviet period, its educational system, strategic decisions and business activity focused on technology development. During its membership in the Eastern bloc's Council for Mutual Economic Assistance (CMEA), Bulgaria was responsible for developing new technology to be adopted by CMEA member states; it supplied 80% of the hard drives in the Soviet Bloc. As a result, Bulgaria gained IT leadership in Eastern Europe and accumulated the potential of highly qualified professionals.

Although the Bulgarian IT industry went through serious decline during the transition period towards a market economy and suffered a brain drain of IT specialists, the country still ranks 5<sup>th</sup> worldwide in sciences and 11<sup>th</sup> in mathematics. Bulgaria occupies the 3<sup>rd</sup> position within Europe and the 10<sup>th</sup> position in the world in certified IT professionals. The IT sector still accounts for 10 percent of GDP, and represents the second sector after tourism in contribution to economic growth. There is steady demand for IT products and services, supplied by some 4,000 companies, 93 percent of which are SMEs.

Under Bulgaria's National Competitiveness Plan, the ICT Broadband Platform for Bulgaria was launched in 2006, in the wake of a successful broadband initiative in Austria in 2004-2005. The objective was to contribute to the national E-strategy and to catapult Bulgaria to the leading ICT position in Central and Eastern Europe.

### **The ICT cluster and innovation**

In April 2004 the first meeting of the ICT Cluster Society was held. The cluster comprised 15 organisations, representing more than 350 technology companies. According to the ICT cluster's management, the entity is not a business development organization but a policy making organization; therefore the members are mainly professional associations. The organisation aims to influence national ICT policies and practices and seeks to channel innovation within the sector.

The IT cluster in Sofia has a strong focus compared to the rest of the technology clusters in Bulgaria. It holds a large share of the overall employment in the region, which is likely to expand rather than be absorbed by other active branches of the economy. The cluster strategy suggested focusing on six objectives:

1. Public-private partnerships to improve the state ICT policies and practices
2. Better business environment
3. Improvement in ICT infrastructure
4. Better professional education and training
5. Mobilizing stakeholders and resources
6. Branding, positioning and promotion

The ICT Cluster is working towards forming a single point of contact in the Bulgarian government on ICT issues. The intention of the organization is to push the government and the cluster itself towards making reforms necessary for efficient development of the ICT sector. The management of the organization sees the cluster-developing co-operation with ICT cluster from other EU regions.

The cluster seeks to foster greater innovation through support of initiatives for different individuals or companies, such as assistance in participating in the innovation programme of Intel Capital for ICT companies.

However, the cluster lacks efficient management. Being focused on further strengthening of the Bulgarian ICT sector, the cluster has not engaged in effective dialogue with the government, universities and the State Agency for ICT. So far no concrete results in increasing ICT cluster competitiveness have been obtained and almost no targets identified by the National Competitiveness Plan were achieved.

### **Meeting challenges in mobility of labour and knowledge**

Progress has been hampered by errors in defining the scope of the cluster. While the perimeter was set too narrowly in one sense, focusing on existing IT companies, by the beginning of 2007, it was obvious that the business community of the Bulgarian IT industry should participate more enthusiastically in the new technology plan and cluster initiatives, and had not. The process was stymied further by the lack of cooperative efforts not only from SMEs but also from the large IT organisations, such as the Bulgarian Association of Information Technologies (BAIT), which still has not joined the cluster.

As the ICT cluster sought to increase its activity, it confronted the major problem of the Bulgarian IT industry: a shortage of qualified labour.

Before 1990, Bulgaria had a highly developed ICT sector, employing more than 220,000 ICT specialists. During the transition period towards a market economy, the sector suffered a massive brain drain of professionals more than 50,000 ICT experts leaving the country between 1990 and 2000.

The professional qualifications of young employees does not currently match the ambitious level envisioned in the strategic plan, due to outdated educational programmes and a low number of IT graduates. An insufficient number of teachers in the universities aggravates the problem. The ICT cluster society undertook the two steps to approach this problem. Some cluster members asked the ministry of education to provide further support for IT students, and others offered to help universities to adapt education programmes to the current requirements of the IT industry.

The low level of ICT penetration, the absence of programmes to encourage technology knowledge and to train individuals to acquire ICT skills, legislation such as controversial Public Procurement Act, and alleged corruption in IT tenders have all been cited by the cluster as sources of difficulty. The ICT cluster has made a concerted effort to connect with technology partners abroad. At a meeting with organizations from Albania, Bosnia, Bulgaria, Macedonia, Romania, Slovenia and Croatia, these committed to build capacity in the region based on quality and innovation. A new brand name of the ICT industry in South East Europe will be introduced in the market.

### **Current status**

The ambitious plan of the Bulgarian Government to improve positioning of the ICT industry in a global level did not meet its goal so far. The National Competitiveness Plan did not develop actively due to low participation among the Bulgarian ICT community. Lack of co-operation of the main actors in the ICT market in Bulgaria threatens the implementation of the governmental strategy and the achievement of the objectives set for the ICT cluster organization. Low management quality of the cluster organization is another obstacle in the way of cluster consolidation.

## 5. Financial services clustering in Cyprus: Learning offshore lessons

### Executive summary

As a full member of the European Union, Cyprus is successfully meeting the challenge of being part of the enlarged European family. The island's economy is characterised by robustness and macroeconomic stability, which is evidenced by the favourable evaluations and comments of the European Commission, the International Monetary Fund and other international organisations.

As a small economy although there is no specific cluster policy in the country, although the different sectoral policies in place in Cyprus directly affect the island's clusters, which roughly coincide with national sectors. Clustering is also recognised as a policy tool for innovation and development in the country's Regional Innovation Strategy (RISC), although no concrete measures had been envisaged in this regard at the time of the case study. So far the RISC has only included somewhat related measures such as thematic networks and innovative networks, although these are not yet operational.

The island economy relies heavily on tourism. This was by far the single most important sector, accounting for almost 22 per cent of GDP in 2001. The property and construction sectors have recently overtaken tourism as the main driver of economic growth. Financial services became increasingly important with the development of Cyprus as an offshore centre.

Cyprus has both a large government sector and a significant financial services sector, both of which offer higher wages than the rest of the economy and arguably crowd out entrepreneurship and the development of other industries.

The cluster cannot unfortunately be considered as particularly innovative – it has developed considerably due to the attractive tax and regulatory conditions that were put in place by the government prior to EU membership, but the cluster has not been capable yet of adapting to new market conditions while retaining its competitiveness.

### Barriers to launch multidisciplinary clustering efforts

A main barrier to the design and implementation of cluster policies in Cyprus is the fragmented nature of the national economy, consisting of very small enterprises with limited sectoral concentration. In addition, cooperation between the research community and Cypriot enterprises, notably the manufacturing sector, has been traditionally very limited and does not appear to be changing. Furthermore, there is also limited interaction between the Cypriot research community and policy makers. It is expected that the RISC project will aim to address this.

Even though there have been some isolated initiatives to encourage the competitiveness of clusters, notably through the Cyprus Development Bank and the Research Promotion Foundation, the key challenges for developing clusters remain the following:

- To investigate the potential for using cluster-related policies to encourage industrial upgrading of the traditional manufacturing companies in Cyprus, notably by working through existing business organizations like the Chamber of Commerce.
- To reinforce the weight given to inter-firm cooperation as a criteria for the selection of projects eligible for state aid.
- To develop competence for monitoring and evaluating cluster initiatives within public authorities and agencies, for instance through interregional projects.

In spite of the entrepreneurial nature that Cypriots are known for outside of Cyprus, there is a lack of innovation culture amongst the population, R&D is low on the priority list of Cypriot companies, and they are not very inclined towards strategic planning. Research and technology development performance rates are quite low.

### **Are the old positive attributes enough for to face new challenges?**

The financial services cluster makes a key contribution to the island's economy. Its weight in the economy finds its origins in the development of an offshore financial sector which was attracted to the island due to a number of advantageous conditions, such as:

- a very favourable tax regime,
- double tax treaties with Eastern European and ex-Soviet Union countries,
- a legal and accounting framework based on the UK's legal system,
- political ties with Middle Eastern countries and Russia,
- good air connections to other financial hubs.

Cyprus is also well endowed in terms of its HR with a very high percentage of university graduates amongst its population – many of them foreign educated which have subsequently returned to Cyprus.

Despite the dismantling its tax preference framework due to its entry into the EU, the remainder of these attractive attributes are still relevant to some degree. However, there are a number of challenges affecting the competitiveness of the cluster.

### **Barriers to innovation: Over-branched, over-staffed, non-innovative domestic markets**

In terms of strategy, structure and rivalry, there are presently 12 domestic banks operating in Cyprus – although the market is highly concentrated with 2 main banks taking the majority of the market. There are also a very large number of highly atomised cooperative credit societies spread in the smaller areas of Cyprus. The domestic market is over-branched and over-staffed: the number of branches is 2-3 times higher than the average per 1000 inhabitants in the EU15 and 6.7 times higher than in the other new member states.

Interest rate limitations are also an additional obstacle to the innovation capability of financial institutions in Cyprus. There have been recent trends towards entry into new areas of service, such as asset finance and insurance, but developments are slow and following international trends rather than setting them.

Unfortunately, local demand is not encouraging innovation in services or products within the industry either, and cannot be considered as sophisticated. Banking is highly integrated into nearly all sectors of the economy, but Cypriots continue to expect personalised attention through the personnel in the bank branches, and internet banking or other services are very slowly being introduced in the market.

In terms of factor conditions, although the availability of high skilled labour at competitive salary levels is certainly a key reason for the development of the cluster in Cyprus, banks are facing a severe problem with the rigidities of the labour union, which appears to be inflexible and limiting the sophistication of the industry. Banks at present are highly over-staffed, and are limited in their ability to introduce flexibility in terms of working hours, to adapt to the new trends in the industry. This rigidity is increasingly having an impact on the competitiveness of the industry.

Key in encouraging innovation in the financial services sector, the Cypriot IT systems suppliers, cannot be described as particularly innovative or outstanding, and suppliers to the cluster tend to be both local and foreign.

**Paradox: Local rigidities as a source of innovation abroad**

Internal rigidities and over-saturation have encouraged, however, the expansion of Cypriot banks abroad, in Greece, the UK, Australia, the Balkans, Romania and Russia. This growth is based on the great importance that culturally both Cypriots and Greeks place on the almost personal relationship with one's banker, and how cultural affinity can help Cypriot banks gain market presence there where there are Cypriots or Greeks. In comparison with Greek banks, Cypriot institutions tend to be more efficient and provide better service, therefore taking advantage of the neighbouring country's entrepreneurial diaspora also in their international growth.



## 6. Packaging clustering efforts in Prague region: By the book but...

### **Executive summary**

Cluster policy in the Czech republic has been an integral part of general SME policy since 2001.

The clustering efforts led by CzechInvest are impressive and by the book: they are training facilitators, identifying clusters, asking them for a strategy and collaborative actions, supporting projects that come out of the cluster, and planning to measure the results. However, there have been only a few clusters that have been able to meet the criteria and respond to the challenge.

The packaging cluster in Jaroměř, in the Hradec Kralove region, is the most advanced clustering initiative participating in the Czech National Cluster Programme. The cluster is branded as “Omnipack” which is also the name of a company within the leading Tanex Plastics Group (already 1<sup>st</sup> and 2<sup>nd</sup> tier supplier to the automotive makers). It groups a number of packaging companies with a very specific driver: although the companies have diverse markets, the one they are targeting is automotive. As a matter of fact, the leading company saw the government’s cluster label as a great opportunity to expand its operations in the automotive sector it already served. Following this method, it is very difficult to engage companies in lead market creation.

Even though the Czech experience is brave and dynamic, the coaching method is weak and will only attract companies that have very clear drivers. Government officials should decide if they want to support other clusters where the drivers to collaborate are not so clear.

### **General national challenge: Closer cooperation in R&D**

There is no explicit innovation policy in the Czech Republic. However, there is a research policy and an industrial policy. Research policy is under the responsibility of the Ministry of Education, and the R&D Council acts as an advisory body to the Government. The Ministry of Industry and Trade is responsible for the industrial policy.

One of the key issues in the Czech Republic is to achieve closer co-operation between the R&D sector and industry. This is reflected in the National Research Programme II (2006-2011) to foster a focus on applied research, co-financed by industry.

### **Rationale: Collaborate locally to better compete internationally**

Packaging is becoming a globalised market. Even with technically suitable solutions, a flexible and creative approach, and favourable quality/cost ratio, the Czech companies suffer from small internal markets, they lack capital and lag behind in supplying large entities.

The Jaroměř packaging companies believe that by working with highly demanding automotive clients, they will be able to serve other markets with the product concepts developed there, and thus gain a competitive edge. The challenge for many is in joining forces to offer complete solutions to clients. To do so, companies have formed associations covering a wide range of different materials (plastic, paper, wood, metal). The clustering efforts initiated thus far have already helped companies to leave aside their rivalries.

Taking inspiration from the example of Austrian and German packaging clusters, many areas of collaboration have been identified together with Pardubice, Plzen and Prague universities in such areas as:

- marketing communications (market and technologies observatory, common sales networks, names and logos, trade show participation)
- productivity increases (better IS-based order tracking system and knowledge management systems)
- HR management skills improvement
- creation of a local technology centre, owned by the cooperative, for R&D and testing with equipment and technologies for all the materials
- logistics to create hubs close to the main automotive clients (in Prague for Skoda & Toyota; in Ostrava for Volkswagen, Peugeot & Kia; in South Poland for General Motors & Fiat)
- recycling.

This case study shows how dynamic clustering actions follow the requirements of demanding clients, giving the whole initiative a driver. As several companies follow the vision of a leader to face competition from much larger companies, they are innovative rather in more organisational (process) issues than in products.

#### **Difficult exercise of defining perimeter for the clustering efforts**

Strategy, common projects, structures and management rules of the packaging cluster were developed before the establishment and development of the cluster organisation. In fact, at the time this case study was carried out (2005), the cluster organisation had not yet started working, but it was already clear that the initiative was truly original and brave in reaching for success with such elements as:

- A cross-industry focus. The customers of the collaborating companies are in the automotive (and subcontractor to automotive) industry, machinery industry, electrical industry, chemical industry, textile industry and food industry.
- Continental reach. Target countries for exports are Germany, Slovakia, Poland, Belgium, Austria, France, Hungary and the Netherlands.
- Decision not to rely on multinationals or large national champions. 90 % of the 21 partners are SMEs and 15 companies (manufacturers) form the cluster core, with 6 companies acting as service providers.
- Multi-regional participation. 65 % of the companies are from the Hradec Kralove region, 21 % from the Vysocina region and 14 % from the Pardubice region.
- Collaboration among different types of manufacturers. Of these companies 40 % produce and manufacture dark blue plastic material, 20% produce light blue metal parts of packages, 20% produce dark red paper packages and 20 % yellow wood packages.

## 7. Food clustering in Denmark: Limited appetite for change

### **Executive summary**

One third of Danish exports come from the food industry, and Danish institutions have proven highly effective at supporting the industry's longstanding traditional segments in their pursuit of improving productivity and technology. But these firms and their support schemes have evidenced little appetite for responding to shifting consumer demand for service and convenience. An advantageous geographical location close to major European markets, that could enable the food industry cluster to expand cooperation across its natural value chain, nevertheless hold out the promise of innovation thus far postponed.

### **The opportunity**

The food cluster in southern Denmark's Triangle region lies within reach of 80 million consumers, lying just one hour from the German border and within reach of all of Denmark within 2.5 hours. Some 7,000-8,000 people are employed in the sector and it is one of the key industries for regional development. More than 120 companies in the region are directly related to the food business, the vast majority belonging to food processing. The dominant subsector is meat, with turnover of Dkk 45 billion in 2001, followed by dairy at 28 billion Dkk. The region is also strongly represented by seafood, ingredients, cakes, confectionary and processed fruits and vegetables.

### **The challenge: A matter of definition**

In the early 1990s, the Danish government classified up to 90 percent of the private sector among mega-clusters, in fields such as building/construction, agro-food, IT/communication and others. While this first effort at cluster analysis and dialogue with cluster members did provide valuable feedback on business conditions throughout the economy, the perimeters of these clusters were too broadly focused to enable effective cluster policy.

In setting the scope, or perimeter, of the food cluster, the industry was limited in its ability to develop a sustainable competitive advantage because of narrowly focused efforts on production and technology. Potential valuable partners within the extended value chain, such as logistics, IT and production processing, were organized into separate networks and associations. These early errors have begun to be addressed recently in an initiative to identify potential lead markets and rally other segments of the value chain to serve them.

### **The need to refocus R&D**

The strong historic position of Denmark's food industry, which produces foodstuffs sufficient for 15 million people, three times the population of Denmark, has made it an habitual target of programmes and initiatives with a high level of R&D investment. In fact, the food industry was one of the original Danish mega-clusters. Yet investment focused on increasing productivity and product development, ignoring opportunities for market innovation such as service and convenience products.

### **Improvement of human, financial and knowledge mobility**

Despite the size of the food cluster and its strong export focus, there has been very little workforce mobility. As an example of how to counteract that shortage, a recent effort to provide knowledge exchange and broader perspectives is an Innovation Academy that takes Danish managers to diverse settings (the first one in Soweto).

Although networks of firms within a value chain would typically be a strong source of innovative ideas, the narrow scope of supported networks in the Danish food cluster, grouping like firms in their own subsectors, does not generate either new strategies that could lead to sustainable competitive advantage, nor much enthusiasm among its members. Once public funds for a network dry up, the network disappears.

#### **The need to share clustering lessons across the economy**

Though clustering efforts have proliferated at a regional level, there has been little coordination among the regions to compare and contrast their experiences and share lessons learned. Thus initiatives are often replicated in several regions without the benefit of a system of reporting back at a national level, although such a feedback system is foreseen in Denmark's recent reform of the regions. Results are not yet available.

## 8. The Tallinn IT cluster: Moving from commodity to high-value producer

### Executive summary

Estonian IT business has benefited from strong electronics and telecommunications sectors, good technological training centres, and from a good degree of rivalry introduced during the privatisation process.

After opening up all domestic markets to international competition and FDIs in the 1990s, the sophisticated demand coming from Finland, Sweden, and Germany has boosted the innovation of the local companies, mainly software developers. In the late 1990s, access to venture capital increased the number of promising start-ups within IT. Also, a very simple non-interventionist government policy has helped in developing very advanced markets for IT services.

Even today, Estonia has one of the highest e-banking usages in the world.

### The dilemma: How to position into the growing markets

Much of the growth in Estonia has been characterised by subcontracting work for northern European companies. Estonian innovation performance is measured as being strong in comparison with other new member states even though innovation in Estonian enterprises has been seen as un-radical. This has led to short term returns but has not necessarily provided a basis for improved competitiveness through new market developments.

In 2001, the Tallinn IT cluster counted some 300 SMEs which employed around 7,000 people. The foreign owned Estonian PC manufacturing companies started to suffer from lowering PC sales due to their lowering price competitiveness. At the same time, the IT markets experienced growth of around 20%. In IT services, 10 local companies were enough to dominate the local market.

### The opportunity: A sophisticated market

The Tallinn IT cluster is probably one of the few ones in the new member countries that can boast of very strong demand conditions.

In fact, the lack of legacy systems in the banking sector, which has been almost developed from scratch, has meant a population ready to adopt new methods of payment without having to discard the old ones. It is significant that 97% of all transactions of the leading commercial bank are performed through internet. In fact, many clients have never had a check book, so they have jumped over such old systems directly to new ones. Similarly, cellular phones have rapidly taken the place of fixed lines, even before the latter had been truly widespread.

One of the IT areas where Estonia has really had an impressive advance is in all E-government applications, with almost half of its population having already been issued new chip-equipped IDs that incorporate an electronic signature, that allows most of the public administrative operations in the country. The E-payments cluster has been very innovative in introducing new applications and user interfaces, to allow innovative services.

Many innovative applications, such as paying your bus ticket with your ID card or paying the parking fee using the cellular phone, show a great deal of public-private coordination along the value chain, between phone operators, bus companies and even the city of Tallinn (that totally outsources the "parking meter" system). Such concepts can be sold abroad, even in the "more advanced" countries.

### **The challenge: Creating European standards to gain sustainable competitive advantage**

An increase in IT and engineering scientific competence has become essential for further technological development to ensure that Estonia moves away from being a cheap sub-contractor to being an innovator.

In general, R&D activities are perceived as too expensive and risky for a substantial part of the Estonian private sector. Despite the introduction of new innovation policies, no targeted IT R&D programmes or wider technology programmes that could foster co-operation in ICT have been initiated, and the national government still prefers to support horizontal measures. But, even without very explicit support policies for R&D, the country's size allows an informal optimization of resources and efficient identification of new opportunities.

Besides the need to develop new applications and co-ordinating efficiently the different players, the true opportunities for differential technological innovation lie in the secure transactions platform, where Estonia has some source of competitive advantage through its cryptography scientists, famous from the Soviet era times. The question is how small Estonian players can fight against the 10 world class players in the rising ICT security markets and could an EU-wide multidisciplinary cooperation help in facing the US or Asian competitors for example in the field of E-Payments.

### **Cluster development through market demand**

Estonia has been slow in adopting a cluster development policy as in such a small country the perimeter of any intervention comes naturally and joint efforts work well even without specific support structures, but based in the personal level collaboration of very good and talented people, both in the public and private sector. Additionally, the proximity of the government to the economy makes it that is a natural thing to feedback the learnings into other sectors and horizontal policies.

In fact, there has not been explicit government driven cluster initiatives to set up the strategy for the Estonian IT sector. Instead, the proximity to leading innovative and demanding markets have forced the local IT companies to be always pointing to the right direction. At the same time, the presence of Nordic investors has helped in integrating the Tallinn IT cluster among the more innovative circles in the world.

Such clustering efforts, driven mainly by the private sector, have improved the needed human, financial and knowledge mobility as they have helped the shift of the entire economy from closed to a very open one.

## 9. Microelectronics in Grenoble: The science of collaboration

### Executive summary

The microelectronics cluster in Grenoble is noteworthy for its market-driven focus, coordinated effort at all administrative levels, and agility in responding to increasing challenges in such a dynamic industry. The cluster benefits from its location in the Rhone-Alpes region of France, which has a leadership position among EU regions thanks to significant research capacity, industry, and major infrastructure investments, among other factors. But perhaps as important as all of these, the cluster is driven by a longstanding culture of scientific entrepreneurship in which research leads naturally to the market.

Grenoble is a very unique case of success that might be influenced by the sports and mountain spirit of its residents. The vision for the future, clustering efforts and institutional alignment seem to be quite unique and have not been reproduced in other clusters.

### The microelectronics sector

The microelectronics sector is a critical element of many other industries, from consumer electronics to automotive or defence and aerospace. Its main products are semiconductors, integrated circuits and Microsystems. The French microelectronics market had turnover of an estimated 307 billion euros in 2005, with components accounting for the highest turnover and employment, in large part due to the presence of the firm ST Microelectronics.

While for many years, defence drove innovation in electronics, more recently the main trigger for innovation has been consumer applications, especially mobile phones, with increasing functionality in an ever-decreasing appliance size, along with continuously lower energy consumption. Such market-driven demands, which require semiconductor companies to achieve larger wafer production, have led to the formation of several consortia in which market rivals cooperate to produce prototypes.

Key players include the component manufacturers, including ST Microelectronics, NXP Semiconductors (Philips) and Freescale (Motorola), all positioned in growth applications with high added value such as telecommunications and industry, despite the absence of final manufacturers in the region. The greatest research asset is the Electronics and IT Lab for CEA, known by its French acronym LETI, which in 2003 filed 153 patents. It has a strong record of turning research into commercial value, relative to other European labs.

The cluster, however, has other significant research players. Multidisciplinarity is crucial for the region's success. The cluster thus benefits from some 21,000 research jobs, some 60,000 higher education positions, and roughly 97,800 industry jobs. Grenoble also has leading European infrastructures and labs such as the ESRF Synchrotron, the ILL Neutrons High Flux Reactor, the EMBL European Molecular Biology Lab and the IRAM Milimetric Radioastronomy Institute.

### Public sector support clustering

Since the early 1990s, the semiconductor industry in France has benefited from substantial investment and partnership programmes between industrial firms and publicly funded laboratories. This has fostered a network of expertise in France, centred on major players and laboratories such as ST Microelectronics, LETI, etc. Several international players have entered the picture, attracted by the availability of highly skilled labour and significant markets in telecoms, automotive and health sectors.

The R&D focus of these support strategies is highly significant, as exemplified by Minattec, a centre of public and private research on micro and nano technologies, and the Minalogic partnership, which has a portfolio of 50 collaborative research projects in a wide range of application fields.

In fact, Grenoble is an example of coordinated efforts. Institutionally, from the chamber of commerce to the municipality, department and region together with universities and research centres join efforts to have the same "pitch", design effective support services and lobby together to obtain policies and funds from France and Europe.

### **Geography's strong role in defining the perimeter for clustering efforts**

Grenoble is geographically an isolated "pot" surrounded by mountains. Although microelectronics firms and labs are in the core, everything that is in this geographical area, including health and energy research and firms, end up finally linking to the microelectronics cluster and producing new sources of opportunity. The main players that make this possible are the INPG and the CEA through its work with industry. The UJF (Université Joseph Fourier) and the CNRS also play an important role.

This has led to fruitful cross-fertilisation that does not let the cluster become obsolete and benefits existing companies but also allows the creation of new ones in convergent or innovative fields. When the interaction does not come naturally, there is a public effort to extend the reach of microelectronics. One example is the effort to incorporate microelectronics into "traditional" sectors like technical textiles and paper and help them innovate and launch innovative products.

### **Strengthening contribution to the development of lead markets**

While the cluster demonstrates successful collaboration in the design and development of microelectronics, its product focus has been primarily "pulled" by demand for improved mobile phone functionality, but the decisions on these functions were external to the cluster. Today the cluster has ideas labs whose aim is to gather university, research and company representatives to reverse this pattern. One example is the nanobio initiative that aims to leverage the biotech and healthcare expertise of Grenoble and Lyon and Teneo concerning energy. Results remain to be seen.

But at least the cluster has proven very effective in focusing R&D resources towards commercial applications, and aligning stakeholders to reach sufficient scale. The current manager of the CEA in Grenoble, Jean Therme, is a visionary who has motivated stakeholders of very different types, rallying and aligning all levels of government from municipal to EU, as well as different institutional and private stakeholders, to create the Minatec centre. He follows in the footsteps of one of the cluster's pioneers, Louis Neel, who created industrial spin-offs from the labs he founded.

Again, the CEA is very active in setting strategies that collect the increasing internal capabilities in Grenoble, fostering new ones, and converging them with future trends advised by industry and by their continuous benchmarking.

### **Improvement of human, financial and knowledge mobility**

The cluster's track record in mobility of knowledge is quite strong. Grenoble has such a concentration of know-how and industry that it has become a magnet to the best researchers and professionals all over the world, and you can find its scientists and engineers everywhere as well. Every year, some 6,000 students and 400 academics and researchers from abroad study or work in Grenoble-Isère.

Even with such a critical mass, Grenoble did not initially attract the early stage investors in as high a concentration as would be expected. But financially speaking, there has been a tremendous improvement following the institutional efforts. Grenoble has finally attracted the attention of French and international venture capitalists, leading to a better climate for start-up financing.



## 10. Forest industry in Finland: Missing the forest for the trees

### Executive summary

The clear Finnish capability for change, evidenced in its industrialization of the 1950s, education restructuring of the 70s or high tech development of the 90s, has thus far been slow to emerge in the huge but conservative forestry sector. The industry's challenge lies in shifting from traditional emphasis on technology for improving the efficiency of a raw materials-based business, to a newer model based on new knowledge-rich applications of its abundant resource. To achieve this, a far broader collaboration with other elements of the value chain will be needed.

After a strong decade of performance in the 1990s, investments that made paper machines far more productive have now resulted in overcapacity at a time of lower world prices and higher input costs (relating to oil, chemicals and transport). The Finnish paper industry seems to have fought for too large a share in magazine and copy paper production, where the barriers to entry are low.

In order to maintain its internationally unique centre of expertise in forest related business and the related well paid jobs in Finland, the actors in the field of research, education, industrial production, engineering and services need to find new methods to establish the best strategies and find the best partners to successfully compete in international markets.

### A restricted perimeter brings restricted opportunities

According to industry interviews, the current structure of the Finnish forestry companies simply does not match up with the market structure. That is, out of the current value chain comprised of harvesting companies, chemical processing and coating, pulp makers and consultancies, the paper sector – traditionally the most influential player in Finland – is the only one not making money. And yet other players in the value chain can see prospects for new products based on the raw materials of forestry.

The powerful sector lobbying associations may have been talking about clusters for 15 years, but they have systematically concentrated their energy around the sole interests of their members (paper manufacturers, harvesters, etc), without including media or printing houses, construction companies, consumer marketers, etc, which might bring the significant product innovations they so badly need.

### The dilemma: Abundant raw material, in need of new markets

Many stakeholders across Finland who are not part of the traditional cluster perceive the key question as "What should we do with our woods?" There are active lobbying groups focused on the forest and environmental issues, such as the regrouped forest owners, professional associations with some employment in the sector, environmental groups, and forest users.

### Prospects for innovation and development of lead markets

Finnish forest-related industries, such as specialized engineering and electronics that deal with wood in a broad range of forms and applications, known as the Forenel sector, have grown faster than forestry itself in recent years. One of the world's largest consultancies in this sphere is the Finnish Jaarko Poyry Group.

In rapidly industrializing countries such as China, that has invested substantially in pulp and paper machinery, there is a major lack of know-how in running mills, and thus an opportunity for related services. At the same time, there is a growing demand for biomass to create renewable energy solutions. Yet paper manufacturers worry that subsidies for renewable energy are leading to the burning of wood rather than its use for paper, perceiving a shift

towards new end products as a threat rather than an opportunity. Thus, it is not entirely clear to what extent the cluster understands this situation as for example the Finnish Forestry Association currently states its three key development needs as: 1), renewing the cluster, 2) enhancing the competitiveness of companies and forestry, and 3) sustainable development.

Some promising pilot projects and ideas on different areas have been proposed, among them real paper and new-media hybrids, next generation media and intelligent packaging, “intelligent” wooden homes and furniture, high quality composites, wallpapers that change colour and shape, etc. But the paper mills and their closely related firms are not necessarily the first ones to embrace these new market opportunities.

Since the role of public support for clusters is in creating favourable environments for innovation, rather than managing or financing associations, perhaps the greatest potential might be found in institutional organization of knowledge-intensive service activities. The core components of research-related activities are based at the “classic” universities and multinationals, not linked with most Finnish SMEs. New areas of R&D could be found if the focus could shift from engineering to knowledge-intensive service areas.

### **Managing the cluster jointly: The risks of government driven initiatives**

Top-down designed programmes, such as the Finnish Competence Clusters, have faced the quite classical difficulty of attracting participants who were not involved in the creation of the projects. Whereas a representative of the IBM Forest Paper Innovation Centre says that his group had no interest in any forest sector related cluster activities, although they have participated in a few meetings relating to the IT sector, a representative of an SME in forest maintenance services says they have no interest in wasting time of anything not directly related to their business.

At the same time, the Finnish government promotes the Finnish model of rational forestry on a global level, following up on the 1992 UN conference on sustainable development in Rio de Janeiro, and more recently promoting global environmental forestry standards and forest trade agreements at EU and global levels. More thorough connections could be made with these government efforts and the potential for related activities by the Finnish forestry cluster.

## 11. Chemicals in central Germany: New potential awaiting launch

### Executive summary

The Chemicals industry cluster in Central Germany has undergone an exhaustive, difficult, yet successful transformation from the standards of the former East Germany to those of the EU. This transformation has enabled the cluster to develop world-class expertise in several fields, from redevelopment of contaminated industrial sites, to implementation of EU and national regulations, to the identification and needs assessment of chemical sites. Yet the cluster has not yet capitalised on these opportunities to take a leading role in new markets for such expertise.

### A structural and political transformation

The chemical industry in Central Germany has undergone 17 years of structural transformation and a radical shift in its political environment since re-unification in 1990, moving from a climate in which business were hardly able to act independently and through which resources were procured by political means, to a relatively free and competitive market that nevertheless imposed far stricter environmental, safety and other regulations. The industry employed some 26,000 people in the “chemical triangle” in the state of Saxony-Anhalt, yet productivity was low, and sales and marketing functions non-existent. It faced two basic choices: a steady decline in productivity and perhaps failure, or a radical re-adjustment and modernisation.

Although the region had one of the most modern transportation and telecom infrastructures in the world, the region had little entrepreneurial experience, little equity and venture capital, small market share, and only one significant trans-regional urban centre, Halle-Leipzig. Maintaining a strong chemical industry would require development of new competencies and incentives for skilled workers to prevent mass migration to western Germany and the rest of Europe.

There is no doubt that the clustering efforts of the “Mitteldeutschland Industrial Initiative” have been a success in terms of building up productivity and innovation capability. Yet these efforts have not yet led to the development of new lead markets for chemical applications, alternative sources of research, or greater mobility of knowledge and people among the industries.

### Building the potential for market innovation

In meeting the challenges of the past decades’ restructuring, the cluster has developed excellent know-how in the following areas:

- Renovating contaminated industrial sites (clearance and redevelopment): registering, evaluation, planning and implementation and creation of clean settlement areas
- Demolition: project management for the redevelopment and the disposal of old chemical sites
- Environment protection (air, water, soil, noise, waste): organisation of environment management and the ongoing monitoring of working processes
- Support in developing chemical sites: identifying, systematising and describing existing or needed expertise and outlining the technical, organisational, financial and promotional potential for the development of chemical sites.

Despite the fact that this outstanding know-how could be an important source of cost reductions and improved efficiency for chemical sites all over the world, no successful product or

service has been launched from the Central Germany cluster to benefit from this specific competitive advantage. The Chemical industry has benefited at home, however, achieving world-class productivity levels.

The cluster is well poised to become a strong service-based industry as the core industry seeks efficiency through outsourcing and splitting of the value chain, as has occurred in the manufacturing of cosmetics and pharmaceuticals. This trend is accompanied by the trend of the establishment of a new industrial segment for broad services as well as site-related industrial infrastructure. This is of particular importance for the SMEs in context of intensification and diversification of their activities, extended market access and business establishment.

### **Help in focusing R&D&I resources**

The main focus of the Central German cluster initiative has been increasing production capacity and in supporting R&D projects. Additionally, the rise of outsourcing agreements from multinationals have provided impulses for the development of innovation infrastructures. Several technology and innovation centres are operating in the region, which enjoys a relatively high level of public support for research. The region has recently been promoted as a national centre for chemical research. Perhaps most noteworthy is the Fraunhofer pilot plan, which aims at lowering the barriers to innovation and piloting new products.

Notwithstanding those achievements, the clustering efforts have not favoured a shift from traditional research funds-seekers to new ones that could bring completely new approaches to traditional industries (for example the mini-plants being developed in other areas of Germany.)

The clustering efforts have helped in creating a dialog between industry and policy makers of the different landers, on such topics as innovation, investment support, new enterprises, innovation centres, or the improvement of general framework conditions.

### **Contribution to an increased mobility of people and knowledge**

The Chemicals cluster has engaged in a significant expansion of inter-industry cooperation since the mid-1990s, when the chemical industry associations covered all the three states, but their initiatives were focused on industry, not involving other parts of the value chain such as suppliers or customers. Such cooperation was sparked by multinational executives such as Bart Groot of Dow, who made use of his personal networks. When BMW decided to locate a major new factory outside Leipzig in 2001, the leaders of Dow and BMW got together.

Today, the regional industry as a whole is in fact represented in the cluster organisation by the networks, which are involved in such fields as lobby work focusing on future clusters; deepening regional cooperation of the chemistry/plastics cluster with science and research institutes in order to strengthen innovation capacity, and development of synergies with other Central German Clusters, in particular automotive, biotech and environment.

### **Remaining challenges**

The cluster has extended relationships across the value chain between chemicals and plastics clusters, but has yet to link with the regional automobile cluster. The cluster initiative is planning to invest in a new plant dealing with issues related to buildings insulation in order to respond to the future challenges in the industry, the only company in the region specialised in insulation, Philippina, is not a member of the cluster and therefore not "inside" the process. Another peculiarity is that local car manufacturers are not buying plastics pellets from local producers.

In coming years as many of the older generation of skilled labour retires, the cluster will face manpower and training challenges, particularly in export oriented and technology intensive enterprises. The cluster will require greater competency in knowledge management as the dynamics of high turnover in an extended value chain make themselves felt.

## 12. Biosciences in Budapest: Exploiting the home-team advantage

### Executive summary

Hungary has an impressive record in scientific research, including one resident Nobel prize winner and nine others Nobel winners who studied in Hungary but won while working abroad. During the 1980s Hungary showed a relative openness to foreign co-operation in R&D, and during the 1990s the country became more actively involved in international co-operation.

Hungary is an interesting biosciences hub with solid strategies to build a sustainable competitive advantage. Indeed, there has been a good effort by the government to set favourable framework conditions that allow the researchers to follow leading developments across the world.

It has been said that the first known use of the word “Biotechnology” was in 1917 by the Hungarian scientist Károly Ereky – in other words, Hungary is not one of the many “wishful thinking” biotech clusters that abound in Europe. For example, Hungary’s pharmaceutical industry has not been limited to manufacturing, but is based on a long tradition in chemistry and biology.

Most Hungarian biotech companies date back to the early 20th century. After surviving the communist regime, they have since been privatised or integrated into large multinational groups. Another more interesting aspect are the smaller biotechnology players, that emerged out of the academic excellence of Hungarian scientists, locally and abroad. These actors have shown interest in working as a cluster, since they are actually part of a much promising global value chain, which they need to reach from Hungary.

While two very dynamic biotech cluster initiatives are located in Budapest and in Szeged, the policy tools being applied to help the biotech sector are quite generic, covering mostly fiscal and financial incentives for R&D intensive industries.

### How to define the perimeter for clustering efforts

A number of cluster mapping exercises have taken place locally in Hungary, identifying mostly small size clusters, fine-tuned to smaller regions. Even though the Hungarian cluster development policy could be characterized as top down by the central government, the methodology has been successfully appropriated by regional authorities and other players. But unfortunately, there’s a lack of feedback to the central authorities.

The results of the past cluster policies in Hungary cannot be seen only in the light of innovation policy, but more as one more regional development tool.

In fact, the Biotechnology cluster case study offers an insight into the impact of horizontal support policies for innovation and cluster-specific initiatives, as Hungary seems to be a country with quite active policy at the regional clusters’ level, but with a set of very generic horizontal national policies.

### The paradox: international level research or local economic development

While the Hungarian authorities would like to define the cluster perimeter as including the local pharma industry, the biosciences players see themselves as satellite research facilities of the global pharma industry. The leading companies in the cluster go so far as to say that the presence of a local pharmaceutical industry is not relevant for their innovation capabilities. This is true insofar as the most advanced users of the areas of excellence developed by the Hungarian scientists are not necessarily the local pharmaceutical industry play-

ers – being that the pharmaceutical markets include only some 200 players in the world and therefore it is quite easy to gain good visibility for good products.

Academic excellence that can give rise to product development of commercial applications is not necessarily routed through Hungary-based companies. In fact, the cluster needs rather Foreign Venture Capital (FVC), not Foreign Direct Investments (FDI).

### **The challenge: managing intellectual and capital flows by organising common efforts**

There is no reason why the innovation capabilities driven by academic excellence and intelligent seed capital could not coexist with a policy of attracting R&D facilities from large multinationals, based both on attractive personnel costs as well as tax and financial advantages. Yet Hungarians must take caution not to lose potential scientist-entrepreneurs who would prefer the security of a multinational instead of their own biotech start-up.

In fact, as a result of privatisation and lack of R&D funding, many scientists have left their speciality, or even the country. It is a cause for concern that the most talented young people will choose other professions for financial reasons. The past privatisation resulted also in the closure of several state institutes for industrial R&D and industrial research activities moved abroad to the centres of multinational companies.

A couple of targeted clustering efforts have been undertaken, such as the support of ITD to the industry, the recent creation of the Hungarian Biotechnology Association (HBA) established by 15 leading Hungarian biotechnology companies, and a recently formed “Biotech cluster” in Szeged:

- Besides communicating and co-ordinating among its members and continuously monitoring national and international trends related to biotechnology, research and development and production, the HBA's major objectives include obtaining financial support for the continued development of national life sciences and the commercialisation of scientific achievements.
- Szeged “Biotech cluster” aims at maintaining sufficient level of R&D funding, as well as facilitating joint research and international commercialisation of innovations. Members of the Szeged clustering organisation are also planning to establish an “incubator house” – a facility offering low-cost shared infrastructure and services – in the Pécs Industrial Park. Additionally, they try to use each other's networking potential to increase cluster's market share.

The efforts in managing joint actions have been efficient, but it is worth underlining that no organisation was created before the cluster had reached a minimal critical mass.

### **Progress and impact of the cluster initiatives**

By its own nature, the biotech industry is always pointing to new markets. The Hungarian biosciences cluster is well connected to the leading US market. The American influence can be seen in another way, too: even though we talk about a research driven business, Hungarian programmes for scientific research in universities is prompting innovation inside and outside the universities, in a quite similar way to the US. In this context, the current biotech clustering efforts have – naturally – helped in focusing national and regional R&D&I resources.

An interesting observation is that the need to focus more in attracting FVC rather than FDI has not been reflected in the policies of the investment promotion agencies, still focused in attracting companies. Luckily enough, successful Hungarian scientists have become themselves investors to new Hungarian research projects. Also, the strong presence of Hungarian scientists abroad offers a high mobility of knowledge, people and capital in this cluster.

## 13. Shared services in Ireland: From cost savings to process innovation

### Executive summary

By creating a favourable business climate for multinational companies to locate IT and other back office services in Ireland, through tax, training, telecom and other policy regimes, Ireland has developed a leading position in the field. The highly agile and competitive culture of this cluster has made Ireland a magnet. Moreover, the cluster has developed a competitive advantage in process innovation and built up a newly skilled workforce through this experience, thus poising Ireland to branch out into lead positions in related knowledge-driven service-support areas.

### The opportunity

The shared services market is one of the fastest growing within the IT service sector, estimated to reach \$144 billion in 2008. Many countries have attempted to position themselves for such a niche. Ireland took advantage of an apparent weakness of its 1980s economy (bottom ranking in the EU, high unemployment) to attract multinationals: an overqualified workforce ready to work at modest wages, high relative public spending on education (20%), and one of the EU's lowest corporate tax rates (12.5%).

Ireland in the 1970s and 1980s experienced a wave of investment in IT manufacturing, typified by Apple's establishment of a circuit board manufacturing and computer assembly headquarters in Cork. Digital Equipment Corp, Amhdal, and Wang made similar sub-assembly investments. The Irish RDA shifted its emphasis from capital-intensive IT to software and data processing and by 1985, when IBM, Lotus and Microsoft had also made investments.

### Clustering efforts and policies

The initial efforts of the shared services cluster focused on increasing its visibility, as Ireland shifted its industrial policy focus from capital-intensive sectors such as chemicals and pharmaceuticals. The United States became the principal target for cultural and linguistic reasons. At the same time, the Irish Industrial Development Agency (IDA) encouraged technical colleges to emphasize electrical engineering and IT in order to deliver on promises made to multinationals regarding its workforce level and availability. In contrast to many other countries and regions in the late 1980s, Irish telecom policies focused not on squeezing high margins from its corporate users, rather offered highly competitive rates on international services that became a significant attraction to multinational firms.

Between 1987 and 1997, more than 165,000 jobs were created in "market services", perhaps a majority of those in IT shared services. The returns to the multinational firms that have located there are remarkable: Through consolidation and standardization, the shared services centre in Ireland typically achieves a cost savings of 30 to 40 percent, with a pay back period of between two and three years. By the end of the 1990s, it had become clear that Ireland was now the first choice location of US companies for administrative services in Europe.

### Developing a lead market: moving up the value chain

A critical distinction in the Irish clustering effort (many small countries had thrown their hats into the shared-services ring in the meantime) has been its clear strategic focus to move up the value chain from services whose primary appeal is cost saving to services that create new value for their sponsoring companies.

In 1998, under the auspices of the IDA and Whirlpool, the first Shared Services Forum was launched to exchange views between the public and private sector on issues such as process and quality management, regulation covering sensitive high value areas such as data protection, EU legislation, project management, and the use of emerging technologies for communication such as VOIP or CRM.

The range of services has grown extensive. Whirlpool located its financial centre in Dublin to provide general accounting, accounts payable and reporting consolidation, and fixed asset/inventory accounting to its European branches. Oracle opened its first telesales office outside of the US in 1997, and now serves the entire EMEA region from Ireland. UPS opened its customer service contact centre in 1995 in Tallaght and then a back-office data processing facility in Ballymount. Apple centralized all of its European financial accounting in Cork in 1998. Its European centre now includes treasury, supply chain management, inter-company accounting, and fixed asset accounting, among other functions.

### **Spreading the cluster's knowledge**

The shared services industry is both a contributor and benefactor of Ireland's transformation in the 1990s from a country known for centuries as a land of immigration to a land of migration. The clustering efforts have permitted the mix of not only people of different nationalities but of extremely varied educational backgrounds. The concentration of technology-based, highly skilled jobs itself becomes a magnet for further labour, as well as the training opportunities fostered by the Irish government. By 2001, the Irish economy was in effect operating at full employment, less than a decade after rates of joblessness had been among the highest in the EU.

By defining the cluster's perimeter very broadly, Irish authorities have helped lay the groundwork for expansion into other service areas which require similar business cultures of dedication to process improvement, efficiency, language skills, and technology savvy administration, finance, client support and so forth. Thus the potential is strong for similar activity in electronics, tourism, pharmaceuticals and other industries.

The overall image and reputation of the Irish workforce has improved dramatically, as a by-product of the spread of the shared services skills across the economy. The lessons learned in recruiting, managing the delivery of complex services, and increasing productivity of knowledge workers, as well as the visibility given to these workers through the cluster, have all improved the prospects of the Irish economy as a whole.



## 14. 4G Wireless communications in Israel: Matching businesses with academia

### Executive summary

Israel's Magnet programme, a highly structured approach to innovation relying on the public sector and academia as catalysts to innovation, is helping move many small and large technology companies towards new markets and knowledge relationships. One of the most noteworthy clusters centres around the development of the next generation of wireless communications known by its emerging technology, 4G.

### The opportunity: faster remote communication for a faster world

Sometime with the next few years, technologists hope to launch a new wireless communications standard that will do for wireless what broadband did for the internet. Though no standardizing agency has yet given a final definition of what comprises 4G, its aims include supporting wireless data transmission rates of up to 100 Mbps (megabits per second) with high mobility (such as travelling on superhighways or fast trains). It also envisions world-wide roaming capability, using multimedia applications within a wide range of services and terminals.

Major disagreements, and thus opposing strategic bets, exist regarding the profitability, consumer demand and feasibility of various next generation wireless technologies now being developed or approaching launch. But led by a key member of the cluster, Remon, the 4G cluster consortium is moving ahead. It aims to eventually reach turnover of \$1 billion on what is currently a public sector support budget of \$20 million.

### Setting an unusual scope for clustering: a perimeter based on R&D

The Israeli business environment is particularly well suited to a high technology cluster with the ambitious goal of taking hold of a lead market by creating the new product. With the second largest number of start-up companies in the world (after the U.S.) and the largest number of NASDAQ listed companies outside North America, the tiny, science-focused nation has often evoked comparisons with Silicon Valley. Intel and Microsoft built their first overseas R&D centres in Israel, while IBM, Cisco and Motorola among others have also opened facilities there. World-class sectors include life sciences, water conservation, geo-thermal energy, software and communications.

In this context, the Israeli government launched its clustering programme, known as MAGNET (the Hebrew acronym for Generic Pre-Competitive Technologies and R&D) in 1994 and until now has included 41 clusters. These consortia are strictly limited to R&D and are supported financially by the government. The programmes broad objectives are:

- to strengthen the country's technology expertise and enhance competitiveness in international markets
- to encourage substantive cooperation among firms in developing such technologies
- to encourage scientific and technology cooperation between industry and academic research institutes
- Achieve more efficient allocation of limited financial and professional resources.

### A license to innovate: contributing to the development of lead markets

A unique feature of the cluster norms in the Magnet programme is the intellectual property rights regime. The rights to the technology developed within a cluster programme, belong to the party, which develops it, but each member of the consortium is granted a free license to use the technology to develop its own products. The license to sell the technology to third

parties is conditional on the approval of other members, and the Office of the Chief Scientist at the Ministry of Industry and Trade.

The 4G cluster, founded in 2004 and known as the REMON consortium, is led by Runcom Technologies Ltd, and includes eight other industrial partners, including Cellcom, the major cellular provider in Israel. Academic partners include Tel Aviv University, Technion, Institute of Technology, Bar-Ilan University, and Ben Gurion University. The cluster has divided into three sub-clusters, covering specific technological challenges.

Because of the heavy weighting of research responsibilities towards academia (15 out of 25 projects by the cluster), the technologies and concepts are spread among a wide range of specialised personnel, from engineers to consultants, subcontractors, etc., making likely the generation of future Magnet clusters.

### **Helping to focus R&D resources: early measurements**

While no investor can yet say which of the many wireless technologies will become the new standard, Remon completed its phase 1 programme last year with a demonstration of 20 Mbps while travelling at a speed of 80km/h, considered a promising early benchmark. Such an achievement might not have been possible without the intense collaboration between the major players such as Cellcom (which serves 2.4 million subscribers), and Rafael with the smaller players such as Runcom (slightly more than 100 employees) and Paragon (about ten employees) and the Academia.

### **Increased mobility of knowledge and finance**

The Magnet cluster format takes strength from an interesting professional phenomenon in Israel, in which university students participating in a cluster, are often hired by the industry after graduation and end up working on the development of products whose technology they participated developing in academia. These employees maintain their academic relationships and contacts with their scientific peers, keeping the flow of knowledge going. Further knowledge transfer occurs through the publication of research papers on such emerging technologies and the patents available to industry.

### **Learning applied to the wider economy**

The Magnet clusters have created a new culture of industry-industry and industry-academia cooperation. More than 120 companies have been involved in the clusters. Ninety five per cent of all the clusters achieved successfully their intended activities and duration over the last five years. Many a company created a new line of business as a result of the Magnet Programme.

Unfortunately, efforts to incorporate European firms into these clusters have not been successful. Non-Israeli firms are not eligible for funding; nevertheless European Telecom providers do participate in the iSmart cluster.

## 15. Footwear in Italy: Small footprints, big steps forward

### Executive summary

In selecting a variety of sophisticated collaborative responses to the globalization of its industry, the footwear cluster in Montebelluna, in Veneto region of Italy, has managed to extend its geographic limits across the border into neighbouring Timisoara, Rumania, while developing a culture of shared learning among large and small firms that has enabled it to specialize early on in the added-value processes. Whereas the footwear industry has declined in many European and U.S. locations considered to be non-competitive on a cost basis, the Montebelluna cluster is prospering through its evolution into the major player in an arguably new industrial category of “sport system” wear.

### The Montebelluna pathway to new markets: from snow sports to all sports

Ever since the 1970s, Montebelluna has been dubbed the “capital of the snow industry” for its dominance in the technologies for the production of ski boots. This competency in sports footwear has strengthened even as the footwear industry has weakened elsewhere in Europe. The cluster now holds a significant share of global production of mountain boots, motorbike boots, in-line skates, and after-ski boots. The world’s leading makers of football, cycling, tennis, basketball and cross-country shoes are based in the area.

Its value chain is tightly integrated locally, with a considerable number of SMEs supporting the major manufacturers, ranging from design firms, assembly and installation companies, laces manufacturers, machinery producers, moulders, and shearing and uppers workshops.

These SMEs support larger firms, some of which were created in Montebelluna, such as Tecnica, Nordica, Brixia and Dolomite, and others that arrived via acquisitions, such as Nike, Rossignol and HTM.

As demand for high quality, specialised sports and leisure gear has risen (perhaps not unrelated, at least in the United States, to the maturing of the rather outdoorsy “baby boom” generation), the cluster has broadened its focus. In 2004, the “sports-system district” of Montebelluna was comprised of some 386 companies, including final firms, subcontractors and component suppliers, accounting for 7,600 jobs. About three quarters of these firms produced footwear.

It is worth noting that, despite this development occurring without an explicit clustering strategy from government or an industry-wide body, the expansion of the product category has fostered a certain strategic advantage as both shoe and sports clothing manufacturers are able to share the same subcontractors and specialised suppliers such as designers, distributors and market agents.

### If enough players follow, it becomes a strategic shift

Unlike certain industries that have been characterised by a strong national or regional identity, during a rapid transition in the 1980s, the Montebelluna cluster easily accepted the neighbouring region of Timisoara, Rumania into its network as a sort of Italian “near abroad” for its production facilities, thus being able to benefit from cost savings while maintaining close enough physical contact for collaboration to take place. Although this movement was due more to an imitation effect with firms that followed successful market leaders, the speed of the delocalisation process has in fact had a strategic impact: The cluster was able to retain the most valuable and creative phases of the sportswear value chain: product design, prototyping, R&D, specialised component production, and design fashion analysis, among others.

### **Achieving mobility in knowledge, labour and finance**

The process of Montebelluna district restructuring has not only avoided what might have been expected – a population of long-term unemployable manpower; the district has been enriched by a new labour flexibility, as owners of subcontracting firms that lost their “outsourced” orders have opened new workshops in Romania or set themselves up as quality controllers of the new subcontractors.

Contrary to some expectations, the case of Montebelluna shows that the presence of multinational corporations can enhance access and exchange of knowledge required in order to serve a partner operating in a global market.

Paradoxically, the exchange of knowledge can also shift competitive advantage in unintended directions. The competence of Timisoara’s sub-cluster is growing fast and will soon be in direct competition with Montebelluna. It too will be pushed to innovate. The Timisoara companies are now facing the same cost challenges that once led Montebelluna to extend operations there – only now their competitors are from other clusters, located further to the East.

### **Extending the lessons of the cluster to national or EU spheres**

Today, Montebelluna is home to a highly successful, high wage, collaborative cluster, serving the world market and focusing on design, brand building and high value production. This has occurred without public interventions or structured governance efforts or cluster labelling (notwithstanding the presence of traditional regional financing of infrastructure, and provision of training and trade fairs by business associations and chambers of commerce.) In fact, the only known initiative by a municipality or agency was a failure: the creation of the Treviso Sportswear Society (STAS), to gather company representatives and provide support services. It closed in 1993.

We have not been able to identify horizontal policies, on a regional or national scale, that could encourage other sectors to apply the lessons of Montebelluna.

## 16. Scooters in Europe: On the road, in need of a push

### Executive summary

Powered two wheelers (PTWs) are a growing market, whether in the West where they complement ownership of more powerful vehicles, or in the developing world, where they are often the sole powered transportation. The EU within the last few years has moved towards transport policy platforms that, primarily for safety reasons, would provide some market boost to the PTW industry. But a lack of strong cooperation among regional supplier and manufacturers, despite an EU-sponsored clustering effort, as well as an unenlightened backing of certain local “champions”, has put the industry in a less competitive position that it might have been.

### The opportunity

World demand for PTWs, which includes motorcycles, scooters, mopeds and cyclemotors, is expected to reach 55.7 million units by 2011, from an estimated 14 million vehicles in 1995. Markets in industrialized countries are expected to turn increasingly to these lower consumption vehicles as fuel prices rise and further restrictions on automobile use are imposed. Demand is expected to increase in emerging markets as well, despite the fact that one of the largest markets, China, is expected to shift towards automobiles.

Europe was a leading production centre of PTW vehicles in the past. Ducati (Italy), Triumph (UK) and BMW (Germany) have always been famous trademarks among powered two wheeler machines. Europe launched Piaggio Vespa (Italy), a “global cultural icon” of the PTW industry and continues offering motorcycle brands such as Aprilia (Italy), Derbi (Spain), Peugeot (France) and KTM (Austria).

Yet the share of European products is very small outside their birthplace, accounting for a mere 2.6% of the US market and only 0.5% of the Japanese market. In European countries, EU producers occupy leading positions, conceding 30% of its market to Japanese producers. The high exchange rate of Japanese currency in recent years has improved the competitive position of EU manufacturers, but this is only a temporary factor.

### The challenge: fragmentation, scale, and lack of cooperation

Market fragmentation in Europe has favoured the coexistence of about 30 manufacturers among which there are some assemblers. The Piaggio Group, Peugeot MTC, and MBK are the three largest European PTW manufacturers. In the 1990s, the three producers possessed more than 60% of European PTW production. But from 1998 to 1995, production fell by more than 30 percent. France and Spain made mainly small-engine utility machines; Austria, Germany and the UK concentrated on larger capacity, higher value machines; while Italy focused on sports bikes and scooters.

The small scale of European component manufacturers had seemed a competitive disadvantage for many years. In 1995 there were nearly 2000 suppliers with an average turnover of only 370,000 ECU. Though that number has reduced significantly, there are still few common suppliers, even in strategic components. Most suppliers were family-owned, single-plant operations that suffered from weak quality assurance systems – although logistics were quite effective.

This decentralization and lack of completely assembled systems brought the industry several negative consequences: Low standardization of technical solutions, fragmentation of resources dedicated to R&D, and the absence of economies of scale. On a global scale, although the European PTW industry still benefited from its famed heritage for beauty and technical quality, it was now facing major competitive challenges in production costs, distri-

bution, and an imbalanced tariff regime that kept EU makers out of fast growing Asian markets while granting those produces easy access to the EU.

European component suppliers networks are weak, characterised by insufficient technological knowledge and quality, high prices, and a lack of funds for aggressive R&D and investment.

### **Clustering efforts and policies**

Clearing a major restructuring was required. As far back as 1995, a majority of representatives of suppliers and manufacturers agreed on the need for cost reduction, updated technology, greater flexibility, and quality improvement. Critically, they also agreed on the need for cooperation to implement these process improvements (although suppliers did not envision cooperation with other suppliers, and certainly not with competitors).

If agreement on goals was not difficult, building trust among industry agents was a major challenge. The EU's Motorcycle Industry in Europe (ACEM) Task Force, which sponsored the conferences and follow-up interviews, settled on a pilot programme under the Commission auspices that would focus on the scooter segment of the industry.

A specialized cluster consulting team was brought in to identify areas of agreement among the suppliers and manage the change management process. A two-tier supplier structure was agreed, along with joint development in technology, production processes, quality systems, etc among non-competing suppliers. Perhaps most critically, it was agreed to group them among standard component suppliers and personalized component suppliers, thus enabling strategic business segments to cooperate on design for the specific needs of their group of companies. The systems developed by standard suppliers will tend to become more universal, with long series. On the contrary, personalized component suppliers may develop the systems suitable to differentiate models and brands and, therefore, those that demand higher production and logistics flexibility.

### **Challenges of joint management between public and private sector**

The European Scooter Suppliers Cluster Project of 1996-1998 was instrumental in enhancing the linkages between European PTW actors. The project resulted in the creation of some real "European SMEs", but it failed to force the large OEMs to join forces on issues of economies of scale, for example in a project to develop joint engines. In fact, the OEMs preferred to use their influence with their national governments to obtain special treatment (financial, labour flexibility...), rather than to follow the recommendations emerging from the cluster project. The unfortunate result was that all the European PTW industry lost in competitiveness.

It seems that while trying to create a competitive Europe, it might be useful to prevent national and regional governments protecting their short term "champions", in order to raise the competitiveness of the whole European industry. In any case market forces have imposed themselves and have finally forced a consolidation of several of the old independent brands (Aprilia, Derbi, Guzzi) under the flagship of the Piaggio group.

### **Extending lessons to national and EU institutions**

Today, in addition to the trans-sectoral competition, taxation or employment rules, PTW business is influenced by the policy frameworks and regulations related to integrated transport strategies, local transport plans, countryside traffic management strategies, or sustainable transport and road safety programmes. The European Commission's White Paper of 2001 "European transport policy for 2010: time to decide" aims to promote a sustainable transport policy. Both the Federation of European Motorcyclists Associations (FEMA) and ACEM participated in the mid-term review conference of the White Paper held in Brussels late 2005. Thus, in its final version, motorcyclists are mentioned three times : twice in the context of dangers in road circulation and once in the context of presenting a slight interest in changing priority lane allocations by some local authorities in cities and conurbations

The PTW industry is not mentioned even once, leaving the interests of the business far behind questions on European railway infrastructure or overloaded airports.

The EU Commission argues that “green” public procurement would help motor manufacturers to gain market credibility through lower polluting and more energy efficient vehicles. It is also drafting regulations to encourage competition in the PTW sector. Given the inevitable shifts in transport habits in industrialized countries, whether from energy costs, environmental concerns, or trends towards lower-profile vehicles Europe’s cities and towns, the industry is certainly worth these additional efforts.

## 17. Wood processing clustering efforts in Latvia: Increasingly adding value

### Executive summary

Since forests are the most important natural resource in Latvia, covering 44% of country's area, the forest sector including forestry, woodworking and furniture is one of the cornerstones of the Latvian economy, and the most important commodities exported from Latvia in 2005 were wood and articles of wood.

The forest sector is the only positive contributor to Latvia's foreign trade balance. The present employment estimates range between 34,000 and 40,000 jobs in 1,500 companies, of which some 300 contribute 85% of the total sector turnover. In addition to being economically successful and one of the main industries in Latvia, the Latvian wood processing sector illustrates a smooth public-private partnership with a strategic alignment that is resulting in the growth of the industry and its added value.

Historically companies processing wood were considered to be of high quality and were able to export a large proportion of production abroad. The industry is now capitalizing on this by continually upgrading, renovating and modernizing equipment and improving quality levels and technical performance.

### The wood products industry in context: The government perspective

The industry is under the Ministry of Agriculture, which has defined the Latvian Forest Policy, developed and implemented on the basis of a mutual consent reached between the authorities and the forest sectors stakeholder groups regarding the sector's long-term development goals.

Together with four other sectors, forestry and wood sciences (forest development, rational utilization of wood biomass, chemical processing of wood) were part of the Latvian basic and applied research priority areas for the period 2002-2006, but only 17 projects worth 58 892 Ls were funded in 2005, giving it the 14th position.

### Variable clustering efforts

During the past years, there have been some interesting targeted clustering efforts in the country:

- The Ministry of Economy in Latvia initiated an aggressive cluster policy in 2000, supported by EU funds (Phare) and rolled out by the Latvian Development Agency.
  - Today, this policy is regarded with scepticism, as the results are seen as too generic and poor relative to the high investments. In fact, development of a knowledge based economy with new priority scientific/ skill areas has since gained priority over cluster policy.
  - One of the reasons for such scepticism is perhaps the misconception of what a cluster is and what to use it for: government (and society) today understands, unfortunately, that a cluster is related to the creation of an institution/ association where members actively collaborate, especially to export.
- In the Forestry/ wood processing cluster, on the contrary, there is a coordinated public/private policy, allocation of resources and a clear strategy alignment, under the Ministry of Agriculture. The industry is growing at a double digit rate and multiplying its added value.



- For example, "Jekabpils Forest Industry Business Park", located in the heart of major Latvian timber log transport routes, is home to an effective enterprise cluster based on knowledge-intensive production and higher value added outputs.
- The Latvian Forest Industry Federation plays a critical role in defining the strategic vision for the cluster and engaging companies and institutions in the definition and development of support infrastructures. They have a 5-year plan focused on the areas of education, research and technology, development of consumer products, sustainable management of resources and increasing the competitiveness of the industry.

#### **A factor of favourable environment for development: Strong private-public cooperation**

The cluster is certainly based on natural resources, but the turnover and exports are progressively achieved by products with more added value. The combined effort of the industry and public institutions is in this direction.

Indeed, the forestry or wood processing cluster has benefited from a strong public-private co-operation between the Ministry of Agriculture and the Federation of the Wood-working industry, as well as with the local governmental institutions and the Latvia Agricultural University. Their joint fund has supported such development projects as:

- the Centre for Technological Competence, providing services to the industry and doing research, testing and products assessment
- the woodworking-centred industrial parks in east Latvia.

There are a number of agencies that support the continued development and effective management of the forest sector:

- The Forest Advisory Board (FAB), established in 1997 by the Minister of Agriculture, facilitates communication and policy development between government and the forest sector to ensure its sustainable development. The stakeholder groups represented in the FAB are: forest owners or managers; wood processing industries; service providers; environment and nature conservationists; employee organizations (trade unions); vocational and higher educational establishments.
- The State Forest Service (SFS) comprises the Head Office, the State Regional Forest Districts that function as the forest authority over a definite region, and the Forest Research Station which is an entity for special assignments. The major objective of the SFS staff is to ensure that the forest managers understand and observe the provisions of law and apply the principles of good forestry. The SFS runs a system of forest extension and consultancy for private forest owners. These consultancy services are available at the forest district offices and in the field.

#### **Challenge: Facing international demand for high-quality wood products**

Regarding structure, strategy and rivalry, there is a large number of companies competing for the same markets and therefore, a healthy rivalry. Nevertheless, these companies are cooperating to develop support infrastructures, as they understand they have shared challenges. The cluster extends all over the country, but there are specific infrastructure initiatives in Jekabpils and in Ventspils.

The manufacturing of wood products, which has become the major branch of industry in a number of Latvian regions, is now being carried out through joint projects with partners from abroad to be able to meet increasing world demand for high-quality wood products. In fact, six out of ten biggest Latvian exporters are connected to the wood industry, and Latvia's forest sector is explicitly focused on external markets. Every year the share of higher value-added products in total exports increases.

It is clear that the sector's competitiveness is increasing as it fights to react to the demands of export markets. As a result of globalisation, less and less warehousing is involved in the cycle of product manufacturing as production becomes increasingly dependent on just-in-time deliveries.

There is an increasing tendency to focus on the more value added parts of the value chain, seeking out new product development, special types of impregnations, etc. Also, the wood products industry continues diversifying its offer.

Construction is one of the main markets of the concentrated industry that has driven demand for added value products such as saw-wood and plywood. While the exports of (less added value) round wood are increasing around 3%, sub-sectors with more added value are increasing between 10% and 16%, just like wooden packaging, fuel or furniture.

Innovation in the forest cluster has been in two directions:

- Forest efficient exploitation and regeneration led by the State-owned Stock Company Latvijas valsts meži (LVM). It claims to having achieved higher efficiencies than reported by Finnish best practices, and it is setting an example for the rest of the industry. All of their wood is certified.
- Adding value by further processing the product. There was a clear strategy and coherent line of thinking in the Ministry and the Federation, including joint efforts to achieve it. Besides the deepening of the technology component of companies (process innovation) and the product development and testing services, the cluster is also considering and implementing actions in service innovation with especial emphasis in logistics.

## 18. Laser Technology in Vilnius: The risk of over-specialization

### Executive summary

The laser technology cluster in Lithuania is an example of how advantageous factor conditions, with a high concentration of specialized scientists in active research centres and academic institutions, can help spawn successful cluster development. But the cluster is struggling to break out of its position of leading provider to a very narrow market, aware that much broader and lucrative opportunities exist in the global market. The limited amount of technology transfer from institutions to companies has proven a brake on the development of the cluster. Lithuania on the verge of implementing a specific cluster policy creating awareness among the cluster's actors, supporting industry associations, and defining cluster strategies.

### The opportunity: From small market to global leadership

The laser cluster in Lithuania, although small in turnover and number of companies, is a successful example of a spinning out process from research institutions. The cluster is centred around the capital, Vilnius, where ten companies operate and produce lasers, optical components and provide related services.

Laser technology companies are exporting to the European Union, US, Japan, Switzerland and other countries. The total sales network covers nearly 100 countries. Nevertheless, the turnover is small (15 M € in 2003) as the market is predominantly scientific. A large part of the lasers are used in the area of scientific research at foreign universities, institutes, including Japanese and Israeli nuclear research centres, and laboratories of large companies. The origin of the cluster is the scientific work for the Soviet Defence industry.

Vilnius companies are global leaders in the production of certain products. However, the absolute numbers of units sold per year is very small due to the specific character of the industry that in fact proves a high specialization and market dominance in certain niches.

### The cluster diamond: Good factor conditions and specialized companies

The high concentration of scientists in the laser field has resulted in the development of companies in the industry. Many enterprises existed in the Soviet era to supply the Soviet defence industry. Company directors and scientists were in close collaboration or involved in research institutions, amongst them the Institute of Physics of the Academy of Sciences. The fact that money ran out with independence motivated the existing company and scientific base to work in other directions and to move towards the scientific market.

The concentration of factor conditions is outstanding, combining both research and education. The current research centres are:

- Vilnius University Laser Research Centre
- Vilnius University Institute of Material Science and Applied Research
- Laboratory of Indirect Optics and Spectroscopy of the Institute of Physics
- Opto-electronics Laboratory at the Institute of Semiconductor Physics

These centres take an active part in international research projects, including those supported by EU and NATO programmes and work together with Vilnius companies within the framework of such projects.

The Vilnius University Laser Research Centre is a member of European Lasernet, which includes the strongest European laser centres working on high intensity lasers and laser-

matter interaction. The Vilnius University Department of Quantum Electronics prepares specialists in laser physics and optical electronics providing on average, 25-30 undergraduate students and about 10 master's students annually.

Companies are quite specialized in terms of structure, strategy and rivalry, with a complementary range of products rather than competing. Company directors, most of whom were fellow scientists earlier, stimulate profitable commercial collaboration in the industry. Larger companies expand markets and offer the complementary technologies of the other cluster companies.

There is a growing structure for the production of laser technologies in the last decade with the establishment of several small companies to supply the laser manufacturer. Cluster firms are now engaged in optics and optic coverings, manufacture and construction of extremely precise mechanisms, as well as supply electronics and optical electronics.

### **Capability to innovate**

The focus of innovation today is in product development, in niche markets and to supply very flexible equipment to scientists. Every product, although sharing the same technology base, is different from each other to adapt it to the specific needs of the industry. However, companies admit that the scientific market is limited, and that if they want to target the industry market they need a much more specific and, at the same time, robust product, capable of working in a production line. The challenge is not easy, since large players dominate the industry market. Some of the companies are thinking of collaborating with these larger companies in specific technologies or setting up consortiums amongst themselves rather than addressing the industrial market directly.

### **Policies affecting cluster innovation**

Lithuania has yet to implement a specific cluster policy. Ministry of Economy has expressed its intention to move forward on this during its next programme period. The Ministry is being advised by an academician from Kaunas University. In spite of this, there is neither a strong conviction about such targeted policies nor a great understanding of them. On one hand, there is the misconception that a cluster revolves around a research capability rather than company businesses and, on the other, there is a general feeling that clusters have to be prioritised and that certain ones have no future.

Industry support, mainly based on structural funds, is addressed individually through the Lithuanian Innovation Centre, which makes companies aware of support schemes and helps them prepare successful proposals.

Lithuania is supporting infrastructures such as technology parks and business incubators to assist companies in clusters. Their approach to building such infrastructures is practical as it looks for the consensus of local, academic and private stakeholders, guaranteeing the success of the venture.

### **Strengthening regional innovation**

Lithuania currently gives a feeling of a very liberal economy, with minimum industry intervention, with the exception of infrastructures. The small size of the country allows government officials to know their industrial base well. However this knowledge is not exploited by translating it into an aggregated understanding of the economy and its challenges.

There is a gap in terms of technology transfer, with a general acknowledgement that Scientific/ Higher Education institutions and companies are not aligned. Intellectual Property might be one of the issues, as there are yet no formulas to transfer it and reward its creation. However, there is an obvious effort from Universities to change this situation. Kaunas University, being eminently technical, is perhaps the more embedded in industry, and Vilnius University is host and a key player in the project Sunrise Valley, a meeting point for campuses, incubators and industry, especially in the IS and electronics areas.

## 19. Malta tourism cluster: Traditional offer in need of innovative push

### Executive summary

A significant part of Malta's land is difficult to farm, making the country heavily dependent on imports. Since the country's independence from the UK in the early 60s, the Maltese tourism and advanced services cluster has been greatly developed. In fact, GDP in Malta is mainly generated by services, comprised 73% from tourism and 24% from industry. Over a million people visit Malta each year.

Malta Enterprise, a government-funded agency uses cooperation and clustering to enhance the cost competitiveness of the micro and fragmented business entities, even though some observers report that clusters are underdeveloped in Malta due to fears of local entrepreneurs of losing their competitive edge if they join forces. In fact, there is a high degree of interaction and healthy collaboration, specifically among hoteliers due to regular sharing of information on rates and occupancy levels, and natural HR mobility. This interaction is not as fluent amongst the other actors in the cluster, such as diving and language schools.

The cluster has not reached its potential, however, by thus far missing opportunities to innovate by, for example, leveraging Malta's other key sector, IT, to join the global trend towards Web-based marketing of tourism.

### The short evolution of the cluster: From mass tourism to increasing specialisation

In the 1970s, government led "the sun and beach" mass tourism boom, which was supported by the large and barely regulated construction boom, resulting in a high increase in volumes but with lower spending per tourist. The difficult period of the early 1980s due to the high dependency of the UK market, in a recession at that time, forced the industry to adopt more aggressive marketing and market diversification, both in terms of the origin of tourists and of their interests: cultural tourism, language learning, diving, conferences and incentive packages.

Later on, since its restructuring in 2004, the Malta Tourism Authority (MTA) has shifted its approach from a geographical-focus in its tourism development to the development of 7 tourism segments, with a considerable effort in branding (Tour operators and leisure; Conferences and corporate incentives; Language learning; Sports (diving); Gozo (rural and eco-tourism); Culture & history; Other growth sectors). The EU Structural Funds are targeted at driving quality assurance in the industry.

At present, tourists still are primarily British (45%), but increasingly other European markets are being developed, whereas tourists coming from the US & Australia are primarily from the Maltese Diaspora returning to visit friends and relatives. Tourism in Malta competes within a market with high price elasticity and increasingly sophisticated tourists. Competing destinations are mainly Spanish islands, Tunisia, Turkey and Cyprus.

### The importance of public sector involvement in a highly atomised tourism sector

The role of the MTA is vital in coordinating efforts, defining a strategy and marketing Malta's tourism products, because the Maltese tourism cluster, as is often the case in this sector, is highly atomised, with 6 large companies and the remainder being (very) small companies.

The key action areas on which the MTA has been focusing (branding, training, quality assurance, heritage restoration) are certainly of vital importance for the competitiveness of the cluster, although unfortunately the upgrading of the cluster's marketing through global distribution systems is still a goal waiting to be achieved. Also remaining to be addressed are

infrastructural weaknesses such as water scarcity, high population density, limited land availability, etc.

### **Innovation capabilities in case study cluster**

With margins in a downward trend for a number of years now, the cluster must still adapt to the global changes taking place in the tourism industry. Whereas traditional distribution channels such as travel agencies are progressively losing market share, the Maltese tourism cluster has been very slow to enter into e-commerce.

Innovation in marketing and distribution could be achieved with a greater integration of two of the main industries in Malta: IT and tourism. Presently, however, the interaction is rarely taking place and synergies have not been developed between both clusters, or even encouraged from the government.

Product innovation could also be pursued in trying to package tourism products that can combine several of the varied products that are available in this small country to better suit the needs of the ever more sophisticated European tourist.

Finally, government could support the cluster by putting in place other measures that could encourage innovation, such as for example encouraging excellence in environmental considerations or energy saving technologies, which could help differentiate Malta's tourism cluster from larger tourism destinations.

### **The so difficult multi-sectoral approach**

Public sector institutions guide the development of the Maltese tourism and financial services industries, and therefore have an impact on the innovation taking place within each sector. The integration, however, of each of these clusters with the 3rd most prominent sector – ICT – is still to be fully exploited. Taking into consideration global trends in both the tourism and banking industries worldwide, with an increasing role in the development of IT solutions, efforts in this direction could have a significant impact on the competitiveness of both clusters.

The Malta Regional Innovation Strategy (MARIS, 2005-2008) project, led by Malta Enterprise might come up with some answers, as it has the most important stakeholders in its steering committee: the Minister for Investment, Industry and IT, banks, industry organisations, unions, investors, university, MCST and the Ministry of Tourism. At least, the MARIS team has so far identified a number of key challenges to be addressed:

- The need to create awareness amongst the different actors, particularly politicians, with regards to the long-term perspective of this exercise.
- The lack of equity financing available for companies to invest in innovation.
- The lack of a clear IP policy and the limited interaction that presently exists between the University of Malta and industry.

## 20. Flowers from the Netherlands: Innovations from the old masters

### Executive summary

The global powerhouse that is the Dutch flower industry relies on 21st century logistics resting atop a mastery of horticulture and foreign commerce dating back four centuries. By creating new benchmarks for everything from freshness and environmental quality control, to horticultural science, to supply chain efficiency, the Netherlands has become the sine qua non of a new global flower industry.

### The problem: the wrong place to grow flowers

The development of the Dutch flower cluster is an example of how a country with little sun and even less suitable land can succeed in flower cultivation. Three regions participated in the establishment of the floricultural sector in the Netherlands: the northern and southern parts of Amsterdam, the Rotterdam area and the Hague. They specialised in vegetables, trees, and flower bulbs. The first auction started in 1887. Soon other auctions emerged in the Westlands and around Aalsmeer. The sector was continuously expanding, and after the Second World War demonstrated exceptional growth after the country invested in physical infrastructure such as roads, waterways and rails. Currently, The Netherlands is the global biggest flower exporter providing 52% of all flora products sold in the world in 2006, followed a very distant second by Colombia (11%), Kenya and Ecuador.

Unfortunately for the Dutch, such growth led to new problems far more challenging than the weather. Intense flower cultivation in such small areas, and the extensive use of pesticides and fertilizers, resulted in the soil in the Netherlands becoming heavily polluted.

### Clustering efforts for competitive product offerings

The existence of a cluster of companies that specialise in all aspects of flowers: breeding, growing, cutting and preserving, packaging, and air shipping. This kind of dynamic, productive infrastructure, has made Dutch companies much more competitive.

From the early days of flower auctions nearly two centuries ago, Dutch producers have developed a network of grower cooperatives that have created a concentration of demand and supply at an international marketplace that now offers additional services such as handling facilities logistics that constitutes one of the cluster's greatest sustainable competitive advantages.

The cluster offers a wide and varied assortment of products all year round (more than 16.000 products in total, and Aalsmeer more than 12.000). This provides traders with a one-stop shop. The payment is direct.

### Environmental constraints sparks market-focused R&D

Facing very strict environmental regulations, the Dutch flower industry had to innovate and search for solutions to adjust to new requirements. Most growers are members of The Dutch Flower Council and the Association of Dutch Flower Growers' Research Groups, which have taken on other functions such as applied research and marketing. In the 1990s growers introduced a closed-loop system for flower cultivation. Under this system flowers grow in water and rock wool, a light fibrous material used as an insulator, lowering the necessity for fertilizers and pesticides. The solution improved not only the environmental situation in Holland, but also lowered production costs and enhanced product quality.

To keep its competitive position in the flower industry the Netherlands established norms that were adopted worldwide. The Dutch introduced specific dimensions for bucket size, standards for environmental certification and many other norms. They revolutionised the

industry in general. In the past, cut flowers were grown near market places and now they can be transported from all over the world. Before flower cultivation was a seasonal business and now it is an all-the-year-round industry.

### **From mercantile tradition, world class logistics**

Though its days of mercantile empire are gone, the Dutch know-how in what we would now call logistics still is a core capability. The success of the flower auctions in the Netherlands is largely determined by their logistics organisation: day-fresh products sold at the auction must be processed and transported to the point-of-sale as soon as possible, requiring customized transport facilities. Uniformity and standardisation of packaging material are essential for that purpose (in 2002, 90% of all transport packaging at the auctions was of uniform design ).

The country has long been considered the ideal site in which to base pan-European logistics operations, and it has become the gateway to Europe for incoming and outgoing shipments, highlighted by the Port of Rotterdam (by far the biggest seaport in Europe) and the airport of Amsterdam (4th largest cargo airport of Europe). It also boasts excellent road, rail and waterways connecting to the rest of Europe.

### **Knowledge mobility: logistics for any purpose**

Almost every international logistics services provider that offers warehousing, transportation and value added services on a European scale can be found in The Netherlands. In addition to professional Dutch companies, many international logistics companies from other European countries and from the USA, Japan and Australia are well represented, serving any producer or distributor who seeks convenient access to a massive consumption area: within a radius of 300 miles (500 km) a market of approx. 170 million consumers can be reached. (If increased to 600 miles (1000 km) one has access to a market of approx. 250 million consumers.)

### **Help in focusing R&D&I resources**

The Dutch flower industry has always benefited from the world-class research capabilities in agriculture of Holland leading universities, but it is going even further by adding technologies from other fields as well. A good example is the recent developments in energy saving technologies, that could completely switch greenhouses from being consumers of energy to being producers of energy.

It was the search for cost reduction that led to the detection of a huge waste of energy in the Dutch greenhouses. According to Doeke Faber, the chairman of the VBN which is the umbrella organization of the cooperative floricultural auctions, the traditional greenhouses do not use more than the 4% of the energy accumulated for heating the plants; the rest is released back to the air. A new concept of "closed greenhouse" will capture that heat, pump it into the ground and use it later for heating the plants, and nearby housing as well.

### **Improvement of human, financial and knowledge mobility**

The greenhouse discovery is not just a fashionable invention, but also a long-term economic and environmental interest of the country as a whole. The Dutch greenhouses managed to lower energy consumption between 1980 and 2003. The industry intends to continue this trend and plans to be independent of fossil fuels by 2020 that will bring 65% of energy savings. The ability to regulate, to keep temperature and to insure carbon dioxide neutral process of energy generation are the main characteristics that make this innovative solution very attractive for the flora industry and for the Dutch economy in general.

The "closed greenhouse" solution demonstrates not only the example of cost-saving innovation but also the effective mobility of knowledge coming from another sector, in this case the heat exchanger uses technologies from the oil and chemical sector, another strength of the Netherlands.



International mobility is also a key to the industry; since Dutch farmers are the one that have developed many plantations all over the world, bringing jobs and technologies to much needed areas as Ethiopia, Tanzania or Colombia.

### **Current status and prospects**

Holland occupies leading position in all European markets providing 66% of the imports of ornamental flowers and plants in Europe. More than 90% of the flora imports in Germany, France, Denmark, Finland, Hungary, Slovenia and the Baltic states comes from Holland and enables the importer to offer low costs using efficient logistics. Dutch exporters also serve remote destinations such as the United States, Japan and the Middle East.

It also dominates the market in the cultivation of starting material. Repackaged exotic products coming from the Middle East, South America and East Africa constitute 30 % of the Dutch flora export. Despite the remote location the products are redirected to the Netherlands and sent to the other countries using the Dutch logistic expertise gained through centuries.

At present, the highly effective clustering strategy of the industry makes it appear unlikely the Dutch flower industry will be challenged in its supremacy anytime soon.

## 21. Offshore oil In Sørlandet: Quick response enables a lead position

### Executive summary

The small and once relatively unknown cluster of companies serving the offshore oil industry in Sørlandet, Norway, seized the initiative to take advantage of quickly shifting demand in the world market. This strategic transformation took place initially without support or awareness of the national government but with significant collaboration with the scientific community. Today, the Sørlandet cluster accounts for 90% of the equipment used around the globe for offshore drilling and mooring and has shifted from pure suppliers to an oil services model.

### The opportunity: instability brings potential for new competitive advantage

As world oil prices continued their steady rise of the past seven years on the back of geopolitical instability and other non-oil factors, the high cost disadvantages of deep sea drilling vis-à-vis land extraction became less of a factor in exploration and extraction decisions. With record market prices making once prohibitively costly extraction locations potentially profitable, and the development of additional offshore locations in the Gulf of Mexico, the South China Sea, West Africa and elsewhere, by 2005 the demand for offshore equipment was at an all time high. Yet this opportunity for Norway's North Sea oil clusters posed significant challenges. Among all the world's potential offshore oil locations, the North Sea is probably the region with the harshest conditions: the waters are deep, often tossed by strong winds, and the pressure is very high. In order to operate in such difficult conditions, the local industry was forced to develop very sophisticated products. Relying on private investment, cluster firms in Sørlandet developed equipment of the highest efficiency and capacity for operating in deep and heavy seas. The cluster now accounts for 50% of the exports of the region and is its biggest employer.

### From equipment to services: Steps towards sustainable competitive advantage

In the southern Norway, there are in fact three complementary clusters representing different parts of the petroleum business value chain. They are situated around Bergen, Stavanger and in the region of Sørlandet (whose key cities are Kristiansand and Arendal). Due to the proximity to the oil fields, its good harbour and air connections, Stavanger was chosen to be the on-shore centre for the oil industry on the Norwegian sector of the North Sea. The oil companies' headquarters and a cluster of equipment companies specialized in "under the sea-bottom" equipment are located there. Bergen hosts the "under the sea" equipment, while around the city of Kristiansand are many drilling companies, and the city of Arendal hosts several mooring and loading companies.

The seeds of the strategic changes that brought the Sørlandet cluster to its current position go back to the 1980s, when the industry focused on building and assembly of sea platforms, where 70 percent of the workforce was based. The integration of control systems and other IT-based product improvements raised the level of skills in the cluster. But it took forward-thinking strategic vision and willingness to take a high risk, embodied by local entrepreneur Bjorn Skeie. The founder of several drilling companies, Skeie invested millions of euros to invest in the next step up the value chain, oilrigs, and move towards integrated solutions for drilling and mooring providers and management.

### Scientific collaboration to spur a new R&D focus

The first university to develop some links with the oil equipment companies was the campus of Grinstad, where the engineering faculty was based (colleges at Kristiansand joined in later). This relationship has grown as time as gone by, and today the University has a very

active role in the cluster association Norwegian Offshore and Drilling Engineering, or NODE. Besides of the educational activities, the university is making a portfolio of the research projects going on in the industry, they participate in the R&D projects of the cluster, etc. In terms of R&D, the companies, not individually but as a cluster, are undertaking research projects to address common challenges, such as the corrosion, overlapping with efforts of metal producing industries or to find the new generation of technology.

### **Public-private sector partnership: Far better late than never**

For a long time, public authorities did not participate or influence the development of the Sørlandet cluster, since government support strategy focused on the oil and gas industry as a whole, with no particular actions around the equipment industry. Equally, no public initiatives were lead in order to further identify the cluster challenges and the needed solutions. Government priority was given to the electronics and mobile industries. Once NODE got underway, however, government did make the connection. Currently, together with counties and university, cluster companies are participating in the governmental research programme ARENA, which had a budget of 727 000 euros in 2006.

### **Mobility of human, financial and knowledge capital**

The blossoming of the Sørlandet cluster is a clear case of adaptation based on knowledge transfer from related industries. During the early years of the oil and gas industry, Norway primarily drew on the knowledge of foreign companies (US companies, such as Philips Petroleum were the first ones to start activities in the North Sea). Very quickly the first Norwegian companies appeared. Most of them were shipyard companies and suppliers of the marine industry that diversified into the oil business. Historically, the marine industry had been very strong in the south of Norway. Marine companies were accustomed to dealing with heavy equipment and had developed offshore skills. For example, Aker Kvaerner Pusner, founded in 1750, had been making marine equipment since 1875. In 1968, it entered the mooring industry, and in 1970 into the loading sector. Nymo, in Grimstad, had been working for the ship industry since its foundation for more than 50 years, and now began doing modules for the oil equipment industry. As a result, the main cluster companies are locally born, yet accustomed to serving the major global players that are now present in most major locations.

The cluster took on a formal identity in 2005 as companies realized their urgent need for cooperation on problems such as scarcity of raw materials (given the boom in demand) and in finding new qualified employees. The NODE cluster association was founded to tackle those challenges, as well as to prepare member companies for upcoming changes in the market. Today, NODE sponsors a quarterly gathering on senior managers from cluster companies to discuss common problems.

In terms of human resources, Sørlandet is better known as a summer spot rather than a technological area. Thus, in order to attract people to live and work in the area, the counties, together with the cluster association NODE, are launching a campaign to promote the region.

### **Extending the lessons of the Sørlandet cluster**

Perhaps partly due to the fact that the cluster in Sørlandet is still young and relatively small, it seems not to have immediate implications at regional, national or EU levels in terms of development of better policies and reducing barriers to innovation. Yet it will be worth keeping in mind the Norwegians' record of establishing high industry standards, particularly in the area of the environment. (the Norwegian oil and gas industry has responded energetically to idealistic HSE goals such as zero accidents and zero emissions.

## 22. The aerospace cluster in Rzeszow, Poland: Ready for take-off

### Executive summary

A “shock therapy” programme in Poland during the early 1990s transformed the economy into one of the most robust in Central Europe. Currently Poland is anticipating the creation of a real and vibrant cluster in its aerospace industry, where innovation capabilities in the manufacturing process and the recent entrance of large international players indicate the positive direction of the industry. However, the process of decentralization of Poland's administrative structure has not been finished yet, limiting progress towards the cluster due to poorly consolidated efforts to support SME development and the absence of an explicit, comprehensive innovation policy for the aerospace industry.

### The opportunity: A new cluster to evolve

Having more than 100 years of aviation history, and responsible for the largest number of helicopters flying all over the world, the Aviation Valley around Rzeszow is still being developed intensively. Big international companies bring the degree of rivalry that the cluster has needed in the past. A series of spin-offs from the vertically integrated plants are creating the related and supporting industries that all players can now use. The aeronautical engineering skills have always been there, and the Faculty of mechanical Engineering and Aeronautical at the Rzeszow University of Technology, continues to act as the pivotal educational and research institution within the cluster.

### Growth policy

While benefiting from various types of support to SMEs, such as technology centres, parks, etc., the industry does not yet have an explicit cluster policy to enhance the innovative environment in aerospace. The only visible policy covers the development of industrial land and infrastructure improvement.

But more important than the “hard” growth policies, is the “thirst” for knowledge and social mobility, which permeates Polish society, from the top managers to the workers. The country is endowed with a wide array of educational institutions that have geared themselves to provide the skills for the next generation. The city of Wrocław currently has 670,000 inhabitants, plus 100,000 students. Among those, 30,000 are students of technology in the Wrocław Technological University, of which 5,000 study in the evenings and another 5,000 on Saturdays and Sundays. This generalized upgrading of skills will definitively have a very positive impact on the innovative capabilities of Poland's present and future clusters.

### Regional innovation institutions

The regional innovation institutions try to compensate for the lack of an explicit comprehensive innovation policy. The country had been historically managed from a centralised perspective, and the new decentralized structure has not been consolidated yet. The regional authorities (elected locally) coexist with the representatives of the central government, often without much coordination.

But even when the regional governments assume the total control of economic development, they will face a patchwork of local development and specialised agencies. Similar to the objective of the country's economy, the orientation of the local agencies is to attract foreign direct investment by offering them good real estate deals.

The exception to this trend can be found only in some technology transfer centres linked to universities, where the focus is clearly on providing competitiveness enhancing tools to the companies in their clusters. Some of these act as regional innovation agencies, as for ex-

ample the Wrocław Centre for Technology Transfer, of Wrocław University of Technology, which is structuring a programme in which it will place 10 of its professionals in the local development agencies, so they act as a point of diffusion of innovation policies, and therefore complement the local skills.

### **Cluster organizations**

The companies in the region formed the Aviation Valley Association, which facilitates the relationships among players. It was created in 2003 as a non-profit organization to foster the rapid development and growth of the aerospace industry in south-eastern Poland. This historic decision was conceived by a group of leading aeronautic producers, suppliers and businessmen.

The objectives of the Aviation Valley Association are:

- The organization and development of a low cost supply chain.
- The creation of favourable conditions in order to enhance the development of aerospace industry enterprises in this region.
- The further development of aerospace research, aptitude and skill.
- The cooperation with technical universities, which would promote new ideas and scientific research within the aerospace industry.
- The promotion of the Polish aerospace industry.
- The protection of enterprises and businesses in the aerospace industry.
- The influence on the Polish government's economic policy towards the aerospace industry and its domain.

The Aviation Valley Association currently represents 35 companies within the region, up from 22 in 2004, with several others in the process of applying for membership. The number of 100 members is expected to be reached within the next few years. Their most important short and medium term goals are:

- to improve the existing manufacturing base.
- to create a strong and reliable network of subcontractors and a low-cost supply chain.
- to attract foreign investment.
- to develop a relationship with other European centres of the aerospace industry.
- to promote joint cooperation of the industry with technical universities, and research centres.

### **Process innovation**

The most obvious innovation capabilities originate in the manufacturing process, since today most of the designs for the engine components produced in the cluster come from their parent companies abroad.

However, the power of process innovation should not be underestimated in an industry like aerospace, where there only seems to be one way to produce the products, the traditional one. In more basic technologies or applications, which lack the economies of scale, the same approach cannot be used due to the processes of development and testing.

The Rzeszów University of Technology is developing avionics technology that if successful would require the a market of at least European level, to face its competitors coming from the US, which address a much larger market.

### **Poland cluster and innovation policy**

The year 2004 has brought a significant shift in Polish innovation policy, especially in terms of available support mechanisms for the private sector. The Polish Agency for Enterprises Development launched two Sectoral Operational Programmes for SME Development and Innovation.

The same year the National Development Plan 2004-2006, defines the Polish social-economic strategy in the first years of EU membership, and together with operational programmes it is the document which outlines the structure for support from the Structural Funds. The National Development Plan also stimulates innovations by supporting the SME sector in creating and implementing product innovations and technological processes, by directing assistance to large enterprises aimed at supporting development and structural processes, and by supporting the business environment via institutions supporting innovation activities of enterprises such as co-operation with R&D units. The National Development Plan also includes features that focus on innovations such as:

- Further implementation of science and research programmes of the State Committee for Scientific Research
- Participation in international programmes for science and technology cooperation especially in the EU Sixth Framework Programme (FP6) (2002-2006),
- Implementation of the Sectoral Operational Programmes – “Improvement of the Competitiveness of Enterprises”, “Development of Human Resources”, Integrated Regional Operational Programme (Government Initiatives for Growth through Innovation).

## 23. The automotive industry in Slovakia: Innovation potential in collaboration

### Executive summary

Facing the negative consequences of the privatization process, in the form of eroded trust between academia, industry and government, Slovakia's automotive industry has turned to international companies that can offer employment to a qualified workforce left jobless during its economic and political transition period. With no robust innovation approach emerging, the automotive cluster provides car assembly and component manufacturing to foreign firms, and does not enjoy support from any effective governmental strategy.

### Opportunity: Big potential of growing industry

The Slovak automotive industry has become the leading sector of the national economy in recent years. Since 1999, VW Slovakia has been 100%-owned by VW Germany. The VW group and Siemens also invested in the construction of a factory producing automotive electronics equipment in Nitra (Western Slovakia). The factory in Bratislava was further expanded and a new manufacturing unit for gears in Martin (Central Slovakia) was developed.

Most of the companies present in the cluster are just implants in a country that was anxious to receive manufacturing jobs. It had a high unemployment rate while having a qualified workforce that had seen most of their jobs destroyed during the privatisation process.

The automotive cluster demonstrated potential for growth, but the privatisation process eroded the trust relationship between the three main forces – academia, industry and government – that play an important role in establishing supporting activities like technological and testing centres, design capabilities, etc.

A fully developed cluster could have a much stronger diamond than most of its competitors in Europe, with top class factor conditions. Among these are highly rated technical schools; an excellent location in the centre of Europe; a dense network of suppliers that could expand into Austria and neighbouring countries; a very healthy rivalry with one of the stronger concentrations of auto manufacturers in Europe; and access to the most sophisticated auto consumer in the world, the German market, that already produces its top range vehicles there.

### Process as a source of innovation capability

The innovation capabilities of the cluster are limited to process innovations, in which the Slovak middle managers and technicians have given good examples of their capabilities, increasing the productivity of certain assembly operations, according to some of the international suppliers. Nevertheless, limited potential for innovation is seen in these incremental process improvements, since there is already little margin for that in an industry as lean as the automotive.

The advantages could be spread to other local industries in Slovakia that could benefit from the process innovations developed by the automotive industry. But that seems to be an area yet to be developed. The integration of other segments of the automotive value chain into the cluster still seems like a distant possibility.

### Innovation policies

Slovakia has reasonable levels of post-graduates in science and technology per 1,000 of population. It also has relatively high levels of innovation expenditures, approximating 6.6 percent of turnover in manufacturing. Good education levels, when combined with high innovation expenditure in manufacturing, generate increased opportunities for establishing high-tech manufacturing industries. On the other hand, unless significant increases in R&D

expenditure occur, there is a risk that Slovakia could remain a low-cost, low-value-added economy.

The Ministry of Education directly or indirectly controls most of the agencies funded by the government that focus on basic and applied research. These include the Slovak Academy of Science, the higher education schools, the Scientific Grant Agency VEGA, the Science and Technology Assistance Agency and the Centre for Advancement, Science and Technology (SARC). VEGA was established through an agreement between the Ministry of Education and the Slovak Academy of Science in January 1996. It provided public research bodies with scientific research grants but was under-funded.

Recently, the Slovak government introduced the concept of the National Science and Technology policy to be attained by 2005 (IRC Slovakia). This has the following aims:

- Consistent coordination of national and regional science policies
- The creation of conditions to bring the standard of Slovak science and technology into line with the standard in comparable countries of the European Union by 2005
- The creation of conditions for the enhancement and improvement of international scientific and technological cooperation
- Increasing R&D efficiency and effectiveness
- The creation of conditions for a common competitive environment for all R&D organisations to enable the most professionally skilled organisation to succeed in a public tender regardless of its management status
- The creation of conditions for selected R&D organisations to become part of a network of centres of excellence in the European Research Area
- The provision of public funding on the basis of the results of a public tender, and the evaluation and accreditation of R&D organisations

Despite the successes, particularly in the automotive industry, the European TrendChart on Innovation (2003-2004) reports that there is no official concept of cluster policy in Slovakia but that some elements are contained in government documents related to the establishment of industrial parks and zones. By June 2004 there were eight industrial parks in Slovakia, the largest of which were parks in Bratislava and Martin that specialise in production of car components, and in the Kosice regions that specialise in electronic solutions.



## 24. Toolmakers in Slovenia: Effective policy as a tool for innovation

### Executive summary

Slovenia, the most prosperous of the six republics that emerged from the former Yugoslavia, experienced a decline in GDP and rampant inflation in 1991-1992, but since 1993 the country's advantageous geographical location in Central Europe, excellent infrastructure and changes in government policy have brought economic recovery and rapid expansion.

Today Slovenia is among the most successful of the countries in transition from socialism to a market economy and currently ranks among the countries with the lowest degree of risk among former Soviet bloc economies in terms of investment.

Systematic integration of cluster policy in the economic development strategy of Slovenia has created a high level of innovation capacity through the establishment of a strong tool-making cluster in the country. The innovation capacity was amassed through technology, educational, and research centres to support cluster management structures. This clustering effort has become a good example of how collaboration among manufacturing, services, and research institutions can create a virtually integrated organization with potential for rapid growth and increasing competitiveness.

### Cluster growth through direct government support

With industry lagging significantly behind the EU average in the 1990s, Slovenia became interested in clusters, and decided to systematically integrate the cluster concept in a comprehensive approach to serve long-term economic policy goals. The Slovenian Ministry of Economy has been promoting cluster development since 1999.

One of the reasons is its policy of anchoring clusters at the heart of a pro-active industrial policy aiming at supporting SMEs and raising the productivity levels and innovation potential of Slovenian industry by dedicating significant resources to the process. This high level awareness of cluster policies, however, resulted in a backlash effect initially, as soon as a political change has occurred in the national government.

The toolmakers cluster in Celje has evolved from a series of captive suppliers to former Yugoslavian large players, like home appliances manufacturer Gorenje, to a real network of companies and institutions collaborating and competing.

### Driving innovation

The key driver of the innovative character was the sophisticated demand conditions, with an impressive list of best practice clients like BMW and Daimler-Chrysler towards whom the cluster companies focus their engineering development, CAM and manufacturing capabilities.

Despite its past, today the cluster has a high degree of rivalry among the managers of the companies – that in some cases used to belong to the same group before privatisation – and they receive ample social recognition for their achievements.

The cluster, which formed an association that acts as governing body and represents the sector, has received ample support from the national and regional government, resulting for example in the creation of a small technical centre on site.

### Innovation capabilities in the toolmaker cluster

Notwithstanding the good diamond conditions, the capabilities of the cluster companies to perform technological innovation differ across the cluster's value chain, with some strong limitations to innovate, in some of the areas with more potential. The process of innovation

in the tool making industry is quite mature in most activities of the value chain, with most of the margin for innovation being due to incremental improvements than to revolutionary new technologies (actually the full potential of CAD/CAM systems has already been fully adopted in the cluster).

The activity of the cluster value chain that has the highest margins for innovation is the development of the moulds in 3D virtual reality. But this technology, which has many other uses (from the special effects in the movie industry to telemedicine) requires levels of investment in R+D that are clearly out of the scope of the companies in the cluster.

Some of the more forward looking companies see this limitation as a threat to their margins, since they see that they could be left with the mechanical low margin side of the business while the high margin knowledge side is kept by new engineering players closer to their final customer in Germany.

Some companies are willing to invest in venture capital funds that help develop companies in the area of 3D Virtual Reality, as a way to keep up with technology and capture part of the knowledge value as well.

## 25. The Catalan textile cluster: From long push cycles to market-sensing pull

### Executive summary

The textile industry in Catalonia, one of the engines of its industrialization more than a century ago, has been transformed from an inward-looking, tradition-bound industry that relied on long manufacturer-led seasonal production cycles, to an internationally focused, quick-responding cluster of companies. This shift in strategic focus, facilitated by an IT-enabled network of companies throughout the value chain, and focused on satisfying constantly shifting consumer demand, has reshaped and re-invigorated Catalonia's clothing industry.

### The problem: An industry falling behind the market

In the early 1990s, many of Catalonia's leading clothing manufacturers were led by a second or third generation of families who had founded the businesses in the 1920s or earlier. All of the cluster's support institutions were designed and operating to support the traditional manufacturers' approach of presenting clothing collections to retailers months before the season, accepting high volume orders, and then liquidating leftover stock through end of season sales. The central government supported this approach through wholesale exhibitions, trade fair attendance support, and designer fashion shows. Most of these initiatives were useless for the manufacturers and distracted attention from the genuine threats to their competitiveness in an increasingly global marketplace. There was no encouragement or support for strategic change such as flexible production, outsourcing and improved logistics.

### The challenge: Industry transformation

The strategic alternative lay in vertical integration, as the reduction in multi-brand retail stores was giving way to consumer preference for channel brands such as Gap, Mango, Zara and others that were proving able to respond to customers' fickleness for the latest fashion with fast and flexible production lines. Zara, one of Spain and the world's leading clothing multinationals, had already blazed the trail with its system of continuous design and demand-based reposition that maximizes sales of its product at full price. This has been possible only through rapid transmission of customer behaviour and preferences.

The Catalan regional government actively encouraged manufacturers to establish their own retail outlets. The key to a strategic change lay in exploiting the extensive network of small and medium sized producers and related businesses while sharply increasing product diversification and response times, which would require major investments in information technology as well as training.

### Cluster strategy: A strategic analysis

In 1993, Catalonia's government and its regional development agency, CIDEM, launched a series of micro-cluster initiatives including knitwear in Maresme and Anoia, dress making in Barcelona and textiles technology across the region. The RDA hired a Barcelona-based consultancy specialized in improving companies' competitiveness by fostering collaborative relationships among the different agents. The consultancy reported back regularly to the RDA on its findings and developments, so the lessons learned could be passed on to policy makers.

The methodology was based on a process of interaction, meetings and collective reflections that brought in all the relevant actors into the strategic analysis and decision-making process. These actors included the SMEs, universities, research centres, government, and industry associations. It became clear in this process that the industry was suffering from a weak distribution sector, formed mainly by SME retailers unable to match the just-in-time

stocking of merchandise in rapid response to consumer demand. The cluster had to integrate its production and distribution. Moreover, it had to transform its 2,600 companies, comprised mainly of SMEs, into a true responsive network over the entire value chain: from suppliers to chemical products, manufacturers of textile machinery, spinners and weavers, dyers and finishers, clothing manufacturers, and so forth.

### **Achievements and remaining challenges**

The Catalan government carried out three clustering initiatives from 1993 to 1997 in different knitwear and clothing clusters, and one for “channel brands” (vertically integrated supply chains with related technology). While the initiatives reached an appropriately wide range of businesses, setting a broad perimeter, its impact was perhaps weakened by the reluctance of industry associations to accept the new strategies.

Joint management of the clusters in public and private partnerships, as well as convincing some traditional businesses to shift their strategic focus, has proven problematic at times. These difficulties stem from the longstanding relationship of industry associations and governments that tended to aim funding at sustaining existing jobs, rather than looking towards innovative, newer businesses. Thus such traditional firms might see the industry in decline, citing a fall in traditional manufacturing jobs. But there is another way of interpreting such data:

A related problem is the transformation of the workforce, which requires a completely new set of skills to move from low value manufacturing jobs to marketing, design, logistics, IT and so forth in the new cluster model. On the positive side, as these positions have been developed, whether through re-training or recruitment from outside the industry and the region, this new workforce increases the potential for innovation in other industries that will rely on similar skills.

This traditional management mindset and custom of seeking government support for the status quo also affected the speed with which the clusters could develop new, sustainable competitive strategies. As might be expected in such circumstances, an occasional member dropped out, some continued along their traditional paths despite the new opportunities, but nonetheless, today, there are 38 significant “channel brands” that run from production to retail. And to its credit, the Catalan government has been consistent in adhering to the strategically forward looking support schemes and divesting those no longer appropriate.

### **Extending knowledge to other industries and levels of government**

The Catalonia region has been able to apply some of the strategic lessons of the textile industry to others such as furniture and jewellery, also significant sectors that were facing similar challenges. The “Channel brands” programme assisted more than 50 companies in these industries during its first two years. A number of companies are enjoying unparalleled success, such as those in the Tous jewellery and accessories cluster.

The Catalan government has been less successful in making its case beyond its own borders, and could have spread knowledge of its experience and policies to national and EU institutions. Future steps might include more vigorous branding and communication of their programmes, creating flagship projects, and lobbying and partnering with EU bodies and its own central government, which, for example, stepped in to support re-training of workers for the changing clusters in the mid-2000s, many years too late.

At present there is still not a single EU programme or fund focusing on the retail sector that is still undergoing this transformation. While H&M, Zara and Carrefour do not appear in need of such support, the same cannot be said of likely hundreds of SMEs in the EU that have yet to make the appropriate changes.

## 26. Ventilation in Sweden: Redefining the market for indoor air

### Executive summary

A new strategic segment within the traditional HVAC industry has developed, as public concern with energy efficiency, awareness of health issues relating to indoor air quality, rising energy prices and other factors have made possible a market serving a converging set of qualitative demand criteria, described in the Vastra Gotaland region of Sweden as Sustainable Indoor Air Quality, or SIAQ. The cluster has recently begun a strategic evaluation in coordination with the region's environment department, and is taking steps to position itself for the future.

### A market driven by new demands

Companies responsible for the air we breathe indoors face demand pressures (and, it must be said, opportunities) that stem from environmental politics and policy, to health and lifestyle issues, to public sector budgets. For example: The ventilation sector is directly affected by the now global and highly publicized debate on energy and environmental sustainability. Management of costs in public sector projects has grown stricter and more precise, with calculation of energy costs in public infrastructure being given more attention than was traditional in the days of cheap oil, gas and electricity.

It is therefore worth noting that maintenance costs alone for ventilation systems in new buildings are estimated to run from 30 to 40 percent of energy costs. And finally, in a paradoxical reversal of decades of popular concern about air quality, most industrialised nations have reduced outside contamination, while the rise of the knowledge economy has seen an increasing number of people spending and increasing amount of hours working indoors, worried about the consequences of a life without fresh air (a not unrealistic perception, as demand for heating and/or cooling efficiency has brought the rise of "smart buildings" in which humans cannot be trusted with the risk of windows that open). If it also turns out that high-income professionals comprise a higher proportion than ever of indoor workers, it is not surprising that public policy has given greater priority to the issue.

### Defining the scope of the cluster: reaching across the value chain

For the SIAQ industry to be successful in meeting this confluence of increasingly rigorous demands, all of the different elements of the value chain (consulting, components, systems, etc.) must be involved in research in improving both sustainability and air quality.

With awareness for these challenges in mind, the Vastra Gotaland region commissioned a Cluster Reinforcement Initiative that would have two main sets of objectives: From the perspective of cluster firms, to enable the cluster companies to gain access to information on alternative strategies, in order to improve competitive position, and to enable them to collaborate on critical issues that influence their business environment. From the perspective of the Vastra Gotaland Region and its Department of the Environment, the initiative would help identify companies that are propelling the cluster forward; identify appropriate cluster strategies; make companies aware of the existing programmes and make these better adapted to their needs; and coordinate policies with other institutional partners in the region to create a competitive environment suited to the cluster companies.

### Setting strategies for sustainable competitive advantage

Since collaboration among a wide range of agents is a requirement for discovering new strategic opportunities, the clustering effort began with individual debriefings of cluster firms regarding current challenges, with the primary aim of bringing as many agents on board as possible, since they will be driving industry change. After this interviewing phase, complemented by analysis using general sources of information on the structure of the industry at

the national and international level, findings were presented at a cluster gathering, to foster a consensus on a set of common challenges to be confronted.

The second phase of analysis, to develop a vision of the cluster's future, looked at demand factors, the purchasing criteria for the cluster companies' products. Among the interesting discoveries is the way cost factoring has changed to accommodate the growing concern about indoor air quality – that is, buyers no longer look solely at the short-term direct price, rather take into consideration the life-cycle cost analysis, including health and environmental factors. After examining global strategies for success and how to better adjust to changing conditions, companies were positioned strategically and strategic options available were identified.

### **Joint management of the cluster**

The Västmanland Region plays a dual role in the cluster, as the owner of a large portfolio of public buildings (hospitals, etc.) and so a customer of the cluster, and as a guarantor on behalf of the public that environmental rules and targets are met. The Region can therefore set particularly strict environmental demands for its own buildings, serving both interests at once.

### **Structural reforms to address strategic challenges**

Several steps are being taken to address the cluster's strategic challenges, including the creation of a "Green Indoor Air" label, a SIAQ awareness campaign, enhancement of procurement procedures, development of a cluster alliances programme. These measures alone will not be sufficient to achieve the cluster's objectives, but they are the beginning of a long-term structural effort to improve the cluster's performance.

A critical success factor will be the companies' capacity to innovate through R&D in a way that can reconcile the (apparently for now) technically contradictory demands for energy efficiency and air quality. Other key factors will be collaboration among the different stages of the value chain, to offer a coherent and complete package, and the ability to establish a strong relationship with the end customer (i.e., understanding their needs and providing follow-up service for products and services sold). Such relationships will play into a positive feedback loop that spawns demand-driven R&D.

In conclusion, the SIAQ sector has high-margin potential and represents an attractive opportunity if the companies of the cluster adapt their strategic positioning in order to perform and respond to the new emerging demand.

The strategic change achieved in this clustering efforts is evident in the transformation of the leading company, at that time an equipment producer (PM Luft), into an full service and even educational one, that after merging with a complementary company now even offers and Indoor Air Academy.

## 27. Humber seafood cluster: Moving from commodity to high-value producer

### Executive summary

The centuries old fishing industry in Yorkshire, UK, had by the 1990s become a commodity producer within an increasingly global frozen seafood industry, focused on a market segment in which it was increasingly uncompetitive. The region's industry is successfully transforming itself into a producer of high value-added, upmarket goods through a strategy that drew heavily on a cluster-based initiative supported by the local development agency and a consultancy specialized in cluster strategy.

### The dilemma: The Humber seafood industry in decline

In 1990, the Humber seafood industry, centred around the cities of Grimsby and Hull, in the Humber estuary of England, sold 80 percent of its catch in frozen form to large retailers. Reduced catch quotas due to depleted fish stocks, combined with demand from retailers for larger volume of gutted and filleted product, were further driving processors to seek new sources. Developing countries were becoming an increasingly large source of seafood as a result of decreases in transportation costs and tariffs, and improved on-board processing capacity. Employment in the primary processing sector (which includes the most basic steps of gutting, washing, chilling, etc.) had dropped 42 percent since the mid 1990s. By 2005, the frozen fish market was languishing and the seafood industry was in decline.

### The opportunity: A sophisticated market

The Humber fishing industry in fact had a golden opportunity. British consumers are sophisticated and demanding buyers of convenience foods. Accordingly, their supermarkets lead Europe in developing new products and in changing quickly in response to market demands. Thirteen of Europe's top 20 food manufacturers are based in the UK.

Amid this outlook, the prospects for seafood were particularly bright. Growing popular awareness of healthy diets, scares over meat safety, nutritional discoveries of the benefits of fish, and an increased consumer priority on freshness with a willingness to pay a premium price for it, all pointed to a strategic opportunity for development of a high value-added seafood product line. Yet prior to the cluster initiative, most of the Humber seafood research and development was centred on fishing itself or on processing technology.

### The challenge: Industry transformation

Fish lovers who once looked forward to exotic travel to sample far off delicacies now nonchalantly purchase fish and seafood from several continents at their local fish mongers. Underlying this dramatic change is a revolution in global logistics. Although it still may take days for a trawler to return to a distant port, a significant volume of high-end seafood now makes its way to market via air cargo. But with international sourcing comes a web of international regulations, safety issues and quality control challenges. Only a few of the most sophisticated producers can master these supply chain difficulties, and retailers have a strong incentive to establish close relationships to a selected few of them to ensure quality, dependability, and an ability to quickly respond to market changes.

The Humber seafood industry was not structured in such a way as to be able to easily embrace such challenges. Restoring long-term competitiveness would require major changes to businesses that had invested heavily in the infrastructure of the frozen fish business. Perhaps more challenging still would be creating the awareness of the market opportunity and a commitment to transformation among businesses that were accustomed to seeking government assistance for the status quo.

### **Cluster strategy: A strategic analysis**

The UK regional development agency for the area that includes the Humber estuary, known as Yorkshire Forward, focused on five industry clusters during its first five years, from 2000 to 2005, including one of the UK's largest sectors, Food and Drinks. A screening diagnostic by an external consultancy brought in by Yorkshire Forward and specialized in cluster strategy, recommended focusing on segments such as fishing within the previously classified Food and Drinks cluster, given the dissimilarities in their circumstances and strategic needs.

An analysis of the fishing industry cluster found that long term competitiveness would depend on a significant shift from the traditional focus of R&D (fishing and processing) to innovation that would foster development of new, high-value added products such as fresh fish and ready-to-eat seafood dishes (requiring advanced logistics and information technology).

The cluster Competitiveness Reinforcement Initiative (CRI) had four objectives:

1. Gain an impartial evaluation of the cluster and determine which companies were driving the cluster forward, as well as what the appropriate strategies for the cluster were.
2. Make companies aware of the existing regional programmes
3. Improve the extent to which Yorkshire Forward programmes met the needs of the cluster
4. Coordinate policies with other institutional partners in the Yorkshire and Humber region with the aim of creating a competitive environment adapted to the companies within the cluster.

The CRI project began with structured dialogue between consultants and local business people in the cluster, followed by presentation of the results of those discussions. Several key business leaders were taken on reference trips to Spain and the Netherlands to learn about world class clusters first-hand. Although the region boasted the largest concentration of cold storage facilities in Europe, the businesses did not realize that the world's major seafood market places receive most of their seafood by air. Several companies had recently made large investments in freezing equipment and cold storage and did not want to acknowledge the threat from cheaper imports. Switching from frozen to fresh seafood required substantial commitment and investment that local businesses, often with CEOs nearing retirement, were reluctant to make.

### **Enabling a transformation: Executing cluster strategy**

A new strategy for the cluster was agreed upon, embracing three prime activities that would enable the cluster to become the leading value-added fresh/chilled fish hub serving Europe: 1) Improving incoming logistics, 2) market concentration, and 3) developing export products and logistics.

The logistics improvements were designed to overcome Humber's major disadvantage in time-to-market, critical in a transformation from frozen to fresh products. Humber was processing some 70 to 80 percent of the UK's seafood, but some 60-70 percent of that was sourced through distant airports in London and Edinburgh, then transported by road to Yorkshire. The cluster project proposed a state-of-the-art facility for handling perishable fish imports at the Humberside airport.

Consolidating the market was deemed essential because neither of the existing markets at Hull and Grimsby had the volume of buyers sufficient for sustainability. Most fish processors purchase raw material on contract and used the markets only for buying niche products. To make Humber the critical hub for seafood in Europe, the consolidated marketplace would offer additional logistics and other services based on the model of the Dutch flower auctions. No such fish marketplace exists in Europe, although perishables auctions for other



products such as flowers, fruits and vegetables have followed substantial consolidation of those industries. There are more than 400 fish auctions in Europe, most working locally.

Because supermarkets in the UK dominate the value chain and wield great market power, the cluster initiative proposed development of export-focused products to enable Humber producers to develop a better capacity to respond to market demands as well as develop a counterweight to squeezed profitability in serving UK retailers.

### **Progress and impact of the cluster initiatives**

Through 2007, the most significant progress among the three objectives has taken place in the development of the perishable products hub at Humberside airport, notwithstanding a rather slow process due to unanticipated bureaucratic hurdles.

The most difficult of the objectives to achieve has been consolidation of the two market-places into one, which must be close to Humberside airport and the cluster's re-focused logistics in order to operate as an efficient hub. Hull's Fishgate is state-of-the art but small, while Grimsby's Fishmarket has greater capacity but requires investment for modernisation. In the past, each local authority responded to "market needs" by promoting local facilities, the proliferation of which runs counter to developing a single, world-class hub. Yorkshire Forward has had to spend considerable resources and energy to overcome resistance from local governments.

The export initiative has resulted in cluster members identifying France as a target market and travelling there on a research trip. However, the habit of relying on UK supermarkets to dictate demand is proving difficult to change, and one cluster member claims that the Humber businesses "don't have the mindset to go abroad."

Extending the lessons of the cluster initiatives to higher levels of government has also proved difficult. Although the UK Seafish Authority participated in the project, a recent policy whitepaper made no mention of the cluster's new strategy.

## 28. Learning from the case studies

### **In defining the perimeter for the clustering effort**

Be it through an analytic mapping or screening exercise, or through a tendering process.

The scope for many clustering efforts was clearly too wide and heterogeneous to have prompt actions of significant impact on innovation. Conversely the sectoral focus of the other cluster groups, of the type of “cluster” meta-associations, that group all existing institutions (employer’s associations, local authorities...) ends up being too narrow and resulting in defensive strategies.

It was necessary to have a neutral player in an open perimeter initiative that defines and broadens the necessary players as the need arise. Such a process is clearly needed to redefine the industry limits, by including new services and technologies.

### **In setting the strategies to build a sustainable competitive advantage**

Be it through a formal cluster initiative or through implicit agreement.

The needs usually expressed by the traditional industry representatives in mature sectors, subject to a global challenge, results in defensive clustering efforts, while at the same time innovative companies within the same sector can be thriving, because they are addressing new market opportunities.

It is important that a neutral player has the capacity to understand the opportunities, and switch the dialog from the “cluster that represents the whole industry”, to the innovative companies that express the needs for the future.

The strategies to build a sustainable competitive advantage for a new lead market are quite known, but rarely the traditional industry representatives will accept them, and will instead press for the status quo. Therefore, it is important to define the strategies to build sustainable competitive advantages with the companies, but with the innovative ones.

### **In managing the clustering efforts jointly**

Formally through cluster managers or informally through other actors.

It is very simple to manage the “clustering efforts” in the defensive mood, where everybody agrees on the actions and these are mostly funded with public funds. But that turns much more difficult once the strategy calls for change. Change in the cluster value chain, change in the industry power structure and change in the geographic scope is always difficult.

### **In applying the learning to the whole economy**

The learning’s from most clustering effort seems to have been limited in most cases to the regional level, with very little transfer of knowledge or lessons learned to other clustering efforts at national or EU level. It seems that bottom up mechanisms, to integrate clustering efforts mechanisms in to national and EU policies are absent in most of the cases

## 29. Implications for regional, national and European policies

This section wants to highlight some bullet points of learning that can be derived from the lessons extracted from the 25 case studies of this project. It is not meant as a comprehensive list, neither as a policy-setting document, just a compilation of some lessons learned.

### **Implications for the local and regional support institutions**

- Start the clustering efforts with a open perimeter, do not set up the cluster players from the beginning, first define the new business or service the cluster should address, and then set the perimeter of the needed new value chain
- Define the strategy to address the lead market together with the industry but independently from them, listen to the market leaders wherever they are, not only at your local industry.

### **Implications for the national and EU institutions**

- Have a clear mechanism to pass the learning from clustering efforts to national and EU broader policies, where most of the support policies should be.
- Modify your policies to support lead market driven competitiveness and innovation that in turn will pull the industries and services behind.

This publication contains only a summary version of all case studies. The full versions, including bibliography and sources, are available on line at the Cluster Observatory library [www.clusterobservatory.eu](http://www.clusterobservatory.eu).

A final and complete version of this publication will be posted as well in the same location at the completion of the European Cluster Mapping project, expected by June 2008.

