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RESEARCH DRIVEN CLUSTERS

Analytical Report on the State-of-play
INTELSPACE (P6)

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The overview of the state of the art on research-driven clusters (RDCs) is based on the desk research reports of the participating countries. It includes a summary of the national/ regional cluster policies and the identification of research-driven clusters in each country, and a synthesis of the identified clusters' practices responding to their training needs.

1. Cluster policies and identification of Research Driven Clusters initiatives

1.1. Bulgaria

Following a rather late and hesitant start, cluster development in Bulgaria accelerated speed markedly in the last 5 years. Bulgarian companies are lagging behind European Small and Medium enterprises (SMEs), in terms of cluster and cluster networks participation. However, in recent years, groupings of enterprises were established in some of the most dynamic sectors of the Bulgarian economy (IT, wood processing, tourism, apparel & textiles, wine), marking the formation of informal clusters. The first actual cluster organization was registered in 2004, and almost 30 clusters in different Bulgarian industries were established since then. Six of these clusters can be identified as research-driven clusters (RDC).

With respect to cluster development, the policy area in Bulgaria is rather heterogeneous, with many policies facilitating and promoting cluster-related activities without being formally labeled as 'cluster-specific' actions. Lately, the state recognized clusters as an instrument for promoting quick economic development and thus put together a national policy for financial and methodological support for existing and potential clusters. In 2009, the Bulgarian Association of Business Clusters (ABC) was established, with the aim of promoting cluster development in accordance with the best European practices.

The profiles of research-driven clusters are varied and include several industrial sectors. Specific RDCs include:

- The **Bulgarian ICT Cluster** (inaugurated in 2004, later agitating the creation of three more clusters, "Bulgarian Cluster Telecommunication" - BCT, "Cluster Microelectronics and Embedded Systems" and "ICT Cluster –Varna")
- **The Mechatronics and Automation Cluster** (established in 2006 for the creation of state-of-the art high-tech products to be exported to highly developed European and American countries)
- The **Marine Cluster Bulgaria - MCB** (in the Black Sea region, with activities in ship design/building/repair, marine equipment, shipping and agency business supplies, etc.)
- **Cluster Aero-Space Technologies, Research and Applications - CASTRA** (inaugurated in 2010 around ten research institutes and universities)
- **Bulgarian Furniture Cluster** (established in 2009, by furniture producers/designers and educational institutions for combining research and innovations, implementation in production and product development)
- **Specialized Apparel and Textiles Cluster & Institute "Danube"** in Russe (established in 2005, for R&D leading to modernization of production and implementation of innovations for the efficient organization of production in member companies)

1.2. Spain

The BioRegión RCD of Catalonia was established in 2006. It is made up of nearly one thousand stakeholders, that cover the entire value chain, from cutting-edge research agencies in innovative areas, like nanomedicine or bioinformatics, through to traditional pharmaceutical or medical technology companies, currently undergoing accelerated modernization processes. It involves more than 350 companies and a significant number of universities, ten of which offer life sciences studies.

BioRegión has a joint strategy for life sciences and biotechnology, as well as for the pharmaceutical, medical technology, diagnostic systems and bioinformatics sectors, with the aim of concentrating, innovating and identifying needs and solutions and the determination to exploit opportunities and promote synergies, networking and collaborations.

The RCD is supervised by Biocat. Biocat is an organization, driven by the Government of Catalonia and the Barcelona City Council, that coordinates and promotes the biotechnology, biomedicine and medical technology sector in Catalonia. It brings together administrations, universities, research centers, companies and support bodies. In this context, it promotes collaboration among stakeholders in the BioRegion cluster and a number of other organizations on a national and international level. Its mission is to dynamize all stakeholders in this area, in order to create an environment with a strong research system, active transfer of knowledge and an entrepreneurial business fabric that can become a driving force of the country's economy and wellbeing.

1.3. Sweden

Cluster policy in the Swedish context is practiced on three levels; national, regional and local. In terms of geographical distribution, most regions in Northern Central Sweden serve as the base for at least one industrial cluster. In addition to regional cluster initiatives within the Swedish borders, there are also a number of 'regional' clustering initiatives on the Nordic/Scandinavian level.

Cluster policy in Sweden can be interpreted in two ways: microeconomic policies, that impact clusters in more general terms (i.e. policies for clusters), or cluster-specific policies targeting individual sectors or particular clusters. Cluster-based economic policy is used in a wider sense, including also cross-cluster policies affecting the fundamental conditions for cluster emergence and the use of cluster structures as tools to improve cross-cluster competitiveness. It should be noted, that in recent years there has been significant disagreement regarding cluster policy frameworks in Sweden.

RDC initiatives are based on traditional industries of Northern Central Sweden, such as forestry, ore-mining and power generation, but are also developing in new areas, such as IT and communications, services and tourism. In most cases, public and private sector players have together taken the initiative for the development of a cluster. Among public stakeholders are both local and regional players, with support from the national authorities for innovation (Vinnova) and for economic and regional growth development (Nutek).

For a number of years, work has been in progress on building up RDC initiatives in three specific regions. In Värmland, initiatives were initiated from regionally strong industries, with trade and industry playing a leading role. Clusters in this region include the Packaging Arena, The Paper Province, the Cluster of Steel and Engineering, Compare. In Gävleborg, the academia and businesses worked in consort with the public sector to form innovative environments for the development of new products and services. Clusters in this region include Fiber Optic Valley and Future Position X. In Dalarna, companies collaborate with players of the public sector and apply research in order to strengthen regional competitiveness. Clusters in this region include Triple Steelix and Destination Dalarna.

1.4. Tuscany

In Italy, Technological Clusters are referred to as "Technological Districts". Technological Districts are defined as "territorial-based aggregations of enterprises, universities and research institutions, led by a specific government focused on a number of defined areas and delimited scientific strategic technology, designed to develop and strengthen the competitiveness of the territories and settlements of excellence, connected with existing in other areas of the country". Technological Districts were first introduced with the National Research Program 2005-2007. Many of them are already formed, while others are still in starting phases. Some enterprises are well organized for internal research, while others still count on external laboratories.

The National Research Program 2011-2013 defines the guidelines for the strengthening and reorganization of the Technological Districts. In accordance to the national policy, in 2011 the Region of Tuscany presented its regional program for Development 2011-2015, identifying five different developmental strategies for industrial districts, based on current industrial excellence:

- ICT and communications technologies Cluster
- Life sciences Cluster
- Technology Cluster for cultural heritage
- Energy efficiency, renewable energy and green economy Cluster
- Railway Technologies for high speed and security of networks Cluster

The official statistic sources of the Region of Tuscany show a relatively high ratio in high-tech enterprises, when compared to the rest of the country. Companies with orientation toward tertiary activity outnumber almost by double the ones of the manufacturing sector. Four principal areas involve altogether almost the 80% of the employees in the tertiary sector: the mechanical sector (21,8%) pharmaceutical (20,7%) electronic elaboration of data (20,7%), medical and optical apparatuses (19,9%).

1.5. Greece

Cluster development in Greece is lagging behind most European countries. Although several attempts for the creation of clusters were made starting from the mid '90s, mainly through EC regional projects for innovation, established and organized clusters emerged only during the past 6 years.

Policies undertaken enabling cluster emergence and supporting cluster initiatives in Greece are:

- either as part of broader strategies/programs for the overall development of national/regional innovation systems,
- or as horizontal policies/measures for the support of regional development, research and innovation
- or more recently through specific cluster policies

Existing clusters in Greece regard diverse industrial and service sectors, including traditional sectors, such as food, wine and furniture, as well as technology-intensive sectors, such as ICT, aero-space technologies, microelectronics, bio-science, solar thermal systems. Currently prominent RDCs include; Hellenic Bio Cluster (HBio, Athens), Hellenic Nano/ Microelectronics and Embedded Systems Cluster (mi-Cluster, Athens), Space Industries Cluster (si-Cluster, Attica), Organic Product Cluster (Bio-cluster, Northern Greece), Technopolis of Thessaloniki Business Park (ICT cluster, Thessaloniki). Potential Clusters are the “Bio-agro-food cluster” in Northern Greece and the “Smart Buildings and Building Materials Cluster” at the Region of Central Macedonia.

1.6. Austria

Established clusters can be found in almost every Austrian province, both in traditional industry sectors and in newly emerged market niches, mostly in high-tech-sectors. Clusters in Austria are seen as a opportunity to promote innovation and to create regional branding. Many clusters are integrated in competence centers, where joint research activities take place.

Most RDC initiatives were introduced by regional public authorities and are owned by public agencies, with the goal of strengthening the competitiveness of the province. Styria, Upper Austria and Tyrol are leading regions concerning the establishment of clusters. In the province of Styria, the SFG is a service provider agency, owned by the federal government, and is in general responsible for the establishment of clusters throughout the province. It starts by owning 100% of the cluster at the starting phase and later it gradually reduces its share to about 26%. In Upper Austria, the policy for economic development and technology is specifically cluster and network oriented. SMEs are particularly supported by this policy. Furthermore, inter-branch networks have been set-up in the fields of human resources, design & media, logistics and energy efficiency. Finally, at the province of Tyrol, the “Standortagentur Tirol” is the promoting agency for economy, owned by the Tyrolean government. Among the key instruments of its policy, is the establishment of clusters, leading to an increased cross-linking of Tyrolean businesses and intensified knowledge and technology transfer between the business sector and the research sector.

Overall, 21 RDCs were identified in Austria. In Upper Austria, since 1998, the following clusters were developed: automotive, plastics, eco-energy, furniture & timber construction, food, health technology, mechatronics and environmental technology. Specific Upper Austrian Clusters include the Cluster drive Technology, the Kunststoff Cluster OÖ, the Automobilcluster OÖ, the Ökoenergiecluster, the Mechatronik-Cluster and the Lebensmittel-Cluster OÖ. Specific Styrian Clusters include the Automotive Cluster Styria, the Human.technology Styria, the Material cluster Styria, the ECO WORLD Styria. Specific Tyrolean Clusters include the Qualitätsbetriebe Tiroler Niedrigenergiehaus, the Life Science Tirol and the Mechatronik Tirol.

2. Research Driven Clusters Management Skills and potential training needs areas

We can identify five main areas of different practices to respond to the training needs of clusters:

2.1. Networking for knowledge diffusion

In all successfully managed clusters of the partner countries, coordination is a key element and it is facilitated by a neutral moderator. Without a common, unified platform for networking, individual bottom-up initiatives risk remaining isolated from each other (as happened in Bulgaria over many years). The facilitation of networking is the most popular instrument used by the EC in support of clusters. The Community measures are intended to foster close networking between regional authorities, enterprises and research entities within the EU-area, to promote networking between clusters at operational level.

The analysis of the active RDC in Bulgaria indicates that network coordination is indispensable, as individual partners are usually not closely interlinked. Network co-ordination is needed to ensure the continuous flow of communication, coordination of activities, and the concentration of partners' interests. Moreover, without effective coordination, transaction costs remain too high for individual partners. Thus, the following basic network co-ordination processes must be handled:

- Exchange of information and communication
- Balance of interests and conflict settlement
- Mutual trust between network partners creation
- Prepared decision-making
- Building and strengthening common interest

The Tuscan experience, too, reveals that it is very important to promote the exchange of experiences between enterprises: seminars, study visits, conferences, reports, maps and a guide on good practice. It also seems very important to involve all employees on the strategic research projects carried out by each enterprise, through an "ad hoc" training. In order to match the results of the R&D with market requests, finally, emerges the necessity of training a team of experts for the development of feasibility analyses concerning market opportunities for new products in innovative areas.

Greek cluster practices for information and knowledge diffusion are instrumented mainly through:

- Training
- Organization or participation of members in conferences and seminars
- Online newsletters
- Online information of technologies and entrepreneurship
- Collaboration with research organization and exploitation of research results
- Technology watch

Potential training needs in the field of Networking for Knowledge Diffusion include:

- Using a unified platform for networking

- Strategic intelligence techniques
- Knowledge management techniques
- IT tools
- Technology watch

2.2. Research Driven Clusters management

According to the outcomes of the Tuscan case, it seems very important to train RDCs' managerial bodies on financial opportunities offered by public authorities at regional, national and European level. This new profile will correspond to a trade-off between a researcher and a marketing manager, is going to identify the factors of success and failure of research projects in each sector, adjusting scientific purposes to market orientation. This argument is also documented by the fact that many successful Austrian RDCs occupy experts on all management levels, thus enhancing the longevity and the professionalism of the cluster.

Besides, cluster management is a prerequisite for networking, as well. Enterprises expect their network to be managed by a neutral agency. However, there is no shared view, on who should assume this role (e.g. an independent consultant, a technology center or an enterprise partner). Technology centers and consultancies comply best with the demands for neutrality. While both may have specific interests, they do not conflict with the competition-oriented goals of the other partners. With regard to the moderation of the network, a balance of interests among partners has to be maintained. A culture of trust and understanding is essential for the successful development of a technology network. Moreover, cluster managers must be sufficiently qualified and work efficiently in terms of minimizing expenses for the partners of the network.

Potential training needs areas in the sphere of RDC management are:

- Communication skills
- English as a working language
- Leadership skills, team management
- Strategy development tools
- Knowledge management techniques
- Customer relationship management
- Public relations, media and press work
- Business and financial planning
- How to develop cluster initiatives
- Identification, mapping and measuring of clusters
- IT skills

3. Intelligence, watch and foresight: emerging technologies, market niches and opportunities, innovation, new product development, Intellectual Property Rights (IPR)

Innovators generate and commercialize new ideas. They find more efficient production processes and create new markets. Although university and advanced research centre-based R&D attract much of the resources and attention of the government, many of the most valuable innovations are improvements in business and production routines devised by employees. Employees are a great source of innovation in developing new applications of existing

technologies, design of production and management systems, marketing of products, and organization of labor. Thus, new product development is another important area of cluster activities.

In Greek RDCs, efforts to support product development and innovations are mainly realized through:

- Promotion of collaborations between the members of the cluster for joint activities
- Establishment of collaborations among clusters and international and national innovation centers
- Technology transfer between industry and academia in Greece
- Market watch
- Organization of meetings, workshops and info-days, aiming at the promotion of networking between key players in the field
- Creation of Incubators for knowledge-based start-up companies
- Assistance in IRP

The Swedish cluster context is characterized by its high level of innovation orientation, the focus on competitiveness and the integration and preparation for future stages of the knowledge society, or stated differently, with a focus on a future-oriented and sustainable value. It is also characterized by a 'glocalised value creation, collaborative regional 'platform development' and a 'value networks approach'.

Furthermore, most of the Austrian cluster staff are experienced technicians with managerial or business skills and anticipate emerging technologies and market opportunities. Innovation, new product development and IPR are also covered by the majority of observed RCDs in Austria. They are not only covered by joint research activities, but also by training offers, workshops and events organized and conducted by the cluster initiatives. In one study, it is mentioned that research works good in applied research, but there may be room for improvement when it goes to the utilization of basic research for the Austrian industry.

Potential training needs areas in the spheres of Intelligence, watch and foresight are:

- Knowledge of the cluster's specific sector/industry
- Innovation policies
- Regional/national cluster policies
- Innovation management techniques
- Regional development policies
- Quality management tools
- Business consultancy know-how
- New product development techniques
- IRP management
- Market watch

4. Access to global markets, internationalization

Evidence has so far shown that cooperation among clusters across regional or national borders is difficult to achieve in practice, due to several reasons. First of all, clusters tend to consider themselves fully autonomous in their everyday operations and business activities, often regarding each other as direct competitors, particularly those which belong to the same

industry. Second, cross-border cluster development usually fails to be systematically supported by cluster policies, which are typically seen as an instrument to strengthen national or regional competitiveness. Adding to this numerous practical impediments linked to different national legislations and administrative systems, as well as major cultural differences and even language barriers, the situation becomes extremely complex.

Despite these impediments, the advantages of cross-border cluster networking are significant. Such networking facilitates information and expertise exchange, acting as bridge-builders across regions and countries. Trans-national cooperation between clusters appears particularly useful for SMEs, which often lack the necessary human and financial resources to conduct market analyses or engage in expensive R&D activities.

In view of supporting the development of globally-competitive clusters, EU cluster policies, while serving mainly as a complement to national and regional efforts, also aim at promoting trans-national cooperation. The Community measures are intended to promote trans-national policy and program cooperation, to foster close networking between regional authorities, enterprises and research entities within the EU-area and to enhance interregional cooperation within its wider cohesion policy.

A recent example of a trans-national approach to cluster development is the start of a joint project under the Programme Trans-border Cooperation Romania-Bulgaria. The main objective of the project is to create favorable conditions and infrastructure for cluster initiatives on both sides of the common border, that are suitable for further development of cross-border networking at a later stage. Following the identification and mapping of cluster potential in the two regions, it will support the setting up of three clusters, with the logistic sector being one of the prospective areas for implementing joint cluster initiatives.

Access to global markets, global market promotion, and internationalization of sales is an issue for Austrian RDCs, as well. The existing automotive cluster in Austria faces this problem, as many of its companies are obliged to act internationally because of the market structure. Others, such as the material clusters or clusters in renewable energy, involve innovative products, but may need additional know-how in this area, which can only be gained through their opening to the global market.

In the Spanish BioRegión cluster, 34% of companies of the RDC explicitly want to increase their international presence. Internationalization is obviously very important to the BioRegión cluster, as it is in way already part of its strategy. One of Biocat's priorities is to encourage Catalan companies and organizations to participate in international networks, forums, congresses and fairs. Internationalization must take place both in research and scientific exchange, as well as business partnering and commercial promotion. In this context, Biocat maintains close knowledge links to countries like Germany, Belgium, Canada, the United States, France, the Netherlands, Hungary, India, Poland, the United Kingdom, Sweden and Switzerland.

Different practices of the management body of clusters are oriented to cover the field of internationalization and access to global markets:

- Creation of international / cross border networks
- Organization of outward company missions
- Participation in international brokerage events
- Organization of international events
- Promotion of members' activities through international online means and sites

- Promotion of members' profile to European companies & research laboratories
- Collaboration with international organizations
- Attraction of foreign investments in business and research

Potential training needs areas in the spheres of the internationalization of RDCs include:

- International cooperation and networking
- EU cluster policies
- EU development policies
- Knowing other clusters (organizations) in Europe and overseas
- Organization of events
- International business and trade practice

5. Funding for innovation

Funding for innovation fosters cluster development, as a major factor for strengthening enterprises' competitiveness and supporting the building-up of clusters' administrative and managerial capacity, the expansion of market positions as well as investments in new technologies and equipment for carrying-out common cluster-related activities. All countries recognize this point as a prerequisite for the development of Research Driven Clusters.

However, the nature of clusters varies among countries, since they come as a result of different policies and (co)funding formulas, from European, national, or regional agencies. In the European context, Structural Funds, the 7th Framework Programme, and the Competitiveness and Innovation Framework Programme are the three major Community instruments, which include, from different perspectives, a number of activities in support of RDC development.

In Bulgaria, the call for proposals and grants for cluster development was supported by a public body. This grant procedure is implemented with EU support through the European Regional Development Fund. In Sweden, funding for innovation is contributed from three strata of the Swedish cluster support context; national authorities / organizations, special project (time-limited initiatives), and regional Growth programs. All Austrian clusters are founded or at least initiated by regional public bodies and are often part of the economic strategies of the provinces. The know-how about national and regional funding is prevalent in all Austrian clusters -this is also the reason why a lack of knowledge about European and national funding opportunities can be occasionally detected. In Spain, sectors are favored with increased amount of local capital, according to needs, whereas increased seed capital policies leverage local funds and attract international investment. Yet, there are well-grounded fears that the requirements for co-financing might turn rather high for some of the participants, as the scope of the earmarked financial aid varies between 50% and 85% of the total amount, depending on the project type. Having in mind the significant resources allocated to support cluster development from the EU Structural Funds in the financial period 2007-2013, the arguments for stronger government involvement in financing cluster initiatives might also appear quite appropriate.

From current research, identified practices of clusters oriented to cover funding needs are mainly:

- Collaboration with venture capital organizations and companies
- Funding of new ventures
- Assistance on start-up companies
- Assistance in the elaboration of financial plans and business plans
- Assistance in the preparation and submission of proposals for European and national RTD projects
- Reinforcing participation in national proposed activities

Potential training needs areas in the Funding for innovation field include:

- Project management tools
- Preparation and submission of proposals
- EU/international subsidies
- Regional/national subsidies
- Business plans and financial planning
- Specific funding needs of innovative start-ups and spin-offs

