



Innovative Regional Development

Instruments supporting development of
regional institutional links

edited by
Matylda Bojar

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Innovative Regional Development

Monografie – Politechnika Lubelska



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Politechnika Lubelska
Lublin 2013

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Niniejsza publikacja powstała w wyniku realizacji projektu badawczego N N114 170338 finansowanego ze środków MNiSzW w ramach umowy 1703/B/H03/2010/38 pt. „Zastosowanie modelu potrójnej heliksy w zarządzaniu polityką innowacyjną w metropoliach”.

This publication is the result of the research project 'The application of the triple helix model in the management of innovation policy in metropolises' (project No. N N114 170338), funded by the Ministry of Science and Higher Education under the contract No. 1703/B/H03/2010/38.

Publikacja wydana za zgodą Rektora Politechniki Lubelskiej

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ISBN: 978-83-63569-72-3

Wydawca: Politechnika Lubelska
ul. Nadbystrzycka 38D, 20-618 Lublin
Realizacja: Biblioteka Politechniki Lubelskiej
Ośrodek ds. Wydawnictw i Biblioteki Cyfrowej
ul. Nadbystrzycka 36A, 20-618 Lublin
tel. (81) 538-46-59, email: wydawca@pollub.pl
www.biblioteka.pollub.pl
Druk: TOP Agencja Reklamowa Agnieszka Łuczak
www.agencjatop.pl

Elektroniczna wersja książki dostępna w Bibliotece Cyfrowej PL www.bc.pollub.pl
Nakład: 150 egz.

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Introduction

Recently, the economic development and competitiveness of national economies have been increasingly determined by regional economic development. The authors contributing to this book share the view that the region is a complex system of interconnected networks of various processes and human activities organized to pursue certain goals. In today's world, knowledge is primarily created in cities. Cities and large urban agglomerations are regional development centres since they attract, absorb and accumulate significant innovative potential for the whole region in terms of technology, economy, politics, human capital and culture. Industry, research units, universities and other higher education and scientific institutions tend to cluster around cities, which are also important administrative centres. The cities participate in European-wide events and benefit from international contacts. Significant expenditures are made to maintain and improve existing infrastructure in cities and around large urban agglomerations. Cities with networks of complex relations occurring between various institutions, organizations and bodies play an important role in regional economic development. The process of building and developing intra-regional relations according to the triple helix model is designed to stimulate economic development based on knowledge. L. Leydesdorff and H. Etzkowitz claim that the triple helix is a model of innovation which incorporates mutual complex relations occurring in the process of knowledge capitalization between the three groups of entities – scientific centres (universities, research-and-development centres, supporting institutions), industry (enterprises), and the government (including self-government authorities).¹ Regional potential is determined by the relations between these three spheres in the formal and organizational dimension (formal and organizational connections and agreements), the cognitive dimension (the structures and processes of knowledge exchange and flow, communication connections, data bases, etc.), as well as in the social and cultural dimension (the structures building the positive social capital potential, confidence, trust). The lack of these relations significantly hampers the flow of knowledge in the region.

¹ Leydesdorff L., Etzkowitz H., The Transformation Of University-industry-government Relations, *Electronic Journal of Sociology*, 2001, URL: <http://www.sociology.org/archive.html>, (downloaded on April 12, 2010).

Globalization processes make the challenges connected with the competitiveness of economies one of the most important subjects of analytical studies and political action. The mechanisms of organization and financing innovative activities and the effectiveness and efficiency of incurred outlays on innovation have a direct impact on the competitiveness of enterprises, investment attractiveness of regions and the overall performance of national economies. These circumstances justify scientific interest in in-depth analytical study of the relations and interactions between the sphere of research and technological development, activities of central, regional and local authorities, and business. However, until now there is no perfect tool to collect all necessary information on various aspects of innovation policy, in particular information relating to regional innovation systems. Regional development theories, highlighting the role of innovation in development processes, attach a great importance to human capital, knowledge and learning process, and stress that the innovativeness of national economies depends on their ability to create new knowledge and develop innovative technologies.² These theories also argue that equally important is the spatial proximity which facilitates the process of knowledge accumulation and exchange, and thus it contributes to the creation of innovation.

In this publication, using a common research methodology, the authors make attempts to analyse existing regional innovation systems by identifying active intra-regional links between government, industry and academia based on the triple helix model and characterize mutual relations between these three spheres in formal, organizational, cognitive, social and cultural dimensions. Comparative studies conducted in regions in the years 2010-2013 were designed to verify the claim that effective regional policies on innovation should focus on regional strengths and build on identified competitive advantages.³

Hence the main purpose of this book is to analyze, based on selected case studies, the methodological instrumentation of strategic management used in various European regions with different innovative and development potentials, as well as to characterize innovation policies and activities carried out by authorities at different levels in order to stimulate lasting regional innovative development. Moreover, the authors made attempts to identify the circumstances and conditions which contributed to successful cooperation between various organizations and

² Zalewski R.I., Wiedza i innowacje jako jakościowe czynniki wzrostu gospodarczego [Knowledge and Innovation as Qualitative Factors of Economic Growth] (In:) Zalewski R.I (Ed.) Nowe otwarcie na innowacje. New Approach to Innovation, The Polish Academy of Sciences, The Commission of Science of Commodities, Branch Office in Poznań, Poznań 2013, p. 71.

³ A study carried out within the framework of the research project “The Application of the Triple Helix Model in Management of Innovative Policy in Metropolises”, financed by the State Committee for Research (project identifier N N114 170338, contract No. 1703/B/H03/2010/38).

institutions within the framework of the triple helix which has materialized in the form of clusters and thus contributed to increasing the competitive advantage of analysed regions. The initiatives analysed in this book build on regional strengths and take advantage of the local triple helix infrastructure which enables the flow and exchange of knowledge inside the region. The proximity of key regional centres, usually big cities which are also regional capitals, provides access to necessary knowledge, modern technologies, and other needed resources. Presented cases feature regions at various stages of economic development and with different innovative potential. Nevertheless all of them have developed cooperative links which have facilitated innovative development due to the effective coordination of innovation policies with regional development policies and the proper use of available policy instruments.

The study presented in this book was carried out in the French region of Val d'Oise which belongs to the group of 'innovation leaders', as well as in regions where innovation performance is below the EU27 average, i.e. in Portugal, which according to the recent report on the EU member states' innovation performance is classified as a 'moderate innovator', and in Poland and Romania, which are classified as 'modest innovators'⁴. This comparison of regions with different innovative potential and performance shows that properly developed relations within the triple helix of government, industry and academia can produce positive effects in highly developed regions as well as stimulate economic growth in underdeveloped regions.

While the efforts of each region to improve its competitiveness by increasing innovation are based on the uniform EU policy on innovation, one can also observe regional differences in approaches to innovation which gives the projects carried out in particular regions a regional specificity and characteristics. The papers presented in this book deal with well-managed regional initiatives concerning clusters (Romania, Portugal, and Poland) as well as cooperation platforms (France, Russia).

The first chapter, entitled 'Innovative Development of Romanian Regions', contains brief characteristics of the ROSENIC cluster, including its aims, activities, organizational structure, main members, as well as major achievements. The ROSENIC cluster, established in 2011 in the form of an association, is an interesting example of a regional initiative in which cooperation in accordance with the triple helix model occurred from the very beginning. The cluster formation was initiated by a public organization, the Economic Development Agency of the Timis District, based on existing local cooperation links. The cluster was founded by 46 members, its promoters were public organizations, enterprises operating in the sector of renewable energy sources (including service providers, manufacturers

⁴ Innovation Union Scoreboard, URL: http://ec.europa.eu/enterprise/policies/innovation/files/ius-2013_en.pdf, (the report downloaded on March 10, 2013).

of equipment, building contractors, entrepreneurs involved in waste disposal and management, etc.), organizations involved in urban planning and development, higher education institutions, consulting and training firms, and the National Institute for Scientific Research. The ROSENIC cluster is a private association, a regional non-government organization in which one can observe the first signs of internationalization. The cluster's activities are financed by its members and sponsors, as well as from public subsidies and grants.

The second chapter is entitled 'Recent Innovation Processes in Portugal'. In this chapter the authors characterize Portugal's performance in terms of innovation, competitiveness and research. Portugal developed its innovation system by increasing investment but after 2008, expenditures on research-and-development have been markedly reduced due to the economic crisis. Despite the difficult economic situation in Portugal, some clusters are performing quite well. The authors present two clusters which even managed to increase their competitiveness. One of these clusters is involved in the clothing industry and the other one manufactures corks. The clothing cluster gained competitive advantage due to significant improvements in design, upgraded production technologies, including computer-controlled machinery and new material-cutting technologies, as well as flexibility, while the driving force behind the success of the cork cluster were new technologies and extensive research that allowed the cluster to recover a large part of the global market.

The third chapter entitled 'Innovation Policy in France. Dynamics of Innovation Evolution' describes an evolution of regional development mechanisms in France. The French economy is one of the most powerful and innovative economies in the world, due to the active role of the French government and adopted policies on innovation and competitiveness. Each of the France's regions has developed a strategy towards innovation. These strategies, which are constantly adjusted to emerging challenges and needs, focus on knowledge transfer, encouraging private investors in order to increase their spending on research and improving evaluation systems of investments made in the sphere of research-and-development. In 2013, France started the implementation of the third phase of its innovation policy. In this phase innovation support measures taken at the regional level are organized around the following issues: the implementation of regional strategic thinking, business transformation and competence enhancement, and development of innovation, in particular through the creation of business networks, clusters, local production systems, development of regional venture capital firms, environmental protection and development of green technologies, renewable energy sources, and the integration of risk and a culture of innovation.

This chapter also contains a case study of the Val d'Oise region which is one of the most innovative regions in France. In Val d'Oise there are several world-renowned high-tech clusters and many successful science and technology parks.

The region owes its success to a coherent consistently implemented strategy based on the cooperation between science, industry and government in which regional clusters play an increasingly important role.

In chapter 'The Evolution of Russian Innovation Policy' the authors describes the state of innovation before the collapse of the Soviet Union and activities carried out in recent years to stimulate innovation. To a large extent the measures undertaken in post-communist Russia are modelled on the instruments used in Western countries and are adjusted to specific needs of the Russian economy. In Russia, research-and-development units are still heavily reliant on funds provided by the government and the National Innovation System failed to meet the expectations for self-financing innovative projects. The Russian Innovation System evolved gradually and finally. 'Concept 2020' assumes the establishment of national research universities and innovation centres and development of Russia's human capital. The Russian government has announced plans to set up two innovation centres, one near Moscow and the other close to Novosibirsk. So far only the innovation centre near Moscow is operative. Russia's previous efforts to improve innovation and competitiveness are not producing significant effects and the cluster-based policy seems to be an alternative to industrial policy. The clusters are inseparable elements of innovation centres in Russia. In the chapter 'The Evolution of Russian Innovation Policy' the author presents the cluster 'Altay bio'. The cluster which operates in the Altai region is one of the most successful clusters in Russia.

In the chapter entitled 'Innovative Development of the Lublin Region – A Case Study of Eastern ICT Cluster' the authors describes a new cluster initiative which purpose is to strengthen the regional competitive potential, development of innovation and cooperation between various organizations and institutions forming the nodes of the regional triple helix. The cluster is oriented on the development of information and communication technologies through a more effective harnessing of the regional innovative potential. The cluster's organization and activities are convergent with developed Operational Programmes and the EU strategy and are based on the triple helix model of cooperation between government, science and business.

The chapter titled 'The Use of the Triple Helix Model in the Silesia Region in the Context of the Innovation Policy' presents various achievements of the region which, in many respects, is the leader among the Polish regions. The wealth of the region includes a rich social, scientific, and economic potential with abundant natural resources, as well as its cultural diversity. The region has many clusters in different stages of development. The Silesian Water Cluster is a regional cluster which is also a good example of cooperation based on the triple helix model. The chapter contains a detailed analysis of the cluster's role in economic development of the Silesian region.

In the chapter 'Metal Cluster of the Lubuskie Region – Interaction in the Helix' the authors analyze the factors which determined the success of the cluster. The fact that Metal Cluster of the Lubuskie Region was created based on a bottom-up initiative, augurs well for its future. The cluster, which management board is seated in Gorzów Wielkopolski, plays a crucial role in the implementation of the regional innovation policy. I highly appreciate the author's original analysis of the consistency of the national innovation policy with the regional innovation policy in implementation of which the cluster plays an important role.

Zizi Goschin*, Matylda Bojar**

1. Innovative Development of Romanian Regions

Introduction

After a nearly 20 year-long transition to a democratic society and market-based economy, Romania has entered a period of solid economic growth – 2000-2008. Building on positive macroeconomic trends, GDP/capita rose to 42% of the EU average, inflation rate dropped to one-digit figures and unemployment rate declined at 6%. The international economic crisis that reached the Romanian economy in the last quarter of 2008 led to a sharp decline in exports, limited access to external financing, strongly diminished FDI, and reversed the economic growth trend. After several years of negative developments, economic recovery started in 2011 when the GDP grew by 2.5 percent, mainly based on a good harvest and growth in private demand. Despite the progress in macroeconomic stabilization, Romania's growth potential is undermined by weakness in the eurozone and low FDI inflows.

In this context, the current development policy of the Romanian government aims at supporting economic growth while restraining expenditures in order to achieve the deficit target. Some structural reforms have been envisaged, such as the ones in energy and transportation (gradual removal of regulated prices in energy, liberalization of gas prices and restructuring or privatization of state-owned enterprises in these sectors), as well as improvements in labour market reforms (a new Labour Code) in the social assistance sector and measures that try to prevent and safeguard against problems in the banking sector.⁵ As public resources are still scarce after the crisis, their better management, as well as the faster absorption of EU funds are crucial. Although the absorption rate of EU funds has recently increased, it is still very low and some of the funds might be reallocated; moreover Romania risks another temporary suspension of EU payments because of found irregularities.

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⁵ IMF, Romania: Fifth Review Under the Stand-By Arrangement, Request for Waiver of Non-observance of Performance Criterion, and Request for Modification of a Performance Criterion, IMF Country Report No. 12/157, June 2012.

The strategic options and policy orientations on a national scale have had a major influence on Romania's regional development during transitional years and in the post-accession period as well. During the transitional period, regional transformation processes were closely related to the efforts to prepare Romania for accession to the EU. Although the regional policy initially had only a marginal place in the reform strategy, the situation began to change in mid 1990s, in the context of preparations for the accession to the European Union. The Green Paper for Regional Development Policy in Romania (1995) was elaborated with Phare support, followed by the adoption of the Regional Development Law (1998) that established eight new development regions in Romania (Figure 1), based on the voluntary association of the counties, accompanied by new decision-making and executive institutions at regional level.⁶



Figure 1. Romania's counties and development regions

Source: National Institute of Statistics.

⁶ The development regions in Romania are statistical territorial units (corresponding to the NUTS II territorial level, according to Eurostat classification) without administrative attributions.

1.1. Innovation policy coordinated with regional development policy

One major goal of all Romanian development plans was to stimulate territorially balanced development growth in Romania. At the beginning of the transition process, the level of regional disparities was relatively low in Romania, due to generalized underdevelopment. Following divergent developmental paths in the regions, regional inequalities strongly increased during the transitional period. Based on the rapid development and dominant position of the Bucharest-Ilfov region, a major imbalance with all other Romanian regions emerged. Another important imbalance occurred between underdeveloped Eastern Romania, traditionally dependent on agriculture and Western Romania, economically favoured by the proximity of the western markets. Significant development disparities between counties within the same region created intra-regional imbalances that are more severe than the interregional ones. The negative impact of economic restructuring upon mono-industrial areas and the economic decline recorded by small and medium-sized towns also added to the territorial inequalities in Romania. Recent regional data indicate the deepening of regional disparities as an effect of the global economic crisis. This confirms that in the economic crisis context the downward direction of economic developments in backward regions and counties is further influenced by structural factors with roots in the transitional period: on a descending trend, the structural weaknesses make these counties decline more strongly than the rest of the country.⁷ As far as the most developed counties are concerned, even if they are exposed to a higher vulnerability considering that they are much closer to the world economy's evolution, it is also expected that they will recover more easily given their economic potential.⁸

The essential component of Romania's National Economic Development Strategy is the National Development Plan 2007-2013, a "multi-annual strategic planning and financial programming document [...] used to guide and boost Romania's social-economic development in line with EU Cohesion Policy".⁹ In view of Romania's accession to the European Community and especially after the 2007 accession, national development policies become increasingly connected to EU policies, objectives, principles and regulations with the goal of narrowing developmental gaps. In this context, the strategic vision of the government established six national development

⁷ Suci M.C., Constantin D.L., Dragan, G., Ipate R., Current Issues Regarding Economic Convergence and Knowledge-Based Society, AESB Publishing House, Bucharest (in Romanian) 2008.

⁸ Goschin, Z., Constantin, D.L. The geography of the financial crisis and policy response in Romania, (in:) Gorzelak G. and Goh Ch. (eds), Financial Crisis in Central and Eastern Europe – from Similarity to Diversity, pp. 161-191, Wydawnictwo Naukowe Scholar Publishing House, Poland, 2010.

⁹ Government of Romania, National Development Plan 2007-2013, 2005, p. 3.

priorities:¹⁰ “Increasing economic competitiveness and developing an economy based on knowledge; Developing and modernizing transport infrastructure; Protecting and improving the quality of the environment; Developing human resources, promoting employment and social inclusion and strengthening administrative capacity; Developing rural economy and increasing productivity in the farming sector; Diminishing development disparities between country regions.”

The main goal of the development strategy embodied in the National Development Plan 2007-2013 is “to assist Romania to become, by 2013, a competitive, dynamic and prosperous country that is successfully integrated into the EU and on a fast and sustainable development trend”. Its successful implementation was supported through public investments, based on specific programs and projects at national, regional and local levels. The National Development Plan 2007-2013 established Romania’s major development priorities, not only at a national level, but also regionally and locally, Support for these priorities was provided through public investment, based on specific programs and projects. During pre-accession to the EU, the National Development Plan was the programming document guiding the reach of structural-type funds, as well as post-accession structural funds. The regional development policy in Romania was revised following the adoption of Act no. 315/2004 and regional development strategies where designed through the Regional Development Plans, as well as the National Spatial Plan.

A new document designed in 2008, namely “The National Sustainable Development Strategy Romania 2013-2020-2030”¹¹, formulated the main guidelines for a future of sustainable development in Romania. This strategy traced a new model of development focused on knowledge and innovation, and set specific objectives for the short, medium and long run:¹² “Horizon 2013: To incorporate the principles and practices of sustainable development in all the programmes and public policies of Romania as an EU Member State; Horizon 2020: To reach the current average level of the EU countries for the main indicators of sustainable development; Horizon 2030: To get significantly close to the average performance of the EU Member States in that year in terms of sustainable development indicators”.

The main regional goals included in the National Sustainable Development Strategy Romania 2013-2020-2030 are:¹³

- Horizon 2013: “to support sustainable and territorially balanced economic and social development of the Romanian regions according to their specific needs and resources by concentrating on urban poles for growth; improving

¹⁰ Government of Romania, National Development Plan 2007-2013, 2005, p. 5.

¹¹ Government of Romania, National Sustainable Development Strategy Romania 2013 - 2020 - 2030. 2008, p. 4.

¹² Ibidem.

¹³ Government of Romania, National Sustainable Development Strategy Romania 2013 - 2020 - 2030, 2008, pp. 112, 115, and 116.

infrastructure and business environments so as to make Romanian regions, especially those lagging behind, more attractive places to live, visit, invest in and work” (Government of Romania, 2008, p.108) and to “enhance the economic vitality of Romania’s rural areas while maintaining the social balance by means of the sustainable development of agriculture, forestry and fisheries, including the related processing industries to meet optimally the demand for food and to preserve and improve the natural resource base”;

- Horizon 2020: the objective is to “strengthen production structures in agriculture and forestry while promoting the economic and social development of the rural areas in order further to reduce the existing disparities and to attain the current average performance level of the other EU Member States; to establish Romania as a stability factor for food security in South-East Europe”;
- Horizon 2030: “to achieve full implementation of the Community policies and practices in agriculture, forestry and fisheries; to complete the restructuring and modernisation of these sectors and of the rural areas”.

R&D and innovation (RDI) are at the core of this new sustainable development strategy designed for Romania. The major objectives of the RDI national policy are formulated in the 2007-2013 National RDI Strategy:¹⁴ “1. Knowledge creation for increasing the performance and international visibility of the RDI system; 2. Increasing economic competitiveness through innovation and knowledge transfer; 3. Increasing social cohesion by using RDI to solve local, regional and national problems related to health, environment, infrastructure, land management and utilization of national resources”.

The implementation of the national RDI strategy is achieved through several main funding instruments: the 2007-2013 National Plan for R&D and Innovation, the Sectoral R&D plans and the Sectoral Operational Programme “Increasing the Economic Competitiveness”, several Core Programmes, and the national R&D programme IMPACT, all coordinated by the National Authority for Scientific Research, as well as a special fund for R&D projects that represent national priorities.

The national RDI strategy was included in the National Development Plan 2007-2013, as well as in other strategic documents, such the 2009-2012 Government Programme in the RDI area.

The current innovation policies rely heavily on demand-side measures, such as regulations for stimulating innovation. Tax incentives for RDI are still poorly developed, while public procurement for innovation is completely absent in Romania’s innovation policy mix. The main challenges for the future are the implementation of better funding schemes that might stimulate R&D in areas of national comparative advantage, improving the business innovation performance, larger support to innovative firms, better technology transfer infrastructure, etc.

¹⁴ Government of Romania, National Research, Development and Innovation Strategy, 2007 – 2013, 2008, p. 15.

1.2. Romanian Regional innovation strategies

A series of Regional Innovation Strategies (RIS) are carried out in six out of the eight Romanian development regions with the support of Innovating Regions in Europe Network, in collaboration with the Regional Development Agencies (RDAs). The projects target the improvement of innovation policies and infrastructure in the regions in view of boosting regional innovation and competitiveness, and funding is provided by DG Enterprise in the framework of the Regional Innovation Strategies in Newly Associated Countries. The first projects covered the period 2005- 2008 and were developed by six regions (West, Bucharest-Ilfov, North East, North West, South East, and South Muntenia Regions), having similar structure and objectives and also specific features in line with the characteristics of each region. A follow-up covering the 2008-2103 period was approved only for the West and South Muntenia Regions.

Although the RIS projects helped to establish the best innovation actions for the targeted regions, their impact is limited by the lack of funding resources. The regional RDI objectives can be financed through the Regional Operational Programme and the Operational Programme “Increasing Economic Competitiveness”. Another limit for their effectiveness is that the RIS projects are weakly integrated with the other projects developed in the regions.

The following are the most notable results of the RIS projects achieved so far:

- Regional Centre for Innovation and Technology Transfer (2006) in the West Region provides assistance for developing innovative services and enables collaboration between R&D institutes, universities and the business sector.
- Regional Cluster Initiative in the Automotive Sector (AutomotiVest, in 2007), is the first formal attempt to create an automotive cluster in the Western Region by bringing together local automotive SMEs, technical universities, the regional Chambers of Commerce and the Western Regional Development Agency. The AutomotiVest Association aims to create a network of companies, increase the cooperation among cluster partners, pool resources, provide technological assistance, enable contacts with foreign companies, and develop a competence centre. The Association benefited from its involvement in the FP7 research project “We Steer” – Support Actions for the Emergence of a Research-Driven Automotive Cluster in West Romania (2008-2010), along with similar professional networks (such as BeLCAR and Co-Makers Romania).
- The project ‘Innovating South Muntenia’ which was carried out in the years 2005-2008 and continued in 2008-2013. The project’s participants are local authorities, SMEs, NGOs, universities, research units, and two partners from the EU with the common goal of increasing innovation and competitiveness based on good practices and regional and international partnerships.
- Drawing on the model of the European Institute of Technology, a Regional Insti-

tute for Education, Research and Technology Transfer was created in North-West Region (2007) as a joint-stock company aiming to enhance education, research and technological transfer in the region. Its shareholders are public authorities, companies and universities of the region.

- The Competitiveness Pole “The Fortress of Science” in Cluj county is focused on supporting research in several areas: agriculture and food safety, energy, environment or innovative materials, health.
- A strategic project carried out by the Central and North-West Regions BISNet Transylvania, envisaged as a Support Network for Business and Innovation for SMEs in Transylvania through technology support, consultancy services, market research, etc.
- The project AsviLoc, which envisages the establishment of a transnational innovation system, based on the network of the RDAs in South-Eastern Europe.

Several empirical studies on the subject of cluster location in Romania revealed that there are some cluster-type industrial agglomerations, but they usually do not form a well defined network of organizations. Recently Constantza (2011) pointed to several clusters that have developed cooperation and common use of innovative service, mostly in Automotives, ICTs Clothing, Footwear and Fashion, Construction Materials and the Food industry (Figure. 2).

Results from a clustering index of concentration that measures the spatial dispersion of economic activities (by summing up the distance-weighted data of all the pairs of regions, indicating if similar economic activities take place in geographically low distanced regions) showed the highest values for industrial activities, as these are less spatially dispersed, exploiting the advantages of the economies of scale, while agriculture and its production are the most evenly dispersed.¹⁵

¹⁵ Goschin Z., Constantin D.L., Roman M, Ileanu B. “Specialisation and Concentration Patterns in the Romanian Economy” in *Journal of Applied Quantitative Methods*, Volume 4, Issue 1, March 30, 2009, pp. 95-111.

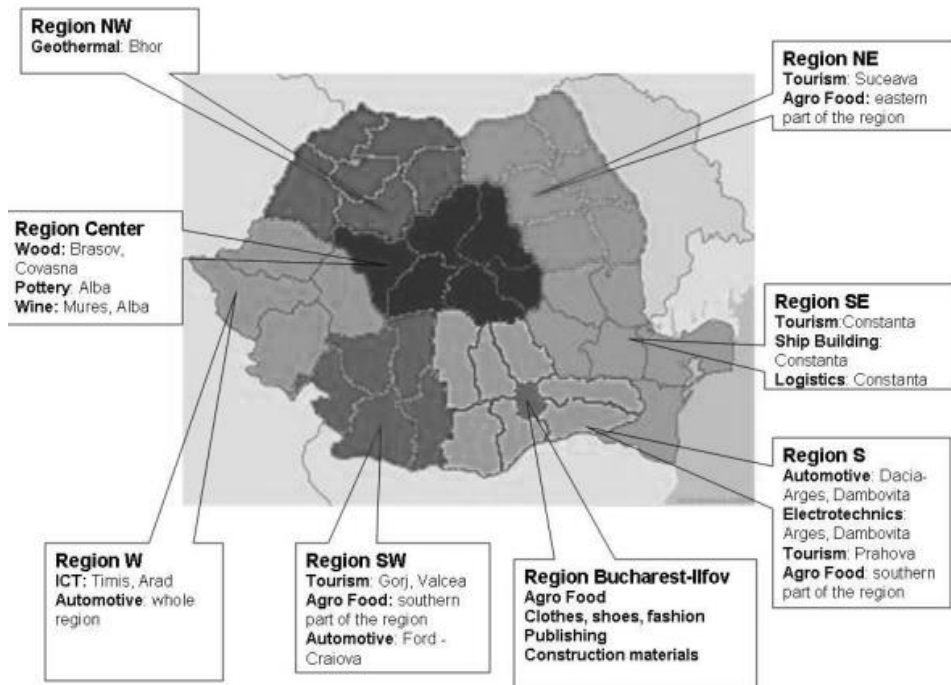


Figure 2: Location of Romanian clusters

Source: Constantza, 2011

1.3. A study of cooperation platforms Romanian Sustainable Energy Cluster (ROSENC)

Utilizing renewable energy sources and increasing energy efficiency are on the Romanian innovation policy agenda, and several national and regional projects have been developed over time. The scope of the Romanian Sustainable Energy Cluster association is to promote Romania, the West Region and Timis county as leaders in the fields of renewable energy, energy efficiency and the new sustainable energy fields; to participate in international networks as a partner or coordinator in projects in the field of sustainable energy; to raise member organizations competitiveness through national and international cooperation. The main objectives of this energy cluster association are participation in the elaboration of renewable energy policies and in management and engineering in this area, developing research, education, innovation, production, distribution and efficient use of conventional energy, of renewable energy and new sustainable energy technologies, as well as support for the development of companies and start-ups in the region, and new investment pooling

in the fields of interest. The association aims to promote innovation, production, distribution and efficient use of conventional energy, renewable energy and new sustainable energy technologies by active networking with similar organizations in the field of renewable energy and environment protection. ROSENC is involved in the entire life cycle of the products, from ecological production and sustainable utilization of the products to the final recycling/exploitation after utilization. Promotional campaigns on sustainable energies for the community have been carried out focusing on utilization of renewable energies, increasing the energy efficiency and raising awareness of environmental issues. ROSENC is expected to contribute to energy efficiency in the region by promoting specific products in the field of renewable energy sources, thus enabling quicker solutions to imbalances between supply and demand, alleviation of market fluctuations and an optimal workflow for all potential actors in the chain.

The ROSENC cluster was established in February 2011, by 26 founding members owing a total budget of EUR 16.8 million for green energy development over 2010-2012 and a total of 6,425 employees. The current number of cluster members is 46, out of which 26 are the founding members. Organizational structure is as follows: 39 private enterprises, 2 public authorities and 5 universities and R&D institutes. The current turnover of member organizations is EUR 245.45 million and the total number of employees is 7,525, out of which 166 employees work directly in the renewable energy field. The initial ROSENC network (Founding Members) was composed of 26 organizations. Categories of members: local public administration authorities (Timis County Economic Development Agency, Timisoara City Hall), firms of production and marketing in renewable energy and related fields, R&D institutes, universities and professional schools, banks and other financial institutions, professional organizations, chambers of commerce, industry and agriculture and experts.

Among the founding members of the cluster are public administration authorities that provide support for socio-economic development of the county and for business environment oriented services with the scope of achieving sustainable and competitive development. Timis County Economic Development Agency had a major role in the creation of ROSENC and is actively involved in the current activity of the cluster, while the Chamber of Commerce, Industry and Agriculture of Timis County acts as a facilitator that provides support for economic relations with official representatives of foreign countries, consulates and foreign economic entities and business environment oriented services. Another public administration authority that is a member of the cluster is the City Hall of the municipality where the ROSENC association is based: Timisoara. Prior to this renewable energy cluster initiative, Timisoara City Hall had already adopted actions and measures concerning the implementation of renewable energy projects, raising the energy efficiency, protection and improvement of urban living conditions. The public

administration authorities are actively involved in the development of the cluster; they provide support in identifying financing resources, in accessing public funds for specific activities and in attracting local and regional investments in the sector of renewable energy. In view of enhancing communication and collaboration between business, universities and public authorities, several meetings and workshops have been organized by the members of the association. In this context working groups have been established to capitalize experts' contribution especially in concrete cooperation initiatives between the three pillars of the regional economy: business, R&D and public authorities.

Among the members of the cluster there are 5 universities and R&D national institutes which had prior developed research projects in the field of renewable energy and related activities. The research units provide the association with access to human resources with specific superior professional expertise who can increase professional competitiveness along the entire value chain. The higher education and scientific research institutions members of the ROSENC cluster are: the University of Medicine and Pharmacy "Victor Babes" Timisoara which undertakes joint research in the fields of technology transfer and intellectual property management and protection, the University of Agricultural Sciences and Veterinary Medicine of Banat, Timisoara which develops research projects in the fields of organic renewable energy sources and bio fuels. Western University in Timisoara is involved in scientific research, design and innovation through its Advanced Environmental Research Institute (ICAM), the Polytechnic University Timisoara is undertaking scientific research, design and innovation activities in its Renewable Energy Research Institute (ICER) and the National Institute for Research in Electrochemistry and Condensed Matter is currently involved in research and development in environment protection technology, renewable energy research, and bio-electro-chemistry. Out of the 46 current members of ROSENC cluster, 39 are private enterprises, involved a variety of activities. The most are working on project engineering, installation and maintenance services, and consultancy in the fields of renewable energy and high energy efficiency, while several firms specialize in project engineering and production of custom metal structures for industrial installations and constructions, in specialized waste management, energy efficiency and production from advanced waste incineration, architectural design, urban planning, project management, and documentation services for permits in urbanism and urban development. There are also enterprises involved in design and construction of renewable energy installations, renewable energy projects developers, firms that offer consultancy in sustainable entrepreneurial development, electricity networks connection, information services for legal aspects in the renewable energy field, programs and projects for sustainable and competitive growth, based on innovative clusters, and integrated innovation in the field of renewable energies.

As a regional organization, ROSENC cooperates with local organizations, although national and even international contacts are not excluded; for instance, international partnership between Austria and Romania is accomplished through one of the ROSENC members, EcoPlus International, a representative of Lower Austria in Romania. ROSENC also cooperates with the ArchEnergy Cluster (Hungary), Agency for Energy Management in Timis-West Region, RoEnergy Fair (Bucharest, Timisoara).

The ROSENC cluster is a very new, yet very active association. The first Strategy Development Session of ROSENC was held in Timisoara, in April 2011, soon after the creation of the association, and established the main directions to be followed in order to make a contribution in the management and engineering in the renewable energy area. The ROSENC association further attended several fairs: Energia Viitorului, held in Timisoara, June 2011, RoEnergy, in Bucuresti July 2011, RoEnergy, Timisoara, in November 2011. ROSENC is also involved in the Inter-Cluster Cooperation and several proposals on International Cooperation Projects (IEE, FP7, Leonardo da Vinci, CIP, EEEF, ELENA) have been formulated. Its participation in Regional Network for Promotion of Renewable Energy (RENREN Project financed by INTERREG IV C) brings the opportunity to draw on the best European practices on utilization of renewable energies and increasing the energy efficiency. As a member of RENREN Project, the ROSENC association participated to the meetings held in Iceland in September 2011 and in Spain in November 2011, as well as participated in the Economic Missions Romania – Wallonia Region held in Wallonia-Bruxelles in September 2011. In September 2012, within the framework of the POR 2007-2013 program ‘Progettazione europea dei processi di sviluppo dell’innovazione – European design in innovation development processes’, ROSENC organized an internship for two groups of Italian students.

Current active collaborations are being developed with GAL Danube, American Semiconductors (GCCA), ‘European Biogas Sustainable Environments (Sheba)’ and there is cooperation between the Netherlands and Romania, aiming to create an ESCO market in Timisoara.

The ROSENC cluster has developed several innovative products, including thermal solar panels, a photovoltaic solar park project, two pilot projects ‘Green house’ and ‘Flux energy’, and a Solar Energy Teaching Kit.

The cluster provides the framework for better communication, increased collaboration and higher technology transfer between research and business environments based on common interest in the field of renewable energy. Cooperation links are currently being forged; formal and informal meetings took place within the cluster in view of preparing research proposals and several project grants have been submitted, including: HURO CBC – ‘Green InfoPoint, promoting best practices and business networks for energy efficiency in construction’; Leonardo DOI: ‘Creating the job operation and maintenance of production facilities for solar thermal electricity’; CSDF: ‘Creating informative guide for the Law 220/2008’;

CSDF: 'Promoting renewable energy in the micro-region Danube River Clisura'; Intelligent Energy Europe 'Integrating and optimizing supply chains for biomass production and exploitation'; Intelligent Energy Europe 'Feasibility Companies in Energy Services (the ESCO) for energy Efficient Buildings'; and SOP 131: 'National Competitiveness Pole for Green Economy'.

The cluster achieved regional, national and international recognition and developed relationships with leading organizations in the field, such as MECMA, CLUSTERO (ROSENC provided a member of the Board of Directors in the Association of Romanian Clusters – CLUSTERO), preparation of future participation in the InnoMatch Fair, 2013 (West RDA: participation in smart specialization strategy in the region), participation in the Sebe project with the Centre for Excellence in Renewable Energy - Vienna, international consortium for future cooperation projects. The ROSENC Cluster is currently involved in several initiatives for local, regional, national sector support of the renewable energy sector. The integration of value chain allows the participation in ROSENC projects of the members with activities in adjacent sectors and inter-institutional working teams are created based on specific projects' needs. Relevant information regarding ongoing and future projects is currently disseminated via the Internet and the cluster's members, and other interested entities are invited to join the projects.

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Francisco Diniz*

2. Recent Innovation Processes in Portugal

Introduction

Situation of the innovation process in Portugal has to bear in mind the European Union guidelines in the context of Europe 2020 strategy. One try to analyze the relationships between research and innovation process taking into consideration the investment in knowledge together with competitiveness.

The identification of Portugal's scientific and technological strengths in an European Union context is also described in order to evaluate how efficient the Policies and reforms for research and innovation were by measuring the economic impact of innovation. To summarize all that one presents two Portuguese clusters to emphasize their relationship with the innovation process.

2.1. Performance in research, innovation and competitiveness¹⁶

The indicators in the table below present a synthesis of research, innovation and competitiveness in Portugal. They relate knowledge investment and input to performance or economic output throughout the innovation cycle. They show thematic strengths in key technologies and also the high-tech and medium-tech contribution to the trade balance. The table includes a new index on excellence in science and technology which takes into consideration the quality of scientific production as well as technological development. The indicator on knowledge-intensity of the economy is an index on structural change that focuses on the sector composition and specialization of the economy and shows the evolution of the weight of knowledge-intensive sectors and products and services.

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¹⁶ European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 pp. 330.

Table 1. Research, innovation and competitiveness in Portugal

	Investment and Input	Performance/ economic output
Research	R&D intensity 2011: 1,50% (EU:2,03%; US: 2,75%) 2000-2011: -016% (EU +0,8%; US +0,2%)	Excellence in S&T 2010: 26.45 (EU: 47,86; US:56,68 2005-2010:+4,23% (EU+3,09%; US:+0,53)
Innovation and Structural change	Index of economic impact of innovation 2010 -2011: 0,387 (EU:0,612)	Knowledge – intensity of the economy 2010: 41,04 (EU: 48,75; US: 56,25) 200-2010: +3,18% (EU: +0,93%; US:+0,5%)
Competitiv- nes	Hot-spots in key technologies: Food, agriculture, fisheries, Biotechnology, Materials, Enviro- ment, ICT	HT+MT contribution to the trade balance 2011:-1,2% (EU 4,2% US:1,93 % 2000-2011:n.a (EU: +4,99%; US: - 10,75%

Source: DG Research and Innovation – Economic Analysis Unit (in:) European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 p. 216

Portugal has expanded its research and innovation system over the last decade, increasing its investment in research at a remarkable average annual real growth rate of 7% between 2000 and 2007. However, R&D intensity in Portugal has decreased by an average of 0.16 % from 2008 to 2011. Public expenditure on R&D was maintained at a level of 0.69% of GDP in 2011, despite the economic crisis.

Portugal has also shown notable progress in the number of new doctoral graduates per thousand population aged 25-34 and in the share of researchers in the labour force. Business enterprise investment in R&D grew dramatically, with Portugal nearly quadrupling the intensity of business R&D in its economy between 2000 and 2011. Business enterprise also increased its share as source of funding of GERD from 27% in 2000 to 44% in 2009. These evolutions had a positive impact on scientific production and excellence as well as on innovation, including in SMEs. The knowledge intensity of the economy has increased by well over the EU average in the period 2000-2010.

However, despite the progress observed on R&D expenditure in the business sector and the large increase in the total number of researchers in recent years, Portugal remains below the EU average in terms of S&T excellence, business enterprise research intensity and business enterprise researchers.

Other challenges are the level of education attainment (both secondary and tertiary education), as well as the lower amount of public-private scientific co-pub-

lications, PCT patent applications, licence and patent revenues from abroad and knowledge-intensive activities. Some ,traditional‘ manufacturing sectors like ,leather and footwear‘ and ,textiles and textile products‘ lost competitiveness over the last decade and reduced their share in total national added value.

Portuguese policies for research and innovation support adequately the structural change needed by the country to improve productivity and competitiveness and resume growth. The new Strategic Programme for Entrepreneurship and Innovation articulates policies like education, training and employment with the aim of stimulating R&D and Innovation in the scientific system and the business enterprises. New initiatives for research excellence were launched to promote scientific employment of talents and excellent research centers. The Competitiveness Clusters are being rationalized and redirected towards strategic objectives of more competitiveness and an increase in exports and employment. At the same time the programme for applied research and technology transfer to enterprises is being reinforced.

Portugal has set a national R&D intensity target for 2020 of 3%, where public sector R&D intensity would reach 1% and business R&D intensity 2%. From 2005 and up to the crisis, Portugal made a very significant progress towards the R&D intensity target. However, from 2009 onwards, the trend is negative and in 2011, Portuguese R&D intensity had fallen back to 1.50%, with a public sector R&D intensity of 0.69% and a business R&D intensity of 0.69%.

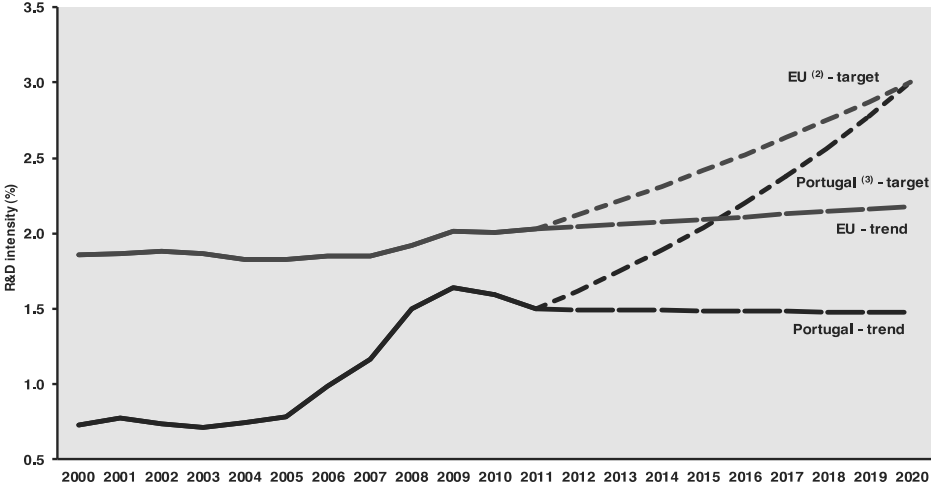


Figure 3. Portugal – R&D intensity projections, 2000-2020

Source: DG Research and Innovation – Economic Analysis Unit (in:) European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 p. 217

The main challenge for Portuguese R&D, therefore, is to increase the share of business R&D investment in total national R&D investment and to attract foreign business R&D investment. R&D investment has slightly decreased, affected by the economic crisis. Business R&D investment reached its highest level in 2009 in absolute terms and in relative terms after some years of notable growth.

The difficult national business environment and the contraction of domestic demand places enterprises in the position of having to find external markets while facing challenges in terms of efficiency (productivity and competitiveness) and financing. The efforts of investing in innovation and research, increasing productivity and competitiveness, point in the good direction. Public funding of R&D has been sustained, despite the pressures created by public expenditure reduction.

Private and public R&D investment also receives support by co-funding from the European budget, in particular through the Structural Funds and from successful applications to the Seventh Framework Program for research. For the FEDER programming period 2007-2013, Portugal benefits from funding of € 5729 million (26.8% of the total allocated to Portugal) for research, innovation and entrepreneurship in the Portuguese regions. In 2010, Portugal had already absorbed 62.5% of these EU funds (the average in the EU was a 46.6% commitment rate). Portugal also has scope to increase its funding of R&D from the 7th Framework Programme. The success rate of Portuguese applicants is 19.1%, lower than the EU average success rate of 21.6%. By early 2012, slightly over 1300 Portuguese participants had been partners in an FP7 project, with a total EC financial contribution nearing € 283 million. Two Portuguese SMEs are among the top twenty SMEs having the highest numbers of FP7 signed grant agreements for the period 2007-2010.

The graph below illustrates the strengths and weaknesses of Portugal's R&I system. Reading clockwise, it provides information on human resources, scientific production, technology valorization and innovation. The average annual growth rates from 2000 to the latest available year are given in brackets under each indicator.

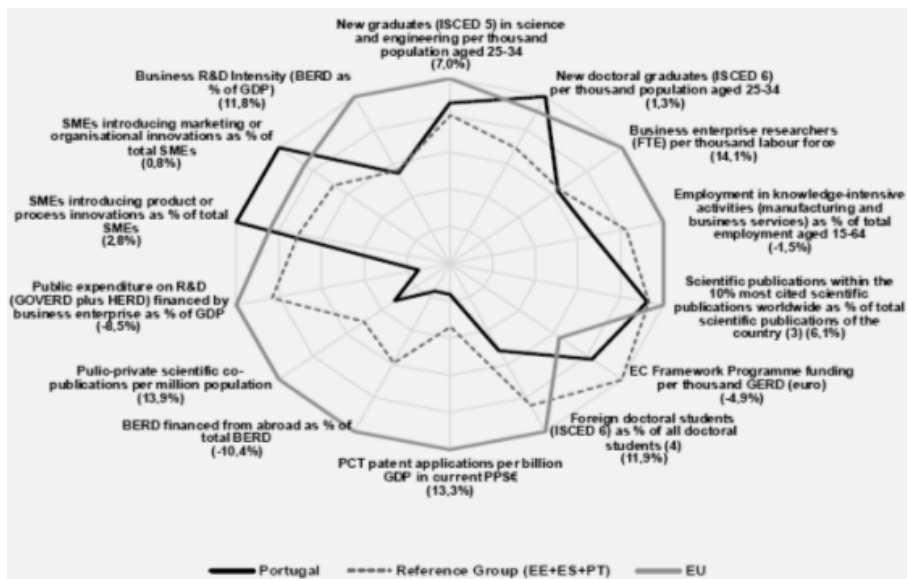


Figure 4. Strengths and weaknesses of Portugal's R&I system in 2011

Source: DG Research and Innovation – Economic Analysis Unit (in:) European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 p. 218

The graph shows in broad terms that the big increase in R&D investment over the period 2000-2011 has triggered a stronger human resources component, higher scientific quality and some innovation but with less progress on technology valorisation. All in all, while good progress is made on human resources, science and business innovation, Portugal remains below the EU average on technology development, business R&D and the knowledge-intensity of the economy.

In the field of human resources for research and innovation, Portugal is achieving notable progress on numbers of new doctoral graduates and on researchers employed by business. This is the consequence of strong public incentives. However, the share of employment in knowledge-intensive activities has not followed the same trend, reflecting a weakness as regards its capacity to move towards more knowledge-intensive domains. The quality of scientific production improved significantly as reflected by an average annual growth rate of 6.1% in the share of national scientific publications in the 10% most cited scientific publications worldwide. As seen in the graph above, overall technology development is well below the EU average, although the level of PCT patent applications per billion GDP shows remarkable progress for the period 2000-2009. Product or process innovations in SMEs are at a good level, having increased substantially over the last decade.

Portugal, in terms of scientific production, has stronger capacity in the fields of health, food, agriculture and fisheries, ICT, materials, biotech, production and transport. The scientific specialization index, covering the period 2000-2009, shows higher values in the fields of food, agriculture and fisheries, ICT, materials, production, construction, transport, biotech and security. Regional diversity in scientific production and excellence is a reality, particularly for health, biotech, ICT and materials with the region of Lisboa taking the lead, followed by Norte and Centro. However, in areas such as food, agriculture and fisheries and environment participation from other regions is more evident. Scientific excellence, as shown by the impact of scientific publications in terms of citations, is shown to be particularly high for food, agriculture and fisheries, materials, energy, environment and transport.

Notwithstanding the diversification of S&T, as shown by the indicators above, the innovation base could be further strengthened by focusing more on some scientific areas that would improve the quality of technological output, such as biotech, food, agriculture and fisheries, materials, environment and ICT.

2.1.2. Policies and reforms for research and innovation

R&I policy is characterized by a large political consensus and continuity over time that allowed for significant progress from a relatively low base. Long term consistency has proved to be a positive determinant in ensuring the consolidation of the research system. However, the need to pursue a very tight budgetary policy has caused some changes. In 2012, for the first time since the economic crisis, the government budget for R&D has decreased. The budget for the Science and Technology Foundation (FCT) decreased by 42 million € between 2011 and 2012. In 2012, the FCT launched a call for proposals for 80 scientists, both Portuguese and foreign nationals, to carry out research in Portugal. New calls will be announced to the coming years. This initiative aims to consolidate the pool of high level scientists working in Portugal. A call for research projects in all scientific domains was also launched following a very similar line to those launched by previous governments. Initiatives have also been launched on doctoral and post-doctoral grants. Financing and evaluation of R&D institutions have been made in different scientific areas on a competitive basis and using new excellence-based demand criteria.

Over recent decades, Portuguese research policy has been horizontal in nature and has covered a broad spectrum. Despite the implementation of a number of recent initiatives addressing more targeted objectives and industry-academia interaction, the fact remains that part of the research carried out in the higher education, government and private non-profit sectors is still essentially organized

according to academic criteria and responds to academic incentives. There are, however, signs that ‘targeted and thematic funding’ has been increasing in recent years. Examples are the ‘International partnerships’, addressing well defined areas, such as energy, advanced computation, security and health, the creation of the Iberian Nanotechnologies Laboratory, and the ‘Commitment to Science’ initiative that had identified some specific areas that research should address. Some initiatives are indicative of the future R&D policies of Portugal, e.g. the greater emphasis on competition for funding beyond Portuguese strategic funds, or the renewal of the Carnegie Mellon-Portugal program to a second phase with a change of the main focus from education and training to entrepreneurship and innovation.

The new Strategic Programme for Entrepreneurship and Innovation (E+I+) includes several measures which are aiming to improve the connections between the two areas of „innovation“ and „research“. These include: (1) promoting experimentation in basic and secondary education; (2) education for entrepreneurship; (3) promoting the transition of PhD holders to non-academic careers, (4) improving the „articulation“ of technology transfer units; (5) encouraging the economic exploitation of scientific knowledge; (6) launching of scientific thematic/priority programmes; (7) support for patent registration and licensing; and (8) a host of initiatives to encourage entrepreneurship. The programme of the new government specifies the „encouragement of the integration of Portugal’s scientific system in the European Research Area“. This will be achieved through an increased participation of Portuguese companies and research organizations in EU Framework Programmes and by supporting industrial research through public-private collaborations. The Strategic Programme for Entrepreneurship and Innovation (E+I+) also includes a measure aimed at supporting the participation of Portuguese companies in international R&D programmes.

2.1.3. Economic impact of innovation

The index below is a summary index of the economic impact of innovation composed of five of the Innovation Union Scoreboard’s indicators. The index of economic impact of innovation shows that Portugal is lagging slightly behind in terms of orienting its economy towards innovative and knowledge-intensive sectors. This is of course partly attributable to the severe economic crisis. However, the scale of the gap also points at more structural problems.

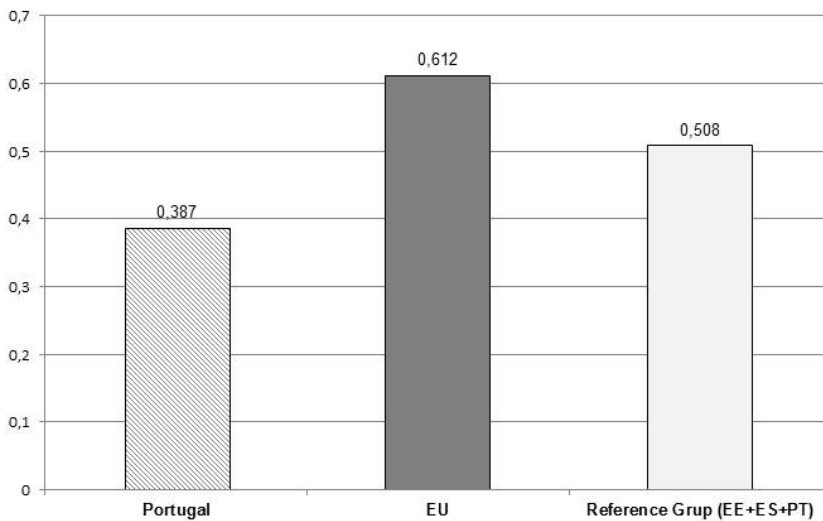


Figure 5. Index of economic impact of innovation – Portugal

Source: DG Research and Innovation – Economic Analysis Unit (in:) European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 p.222

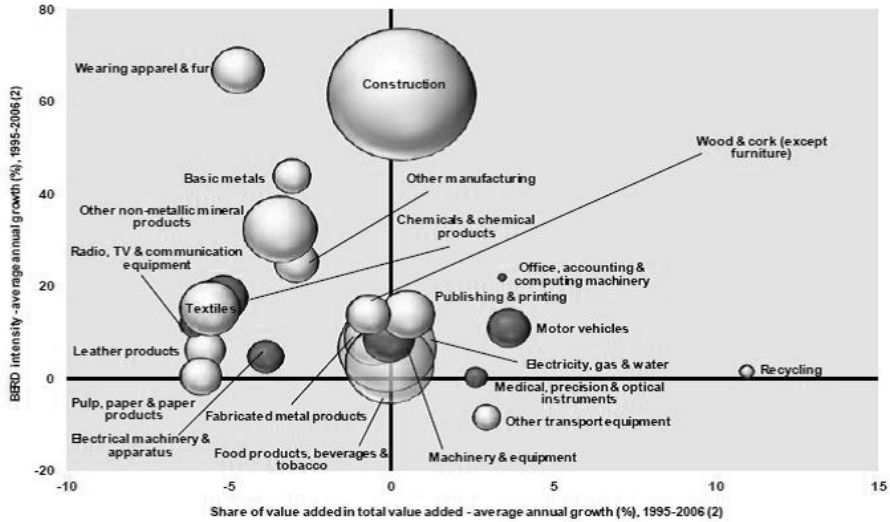
Portugal's overall performance in innovation is moderate also according to the IUS report. Although there is a high share of SMEs introducing innovations, exports and employment in high-tech sectors and knowledge-intensive services are particularly weak, showing the difficulty for innovative firms to positioning themselves in markets with high potential for growth. This weakness is recognized and a strategic programme to promote entrepreneurship and innovation, „E+I+“, was introduced at the end of 2011, leading to the creation of a National Council for Entrepreneurship and Innovation and the launch of competitions for innovation and R&D projects to be implemented by micro and SMEs in cooperation with universities and research institutes. Standards on innovation management and guidelines for the valorization and protection of IPR are being developed. Various measures were adopted to reduce the constraints on credit conditions and to promote the internationalization and exports of SMEs. The on-going „Digital Agenda 2015“ is progressing well, leaving Portugal with one of the most advanced broadband networks in the EU.

If the analysis is not limited to innovative enterprises but refers to all fast-growing firms, it reveals that Portugal's share of high growth³ enterprises (in terms of employment) in the total of active enterprises was 2.70% for micro enterprises

and 3.26% for somewhat larger enterprises (10 employees or more) in 2009. These values are lower than the 2008 values, at a similar level to Spain but lower than Estonia and the Czech Republic. If fast-growing firms are measured in terms of turnover, the values for Portugal for 2009 are higher (4.45% and 6.38%, respectively) which seems to indicate that a critical size (in terms of employment and/or turnover), let alone other important factors, is an important factor in the growth of enterprises. The share of fast-growing enterprises by sector is much higher when measured in terms of turnover than in terms of employment. In 2009 the shares of high growth enterprises in the construction sector, in terms of turnover, were 8.27% (5 to 9 employees) and 11.95% (10 employees or more), whereas in terms of employment the corresponding shares were much more modest at 2.90% and 3.35%, respectively.

2.1.4. Upgrading the manufacturing sector through research and technologies

The graph below illustrates the upgrading of knowledge in different manufacturing industries. The position on the horizontal axis illustrates the changing weight of each industry sector in value added over the period. The general trend of moving to the left-hand side reflects the decrease of manufacturing in the overall economy. The sectors above the x-axis are sectors whose research intensity has increased over time. The size of the bubble represents the share of the sector (in value added) in manufacturing (for all sectors presented in the graph). The red-coloured sectors are high-tech or medium-high-tech sectors.



Data: OECD; **Notes:** High-Tech and Medium-High-Tech sectors are shown in red. 'Other transport equipment' includes High-Tech, Medium-High-Tech and Medium-Low-Tech. (2) 'Food products, beverages and tobacco'; 1995-2005; 'Wearing apparel and fur': 1996-2006.

Figure 6: Portugal – Share of value added versus BERD intensity – average annual growth, 1995-2006

Source: DG Research and Innovation – Economic Analysis Unit (in:) European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 p. 223

For a small country like Portugal, the road to growth leads to an extended market beyond the national boundaries, where competition must be confronted with high quality actors in sectors providing more value added. This requires reinforcing the capacity of enterprises to move into more high-tech and medium-high-tech sectors. Portugal has scope to upgrade the knowledge intensity in new areas of industry and in 'traditional' sectors by integrating more R&D with creativity, design, etc. The graph above shows a general picture of manufacturing sectors over the pre-crisis period 1995-2006, showing reduced shares of value added but increased BERD intensities for most of the sectors. In particular, textiles, leather products and other non-metallic mineral products, lost important positions. Wearing apparel and fur, despite a growth in R&D intensity over the period, lost an important share of value added, which can be explained by factors such as aggravated price competitiveness loss. Construction (a non-exposed sector) continues to play an

important role in manufacturing value added with a very high growth rate of R&D intensity. The growth in the shares of value added for motor vehicles, and medical, precision and optical instruments is encouraging.

The 2011 EU industrial R&D scoreboard, ranking the top 1000 companies investing in R&D, shows that the top Portuguese companies are in the telecommunications, banking and electricity sectors. Just a year earlier pharmaceuticals and construction were also among the top sectors.

2.2. Competitiveness in global demand and markets

Investment in knowledge, technology-intensive clusters, innovation and the upgrading of the manufacturing sector are determinants of a country’s competitiveness in global export markets. A positive contribution of high-tech and medium-tech products to the trade balance is an indication of specialization and competitiveness in these products.

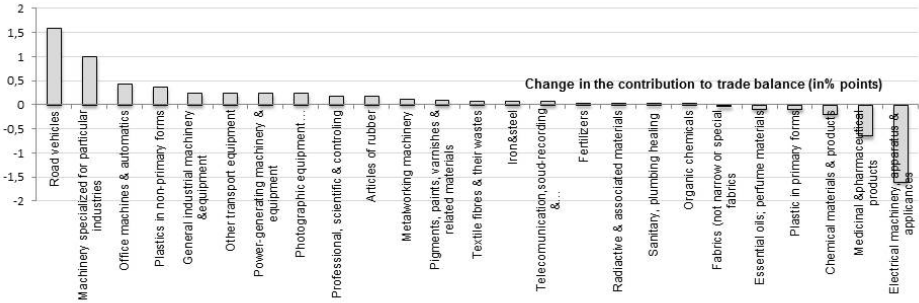


Figure 7. Evolution of the contribution of high-tech and medium-tech products to the trade balance for Portugal between 2000 and 2011

Source: DG Research and Innovation – Economic Analysis Unit (in:) European Commission, Research and Innovation Performance in EU Member States and Associated Countries Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, 2013 p. 224

Over the last decade, Portugal has had large current account and trade balance deficits, reflecting the overall weak competitiveness of the majority of enterprises. The graph above shows the changes, from 2000 to 2011, of the contributions of various industries to the national trade balance. The highest positive variation occurred in machinery specialized for particular industries. The second highest positive variation is in road vehicles (including air-cushion vehicles), which passed

from a negative contribution in 2000 to a positive contribution in 2011. The next positive variation is in plastics in non-primary forms (this industry had a positive trade balance since 2007). On the negative variations, the highest occurred for electrical machinery, apparatus and appliances, and electrical parts. Medicinal and pharmaceutical products and other transport equipment also had negative variations. Industries that contributed positively to the trade balance throughout the decade are: sanitary, plumbing and heating fixtures and fittings and fabrics, woven, of man-made textile materials.

Total factor productivity is lower than a decade ago and the share of employment in knowledge-intensive activities is also relatively low. Labour productivity increased over the same period, but only slightly. Enterprises need to further integrate new technologies and strive to develop new products, processes and services that may provide higher added value for their activities.

Concerning the other EU 2020 objectives, Portugal is progressing well in particular in relation to increasing the share of renewable energy in total energy consumption and the share of population having completed tertiary education.

2.2.1. Portuguese Footwear Industry Cluster

Over the past decade, the European Union has moved from a scenario of almost total equilibrium in the international footwear trade to a major deficit in this area: in 2001, the balance of trade in the EU27 was – 189 million Euros, equivalent to a 99% rate of cover; ten years later, the balance had already risen to – 5,545 million Euros – a drop of 81% in the rate of cover.

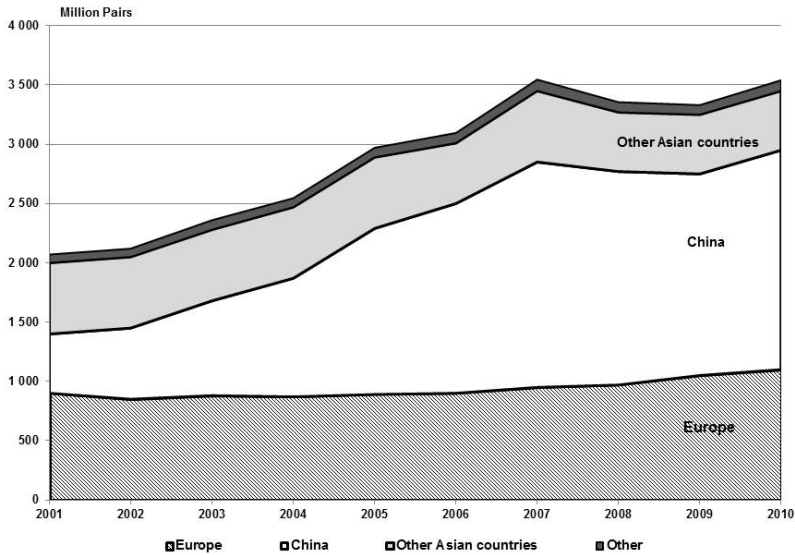


Figure 8. Footwear imports of the 27 members of the European Union (2001-2010)

Source: APICCAPS, Footwear Components and Leather Goods, 2011, Statistical Study. http://www.adi.pt/docs/ADI_Footwear.pdf

Underlying this drop in the trade balance of the EU27 is the fact of China becoming fully integrated into world trade. This becomes clear when footwear imports into the EU27 are broken down geographically. Over the last decade, the amount of footwear imported from China has more than quadrupled, from approximately 420 million pairs to almost 1,900 million. In this ten – year period, China alone represented 94% of the rise of 1,540 million pairs in total imports to the 27 countries of the European Union. Thus, the Chinese share of European Union imports rose from 21% to 53%. The success of Chinese footwear may be explained by its very aggressive prices: the average price of Chinese footwear arriving in Europe is under 4 Euros – one quarter that of intra – European imports.

As a result of a deliberate strategy aimed at redirecting the footwear industry to higher value-added niches, Portuguese footwear exports have begun to rise once more – Portugal is now ranked eighth in the world for exports of leather footwear. The average price of USD \$27 reflects the degree of appreciation that Portuguese footwear has earned in international markets¹. The relative price index of exports/imports since 2001 has grown by 65%, which confirms a good level of international specialization.

Success in this area was one of the main pillars of technological development, which involved the Technological Center and the footwear cluster, and brought together companies and universities.

The R&D projects which involved a consortium of companies that has been supported by ADI since the mid – 90s added significant value, totalling over 36 million euros. Figure 9 below shows the three development phases of the R&D project.

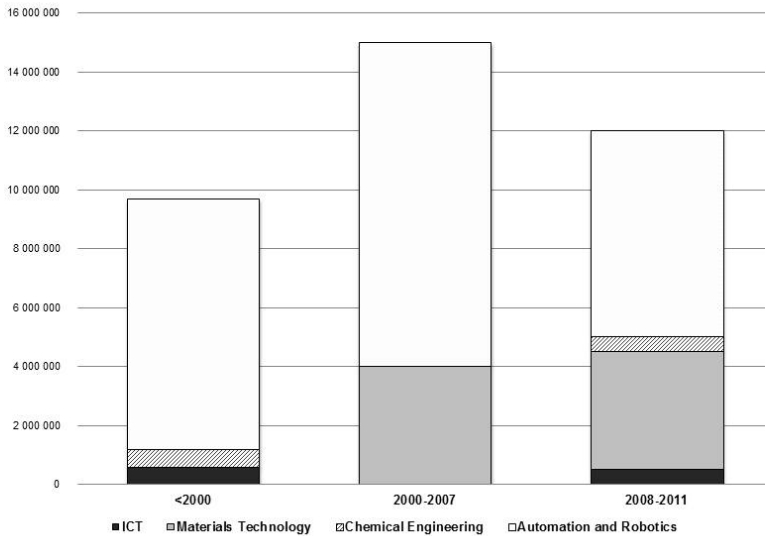


Figure 9. Consortium R&D Projects – Distribution of Eligible Investment aimed at the footwear sector by application year and technological area

Source: APICCAPS, Footwear Components and Leather Goods, 2011, Statistical Study. http://www.adi.pt/docs/ADI_Footwear.pdf

Initially, the only research projects were those aimed at developing solutions for Automation and Robotics. While the importance of this technological area continued during the second phase, there was a tendency to emphasize the importance of greater materials technologies. To put it simply, we could say that the first R&D phase focused on process technologies, whereas during the second period greater concern is beginning to emerge about innovation in product technologies (the shoes).

When we talk about automation, we usually associate it with the idea of replacing manpower with machines and thus obtaining major gains in physical productivity.

However, we can see from the graph below that this was not the case. Although “physical” productivity (the number of pairs produced per worker) did rise slightly, the highest increase was in the value of the productivity, which doubled.

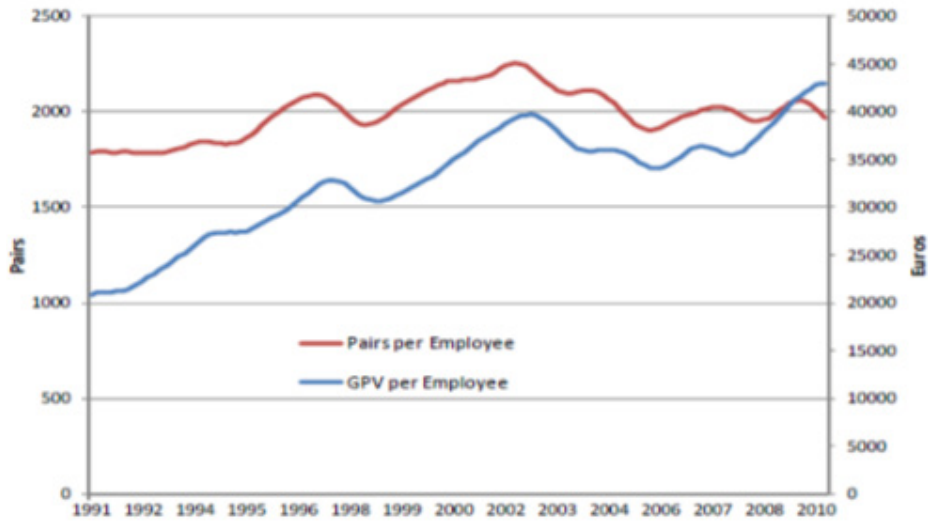


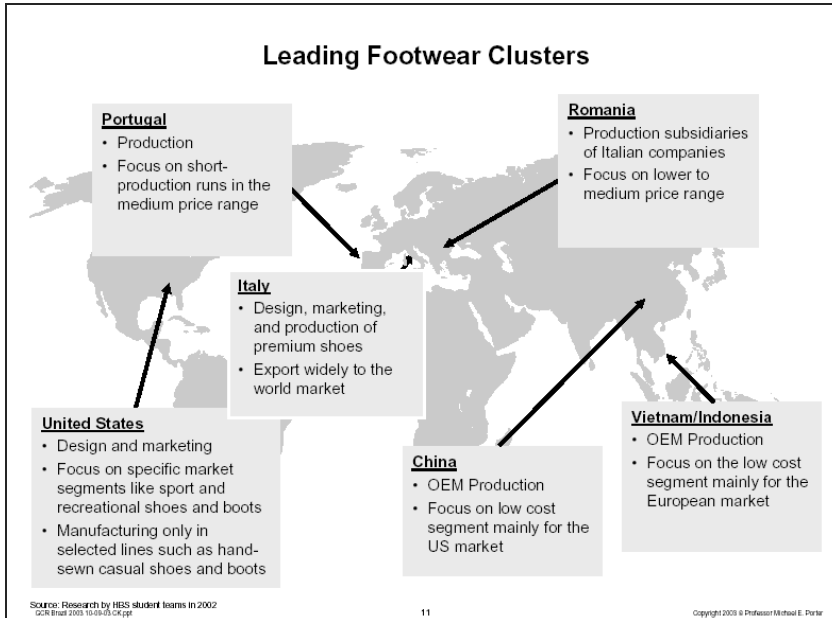
Figure 10. Footwear production per employee (1991–2010)

Source: APICCAPS, Footwear Components and Leather Goods, 2011, Statistical Study.
http://www.adi.pt/docs/ADI_Footwear.pdf

When we analyzed the contents of these R&D projects in more detail, we found that „automation“ is generally associated with a demand for „flexibility“. One of the core instruments in this process was the development of flexible automated „water jet cutting“ equipment which was integrated into a growing number of software applications, beginning with CAD, by CEI Industrial Equipment Company, which replaces the metal blades and cuts a large number of equal-sized pieces of leather in a single movement. This “water jet” cutting technique, which developed out of the cutting of composites in the North American aviation industry and was „recreated“ with the characteristics of our footwear industry in mind, has afforded us the benefit of many advantages:

- Savings on investments in cutting tools;
- Reducing the degree of raw material waste, which is particularly suitable for specializing in footwear made from natural leather (which is more expensive and has non-homogeneous characteristics thus becoming more challenging to optimal cuts);
- Making the production of small series easier, increasing efficiency by taking advantage of the downtimes caused by having to change cutting tools;
- Enabling a quick response to customer orders; this is particularly important for specializing in a variety of short-lifecycle fashion products, with particular emphasis on women’s shoes.

The Portuguese industry has managed to survive the „steamroller“ of low – cost competition from China by playing on its competitive edge in terms of its „proximity“ to European markets, adding value by providing an efficient service.



Source: Porter, M. (2003), *Microeconomics of Competitiveness. Conceptual framework*, in Abrantes, LN "Internationalization Strategy for Portuguese footwear companies", UCP, Porto, 2004.

Figure 11. Leading Footwear Clusters

Source: APICCAPS, Footwear Components and Leather Goods, 2011, Statistical Study. http://www.adi.pt/docs/ADI_Footwear.pdf

The ability to respond quickly to small orders has become a differentiating factor in the face of competition from countries with cheaper manpower, even as regards products where the large initial order has been made to China, gambling on the „reassortment“ market by taking advantage of price opportunity.

Table 1 summarizes the results of the Community Innovation Survey (CIS) for three different periods. The first survey (1996 – 98) shows the poor results of R&D projects, which only began to become relevant in the industry in the 1998 –2000 survey. In the year 2000, there were thirty companies with water jet cutting systems installed 2, while four years later, this number had risen to 150% . During this first period, investments in footwear innovation were focused on two goals in particular: to cut costs (particularly the costs of materials and manpower) and to improve the quality of production. Between 1998 and 2000, the cost –

cutting goal fell dramatically and there was a rise in the importance of increased flexibility of production and the diversity of the product range (associated with it). During the most recent period (2006 – 08), these innovation objectives continued to be viewed as „very important“ in relative terms, based on quality and costs. The importance of innovation and the goals related to product innovation (the first three goals shown on Table 1 below) and image sustainability also increased.

Table 2. *Footwear Industry: % of companies with innovation activities that view innovation as “Very Important”*

Innovation objective	Inquiry on Innovation		
	CIS2	CIS3	CIS6
	1996-98	1998-2000	2006-2008
Substitution of products at the end of cycle	15,7	n.i	21,8
Expand the range of products in the market	17,6	31,5	28,6
Enter new markets or increase investment in the market	17,6	11,8	27,3
Improve the quality of the product	58,4	26	46,2
Increase the flexibility of production	24,5	37,9	38,1
Increase the capacity of production	n.i.	20,6	30,6
Reduce the cost of manpower	41,6	19,7	35,9
Reduce the consumption of energy	8,8	0	25,1
Reduce the consumption of materials	51,8	0	27,8
Reduce environmental damage	10,2	0	31,5
Comply with regulations or rules	24,5	19,7	31,2

Source: CIS – Inquiry on Innovation, Disaggregated special inquiry of the footwear sector, Office for Planning, Strategy Assessment and International Relations / Ministry of Science, Technology and Higher Education. Concluded by Adi. http://www.adi.pt/docs/ADI_Footwear.pdf

The graph below confirms the growing importance of product innovation during the third phase of footwear innovation, as already suggested by the data in Table 2, with the increase of innovation in materials technologies. The XXI century has already seen a significant rise in the “registration of models” in the footwear industry, which peaked in 2008.

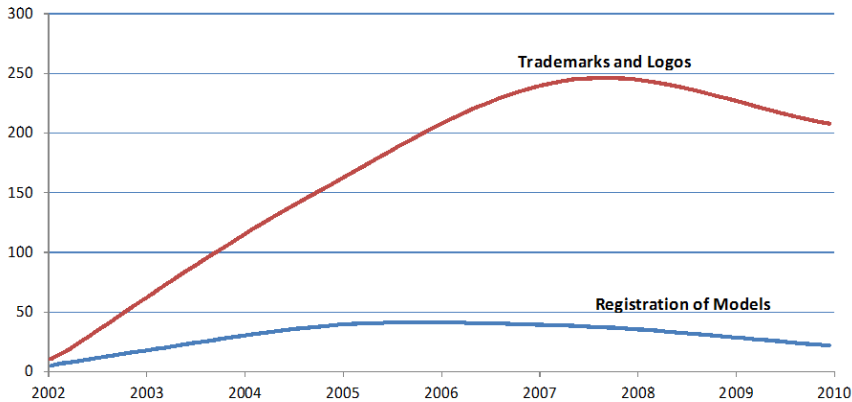


Figure 12. Portuguese footwear industry improved its competitiveness through R&D Number of Requests for registration field with GAPI/CTCP (2002 – 2010)

Source: APICCAPS, Footwear Components and Leather Goods, 2011, Statistical Study. http://www.adi.pt/docs/ADI_Footwear.pdf

The flexibilization of the manufacturing process, which automation brought with it, subsequently made product innovation easier and the production of small series has become more competitive.

2.2.2. Portuguese Cork sector Cluster¹⁷

Portugal is the largest exporter of cork in the world. In the last decade, its share of world exports increased significantly, namely 57.6% in 2001 and 61.3% in 2010. The main product exported is cork stoppers for wine bottles (67%) which are subject to fierce competition with other closures and have lost market share.

APCOR (The Portuguese business association for the cork sector) guarantees that “wineries that have used alternative closures are returning to cork because they were not satisfied with their performance,” cited by “i” newspaper on December 29, 2011, adding: “investing in research in this field ultimately dictates regaining the market.” Since the 1990s, Agência de Inovação (the Portuguese official innovation agency) has approved 27 R&D projects with applications in the cork sector. As Chart 1 below shows, 67% of the projects were directed to the manufacturing of wine bottle stoppers. These projects have provided results ranging from machines for cork stoppers producers, automation of manufacturing processes, to the chemical processes to lower TCA (Tricloroanisol) and reduce “off – flavours” in the wine.

¹⁷ ADI, Portuguese Cork industry, Lisbon 2011.

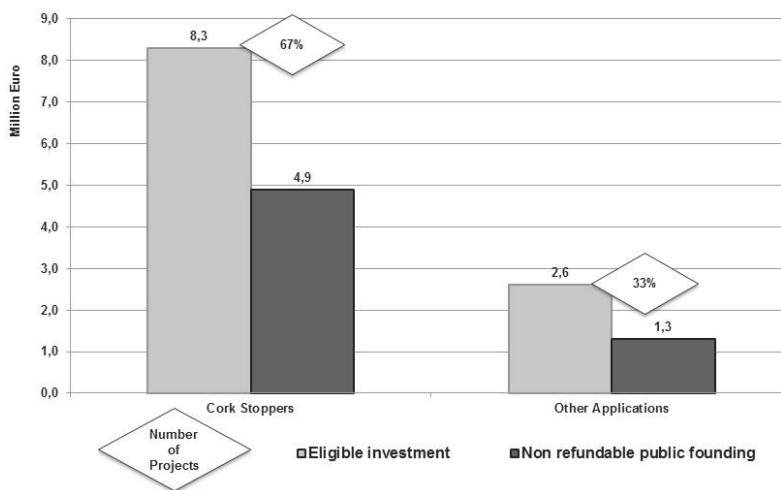


Figure 13. R&D projects approved by Adi with applications in the cork sector – eligible investment, public support and distribution of number of projects

Source: Adl, <http://www.adi.pt/docs/ADICork.pdf>

“Sales of Cork Finished Wines Continue to Increase It has been eighteen months since the Cork Quality Council began tracking sales by closure type for the Top 100 Domestic Premium Wine Brands. This category consists of domestic Table Wine Brands with an average retail price over \$6 per bottle. The comparison of sales performance within this group has revealed a consistent pattern of increased volume and revenue for wines finished in with cork closures. The most current Nielsen Survey for the four-week period ending September 17, 2011 shows that sales from the Top 100 Premium Brands posted a slight decline (-0.9%) from 2010. Within this category, sales from wines with cork finish were up 7.7%. Wines using alternative closures posted sales -11.9% below last year’s performance. The net effect of sales activity has brought a change in the business mix for the Top 100 Premium Wine Brands—from 56% cork in 2010 to 61% in the current period. Though cork finished wines have a slightly higher “same-brand” sales growth than wines with alternative closures, the most important reason for the shift in favour of cork closures is due to changes in product mix. The number of SKU’s in the Top 100 Brands show a 5.5% increase for those finished with cork and a -15.4% decline for items finished with alternative closures”¹⁸

¹⁸ R&D in the cork sector, Case Study - 16 February 2012, URL: www.peprobe.com/library/search-themes/all-thematics/95-cork/1846-rad-in-the-cork-sector#see_doc (downloaded on December 20, 2012).

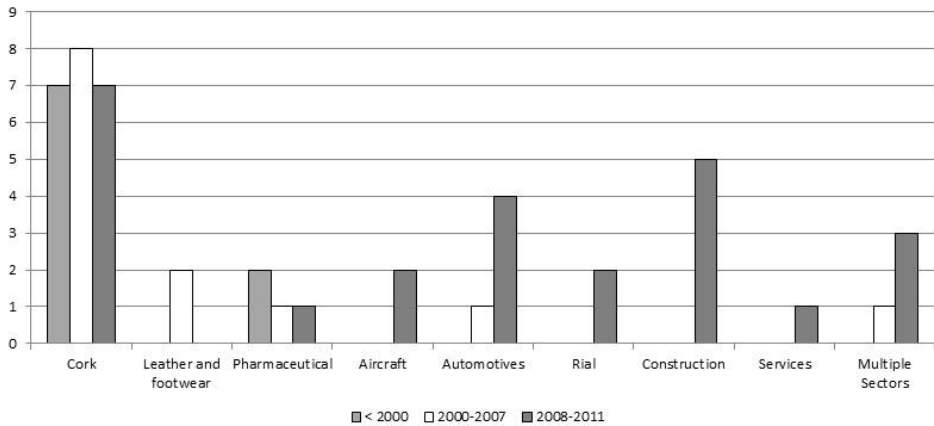


Figure 14. Number of projects with the participation of cork companies by application sector and year of application

Source: Adi, December 2011, <http://www.adi.pt/docs/ADICork.pdf>

In addition to these projects whose market application is the cork sector, cork companies are investing in projects for other areas of application in order to diversify the markets. This diversification movement has accelerated in recent years as shown in Figure 14 above. Cork companies seem to be focusing on creating products with higher added value.

They aim to develop products from cork or cork waste to produce clean, lightweight materials, with high capacity of thermal and acoustic insulation applied in various industrial sectors including aircraft, ground transportation and construction.

The chemical properties of certain components of cork can be used in the pharmaceutical industry and its absorbent properties also contribute to minimizing the effects of pollutant spills.

Final remarks

First of all one has to stress that this analyzes do not take into consideration regional approach, There is no regions in Portugal so innovation policy as well as policy in generally speaking are defined in a centralized way. This justifies the sector approach followed in the article.

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Bogumiła Kowalska*, Ewa Bojar**

3. Innovation Policy in France. Dynamics of Innovation Evolution

3.1. The Main Goals and Assumptions of the Current Development Policy and the Policy on Innovation Adopted by the Government

France with its economic potential is the fifth economic power in the world following the USA, People's Republic of China, Japan and Germany. France is also the world's fourth biggest investor and the third biggest recipients of foreign investments. The major strengths of the French economy include well-developed defence, aviation, and automobile industries, nuclear power engineering, resilient sector of hi-tech production technologies, modern service potential, and diversified agriculture.¹⁹ The French Government is carrying out the Stabilization Programme for 2011-2014 which aims to achieve a balanced budget, social benefits cuts, and increase innovativeness of the French economy. As regards sectoral policies which shall be implemented in the next programming period 2014-2020, France announced further support for the research-and-development sector and development of innovation. The government also intends to support the research carried out by a wide spectrum of private entities, development of entrepreneurship, in particular development of the SME sector, e-commerce, as well as the re-industrialization and revival of brownfield sites.

In France, the first efforts to stimulate development of innovation and highly advanced technologies were undertaken as early as in the 1970s. This resulted in an urgent need for funding of innovative processes and development of the institutional environment supporting innovation activity of small and medium-sized enterprises. However, in the 1980s the process of decentralization of innovation policy was initiated. This decentralization was associated with a more direct nature of the support aimed at strengthening small and medium-sized businesses, by supporting the dynamics of their development and assistance to meet technical requirements produced by the changing environment they operated in. The pro-

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¹⁹ A brief information on France and economic cooperation with Poland, Ministry of Economy, 2012.

cess of decentralization of innovative policy has also brought about a significant increase in the number of institutions providing more and more efficient and effective support to small and medium-sized enterprises.²⁰

In 2007, the European Commission, in consultation with the French Government, encouraged each of the 26 French regions to develop regional development strategy aimed at increasing the efficiency of European investments in research and innovation and improve both the efficiency and effectiveness of support to enterprises delivered under various programmes implementing the EU cohesion policy. Presently, developed policies are implemented in the French regions.

The essential elements of the French innovation policy are included in the National Reform Programme for the implementation of the Lisbon Strategy at the national level. The report for 2005-2008 proposed various forms of support to family-owned businesses in order to increase their competitiveness and encourage cooperation with enterprises from other European countries. Modern French industrial policy is based on the projects initiated by the state, businesses and regions, and the combination of their potentials at the national level.

The National Reform Programme for 2008-2010 envisaged that the objectives connected with sustainable growth, innovation and business development would be achieved through the transfer of knowledge to enterprises in order to stimulate and sustain their innovativeness. This knowledge would be the result of the reformed research policy implemented by specialized government agencies.

The innovation policy in France was designed to ensure successful implementation of the Lisbon Strategy which requires continuous efforts to improve the functioning of innovation-oriented institutions. To a large degree these institutions are responsible for the flow of knowledge and innovation inside the system. Innovation-oriented institutions should primarily act as intermediaries between the science and business. They should also encourage and stimulate cooperation between enterprises.

The French National Reform Programme is based on the assumption of 'social growth' and the following three priorities: [1] creating conditions conducive to stable and continuous economic growth, [2] reduction of unemployment and development of labour market, and [3] building the knowledge-based economy. The programme also emphasizes the need to rectify public finances and increase competitive advantage of enterprises.²¹

The National Reform Plan aims to increase private investments in research and innovation and improve the efficiency of publicly funded research projects in order

²⁰ Rokita-Kwietniak I, *Strategia rozwoju innowacji w krajach unii europejskiej na przykładzie Polski i Francji [Innovation Development Strategies in the EU States – An Example of Poland and France]*, URL: www.euroinfo.krakow.pl (downloaded on January 20, 2013).

²¹ *Ibidem*.

to support the dissemination of innovation in the French economy. The program also provides tools such as the simplification of labour laws, tax allowances, better access to finance, diffusion of information and communication technologies, allocation of substantial resources for territorial development and the development of transport and energy infrastructure. Research, innovation and industrial policy are the foundations of the French National Reform Programme.

The French Government tends to engage substantial financial resources in big technological programmes. Therefore most public funds allocated for research and innovation development are absorbed by big French industrial groups. At the same time the scientific merit of such projects is frequently questioned in scientific circles.²² Moreover, the support for innovation is focused on the development of the RAD sector. The French tax system favours research-and-development activities guarantying return of up to 50% of expenditures on research and development. Furthermore, OSEO, one of the public banks supporting small and medium-sized enterprises in France is a key player in the field of innovation supporting important technological innovation projects.

Table 3. *Examples of government institutions supporting development of innovation in France*

Institution name	Brief characteristics
<i>Agence nationale de la recherche (ANR)</i>	ANR was established on February 7, 2005 to finance various research projects. According to its mission, activities performed by ANR are addressed to public research units as well as entrepreneurs. The ANR's mission includes activities supporting the creation of new knowledge and encouraging cooperation between public laboratories and laboratories owned by private enterprises, in particular encouraging the establishment of public-private partnerships in order to carry out research projects. In 2005, ANR received over 5,600 applications for funds and allocated approx. 800 million EUR in subsidies supporting various innovative projects and partnerships between public and private research institutions, especially projects carried out within the framework of so-called 'poles of competitiveness'.
<i>Fonds de compétitivité des entreprises (FCE)</i> [Enterprise Competitiveness Funds]	Enterprise Competitiveness Funds support industrial research-and-development projects carried out by enterprises. The support is not conditioned on the size of applying entrepreneur. Enterprise Competitiveness Funds are one of the most important instruments supporting projects carried out within the framework of 'the poles of competitiveness' and Eureka Clusters (big, long-term strategic programmes worked out and presented by the European representatives of industry sectors, approved and co-financed by the state governments, and enterprises which make up the cluster).

²² The French system of innovation management, Innovation Portal: www.pi.gov.pl (downloaded on February 2, 2011).

<i>Agence de l'innovation industrielle (AII)</i> <i>[Industrial Innovations Agency]</i>	Industrial Innovations Agency was founded on August 30, 2005, in order to support big innovative industrial projects. The Agency announces tenders for big, medium term projects, co-financed by entrepreneurs in accordance with binding EU regulations, which require significant RAD resources.
<i>Group OSEO</i>	OSEO is a group of companies which support the development and implementation of innovation in the SME sector, including co-financing, guaranty schemes, on-line services and studies on the SME sector. OSEO Anvar provides small grants for innovative projects carried out by small and medium-sized enterprises.

Source: Worked out by the author

Building clusters based on the poles of competitiveness creates a kind of local production systems (systemes productifs locaux - SPL) in which local small and medium-sized enterprises cooperate with the global giants. The state and regional authorities provide them with the necessary physical infrastructure such as road and railway transport infrastructure, airports, scientific resources, research-and-development infrastructure, laboratories, business centres, technology parks, office space, etc.

Instruments stimulating innovation in enterprises include as follows:²³ a possibility of setting up single-shareholder companies investing in high-risk undertakings so-called 'Business Angel' [Société Unipersonnelle d'Investisseurs a Risque]; modernized Mutual Innovation Investment Funds [Fonds communs de placement innovation – FCPI]; SOFARIS offering guarantees for innovative projects carried out by small and medium-sized enterprises; Alternext, an equity trading market; tax exemptions for entrepreneurs investing in research and development available under The 2004 Finance Act; tax credit for research [Crédit d'impôt recherche – CIR].

The most interesting idea to renew and revitalize the French industrial policy are the poles of competitiveness [pôles de compétitivité] which are the central part of the French National Reform Programme – Priority 3.2 Renew and revitalize industrial policy. It is a combination of industrial policy with territorial logic. The poles of competitiveness bring together entrepreneurs, research centres and training institutions, both private and public ones, around joint innovative projects characterized by high added value.

The Inter-ministerial Committee for Territorial Development and Growth – CIADT [Comité interministériel d'aménagement et de développement des territoires] in September, 2004, a call for proposals for the projects connected with

²³ Rokita-Kwietniak I., Strategia rozwoju innowacji w krajach Unii Europejskiej, URL: <http://pldocs.docdat.com/docs/index-49132.html> (downloaded on January 20, 2013).

competitiveness poles. 67 out of 105 proposals were selected for financing. Most of submitted proposals concern nationwide competitiveness poles, 6 global and 9 are projects aiming to build the global poles of competitiveness. The first contract were concluded on 14 October, 2005.

The French industrial policy is not limited to supporting scientific progress and innovation, but it also attaches a great importance to the prediction of future crisis and identifying threats to the country's economy. This policy takes also into account the industrial transformations occurring during the restructuring of territories. In this respect, the National Reform Programme provides for constant monitoring of changes occurring in particular sectors of industry, valorisation of industrial professions, and increasing the competitiveness of French products on foreign markets.

The Pact for Research [Pacte pour la recherche] is an ambitious action plan of the French Government aiming to ensure the highest quality standards of research carried out in France in the face of growing international competition. The main 6 goals of the plan are as follows:

1. Enhancing the capacity to define strategic directions and priorities of research in France.
2. Development of a uniform, coherent and transparent research evaluation system.
3. Facilitating cooperation between the main research-and-development institutions in order to ensure a better and more efficient use of available resources.
4. Creating incentives to make scientific careers more attractive.
5. Supporting research carried out by enterprises and encouraging development of close cooperation links between public and private research institutions.
6. Integration of the French system in the European research space.

The legislative framework for the Pact for Research was laid down by the Act of 18 April 2006. The Act determined the objectives to be reached by 2010 and provided corresponding funding for the implementation of scheduled activities in 2006 and 2007. The funds assisted mainly public research, however some funds were assigned to support the enterprises in carrying out research projects which translated into economic growth and new jobs in the French economy.

3.1.1. The Impact of Central Policy Instruments on Regions.

The Evolution of French Innovative Enterprises Networks

As pioneers in the field, French companies have adopted the practice of open innovation as early as at the end of the twentieth century. They got involved in the

internationalization of research and development since the late 80's, first in Europe and in the United States, and from 2000, in some developing countries. In 2012, among the 10 most innovative companies in Europe as many as 6 companies were French companies, three from the UK, and only one was based in Germany, the largest economy in Europe.²⁴

ARM Holdings (Great Britain, 10th position in the ranking). ARM Holdings is a British multinational semiconductor and software design company. Interestingly enough, this one of the most innovative companies in the world, unlike other microprocessor corporations such as AMD or Intel, ARM only licenses its technology as intellectual property rather than manufacturing its own central processor units.

1. Pernod Ricard (France, holding 15th position). Pernod Ricard, which is the owner of several brands of spirits, including Absolut, Becherovka, whisky Chivas Regal and vodka Wyborowa, is an extremely innovative company which may be likened to many technological start-ups in Silicon Valey (for example Breakthrough Innovation Group – BIG). Pernod Ricard attaches a great importance to the perception of its products by the customers. The company carries out continuous research on the customers expectations and modifies its products accordingly.
2. Danone (France, 25th position). In 1920, Danone has decided to popularize yoghurt in Western Europe. Today, it goes back to the tradition, developing a business model focused on health. The company is introducing constant changes in its product line and packaging.
3. Essilor (France, 28th position). It is estimated that a half of the world's population has vision problems and almost 2.5 million has no access at all to vision correction devices. The French optical concern is dynamically developing its presence in Colombia, the Dominican Republic, Marocco, Turkey, Brazil and Russia.
4. Reckitt Benckiser (Great Britain, 30th position). Reckitt Benckiser is the owner of many leading brands, including Finish, Vanish, Airwick, Cillit Bang, Harpic, Woolite, Calgon, Bryza, Lovela, Scholl, Durex, Veet, Strep-sils, and Nurofen. In 2012, the concern invested in developing its leading brands over 100 million USD.
5. Diageo (Great Britain) owns several leading world brands, for example Johnnie Walker and Guinness. The company has plans to invest 1.5 billion USD over the next 5 years in Scotch distilleries.
6. L'Oreal (France). In 2011 alone, L'Oreal was granted 613 patents. 96% of waste produced by the company is recycled or used to produce energy.

²⁴ Sharf S., The list of top ten most innovative firms in Europe, Forbes, September 24, 2012.

7. Beiersdorf (Germany). The Beiersdorf 's laboratory in Hamburg, which is involved in skin research, employs over 450 scientists and researchers.
8. Dassault Systems (France) developed the 3D design software used by many leading corporations, including BMW, Boeing, Ford, Guess, GE and Honda.
9. Technip (France). Technip has a fleet of specialized vessels used to construct underwater pipelines and other structures.

3.1.2. Towards the Third Generation Innovation Policy in France

In response to the new approach to innovation and innovation policy of the third generation that is emerging in France, a number of new tools are implemented without removing the old ones. In this way, multiplied options are available to the players of the innovation ecosystem which enables them to better adapt to the challenges of economic development based on innovation: the challenge of coordination, internationalization and competitiveness.²⁵

Upon evaluation of the first phase/generation innovation policy, which covered a period of 2006-2008, France allocated 1.5 billion € under the second phase/generation innovation policy (so-called Pôle 2.0), implemented in the years 2009-2012, to the following priorities:

1. Animation and strategic pilotage of competitiveness poles.
2. Development of structural projects, including 'innovation platforms'.
3. Development of the 'innovation ecosystem' and increasing the number of enterprises in the poles of competitiveness (pôles de compétitivité) by mobilizing private funds and strengthening territorial synergies.

The third phase of innovation policy, which was launched by the French Government on January 9, 2013, is based on the evaluation report for the period 2009-2012 submitted to the Government on June 19, 2012, and the results of public consultation held between June 20th and September 2012. This phase will last six years (2013-2018) and its mid-term evaluation is planned. In particular, the third generation innovation policy is focused on the economic performance of supported competitiveness poles, the continuation of research-and-development projects and their commercialization.

The main challenges and instruments of the national third-generation innovation policy in France include: the poles of competitiveness [pôles de compétitivité] in the field of higher education, research and research networks, development of research and technological innovation networks in public-private partner-

²⁵ A synthesis worked out by the DIACT and DG REGIO working groups on innovation, Debate on the National Strategic Reference Framework and development of operational programmes implementing the EU regional development policy covering the years 2007-2013, March 2006.

ship (ANR), greater integration of the French system with the European space, industrial innovation agency (global scale, inter-government coordination, competitiveness), 6 poles of global competitiveness, and establishing the National Council for Science and Technology.

The main regional challenges to the processes of dynamic competition are as follows:

- the establishment of regional development and innovation agencies,
- 9 poles of the future global competitiveness [vocation mondiale],
- 51 nationwide poles of competitiveness [pôles de compétitivité],
- labels Carnot,
- the establishment of funds offering support to entrepreneurs on competitive terms and conditions,
- encouraging partnerships between big and small and medium-sized partnerships to carry out joint research-and-development projects,
- financial assistance to innovative small and medium-sized enterprises, especially by OSEO,
- creation and development of effective networks of organizations supporting enterprises in incubation phase.

Activities supporting innovation carried out at the regional level in line with the third generation national innovation policy are organized around the following axes:

- The implementation of the regional strategic thinking supported by the coordination by local actors and their European and domestic partners. Benchmarking, forecasting and evaluation of economic and social effects of innovative undertakings are the main tools used by the regions.
- The transformation of enterprises and improvement of competences through lifelong learning in order to meet emerging challenges in the field of innovation.
- Development of innovation, in particular through the creation of business networks and clusters, local production systems, and development of regional venture capital companies.
- Environmental protection, development of environmental technologies, promotion of energy produced from renewables, e-commerce.
- Integration of risk and culture of innovation.
- New economic coordination mechanisms are now implemented. They should promote the competitiveness of many companies with diversified business goals but grouped in the same pole of competitiveness or around a single project. For example, competitiveness poles [pôles de compétitivité] as a result of cooperation between the science and business in the field of high-tech industrial production technologies are able to create local resources and thereby form a relatively stable ecosystems which can effectively mitigate the global risks.

The concept of ‘competitiveness poles’ (pôles de compétitivité) which appeared in France’s regional policy in 2004 was an innovative solution. The poles of competitiveness have been established at the initiative of the French Government with the aim of creating specific networks of businesses, research centres and training institutions grouped around the joint innovative projects to take advantage of the synergies of joint activities. Since competitiveness poles are a key component of the innovation system at the regional level, they are supported through various subsidy schemes, tax allowances and exemptions, as well as other incentives and supporting measures, which attracted many small and medium-sized enterprises. Until now as many as over 1,500 innovative projects seeking financial support have been submitted. More than half of them were approved for implementation and the French Government allocated 946 million EUR in financial assistance to entrepreneurs in addition to 512 million EUR committed by local authorities (OSEO 2009). The popularity of competitiveness poles with small and medium-sized entrepreneurs, as well as tangible effects of this innovative initiative have caused that the French Government decided to allocate additional funds to support the development of competitiveness poles. In 2009-2011, in total 1.5 billion EUR have been allocated to subsidize activities of competitiveness poles in France. A significant portion of these funds has been earmarked for innovative projects financed by the inter-ministerial fund FUI, designed for competitiveness poles [pôles de compétitivité].

The poles of competitiveness [Pôles de compétitivité] are an effective instrument for creating synergy effects resulting from cooperation between industry, scientific research and higher education. However, there are too many of them now (71) and therefore they are encouraged to consolidate and simplify their management. The real unity of place on the model of German industrial basin or Californian clusters is a key element of success of the French competitiveness poles.²⁶

Since their creation the poles of competitiveness have been classified according to the following three categories: the nationwide competitive poles (53 poles), the future worldwide competitiveness poles [à vocation mondiale] (11 poles), and the global poles of competitiveness (7 competitive poles).²⁷

According to this classification the worldwide competitiveness poles are: Aerospace Valley, Finance Innovation, Lyonbiopôle, Medicen Paris Région, Minalogic, Solutions communicantes sécurisées, and Systematic.²⁸

²⁶ Ferrand O., Schweitzer L., Investir dans l’avenir. Une politique globale de compétitivité pour la France, www.tnova.fr - 2/29.

²⁷ Evaluation des pôles de compétitivité, Technopolis Group-ITD, BearingPoint France SAS-Erdyn, 2012.

²⁸ Ibidem.

The future worldwide competitive poles [à vocation mondiale] are: Alsace Bio-valley, Axelera, Cap Digital Paris Region, i-Trans, Images & Réseaux, Industries & Agro-Ressources, Mer Bretagne, Mer PACA, Mov'eo, and Végépolys.

Domestic competitiveness poles [Pôles de compétitivité] include: Advancity, Agrimip Innovation, Aquimer, Arve Industries, ASTech, Atlanpole Biotherapies, Cancer-Bio-Santé, Capenergies, Céréales Vallée, Cosmetic Valley, Derbi, Elastopôle, Elopsys, EMC2, Eurobiomed, Fibres Grand'Est, Filière équine, iDforCAR, Imaginove, Industries du commerce, Lyon Urban Truck&Bus, Materialia, MAUD, Microtechniques, Nov@log, Nucléaire Bourgogne, Nutrition Santé Longévité, Optitec, PASS, Pegase, Plastipolis, Pôle Européen de la Céramique, Pôle Européen d'innovation fruits et légumes, Pôle Risques, Qualiméditerranée, Qualitropic, Route des lasers, S2E2 - Sciences et Systèmes de l'Énergie Électrique, Techtera, Tenerrdis, TES - Transactions électroniques sécurisées, Trimatec, Up-TEX, Valorial, Véhicule du futur, Viaméca, Vitagora, and Xylofutur.

Despite recommendations contained in the report developed as a result of evaluation carried out in 2008, the classification of competitiveness poles has not been modified since 2005. The evaluation report proposed to abandon the category 'à vocation mondiale' and classify the poles of competitiveness either as global poles of competitiveness or nationwide poles. Today, the classification of competitiveness poles is often criticized by all players, i.e. the poles themselves, public administration and communities claiming it is obsolete.

The following are examples of industries represented by competitiveness poles [pôles de compétitivité]:

- Axelera (Lyon): green chemistry and the environment.
- Arve-Industries Haute-Savoie Mont-Blanc (Cluses): Precision metal machining and mechatronics.
- Imaginove (Lyon): multimedia and video games.
- Lyonbiopole (Lyon): health, bio-chemistry, sanitary protection.
- Lyon Urban Truck & Bus (Lyon): public transport.
- Minalogic (Grenoble): micro- and nanotechnologies and software.
- Plastipolis (Oyonnax): plastics.
- Sporaltec (St Etienne): sport, recreation and health.
- Techtera (Lyon): textiles.
- Tenerrdis (Grenoble): new technologies in power engineering.
- Trimatec (Pont St -Esprit): nuclear technologies.
- Viameca (St-Etienne): transport, industrial equipment and devices, advanced technologies.

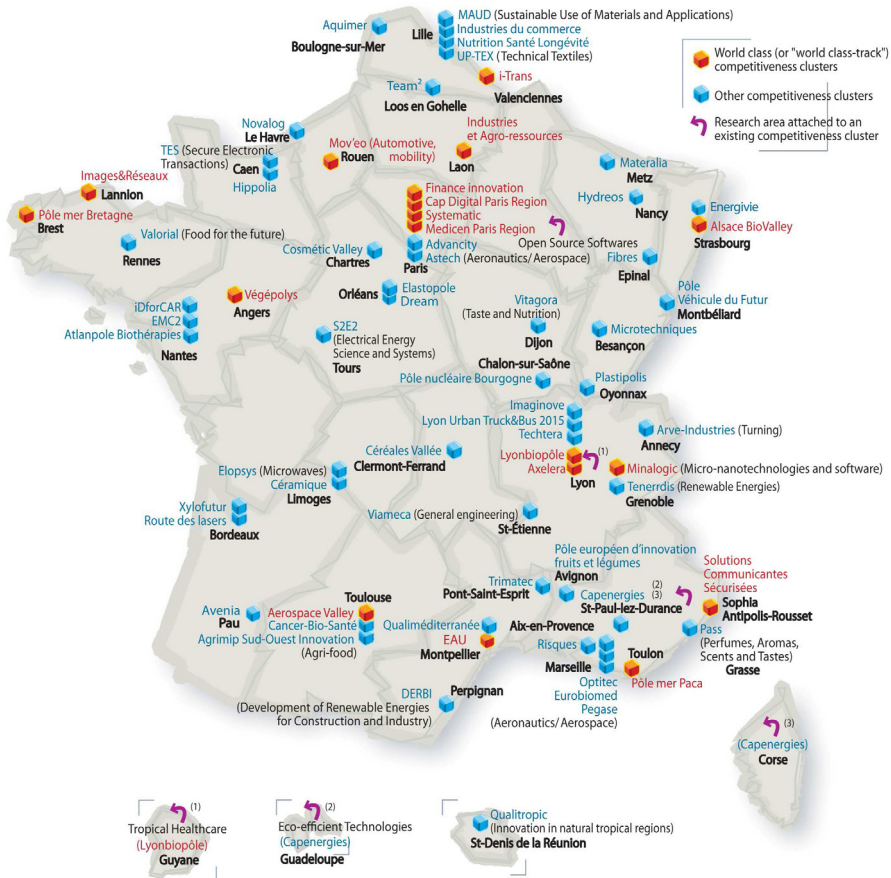


Figure 15. Map of competitiveness clusters

Source: DGCIS/DATAR (February 2013); http://competitivite.gouv.fr/documents/commun/Documentation_poles/cartes-poles/carte-pole-eng.pdf

3.1.3. Financing Innovative Development in France

Current structural funds interventions in the field of innovation are insufficient both in terms of the amount of allocated funds and the diversification of supporting instruments.

The OSEO group is particularly noteworthy project. The group was established in 2005 and resulted from the merger of the National Agency for Innovation (ANVAR), the Bank for Development of SMEs (BDPME) and the Agency for SMEs (Agence des PME). The OSEO group was created to form a comprehensive, one-stop shop offering support to small and medium-sized enterprises. The group

consists of the following three subsidiaries: OSEO Innovation, OSEO Financing and OSEO Guarantee²⁹. The OSEO group is involved in the following three areas of activity, all addressed to small and medium-sized enterprises: innovation support and funding, including support to innovative projects, technology transfer, assistance in setting-up innovative companies, providing guarantees for bank loans and equity contributions, and providing investment funds. The OSEO group has 25 regional branch offices in France which makes its offering readily available to entrepreneurs, potential beneficiaries. In order to better serve the changing needs of entrepreneurs and meet their expectations, the group is constantly adjusting offered services. Moreover, since its merger with the Agency for Industrial Innovations [Agence de l'innovation industrielle] in 2008, the group also offers support to big companies.

The European Commission and the European Investment Bank developed the Risk-Sharing Finance Facility (RSFF), a new innovative loan finance instrument supported by the Seventh Framework Programme, which offers loan finance for research, development, demonstration and innovation in EU member states and FP7 associated countries. RSFF supports riskier but creditworthy RDI projects through risk-sharing between the European Union and the European Investment Bank. This joint initiative of the EU and the EIB has opened new possibilities of financing innovation in French companies, supported by the OSEO group.

The project 'Carnot' [label 'Carnot'] is the most recent initiative which purpose is to encourage and support the development of so-called partner projects. Under the project in the years 2006-2007, the funding was assigned to 33 research structures. Typically the funds are granted for a period of four years to encourage cooperation and joint projects carried out by public research centres and enterprises.

Presently, the most important instrument supporting development of small and medium-sized enterprises are technological and scientific parks. The first technological and scientific parks in France were established as early as in the 1960s. In Poland, technological and scientific parks appeared in the early 1990s along with political and economical transformations following the collapse of the state-controlled socialist economy. Science and technology parks facilitate entrepreneurs access to innovative solutions. Besides business incubators and technology transfer centres, science and technology parks create institutional framework for commercialization of scientific research, cooperation and joint research-and-development projects, and technology transfer, which otherwise would be more difficult and arguably less intensive (Marciniak B.M. 2007). In France, a significant correlation between the

²⁹ Czech K., Infrastruktura instytucjonalna w procesie wspierania działalności innowacyjnej MŚP we Francji – wnioski dla Polski, Chapter 12; [in:] Kopycińska D. (ed.), Ekonomiczne problemy funkcjonowania współczesnego świata, University of Szczecin, Szczecin, 2009.

development of the SME sector and the operation of scientific and technological parks, was observed as early as in the 1970s. In particular, it was observed that scientific and technological parks, which in France are called ‘Technopolises’, have an immense impact on the development of competitive advantage of French small and medium-sized enterprises. Similar effects are also observed in Poland where science and technology parks, being non-government organizations supporting innovation, are an essential component of the government’s policy on innovation. Lessons learned from the French policies on innovation, in particular observations of the French Technopolises, can help avoid many potential threats and wrong decisions.

3.2. The Val d’Oise Region – An Example of Good Practice³⁰

France provides quite a few examples of successful cooperation between government, industry and academia in many regions according to the triple helix model. This is an unquestionable result of mature and well designed policy of the French Government implemented with the strong support from the regional authorities.

Experiences of the French region of Val d’Oise are especially worth popularizing. The proximity to the Paris metropolis has attracted many companies to the region. The region was able to stimulate effectively the development of cooperation links between local small and medium-sized enterprises and big international corporations like Delhi, Nielsen, Eads, General Motors, Yamacha, Huawei, Morpho, and BP Frame. These companies have brought into the region significant capital and other material resources, most recent technologies and modern management methods. Trans-national corporations based in the region of Val d’Oise significantly support research-and-development works and modern products developed and manufactured in cooperation with regional small and medium-sized enterprises find customers in many countries. These regional cooperation platforms were crucial to the regional growth and have significantly contributed to enterprise development in the Val d’Oise region and the prosperity of its inhabitants. The foundations of this cooperation are clusters, constantly developed cooperation networks, which in French literature are also called the poles of competitiveness.

In the Val d’Oise region there are a dozen or so operative clusters/competitiveness poles, including System@TIC (software and complex systems), Medicen Paris Region (health and bio-technologies), WPR DIGITAL Paris Region (image, multimedia and digital world), MOV’EO (road safety and sustainable transport), ASTECH Paris Region (aviation and outer space), Cosmetic Valley (cosmetic products), ELASTOPOLE (rubber industry and polymers), and ADVANCI-

³⁰ Wierzyński W., Region, który klastrami stoi, URL:<http://www.pi.gov.pl> (downloaded on February 20, 2011).

TY (ecological technologies and sustainable cities). Activities of these clusters are supported by so-called 'business parks'. In the Val d'Oise region there are 21 business parks which in total occupy approx. 3,000 hectares and employ over 1,000 specialists in many fields. Three of them have the status of Technopolis. With these solutions more than 100,000 new jobs have been created in the Val d'Oise region in the last twenty years which is the highest employment growth dynamics recorded in the French private sector (source: ASSEDIC).

An example of a typical cluster for the region of Val d'Oise is the cluster Moveo. The cluster was founded in 2006. Its main activities include transport systems (mainly mobile solutions and road safety), automobile vehicles (monitoring the impact of vehicles on the environment and development of the vehicles with reduced CO2 emission), and automotive technologies (mechatronics and development of electric cars, fast railway Intercity Express, energy storage systems).

The main task of the cluster is creating a lasting cooperation platform for big corporations and local small and medium-sized enterprises operating on the automotive market. In recent years the cluster had a lot of success. Since its establishment the cluster Moveo has accomplished over 200 innovative research-and-development projects of the total value of approx. 660 million EUR. The Val d'Oise region has a well-developed research-and-development infrastructure built by global corporations investing in the region, which combined with highly qualified and experienced researchers and helpful local administration, creates an excellent environment in which small and medium-sized enterprises and big international corporations can benefit from mutual collaboration.

3.2.1. Mechanisms of Cooperation Between Government, Science and Business

Public institutions such as regional authorities, business support institutions and government agencies can play a crucial role in initiating and encouraging clustering processes. In the Val d'Oise region the regional policy on clusters is coordinated by the Committee for the Economic Development of the Val d'Oise Region [Comité d'Expansion Economique du Val d'Oise – CEEVO]. The Committee was established in 1973 by the General Council of Val d'Oise [Conseil Général] which is the supreme administrative authority of the Val d'Oise Region responsible for the cooperation with entrepreneurs, organizations of employers, labour unions, central administration, and local government bodies. CEEVO which participates in all regional cluster-related initiatives turned out to be an extremely effective body supporting business development in the Val d'Oise region. In recognition of the quality of performed services, CEEVO was granted the ISO 9001 certificate covering all fields of performed business supporting activities. Its main activities are focused on attracting potential investors to the Val d'Oise region, strengthening

the industrial and technological character of the region, and developing cooperation networks between enterprises and scientific and research institutions, as well as on promoting the diversity of the Val d'Oise region.

Activities performed by CEEVO are especially valuable for local enterprises, seeking the possibility of international cooperation, as well as for foreign partners. CEEVO has developed a database of land plots, premises and office space offered for sale or rent which is available to potential domestic and foreign investors on its website. Moreover, CEEVO acts as an intermediary facilitating contacts between big companies and small and medium-sized enterprises, as well as with local authorities. The Committee organizes regular lectures and conferences as well as participates in many professional exhibitions in France and abroad. As a member of the European Association of Development Agencies (EURADA), CEEVO is involved in many activities carried out in collaboration with other economic development agencies in Europe and worldwide. Besides its main office in Cergy-Pontoise, the Committee CEEVO has an information centre at the Charles de Gaulle airport in Paris and representative offices in Japan (Osaka) and China (Shanghai). CEEVO's activities are the prime example of cooperation based on the triple helix concept.

The Val d'Oise region has achieved a spectacular success in attracting many big investors to the local economy and in encouraging cooperation between big concerns and local entrepreneurs. It wouldn't be possible without a well-designed cluster-based policy. The clusters constitute specific production systems in which local small and medium-sized enterprises cooperate with transnational corporations. The foundations of this cooperation are built by the Government and regional authorities which provide necessary material infrastructure (communication routs, airports, laboratories, scientific and RAD facilities, business centres, technological parks, office space, etc.).

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Other sources: www.competitivite.gouv.fr

4. The Evolution of Russian Innovation Policy

4.1. The Russian National Innovation System – development of innovation infrastructure

After few years of destruction in national economic system, disintegration of human resources and the disturbance of established linkages and networks, production and technology chains, in mid 1990s some first efforts to specify strategic policy objectives took place. They were accompanied with development of innovation infrastructure for the purpose of rebuilding bridges between scientific organizations and industry. Russian Ministry of Education and Science has started from organization of technology parks and centers for transfer of technologies countrywide mostly on the base of universities.

These objects of forming national innovation system were created primarily for budgetary funds and according to the main idea should have been, over time, to self-financing through fees from successfully implemented innovative projects. But most of them were not able to achieve high level of performance because of using predominantly „push technology” approach, in which it is not the end user of knowledge or new technology, who prioritizes research, but researchers themselves, while innovation remained a marginal activity for enterprises that faced economic and ownership-protection challenges. A study conducted in Russia in 2002-2005 in a frame of OECD project reviewing of innovation policy has clearly demonstrated the lack of public research organizations of real incentives and feasibility of commercializing them by scientific and technical results.

For example, due to a strictly targeted form of funding and restricted legal capacity, all government research and educational organizations were unable, of their own, to realize in practice (introduce) their intellectual products. Moreover, they are unable to create the operating economic entity that could put into practice the respective intellectual product. Taking into consideration the fact of dominating share of the government funding of R&D in Russia (Figure 16), the reason for lack of innovation activity in scientific part of Russian innovation system becomes clear. At that time and still at present the greater part of intellectual products (IP) is created

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from budget outlays to research and educational organizations with the legal status of a budget-supported organization or an organization of the state academy of sciences.

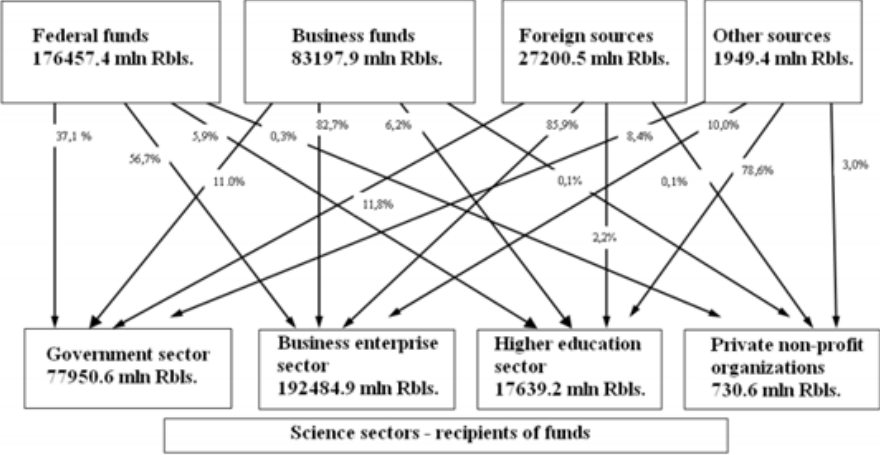


Figure 16. Breakdown of financing of research and development by science sectors: 2006
 Source: IMEMO RAS

From the time OECD study was published, much effort was devoted to creating a structured policy framework and efficient regulation. Thus, one of the important government initiative aimed at elimination of obstacles for innovation development in educational institutes was passing in 2009 the federal law (N.217) on setup of economic entities at educational institutes and research organizations. This law fills the gaps in the legal regulation of the relationships regarding establishment of economic entities by budget-supported research and educational organizations, by research and educational organizations of academies of sciences and vesting them the exclusive rights to the results of intellectual activity and receipts from their realization. Its main purport is to put into practice the research products created on the basis of outlays from the budget the rights to which belong to the budget-supported research and educational organizations.

For addressing these problems the mentioned Federal Law provides to the budget research organizations (including established by state academies of sciences) and to higher educational institutes, being budget organizations, the right to be founders (including together with other entities), without consent of the owner of their assets, of economic entities designed to introduce into practice the results of intellectual activity of which these research organizations are the exclusive owners.

Another big problem of innovation activity efficiency countrywide is regional polarization. Inside the Russian sector of research and development the scientific output is very uneven in the regional profile, which reflects the specific features of

localization of scientific organization. According to the information from database ISI for 1999-2004, by the level of article citations the leaders are Moscow and Moscow Region, Petersburg and Novosibirsk. Their share makes 81.8% of all citations. Other regions are significantly behind. Besides that, regions are characterized also by diverse business climate conditions, competition regimes, and availability of both innovation and regular infrastructures such as energy, transportation and logistics, healthcare, education, etc.

Beginning in 2006-2008 Russian government has gradually shifted from a distributed system of financing of innovative activities to a centralized, more easily controlled. In November 2008 “The Concept of Long-Term Socio-Economic Development of the Russian Federation for the Period Till 2020” (hereinafter – “Concept 2020”) was adopted by the national government. The Concept defined the main directions of transition to the innovation socially-oriented type of economic development of the country. Concept 2020 states that the transition of the Russian economics to the innovation development is impossible without formation of a globally competitive national innovation system and set up of legal, financial and social institutions that would ensure interaction of the education, science, business enterprise and non-profit organizations and structures in all spheres of economics and public life.

The first direction of implementation of “The Concept” is development of the human resources in Russia, including overcoming of the negative demographic tendencies, creation of economic and social conditions for improvement of the education level of the population, addressing the problems of continuous education. The second direction is creation of the competitive institutional setup stimulating business activity and attracting capitals into economics, including wider access for organizations to the financial, information and other resources. The third direction is structural diversification of the economics on the basis of innovation technology development. The key targets defined in Concept-2020 are as follows:

- the share of organizations implementing technological innovations should grow to 15% in 2010 and to 40-50% in 2020 (10% in 2007);
- the share of Russia on the world markets of high technology products and services should reach by 2020 in 5-7 and more economic sectors at least 5-10%, including nuclear power generation, aerospace equipment and services, special shipbuilding, some niches on the software market;
- the specific share of export of the Russian high technology products in the world’s total export of high technology products should grow to 2% by 2020 (0.3% in 2007);
- the specific share of innovation products in the total industrial products should grow to 6-7% in 2010 and to 25-35% in 2020 (5.5% in 2007);
- the intramural expenditure on research and development should reach 2.5-3.0% by 2020 (1.1% in 2007), of which more than the half in the private sector).

While some practical steps of achievement of abovementioned goals (especially

in the last listed direction) are still unclear, in some arrears it is possible to see a number of positive changes. In the next section we will look at some of the major initiatives of the Russian Government's in the development and support of innovation in 2008-2012 and their results.

From 2008 Russian government started to support so-called national research universities (NIU). The main task of state support of the institute of NIU is in taking out educational organizations, which are able to take the responsibility for preserving and development of scientific staff, high technologies and professional education, the development and commercialization of high technologies in the Russian Federation, to the global level. The category „national research university” is established by the Government of the Russian Federation for the term of 10 years. A university can be deprived of the category „national research university” by the results of estimation of efficiency of realizing the development programs.

The first Russian NIUs were created by the decree of the President of Russia Dmitry Medvedev of May, 7, 2008. They were National research nuclear university (on the basis of Moscow Engineering-Physics Institute) and the National research technological university (on the basis of the State technological university „Moscow institute of steel and alloys”).

The first open competition of the universities for the status of „national research university” was announced on August, 1, 2009. Development programs of 110 universities participated in the competition. Taking into account the results of independent expertise and two-stage discussion by the contest commission via secret vote 12 universities-winners were selected, which received finance from the federal budget in the volume up to 1,8 billion rubles each for the period 2009-2015 years.

The second open competition of development programs for universities was announced on February, 15, 2010. To the participation in the contest development programs of 128 universities were admitted. On April, 19, the contest commission defined 32 finalists of the second contest from which it selected only 15 winners and on April, 26. 27 National Research Universities are now located in 11 regions of Russia: Moscow, St-Petersburg, Nizhni Novgorod, Kazan, Novosibirsk, Perm, Samara, Tomsk, Belgorod, Irkutsk and Chelyabinsk. Some of them already were the centers of regional innovation systems (for example, Tomsk polytechnic university and Nizhni Novgorod state university of N.I.Lobachevsky) even before they gain a status of NIU. In these cases federal money helped to improve the strength of regional innovation systems by providing high quality scientific service and wider innovation infrastructure.

But it is still too early to estimate the results of these state initiatives. While some extra money helped to improved scientific infrastructure and to attract young talented scientists to universities, some part of the budget was wasted because historically most of deep scientific research was conducted in Russia not by the universities, but by institutes of Russian Academy of Science (tab. 4).

Table 4. Percentage share of RAS in R&D indicators for Russia in 2000-2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Research organizations	11,1	11,2	11,6	12,2	12,4	12,6	12,8	12,1	12,2
Implementing R&D	11,9	12,0	12,2	12,4	12,5	12,7	12,4	12,1	13,9
Including doctors of sciences	42,8	43,2	43,2	43,5	43,4	43,5	43,2	41,4	50,7
Candidates of sciences	30,8	31,4	31,9	32,9	32,8	33,1	32,6	30,8	38,4
Intramural expenditure on R&D	9,7	10,1	10,3	11,0	11,1	11,2	11,8	11,9	12,3
Fixed assets	12,5	12,2	11,1	19,6	20,3	19,2	16,4	20,2	22,4

* estimates

Source: Russian Academy of Sciences in Figures, 2007, M2008 pp.13-37

In order to help universities to improve the quality of their research programs on April 9th, 2010, Russian Prime Minister signed decree No. 220, „Measures to Attract Leading Scientists to Russian Educational Institutions”, through which 3 billion rubles have been approved from the federal budget in 2010, with an additional 5 billion rubles allocated in 2011, and another 4 billion rubles in 2012. Program funds are be available through a competitive grant process. „Grant stipends were offered in amounts of up to 150 million rubles for each research project in 2010-2012, with opportunities to extend the research period for 1-2 years,” according to an official government release. This government initiative helped to improve international cooperation to some point, but the effectiveness of redirection of financial flows from the most experienced part of scientific society to young collectives is not proved yet.

4.2. Innovation Center “Skolkovo”³¹

In order to improve the structure of national innovation system and fill the gap between R&D and Production stages of innovation life cycle the State Commission for Modernisation and Technological Development of Russia’s Economy approved the idea of establishment of the new Foundation for development and commercialization of new technologies in June of 2010 (Figure 17). The foundation was named after a small city near Moscow with good environmental conditions and transportation - Skolkovo. Russian President Dmitry Medvedev became head of the Board of Trustees of the Skolkovo Foundation. Later the same year Russian

³¹ On a base of “Scolkovo Tech, Skolkovo Institute of Science and Technology, Annual Report 2011”, Skolkovo Foundation 2011, www.sk.ru (downloaded on December 23, 2013)

President Dmitry Medvedev signed the Federal Law “On the Skolkovo Innovation Centre” passed by the State Duma on September 21 and approved by the Council of the Federation on September 22.

The former CEO of the Intel Corporation Craig Barrett became co-chairman of the Skolkovo Foundation Council together with Victor Vekselberg (Russian oligarch), the Skolkovo Foundation’s President and Chairman of the Supervisory Committee of the Renova Group of Companies. Outstanding scientists, Nobel Prize laureates, Academician of the Russian Academy of Sciences Zhores Alferov and Professor of Stanford University Roger David Kornberg were appointed Co-Chairmen of the specially established expert body – The Foundation’s Scientific Advisory Council.

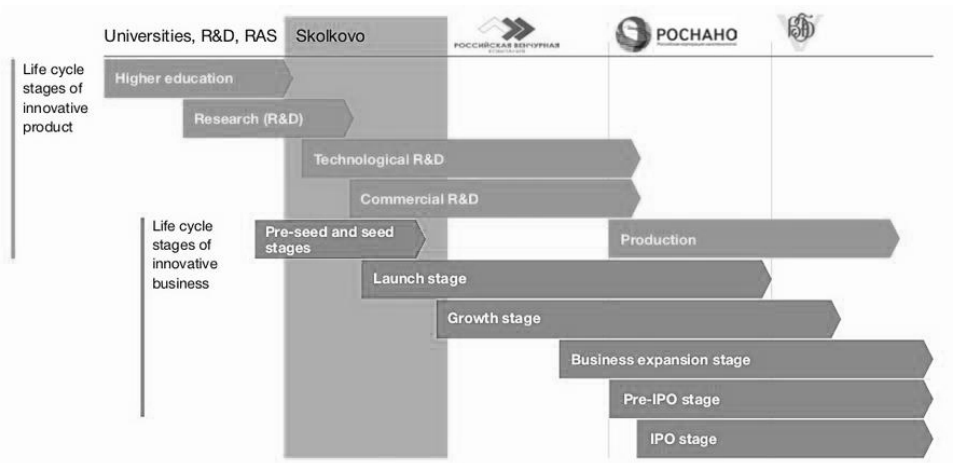


Figure 17. Skolkovo in National Innovation System of Russia

Source: <http://community.sk.ru/>

The strategic goal of the Skolkovo Innovation Centre is to concentrate international intellectual capital, thereby stimulating the development of break-through projects and technologies. Participants of the Skolkovo Innovation Centre are those companies, which have proposed innovative solutions to the most significant scientific, social and economic problems.

The structure of The Skolkovo Project consists of Technopark, the Skolkovo Foundation, a university complex, and the city of the future called Innograd. Technopark provides the innovators with all the necessary services and utilities needed for their technological assets and corporate structures. The scientific and educational unit consisting of the Skolkovo Institute of Science and Technology, the Open University and the Skolkovo Business School should ensure integration

of education, science, and research, while engaging young scholars and engineers into innovation activity aimed at yielding economic results.

Today Technopark Skolkovo is setting up shared facilities centers (SFC) and centers of excellence (CoE) that are part of the research infrastructure development. SFC is a complex of scientific equipment for participant companies. CoE is a center established in partnership with research and commercial organizations for solving applied science problems. Services for participants are provided at reduced prices in the most convenient manner suitable to a client. The list of the common use centers specified by the Foundation's development plan and the budget includes: SFC Metrology (analytical and measurement instrumentation), SFC Microanalysis (scientific visualization: microscopy for visualization and morphology studies), SFC Prototyping (clean rooms and shops), SFC Cytology and Histology [Skolkovo Annual report].

The Skolkovo Intellectual Property Center (IPC, Skolkovo IP) as a part of Technopark was incorporated on September 21, 2011. It was established in order to provide services in the area of intellectual property protection. Its main activities include consultations on the matters related to intellectual property, services related to state registration of the results of intellectual activity during research, mediator services in case of disputes involving intellectual property.

The backbone element of the whole ecosystem of the innovation center and the basic component of its educational segment, according to its founders idea, should be Skolkovo Institute of Science and Technology (SkTech), which was established on October 25th, 2011. The founders of SkTech are: Moscow Institute of Physics and Technology; National Research Tomsk Polytechnic University; Moscow Business School "Skolkovo"; New Economic School; ROSNANO; OJSC Russian Venture Company; State Corporation 'Bank for Development and Foreign Economic Activities'; Fund for the Promotion of the Development of Small Forms of Enterprises in the Scientific and Technical Sphere; Scientific Center of the Russian Academy of Sciences in Chernogolovka; the European University at St. Petersburg. In 2012/2013 academic year SkTech started admission of the first students for participation in the master's degree program. It is too early now to discuss any results of this initiative.

The second component of the educational environment of the Skolkovo Innovation Center is Open University Skolkovo (OpUS). Its mission is to create a system of distribution of present scientific and technological knowledge and competencies, to develop a mechanism for creating and supporting a network of active and talented young people at the orbit of the Skolkovo Innovation Center. Key OpUS processes are formation and support of network interaction. It is important that OpUS is not an ordinary educational institution; it does not award diplomas upon completion of education. OpUS is a source of prospective applicants for SkTech, a source of interns and employees for Skolkovo partner companies, a source of projects for the Foundation clusters. OpUS intends to achieve this by means of

implementing a unique educational program and tutor support for students, and creating OpUS communication centers.

In 2011-2012, six courses and more than 40 lectures and seminars were held as part of the OpUS educational program mostly in Moscow, but in other regions of Russia as well. Globally renowned scientists and experts gave lectures and delivered reports on the topics of entrepreneurship, communications, leadership, management, information technologies, biomedicine, power engineering, innovations, invention, design, mathematics, and science organization. This program was very successful and impetus the new social movement in the field of open innovation.

At Skolkovo, the mechanisms of financial support and co-financing of private investments into projects/participants have been developed, the most friendly tax environment and interaction with public authorities have been provided for innovative companies and their investors. The accredited investor institute has been established at Skolkovo. When a company receives the status of an accredited investor of the Skolkovo Foundation, it gets access to the base of projects implemented at the Innograd. Besides, portfolio companies of the accredited investors will be able to receive consultations and support while acquiring the status of the Skolkovo participant. An accredited investor, for his part, documents its intention to invest certain funds into participating companies of Skolkovo. 24 venture fund managers were accredited at Skolkovo in 2011.

All companies applying to be participants of the Skolkovo Project are distributed between clusters (Energy Efficient Technologies Cluster, Nuclear Technologies Cluster, Space Technologies and Telecommunications Cluster, Biomedical Technologies Cluster, IT Cluster). The priority is given to the projects that are able to change the face of the market or introduce new, second-to-none products and technologies (fig. 18).

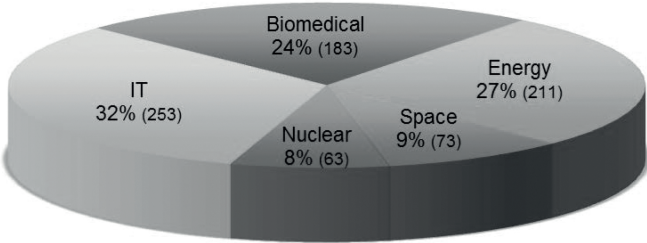


Figure 18. Participants of clusters in Skolkovo Innovation Center

Source: Worked out by the authors based on data from Skolkovo Tech, Skolkovo Institute of Science and Technology, Annual Report 2011

Project participant status is awarded for a ten-year period. It gives them the possibility to improved efficiency of the founders' investments by tax concessions (no income tax, no value added tax, the social tax reduced to 14%) and grant financing. It also gives a better access to markets because of close relationships with world leaders in various spheres (access to information on future demands and to the actual market outlets) and assistance in entering financial markets. Services available to the Project participants in Technopark Skolkovo on favorable terms are the access to Common Use Center and consulting, corporate and other business services (accounting, legal advices, intellectual property advices, coaching, etc.) It also helps to reduce such administrative hurdles for participants as procedure for hiring abroad and redemption of tax duties.

Each of the five clusters carries out an active work in order to build partnership ties and attract new participants. For example, the Energy Efficiency Cluster in 2011 held five road-shows of the international applied research centers for the Russian and international participating companies, and organized presentations of the cluster as part of the exhibitions "Innoprom-2011" (Yekaterinburg), "Innovus-2011" (Tomsk), "Itera-2011" (Novosibirsk) and St. Petersburg International Innovation Forum. The Nuclear Technologies Cluster organizes meetings "Cluster's Friends Club" on a monthly basis.

Major corporations – the world's leaders in their industries are considered by the Skolkovo Foundation as an essential element necessary to launch and form the ecosystem of the Skolkovo Innovation Centre. Cooperation with international companies at all levels naturally integrates the Project into the international innovation environment, plays a role of a link to products and services created by global players. The key partner service of the Skolkovo Foundation is aimed at attracting the largest international and Russian corporations to place their research and/or venture profile at the Skolkovo Innovation Center.

In 2011, 25 corporations – the world's leaders in their industries showed interest in mutually beneficial cooperation. 12 of them (Siemens, EADS, Nokia, Ericsson, GE, IBM, the JSC "Academician M.F. Reshetnev "Information Satellite Systems", NSN, HK Composite, Intel, Sistema JSFC, SAP) made a decision to create corporate R&D centers in the territory of the Skolkovo Innovation Center and signed relevant agreements. The total corporate research pool as of December 31st, 2011 reached 1 100 persons, and the total budget by 2015 will be around RUB 13.2 bln.

The most important results for the January 2013 are the following: 793 companies (selected from 4 075 applications) are created in 44 regions of the country; 87 patents are received (63 Russian and 24 PTC); 1,2 billion RUR revenues in 2012; 184 grants for 9 billion RUR are received, including 3 bill RUR for R&D. The participants raised 6,2 bill RUR as private co-investments.

4.3. Cluster policy

At the regional level in 2008-2009 became obvious for experts the fact, that first of all, it is necessary to generate innovation demand on the part of big business so that competitive products are created within the framework of the new clusters. In Concept-2020 some key elements of the cluster policy in Russia were pointed out. Basically they are:

- Contribute to the institutional development of clusters through creation and maintenance of a specialized cluster development organization, strategic planning of cluster development initiatives, and stimulation of effective communication and cooperation among cluster members;
- Develop mechanisms to support projects contributing to better competitiveness and more effective cooperation of enterprises. Such support should be provided on an equal basis to all projects irrespective of the specialization of the enterprises implementing them;
- Create favorable conditions for cluster development including creation of a more effective system of professional education, stimulation of cooperation between the business and educational institutions, targeted investment in the engineering and transport infrastructures, housing construction which supports cluster development initiatives, provision of tax benefits, and reduction of administrative barriers.

Nowadays in Russia the cluster policy is usually considered as an alternative to the traditional «industrial policy» which inhibits competition by supporting specific enterprises or industries. But despite of existing of several very successful cluster initiatives in Russia, industrial clusters tend to be of concern, as a panacea, to many theorists and experts of regional economic development who claim that the clusters initiatives can help to overcome the gap between industrial and informational economic setups, creating a competitive advanced economy based on innovative technology.

In addition, the formation of a regional cluster was regarded by local authorities as a way to attract federal financial flows to the region. So, many cluster initiatives were implemented on a public-private partnership in support of the cluster-forming enterprises. However, simply increasing funding cluster-enterprise does not automatically provide the synergy effect, which is observed in “real” clusters as self-organizing systems. Let’s consider some typical examples of cluster initiatives in the Russian Federation.

4.3.1. Altai biopharmaceutical cluster

Scientific-industrial complex Biysk „Altay bio” can be considered as one of the examples of modern clusters in Russia. The following groups of assumptions have contributed to the formation of this cluster:

In the area of innovation capacity:

- The presence in the region of about 15 large companies, as well as a conglomerate of small businesses, specializing in the commercialization of results of scientific research in the defense industry;
- Efficient vertical integration of enterprises (former scientific-industrial complex), providing of all stages of the innovation cycle;
- Availability of external relations of the cluster with other complexes and associations, providing an active exchange of knowledge and technology.

In the area of institutional and legal capacity:

- Developed cluster regional strategy, government control of the implementation of this strategy;
- Support for cluster subsidies from the federal budget, as well as from the various funds.

In the area of resource potential:

- Availability of natural resources, in particular, more than 2,186 species of vascular plants, of which about a hundred species are widely used in medicine;
- Presence of a large number of lakes with a high content of minerals used in the production of vitamins.

The major objective of Altay Region economic policy is conversion into intensive development of economy which demands complex innovative supply of resources on the basis of modern scientific potential.

According to the expert judgment of rating agency “RA-Expert” Altayregion possesses considerable competitive advantage over the corresponding potential of other Russian regions.

At the present time Altay Region has the basic conditions for priority development of high technology science intensive production – bioengineering and pharmaceuticals, nanotech industry, energy-saving technologies and materials. The complex of branch institutes of higher education together with scientific departments of Russian Academy of Science (RAS), provides sufficient balance in regional demands for education and scientific research. The major tendency of the innovative processes of the region is determined by industrial enterprises. Besides regional industry consolidates 9% of innovatively active enterprises; the total industrial output of innovative production is 99%. The concentration ratio of innovatively active enterprises is the following: chemical industry - 50%, metal products industry - 26,3%, electrical equipment industry - 25%, mechanical engineering - 22,2%, food manufacturing industry - 19%.

Biysk, having the status of science town of Russian Federation since 2005, is a successful example of points of increase on the basis of high-technology enterprises (Figure 19). A peculiarity of Biysk is an opportunity to realize the innovative production change in the borders of one and the same municipal formation. The complete cycle of innovations – from research activities and projects to high-tech industry – is provided by the local scientific production complex consisting of 15 high-tech enterprises, which work in close cooperation with small innovative companies. For example, cluster “Altay” includes 40 high-technology companies. For the last five years more than 200 innovative projects have been realized in Biysk, providing 7,5 billion rubles increase of production volume.

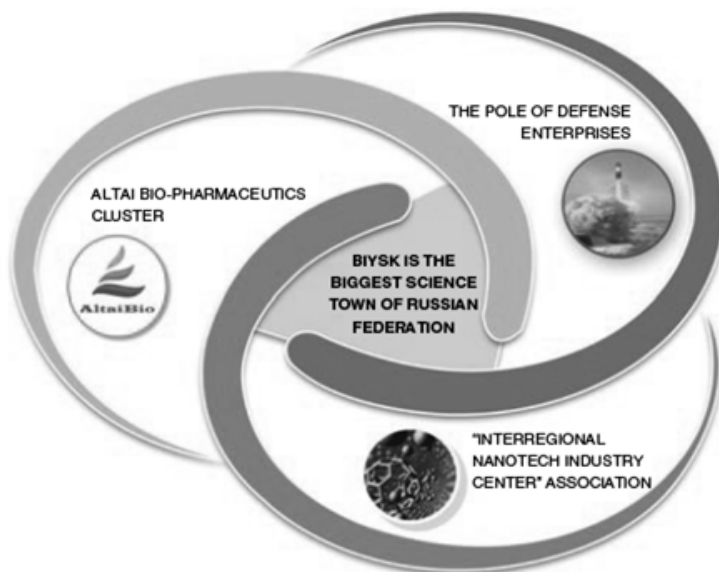


Figure 19. Innovative potential of Altay Region

Source: Altai Krai, Reference Book of the Investor 2011-12, Krasnyi Ugol, Ltd. 2010, p 24.

To create scientific production cluster chains in Altay Region, consulting sites are being formed at the present moment. Altai bio-pharmaceutics cluster, having its center in science town Biysk, medical cluster in Barnaul, agricultural engineering industry cluster in Rubtsovsk have been recently created and are developing now.

The primary aspects of their activity are cooperation with Russian state scientific foundations, maintenance of innovative projects and development of innovative data bases. In 2008 the site of regional innovative data bases was put into operation to pool information resources of the major constituents of Altai innovative system.

In May 2007 Altay region innovative coordination board was founded in order to introduce national scientific and technical innovative policy and provide effective cooperation and coordination of executive power bodies of Altay Region, local self-government authorities, scientific institutes and other innovative enterprises (Figure 20).

The collaboration of main enterprises (which form technology core of the cluster) was established in 2008. In 2009-2010 around 9 billions RUR were given for cluster structure development from regional budget. The strategic goal of the „Altay bio” is the increase in production by 10-15 times by 2025.

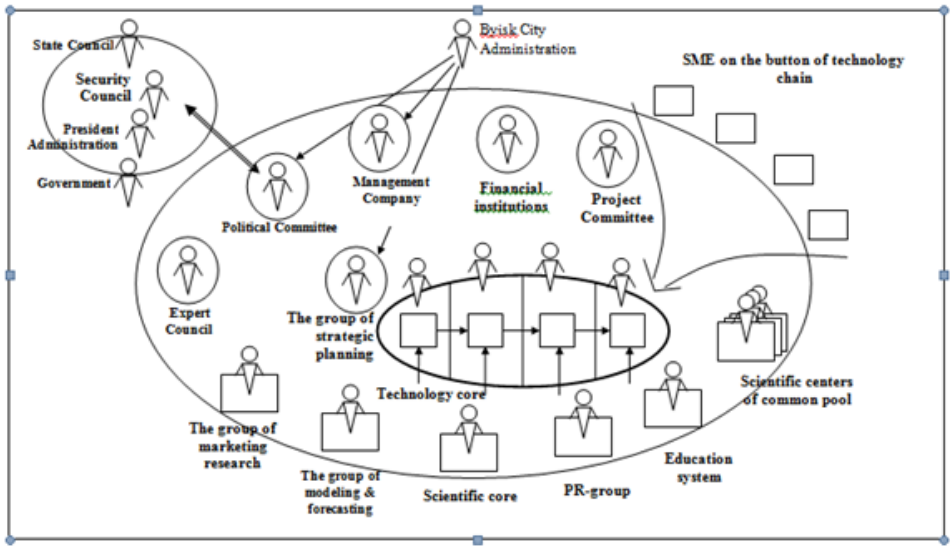


Figure 20. The project of “Altay-Bio” cluster formation
 Source: Worked out by the author

In 2012 the production of the cluster has grown by 24%. The government support of the cluster is delivered through the national program “Development of pharmacy and medical industry in Russia for the period until 2020 and further prospect”. The main feature of the cluster is the form of its organization that more usual for associations than for clusters. All members of the cluster have signed the agreement (charter) on the basic principles of cooperation. As stated in the charter, new members can be accepted into a cluster if they agree on these principles and have enough technical and financial resources for active cooperation.

Despite the fact that the above mentioned business coalitions is called a cluster they are not real clusters due to the lack of competition inside of them. Their structure resembles the structure of large vertically integrated holdings.

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Innovative Development of the Lublin Region – A Case Study of Eastern ICT Cluster³

Introduction

In the Lisbon Strategy, launched in March 2010, the European Union set an ambitious goal to make the Community the most competitive and dynamic knowledge-based economy in the world, growing even faster than China and the United States. The strategy was devised for the years 2000-2010. However, by 2010 most of its goals have not been achieved. Following the Lisbon Strategy, in March 2010, the European Commission proposed a 10-year strategy for social and economic development in Europe entitled 'Europe 2020 – a strategy for smart, sustainable and inclusive growth.' The strategy puts forward the following three mutually reinforcing priorities to be achieved thanks to a more transparent public institutions, efficient management of public funds, as well as supporting innovation and development of new technologies³²: *smart growth – developing an economy based on knowledge and innovation; sustainable growth – promoting a more resource efficient, greener and more competitive economy; and inclusive growth – fostering a high-employment economy delivering social and territorial cohesion.*

In order to achieve established goals, the European Commission developed several leading initiatives, including the so-called 'Innovation Union,' an initiative which supports the dialogue, cooperation, and technology transfer between the scientific institutions and business to ensure that developed technologies and inventions are turned into marketable products. The Innovation Union renewed some of the goals of the Lisbon Strategy, in particular it postulates the growth of expenditures on research and development up to 3% of the EU's GDP. New investments are expected to create 3.7 new jobs by 2025. The core of the Innovation Union consists in creating so-called 'innovative partnerships' between the public and private sectors. *The main goal of the Innovation Union is to turn ideas into jobs, green growth and social progress. The main priority areas in which the European*

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³² The European Commission: Communication from the Commission EUROPE 2020. A strategy for smart, sustainable and inclusive growth.

*Commission is going to encourage public and private partnerships include climate change, efficient use of energy, healthy lifestyles, smart cities and mobility, rational use of available water resources, raw materials, and agriculture in accordance with sustainable development principles.*³³

The role of regional policy in implementing the Europe 2000 strategy, and in particular in implementing the initiative ‘Innovation Union’ is set out in the Commission’s Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions entitled ‘Regional Policy contributing to smart growth in Europe 2020’, issued on October 6, 2010. The European Council is of the opinion that regional policy can unlock the growth potential of the EU by promoting innovation in all regions, while ensuring complementarity between the EU, national and regional support for innovation, R&D, entrepreneurship and ICT. Therefore, national and regional authorities should develop and promote, as it was called, smart specialization strategies and thus support the establishment and development of the following:

- innovative clusters contributing to regional development and growth,
- business supporting organizations, in particular those offering services to small and medium-sized enterprises,
- universities, especially those universities which encourage and stimulate innovation and entrepreneurship among students and academic staff, and help them in patenting and commercializing the research output,
- research-and-development infrastructure, and competence centres,
- cultural institutions developing people’s creativity.

5.1. Policy Supporting Innovativeness in Poland

The Polish government supports innovative processes and development of cooperation links between science, industry, and government through a series of strategic documents. Poland has now almost all institutions and instruments needed to support innovation, however, in order to be competitive on the global markets it should develop and strengthen already existing cooperation links between science and business.³⁴

³³ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and The Committee of the Regions, Europe 2020, Flagship Initiative, Innovation Union, SEC (2010) 1161 http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf (downloaded on January 20, 2013).

³⁴ "Policy Mix for Innovation in Poland – Key Issues and Recommendations", a report worked out by the Organization for Economic Cooperation and Development on the request made by the Ministry of Science and Higher Education and the Ministry of Economy, Warszawa 2007 .

In the Long-term Development Strategy 'Poland 2030. The Third Wave of Innovativeness', developed based on the report entitled 'Poland 2030. Development Challenges', the authors highlight the dilemmas which Poland will be facing in the nearest future, in particular in the field of economic and social policy, infrastructure, energy security and the efficient management of the State. The authors of the report argue that Poland should adopt a polarization-and-diffusion model of development which would strengthen the growth dynamics and help overcome development barriers. Therefore, besides supporting the growth poles, i.e. polarization processes caused by disparities in regional potentials, the conditions for diffusion should also be created, i.e. the conditions for processes which enhance equal education opportunities, improve transportation in the country, reduce the risk of digital exclusion, improve the level of social integration, build solidarity between generations, and strengthen capacities in regions. Proposed development model is based on the following three fundamental pillars: [1] building the foundations for innovation in Poland (reducing developmental gaps, including upgrading of existing infrastructure and building new competitive advantages based on widely understood intellectual capital); [2] territorially balanced development (creating conditions for spreading developmental benefits created by the growth poles, mainly by the cities, and stimulating development potentials of other areas – regional and local centres, and rural areas); [3] solidarity between generations (a mix of activities responding to emerging changes in social living patterns and addressing challenges resulting from demographic trends).

In the long-term development strategy 'Poland 2030. The Third Wave of Innovativeness' a lot of attention is paid to reducing inequalities in the quality of life and disparities in development potentials between Poland's regions. In this context the strategy points to an urgent need of substantial investments to be made in the backward Eastern parts of Poland where poor and outdated infrastructure significantly hampers economic development and growth in these regions.³⁵

The most important strategic documents concerning the 2020 perspective are: Mid-Term National Development Strategy 'Dynamic Poland', National Reform Programme Supporting Implementation of the Strategy Europe 2020, and nine integrated strategies. The main goal of the Strategy for Innovation and Increasing the Efficiency of the National Economy 'Dynamic Poland 2020' is to make Poland a highly competitive economy (innovative and efficient), based on knowledge and cooperation. The strategy assumes that interventions shall be made in the following four main priority areas:

- 1) Adjusting the regulatory and financial environment to the needs of innovative activity (according to the report Innovation Union Scoreboard IUS 2011, in

³⁵ A draft of amended Strategy for Social and Economic Development in Eastern Poland by 2020.

- Poland, the public and private spending on research and development related to the total GDP account for 70% and 16% of the EU27 average respectively, and venture capital investments related to GDP are below 36% of the EU27 average).
- 2) Ensuring appropriate knowledge and labour resources for the national economy (according to IUS 2011, in Poland, the percentage of scientific publications in a group of top 10% most cited scientific publications worldwide is almost three times lower than the EU27 average and the number of new doctorate graduates per 1,000 inhabitants aged from 25 to 34 only insignificantly exceeds the EU27 average, while employment in industry and services in knowledge-intensive activities accounts for about 68% of the EU27 average).
 - 3) Sustainable use of available resources (according to Eurostat's data, in 2005, a material productivity index was over three times lower than the EU27 average, while energy consumption to GDP ratio was over two times higher than the EU27 average).
 - 4) Internationalization of Poland's economy (according to IUS 2011, a share of knowledge-intensive services export in the total export is lower than the EU27 average by almost one-third, and the number of new Community trademarks per 1 billion EUR of GDP only slightly exceeds 50% of the EU27 average).

5.2. Amendments to Regional Strategic Documents, Lublin Voivodeship

Lublin Voivodeship is one of the largest regions in Poland; it occupies over 25,000 sq. kilometres, which represents 8 % of the total Poland's area. The region has approximately 2.2 million inhabitants and its population density is equal to 71.3 % of the national average, while urbanization index equals 46.7 % of the country's average³⁶. Gross domestic product per capita generated in the region is 16,651 Pln, which represents about 70 % of the national average. Lublin Voivodeship is one of the most underdeveloped regions in Poland. The region has weak, labour-intensive and outdated industry with relatively low investment outlays. Lublin Voivodeship has the most scattered urban network in Poland³⁷ The region is largely agricultural; its industrial production accounts for as little as 10 % of the total production generated in the region³⁸, which represents only 2.9 % of the total industrial production in Poland.

³⁶ Bojar E. (ed.), *Klastry jako narzędzia lokalnego i regionalnego rozwoju gospodarczego*, Politechnika Lubelska, Lublin 2006.

³⁷ Bojar W., *The role of groups of agricultural producers in the process of cluster formation in the Lublin Region* (in:) E. Bojar, Z. Olesiński (eds) *The emergence and development of clusters in Poland*, Difin, 2007, p. 152.

³⁸ Krasowicz S., *Czynniki ograniczające wykorzystanie potencjału rolnictwa Lubelszczyzny*, Buletyn Informacyjny PAN, No. 9, 2004.

In Lublin Voivodeship, the most important documents defining the directions of development of the region are: the regional development strategy, implemented through corresponding regional operational programs co-financed by the European Union, and regional development programs which are financed from domestic funds. Presently implemented strategy is an update of the strategy developed in 2000 and covers the years 2006-2020.³⁹

The authorities of Lublin Voivodeship have also developed a zoning plan complementary to adopted regional development strategy. The plan defines the spatial dimension of socio-economic development of the region and the conditions for carrying out activities set out in the strategy. Moreover, recognizing the role of innovation and modern technologies in economic development, the regional authorities have developed the Regional Strategy of Innovation which is the third principal strategic document of the Lublin Voivodeship.⁴⁰

The abovementioned documents define the leading areas of regional economic specialization which include the production of high-quality food, organic farming, outsourcing services, business and IT services, services offered by the cultural sector, and development of renewable energy sources. These strategic documents attribute a special role to companies operating in industry and construction. The operation of these companies provide a basis for the development of various of cooperative structures, for example industrial parks, clusters and so-called zones of economic activity.

Tourism and recreation, ecological agriculture, and higher education, including education offered by non-university institutes, are these areas which offer the best opportunities for building regional competitive advantage⁴¹. The strategic fields of science include engineering sciences, biotechnology, information technology and computer sciences, environmental protection, agriculture and food processing, and the production of energy from renewable energy sources.

It was assumed that the development of food-processing industry and ecological products, including biofuels, would significantly increase the competitiveness of the regional economy. However, to achieve this goal, substantial investments in existing scientific and research-and-development infrastructure are needed.⁴²

The analysis of available resources made in 2004 prior to the adoption of the current Regional Innovation Strategy of the Lublin Region indicated that increasing of the regional competitiveness is possible by parallel pro-innovative efforts

³⁹ The strategy was adopted by the Parliament of Lublin Voivodeship, [Sejmik Województwa Lubelskiego] on July 4 2005.

⁴⁰ A draft of updated Strategy for Social and Economic Development of Eastern Poland by 2020.

⁴¹ Plawgo B., *Badanie struktur klastrowych Polski Wschodniej*, Ministry of Regional Development Warsaw, 2007, p. 46.

⁴² *Ibidem*.

towards entrepreneurship development, restructuring of agriculture, better utilization of regional ecological advantages, and a more competitive educational and scientific offer.⁴³

In view of the new approach to regional development and innovation expressed in many EU documents, correlated legislation adopted by the EU member states, and amendments to the Development Strategy of Lublin Voivodeship for 2006-2020, there is also a pressing need to update the Regional Innovation Strategy of Lublin Voivodeship.

The study carried out before upgrading the Regional Innovation Strategy of Lublin Voivodeship, which involved the identification of endogenous development potential, allowed to determine so-called smart regional specializations. Identified smart specializations of Lublin Voivodeship include key regional specializations, as well as supporting and emerging specializations. The identification of endogenous development potentials was carried out based on the location indices estimated on the basis of the number of companies/businesses, employment in industry/employment in the economy, and industrial production sold.

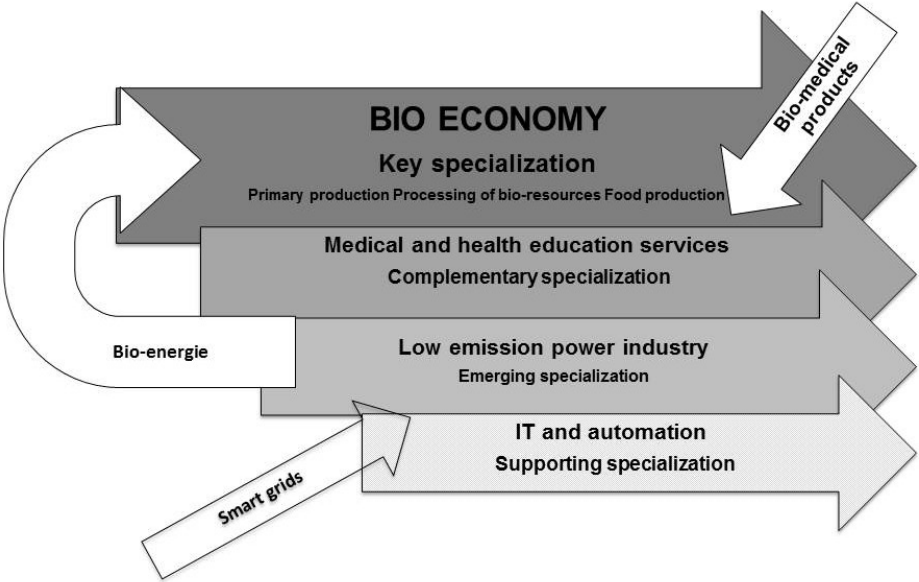


Figure 21. Smart specializations of the Lublin region

Source: Worked out by the authors based on data from the Department of Economy and Innovation of the Marshal’s Office of Lublin Voivodeship

⁴³ Regional Innovation Strategy of the Lublin Voivodeship – Innovative Region – Transforming Ideas into Action, Lublin 2004.

The key regional specialization is bio-economy. This specialization includes many sectors of regional economy which determine the region's development potential – agriculture, food processing, forestry, chemical industry, biotechnologies, and power industry.

Regional supplementary specialization involves specialization in health care and other medical services. This kind of regional specialization is determined by a large number of operators and business entities in this sector of regional economy, in particular institutions carrying out research in medicine and pharmacy, as well as by the ongoing process of population aging.

Assisting/supporting specialization refers to specialization in innovation and research intense sectors which enable the development of new, innovative market products and services in many sectors of regional economy. This kind of regional specialization is based on the region's growing internal potential (a large number of students and university graduates of computer science and automation, the growing number of IT companies, their cooperation and networking).

Emerging specialization – includes specialization in low carbon power industry, both conventional power industry based on the regional rich hard coal and shale gas deposits, as well as specialization in producing energy from renewable sources such as biomass, energy of the sun, wind and water.

5.3. Eastern ICT Cluster

Eastern Cluster of Information and Communication Technologies (Eastern ICT Cluster) was founded in Lublin in June 2007 in order to strengthen regional competitive potential, increase innovation and promote development of cooperation links between entrepreneurs, scientific institutions, self-government bodies and a wide spectrum of business supporting institutions.⁴⁴

The cluster's mission is to create a powerful and flexible coordination platform grouping independent entities, including companies, non-government organizations (NGOs), universities and other scientific and research-and-development units, which through the cooperation with self-government bodies in Eastern Poland is capable to carry out big innovative, international ITC projects, important for the local economy, funded with both public and private financial resources, in particular projects involving power engineering and renewable energy sources, education and tertiary education, public administration and local self-government, mass media and communication, culture, recreation and tourism, transport and logistics, agriculture, health care, and cooperation of cluster organizations and business supporting institutions.

⁴⁴ Eastern ICT Cluster URL; <http://www.ecict.eu/> (downloaded on January 20, 2013).

In the cluster founders' vision, the cluster was intended to be a modern organization, attractive to both current and prospective members, partners and customers, recognized locally, nationwide and internationally. With the support provided by self-government authorities and foreign partners operating in the ICT sector, the cluster should quickly become an effective body integrating local business environment and scientific institutions.

Presently, Eastern ICT Cluster has 86 members, including 58 micro-enterprises (with up to 9 employees), 16 small enterprises (10-49 employees), 11 medium-sized enterprises (50-249 employees) and 1 big enterprise, 5 research-and-development units, 4 business supporting institutions.⁴⁵ The functioning of the cluster is based on the triple helix model involving close and continuous cooperation between science, industry and government. Eastern ICT Cluster emerged as a result of a bottom-up initiative of local entrepreneurs, mainly running a business in the simplest form of sole proprietorship, who entered into cooperation with Stowarzyszenie Rozwoju Aktywności Społecznej 'Triada', a business supporting organization based in the city of Chełm. These entrepreneurs decided to build on international contacts they already had, including contacts with clusters operating in the Italian region of Piedmont (Piemonte).

An additional external impulse for the cluster formation was given by the regional development policy designed by the regional self-government authorities, economic policy adopted by the Lublin city government and funds acquired by the cluster leader under institutional building schemes which included developing of Internet-based cooperation platform, working out of cluster development strategy and funds for delivering a series of seminars and conferences promoting the concept of clustering.

The Regional Operational Programme for 2006-2013 and regulations concerning specific calls for proposals announced within the framework of this programme favoured applications made by entrepreneurs who already operated in cluster structures. In line with the EU policies of the time, subsidies and grants available to entrepreneurs offered under various EU-funded programmes supported development of cluster structures. Since its inception, Eastern ICT Cluster developed dynamically and attracted quite a few members mainly due to the fact that there was no membership fee and the members instead of financing administration of the cluster financed particular projects and activities carried out within the framework of the cluster. In terms of membership, in the years 2008-2012 the cluster grew at the rate of 50% per annum to become the third largest cluster in Poland following Łódzki Klaster Warzywno-Owocowy 'Zjazdowa' (fruit and

⁴⁵ Based on statistics available on the website Interactive Cluster Maps: URL: <http://www.pi.gov.pl/PARP/data/klastry/index.html#nokla=11&nowoj=12> (downloaded on January 20, 2013).

vegetable growing and wholesale) which presently has 120 members and Aviation Valley Cluster based in Podkarpackie Voivodeship (South-Eastern Poland) which has 86 members, and the largest Polish cluster operating in ICT industry.⁴⁶ The cluster development strategy assumes that by the end of 2013 the cluster will have as many as 150 members and that 20% of all regional enterprises operating in the ICT sector will become its members by 2020.

According to economic development policy developed by the Lublin city government, the ICT sector is crucial to economic development of the city of Lublin, the capital of the region. One of the most conspicuous manifestations of collaboration between the Lublin city government and Eastern ICT Cluster is the project 'Lubelska Wyzyna IT' which we will expand on in the next paragraph.

Although external impulses played an important role in establishing Eastern ICT Cluster, its successful story is based on effective, well-designed development strategy and the commitment of the cluster leaders and promoters to the project. External impulses are always important to make things happen, however, they can only stimulate and strengthen processes and it seems unlikely they will suffice to ensure the durability of the project like the formation of a cluster.

The success of every cluster initiative depends on the commitment of institutional leaders such as the cluster coordinator, municipal self-government bodies, individual universities and enterprises participating in the cluster formation project, as well as on the commitment, devotion, determination, social, organizational and marketing skills of the staff employed by these institutions.

Functioning of Eastern ICT Cluster is based on the concept of the triple helix with several additional elements added to it at the tactical and operational level. One of the developments at the tactical level is the concept of the three expanding geographical circles.

The internal circle which is a direct environment surrounding the Eastern ICT Cluster includes cooperation and interactions of the cluster with enterprises based in Lublin Voivodeship, self-government authorities of different administrative levels, and universities and scientific institutes based in Lublin Voivodeship. This circle also includes cooperation with other regional clusters, including clusters operating in other sectors, and supporting cluster initiatives emerging in the region. Eastern ICT Cluster actively cooperates with Marshal's Office of the Lublin Voivodeship, the government of the city of Lublin, which is the capital of the region, as well as self-governments of lower administrative levels – poviats and gminas. The cluster cooperates with regional leaders in poviats like Biała Podlaska, Chełm, Zamość, Puławy, Kraśnik, Łęczna and Janów Lubelski, as well as with many gminas and gminas' associations, for example Związek Gmin Lubelszczyzny [Union of the Lublin Region Gminas], Euroregion BUG and Dolina Zielawy.

⁴⁶ Ibidem.

The central circle encompasses cooperation with nationwide companies operating in the ICT industry, representatives of worldwide corporations in Poland and nationwide associations of ICT companies, for example National Chamber of Electronics and Telecommunication (NCET), cooperation with the Polish Government, government agencies and nationwide organizations which associate various self-governments. The central circle also includes cooperation with other clusters, for example within the framework of Klub Klastrow [Clusters Club], a platform set up by the Ministry of Economy and Polish Agency for Enterprise Development (PAED), and other partner clusters, for example Mazowiecki Klaster ICT. Moreover, Eastern ICT Cluster cooperates with many nationwide and regional scientific institutions and research centres based in other regions, for example the Systems Research Institute of the Polish Academy of Sciences.

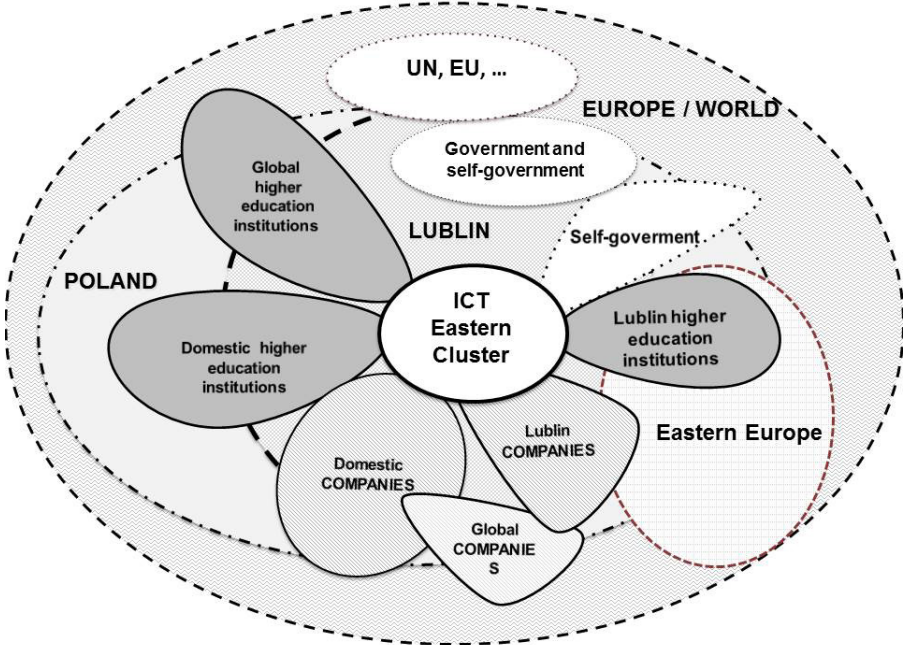


Figure 22. Eastern ICT Cluster cooperation diagram

Source: Worked out by the author

In order to develop its strategic competences, Eastern ICT Cluster should also develop cooperation links with organizations dealing with the issue of renewable energy sources such as Stowarzyszenie Energii Odnawialnej SEO [Polish Association of Renewable Energy], Towarzystwo Rozwoju Małych Elektrowni Wodnych TRMEW [Society for Development of Small Hydroelectric Power Plants]

which with as many as over 400 members is the biggest association grouping producers of energy from renewables, and Polska Rada Koordynacyjna OZE [Polish Coordination Council OZE], established in 2008 by representatives of many organizations dealing with the issue of renewable energy sources.

The third, internal circle is the sum of international activities carried out by individual members of Eastern ICT Cluster, including participation in various projects promoting clustering and supporting development of cooperation networks. As of the end of 2012, Eastern ICT Cluster cooperated with several dozens of partners all over the world.

5.3.1. The Cluster – An Open Space For Cooperation

An essential element serving better realization of the cluster’s mission and development vision, including effective and efficient achievement of its goals, is its organizational structure. Eastern ICT Cluster has a flexible and multi-pronged structure designed to attract as many members as possible, intended to encourage development of cooperation links by creating cooperation frameworks, convenient for all involved partners.

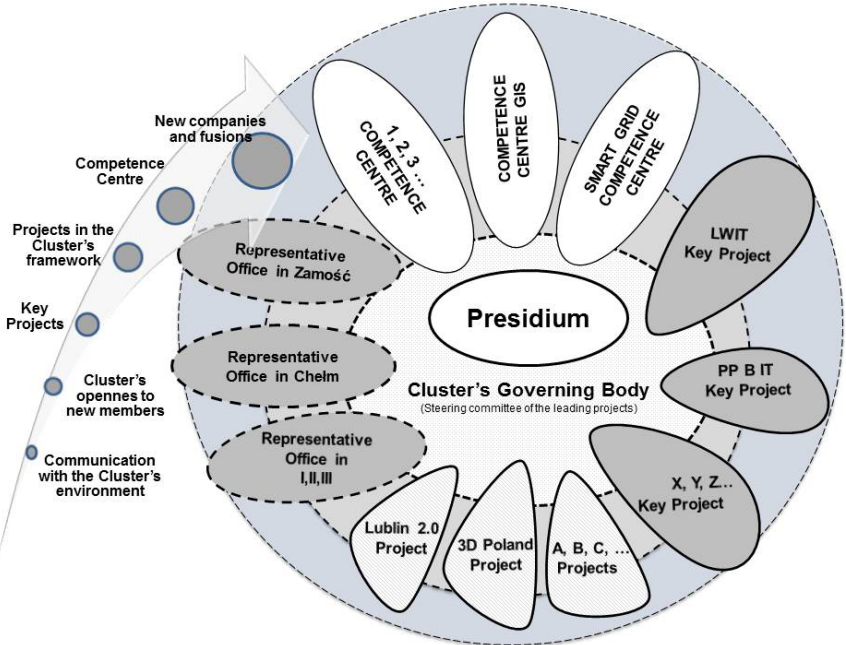


Figure 23. Organization of Eastern ICT Cluster

Source: Worked out by the author

The organizational structure of Eastern ICT Cluster reflects its openness to new members. It was designed to ensure efficient and effective communication with the cluster's environment and the spread of information in a way similar to the transmission of computer viruses. On one part, the cluster's structure creates the space conducive to carrying out various projects by particular groups of interested members. On the other hand, the cluster provides the frames for working out and implementation of key projects funded from the public means which can give impetus for further development of the cluster. Moreover, the cluster creates the space encouraging business start-ups, joint ventures with more experienced entrepreneurs and fusions of companies operating in Eastern ICT Cluster.

The key elements of the cluster's organizational structure are: key projects, centres of competence and regional representative offices which leaders make up the Cluster's Board. The cluster is governed by the Presidium whose members are elected.

5.3.2. Project carried out within the framework of Eastern ICT Cluster

In laying the foundations of Eastern ICT Cluster its initiators assumed that the cluster would exist as long as it would be capable to carry out important projects. In order to ensure high quality of the projects carried out within the framework of the cluster, in particular the key projects crucial for the cluster development and growth, the cluster promoters postulated that the team carrying out specific project should not only consist of the project leader, companies and individuals performing assigned tasks, universities, business supporting institutions, sometimes also representatives of public authorities, but also reputable and experienced industry leaders (local, regional and global 'brands'), as well as other clusters. Implementation of key projects is supervised by the Bureau of the cluster and Bureau of Communication and Marketing. The concept of key projects implementation is shown in Fig. 24 below.

Presently, within the framework of centres of competence Eastern ICT Cluster is carrying out several major projects. One of Eastern ICT Cluster's centres of competence is SmartGrid. In May 2012, German-Polish Foundation 'NewEnergy' was established. The main goals of the foundation include as follows:

- providing support to initiatives undertaken in the field of power engineering connected with realization of strategic goals of the European Union related to the time horizon 2020, 2030 and 2050;
- supporting initiatives related to sustainable development and sustainable development of the power industry, in particular renewable energy sources;
- supporting development of Smart Grid and the concept of prosumer;
- raising social awareness concerning sustainable development and energy produced from renewables;

- dissemination of knowledge on the progress in the field of modern technologies leading to the reduction of harmful emissions, alternative energy sources and energy-saving technologies;
- cooperation with other domestic and foreign institutions and organizations involved in development and implementation of energy-saving technologies, sustainable power engineering and renewables;
- promoting energy sources available regionally and locally;
- improving living conditions and the quality of life resulting from harnessing renewable energy sources.

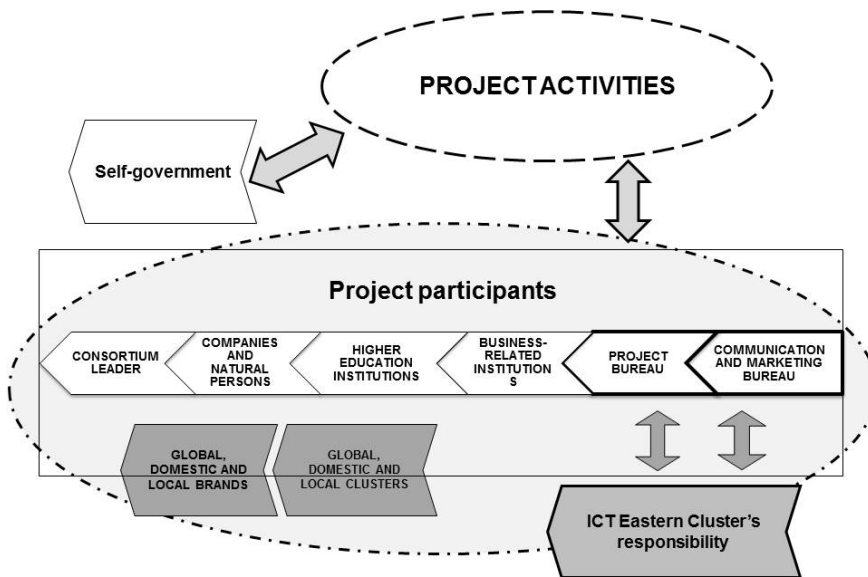


Figure 24. Eastern ICT Cluster – the structure of key projects

Source: Worked out by the author

Marketing activities of Eastern ICT Cluster are focused on the promotion of regional IT potential and building a regional brand. One of the most prominent examples of these efforts is the project ‘Lubelska Wyżyna IT’⁴⁷ carried out jointly with the Lublin city government.⁴⁸

⁴⁷ Official website of “Lubelska Wyżyna IT” <http://www.lwit.lublin.eu/> (downloaded on December 13, 2012)

⁴⁸ Official website of the Municipality of Lublin City, <http://www.um.lublin.eu/um/index.php?t=200&id=177665> (downloaded on December 13, 2012)

Lublin has a unique intellectual capital in the field of information and communication technologies. Presently, companies operating here employ over 5,000 IT experts and about 5,800 students studying various ICT-related fields of knowledge are enrolled at all Lublin-based universities, including almost 2,300 ICT students.

One of the key element of this project, which will be implemented within the next several years, is the promotion campaign addressed to pupils, students and graduates of universities in Lublin, as well as local small and medium-sized entrepreneurs. The campaign applied creative and dynamic forms of communication to encourage a positive energy which is the hallmark of economic brand 'Lublin. Inspires business.' In 2012, the campaign used 9 billboards and 350 posters to present selected stories of graduates who already had a successful career in innovative companies associated in Eastern ICT Cluster. Stimulating the development of local IT sector is presently one of the most important objectives of the Lublin city government. The authorities of the city of Lublin on many occasions expressed their commitment to the project. Krzysztof Żuk, President of the city of Lublin, once said that 'The local IT potential is exemplified by successful stories of our graduates who are now holding important positions in many Lublin-based companies. We want the addressees of our campaign recognize this potential and perceive local IT companies as reliable, trustworthy employers and solid business partners.'

The strategy of Eastern ICT Cluster for 2013 assumes further intensification of activities promoting regional IT potential. The cluster is planning to continue the promotion campaign 'Lubelska Wyżyna IT' and to organize several other promotional events, including 'Lubelska Wyżyna IT Days', which will be organized in collaboration with the Lublin city government and University of Maria Curie-Skłodowska in Lublin. The event will be addressed to students and employers operating in the ICT sector. The second edition of '3D Poland', a series of conferences and trade fairs will be organized in cooperation with Targi Lublin S.A. The cluster has also plans to initiate at least 5 research-and-development projects co-financed by the European Union and at least 5 commercial projects carried out by consortia established by the cluster members.

Final remarks

The main characteristic feature of the Cluster Wschodnia Wyżyna ICT is its high level of innovativeness and project-based management structure. The number of its members and dispersed structure stimulates activity of the cluster's participants. Activities of the cluster are focused on building what is often called 'the regional development cooperation platform'. An important fact is that the initiative is based on one of the main regional potentials – a strong sector concentration and the scientific potential centered around the ICT cluster. Members of

the cluster combine their capacities and potentials in order to develop innovative projects carried out in consortia under the newly defined smart specialization of the region, including projects in the field of renewable energy sources and activities responding to emerging regional and national development challenges.

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Joanna Machnik – Słomka*

6. The Use of the Triple Helix Model in the Silesia Region in the Context of the Innovation Policy

Introduction

The aim of the innovation policy of the Silesia Voivodeship is to improve the level of innovation, create conditions of achieving market leadership and ensure technological development. According to modern trends, the innovation policy is also oriented to attain perfection in selected areas. In order to achieve these goals, it is necessary to strengthen cooperation in economic environments, activities of public authorities and research communities in the region on the basis of the triple helix model.

Over a span of many years of transformation process, the approach to regional policy, including the innovation policy in the Silesia Voivodeship, has been constantly changing. The policy of supporting entrepreneurship prevailed in the 90s. It was focused on creating and developing local and regional infrastructure of business-oriented institutions. At the beginning of the 21st century, they set the base for the foundations of the pro-innovation policy. During that period, with the use of pre-accession funds and the EU structural funds, new institutions supporting innovation began to emerge, including technological parks, technological incubators, centres for technology transfer and venture capital funds. Currently, the institutional infrastructure of the region is relatively well-developed and is characterised by institutional maturity of the demand aspect of the pro-innovation policy in the region. The Silesia Province has the most centres for innovation and entrepreneurship – 96⁴⁹ (with a total number of 821 in Poland) including, among others, 8 technological parks (including: 4 technological parks which are fully operational, 2 at the start-up stage and 2 at the preparatory stage), 4 technological incubators, 7 pre-incubators and academic entrepreneurship incubators, 11 entrepreneurship incubators and 6 technology transfer centres. Moreover, the Silesia Province contains 5 seed capital funds, 3 business angel networks, 10 local and

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⁴⁹ Bąkowski A., Mażewska M., (ed.) Ośrodki Innowacji i Przedsiębiorczości w Polsce – Raport 2012, PARP, Warszawa 2012.

regional loan funds, 6 credit guarantees funds, 37 consulting and training centres, 4 centres coordinating Polish technological platforms⁵⁰.

The *Regional Innovation Strategy for the years 2013-2020 (2013-2020 RIS)* puts an emphasis on the fact that the region has not yet reached neither sufficient dynamics of innovation activities in the scale of the region nor stability of sources and flows of financing pro-innovation and innovation actions⁵¹.

The Silesia Voivodeship is the first region in Poland that developed its own innovation strategy based on the EU methodology which main purpose was to reach a consensus between various environments and subjects. In the process of creating and implementing the innovation strategy, and thanks to the regional consensus and partnership based on the triple helix model between the business and scientific communities and public sector, it was possible to carry out multiple enterprises and projects and implement various instruments of innovation policy. The RIS has been prepared and implemented in the Silesia Voivodeship by numerous representatives of the economy, science, business-oriented institutions and civil communities. Therefore, the involvement of these communities' representatives in the framework of the triple helix, and the fourth helix element, i.e. the society, is very noticeable. The provisions of the 2003-2013 Regional Innovation Strategy document as well as those included in the updated RIS for the years 2013-2020 have been prepared by various body assemblies of the region: during theme seminars and conferences, workshops, in the framework of the Regional Innovation Strategy Control Committee, during the sessions of the commissions appointed by the Silesia Voivodeship Assembly. Moreover, the Silesian Innovation Council was a consulting body in the works regarding preparing an updated strategy.

The Silesia Voivodeship has a major economic, social and research potential characterised by large cultural variety. Thanks to the resources of the Silesia Voivodeship, the biggest industrial belt was created. After the period of regional transformations, a new research and economic network is emerging. The Silesia Voivodeship, after twenty years of restructuring, is no longer a region of industrial monoculture. Instead, it has become a region of many industries formed by enterprises operating in branches traditional for the

⁵⁰ Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, June 2011, worked out within the framework of the systemic project carried out by the Marshal's Office of the Silesian Voivodeship 'Management, implementation and monitoring of the Regional Innovation Strategy of the Silesian Voivodeship'. The project was co-financed by the European Union within the framework of the European Social Fund – Operational Programme Human Capital for the years 2007-2013, Subaction 8.2.2 Regional Innovation Strategies.

⁵¹ Regionalna Strategia Innowacji Województwa Śląskiego na lata 2013-2020 [Regional Innovation Strategy of the Silesian Voivodeship for the years 2013-2020], Katowice 2012.

region, companies operating in completely new areas and, last but not least, specialised entities offering niche products and thanks to that, included in the global delivery chains.

The Silesia Voivodeship is a major academic and research centre in Poland (it is second only to Mazovia Voivodeship). There are 234 entities running R&D activities in the Silesia Voivodeship (it was ranked second in 2010)⁵². Restructuring of the economy has become a stimulant to changes in the R&D sector. Research institutes in the region adapt their offer and the scope of works for the changing reality. They also increase the intensity of international cooperation and their participation in European research and expert networks. Similar transformations concern the scientific activity of higher education institutions which additionally develop education in new fields of studies and specialisations⁵³.

6.1. Regional innovation policy of the Silesia Voivodeship vs. the region development

The Provincial Self-Government, pursuant to Art. 11.1 of the 5th June 1998 Act on Provincial Self-Government, determines the strategy of the voivodeship development which encompasses, among others, goals connected with improving the level of innovation and competitiveness of the province's economy. From the point of view of shaping the regional policy, it is particularly important - for identifying changes in the environment and further identification of strategic challenges of innovative development of the region - to take a common approach based on comparing processes of market changes with processes of changes in carrying out the development policy understood as public authority intervention⁵⁴.

Regional innovation policy in the Silesia Voivodeship is compatible with the regional development policy, which is reflected in prepared strategic documents. It concerns both 2003-2013 RIS and updated 2013-2020 RIS.

The 2013-2020 RIS was the first regional document oriented to improving the innovative processes and innovative character of the region. Pursuant to the EU methodology, the most important element was reaching a consensus in the region between respective participants on issues connected with supporting innovation. According to the then needs of the regional economy, and pursuant to the recommended the then EU methodology, these strategy was characterised by functional approach⁵⁵. Those actions were oriented to creating the complete set of instruments of support for innovation in the region.

⁵² Ibidem.

⁵³ Ibidem.

⁵⁴ Ibidem.

⁵⁵ Ibidem.

A follow-up to the line of thought included in the RIS was the technological foresight in the region started in 2006 and later on, the *2009 Programme for Technology Development*, which became a guide for development of the technology condition in specific technological areas. It also defined the following eight areas of technological specialisation of the region: medical technologies, technologies for the power industry and mining, technologies for the environmental protection; IT and telecommunication technologies; production and processing of materials; transport and transport infrastructure; machine, automotive, aerial and mining industries; nanotechnologies and nanomaterials. As a result of further works, the 2013-2020 RIS defined the following theme intelligent specialisations of the region: power industry, medicine, information and communication technologies.

In December 2012, the updated *2013-2020 RIS* was passed. The principles and goals of this strategy are compatible with the context set by the regional, domestic and European strategic documents, including:

- Europe 2020,
- Long-term National Development Strategy “Poland 2030. Third wave of modernity”,
- Medium-term National Development Strategy,
- Strategy for Innovation and Effectiveness of Economy,
- Strategy for Human Capital Development,
- Strategy for Social Capital Development,
- Strategy for “Energy and Environmental Security”
- Strategy for Silesia Province Development “Silesia 2020”⁵⁶.

In modern world, the trend of thinking characterised by global perception of resources and markets is dominant. Moreover, the concept of “nearness” is getting more and more blurred. In such circumstances, the role of the innovation policy of the Silesia Voivodeship is to disallow isolation in the administrative borders of the region and to answer to strategic challenges which will:

- Allow the selected communities in the region to become known in international networks and global markets;
- strengthen the selected communities just enough for them to become a magnet attracting global resources to the Silesia Province and create the “snowball effect”⁵⁷.

Pursuant to the EU and domestic innovation policy, the 2013-2020 RIS document is oriented not only to supporting activities in the area of technological innovations, but also to a broadly defined concept of innovation, encompassing also innovation in marketing, services and organisational innovation connected, among others, with management processes or creating new business models.

⁵⁶ Regionalna Strategia Innowacji Województwa Śląskiego na lata 2013-2020 [Regional Innovation Strategy of the Silesian Voivodeship for the years 2013-2020], Katowice 2012.

⁵⁷ Ibidem.

The key strategic challenges of the innovative development of the Silesia voivodeship are:

- risk management in financing innovative activity of enterprises,
- stimulation of innovative potential of capital groups and industrial corporations,
- information asymmetry reduction and knowledge management in the system of public support for innovation;
- diffusion of innovation focused on the user in the public services sector,
- development of the knowledge economy infrastructure,
- creation of intelligent markets for future technologies,
- shaping the culture of innovation⁵⁸.

One of the fundamental 2013-2020 RIS principles is to strengthen and convert the regional innovation system into the *ecosystem of innovation*, which aim is to strengthen the innovative environment. The concept of creating the ecosystem of innovation is compatible with the regulations of the European Commission in the field of the so called “third generation regional innovation strategies” included in the “Smart Specialisation Platform” handbook published in December 2011 and it is an answer to challenges that the regions currently have to face. There are relatively not that many breakthrough theories as regards ecosystems of innovation in comparison with the previous concepts, such as e.g. clusters. New concepts and definitions such as “ecosystems of innovation” often mean leaving behind the old reality in the pursuit of the current one. They also introduce fundamental changes in mainstream thinking to transform it into a new paradigm⁵⁹. These actions are leading towards new global network economy.

The identification of goals of the 2013-2020 RIS is based on two priorities of the Silesia Province’s ecosystem of innovation development and five strategic areas of public intervention. The priorities of development of the ecosystem of innovation are as follows:

- The increase and internal integration of the innovation potential level of the region.
- The creation of intelligent markets for the future technologies⁶⁰.

The strategic areas of public intervention are as follows: creation of communities of knowledge and innovation; development of technologically advanced networks of public services; reference of the regional system of innovation infrastructure; including the sector of small and medium-sized enterprises (SMEs), as a source of innovation, in the global networks; creating talents and improving competences⁶¹.

⁵⁸ Regionalna Strategia Innowacji Województwa Śląskiego na lata 2013-2020 [Regional Innovation Strategy of the Silesian Voivodeship for the years 2013-2020], Katowice 2012.

⁵⁹ Ptak K.: Ekosystemy innowacji, http://www.pi.gov.pl/Polityka/chapter_95499.asp, (downloaded on February 10,2013).

⁶⁰ Regionalna Strategia Innowacji Województwa Śląskiego na lata 2013-2020 [Regional Innovation Strategy of the Silesian Voivodeship for the years 2013-2020], Katowice 2012.

⁶¹ Ibidem.

6.1.1. Key enterprises based on the triple helix model connected with network cooperation and clusters' activity in the region

The cooperation between various entities, based on the triple helix model, in the Silesia Voivodeship is created in the framework of the Regional System of Innovation on the basis of the cooperation networks between organisations supporting business, the R&D sector, local government and companies. The creation of the aforementioned system was one of the fundamental goals of the Regional Innovation Strategy of the Silesia Voivodeship for the years 2003-2013. In 2011, the Marshal's Office of the Silesia Voivodeship commissioned preparing the document entitled "Current evaluation of the processes of implementing the Regional Innovation Strategy of the Silesia Voivodeship for the years 2003-2013. Final report". According to this document, "the Regional System of Innovation, based on cooperation networks, is functioning poorly – there are issues regarding maintaining its stability and internal integration.⁶²". On one hand, as the report shows, the Regional System of Innovation lacks sufficient cooperation, particularly between enterprises and the science sector. On the other hand, in comparison with other Polish regions, the cooperation is relatively intensive and based on broad cooperation of multiple institutions and organisations.

For greater integration of innovation environment in the region, the 2013-2020 RIS contains provisions on strengthening the regional system of innovation and its transformation towards the "ecosystem of innovation". Introduction of the concept of ecosystem for regional system of innovation is primarily connected with the necessity of encompassing, in a broader way, the issues of roles of actors in innovative development of economic, research and civil communities. Treating them as a whole allows to emphasise uniqueness and value of the region and, through that, to include identity and regional specialisation in the thinking processes regarding innovative development of the Silesia Voivodeship⁶³. The characteristic features of the ecosystem of innovation of the Silesia Voivodeship are: the regional information system on innovative activities in the region, 2 World Class Clusters, 4 objects of common R&D infrastructure of the region, 8 key centres of competences in priority areas of the Programme for Technology Development, 16 living labs concerning 8 intelligent markets, 32 UE framework projects led by regional entities, 64 R&D consortia in the region, 128 thousand persons employed in innovation enterprises, 256 companies out of 1000 categorised as innovation enterprises, EUR

⁶² Bieżąca ewaluacja procesów wdrażania Regionalnej Strategii Innowacji Województwa Śląskiego na lata 2003-2013. Raport końcowy [Working evaluation of the implementation of the Regional Innovation Strategy of the Silesian Voivodeship for the years 2003-2013. Final report], the Marshal's Office of the Silesian Voivodeship, Katowice, 2011.

⁶³ Regionalna Strategia Innowacji Województwa Śląskiego na lata 2013-2020 [Regional Innovation Strategy of the Silesian Voivodeship for the years 2013-2020], Katowice 2012.

521 million allocated for innovation activities, 1042 thousand citizens of the region encompassed by activities in the field of creativity and innovation.⁶⁴

There are numerous enterprises and projects implemented in the Silesia Voivodeship, which are based on the cooperation between three groups of communities (triple helix) connected with innovation policy. One of the key enterprises based on the triple helix cooperation regarding innovation policy in the region is the “*Management, implementation and monitoring of the Regional Innovation Strategy*” project. It has been carried out in subsequent editions since 2009 and it is co-financed from the means of the Human Capital Operational Programme. The Marshal’s Office of the Silesia Voivodeship is the project leader and the consortium members include: Academy of Fine Arts in Katowice (until 2011), Central Mining Institute, Silesian University of Technology, Gliwice Technopark (since 2011), University of Economics in Katowice.

The project’s beneficiaries are: entrepreneurs, higher education institutions and research workers, R&D units, business-oriented institutions, local governments. The structure of the implementation and management system of the RIS has been presented in figure 25.

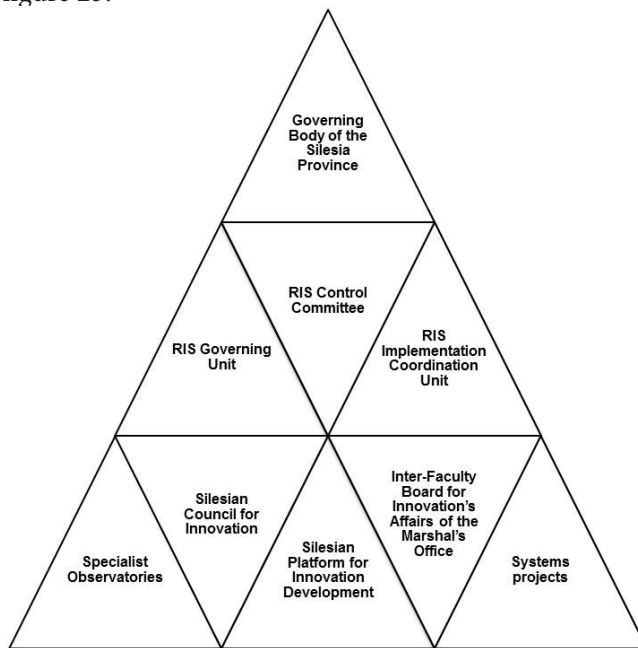


Figure 25. The structure of the implementation and management system of the RIS

Source: Regional Innovation Strategy of the Silesia Voivodeship for the years 2013-2020, Katowice 2012

⁶⁴ Ibidem.

Currently, the third edition of the systems project entitled “*Management, implementation and monitoring of the Regional Innovation Strategy of the Silesia Voivodeship*” is being carried out. This project is a regional platform for exchanging knowledge, cooperation and support, i.e.:

- the primary instrument for innovative and pro-technological development of the region,
- creating the system of education: trainings, graduate studies, workshops,
- supporting the system of cooperation and clusters,
- promoting innovation through development of specialised business services,
- mobilising regional financial potential for the development of entrepreneurship and economic diversity,
- supporting the RIS based on mutual trust, creativity and perfection,
- stable cooperation platform for innovation and information oriented to integrating scientific, research, industrial communities and local governments,
- place for exchanging experiences between science and business,
- promotion and animation of innovative actions in the framework of the Regional Platform for Innovation Development,
- stimulating creativity and innovation in the region through the promotion of “good practices”⁶⁵.

The *innovation animators* operate in the framework of the project. They cooperate with representatives of science and economy sectors as well as local and regional administration. They identify the needs and problems of organisations and entrepreneurs in the field of innovation and help with overcoming them.

Activities in the framework of the systems project in the Silesia Voivodeship entitled: “*Management, implementation and monitoring of the Regional Innovation Strategy*” are also aimed at providing support in the field of creating and developing *clusters* in the Silesia Voivodeship. Complementary activities carried out in this region, connected with preparing the new regional innovation strategy, the programme for technology development and programmes supporting development of innovation in the framework of the Regional Operational Programme emphasise the importance of creation and development of clusters in the region⁶⁶.

⁶⁵ http://ris.slaskie.pl/pl/artykul/o_projekcie/1332418875/0/249, (downloaded on December 10, 2012).

⁶⁶ Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, June 2011, worked out within the framework of the systemic project carried out by the Marshal’s Office of the Silesian Voivodeship ‘Management, implementation and monitoring of the Regional Innovation Strategy of the Silesian Voivodeship’. The project was co-financed by the European Union within the framework of the European Social Fund – Operational Programme Human Capital for the years 2007-2013, Subaction 8.2.2 Regional Innovation Strategies.

Clusters in the Silesia Voivodeship are considered to be one of the stimuli and catalysts for the regional development. *Silesian Cluster Forum* is an event organised in the region in the framework of the project and it is aimed at representatives and organisers of the Silesian clusters, business-oriented institutions, chambers of commerce and enterprises that either develop clusters or are interested in these matters. The Silesia Voivodeship, due to its historical conditions, is a very specific region: it is an agglomeration of developed clusters in the so called “old” industry branches. Nevertheless, this does not mean that they do not have potential for generating large scale of innovative solutions. However, because of the corporate relations and ownership relations, these industries are usually not the locations where the cluster initiatives emerge⁶⁷. There are more and more cluster initiatives emerging in the region in the selected technological fields that are priority for the Silesia Voivodeship. From the point of view of implementing cluster policy, it is much more justifiable, as emphasised by the authors of the assessment, to focus on new economic communities that emerge in various parts of the region. They are receptive to pro-cluster activities and they are flexible enough to test new solutions for branches or value chains in a “safe” cluster environment⁶⁸.

The provisions of the Regional Innovation Strategy of the Silesia Voivodeship indicate that by 2008 1000 small and medium-sized enterprises operating in 15 local and regional clusters had been active. The prepared Programme for Technology Development of the Silesia Voivodeship defines key technological sectors that should be developed in the region.

Authors of the report identified 26 cluster initiatives, from which 11 were identified as active. The number of these cluster initiatives is constantly growing in the region. Their main features are: orientation to key technologies that might have a future for the region, local or sub-regional agglomeration and orientation to possibilities of supporting the initiative through central or regional programmes⁶⁹.

⁶⁷ Ibidem.

⁶⁸ Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, June 2011, worked out within the framework of the systemic project carried out by the Marshal's Office of the Silesian Voivodeship 'Management, implementation and monitoring of the Regional Innovation Strategy of the Silesian Voivodeship'. The project was co-financed by the European Union within the framework of the European Social Fund – Operational Programme Human Capital for the years 2007-2013, Subaction 8.2.2 Regional Innovation Strategies.

⁶⁹ Ibidem.

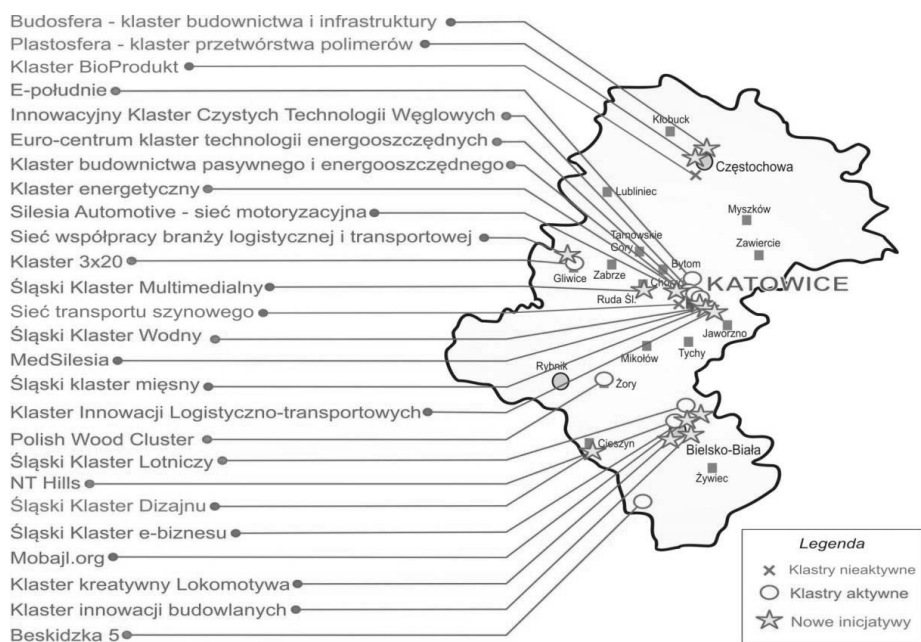


Figure 26. Map of clusters in the Silesia Voivodship.

Source: Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, 2011.

The above figure indicates that the biggest number of active clusters are located in the central sub-region in the Upper Silesian Agglomeration which is a result of the high concentration of enterprises in this sub-region.

6.2. Silesian Water Cluster as an example of the triple helix cooperation

One of the biggest clusters functioning in the Silesia Province that bases its cooperation on the triple helix model is the *Silesian Water Cluster (SWC)*. Cluster encompasses primarily regional area. The Silesia voivodeship is the cluster's "root" region. The remaining provinces in the framework of which the cooperation is maintained are: Małopolskie, Mazowieckie and Wielkopolskie Provinces. The idea of the cluster is compatible with the RIS of the Silesia Voivodeship. Both the initiative and the cluster's activity were included in the Development Strategy of the Silesia Voivodeship, which was created in cooperation with water supply branch enterprises. The importance of creating and developing clusters in the region is emphasised in the RIS and the Programme for Technology Development (PTD). The project of

creating this cluster was supported by the authorities and operates under the auspices of: Jerzy Buzek, Prof. Ph.D., Marshal's Office of the Silesia Province, National Council of Water Management in Warsaw, Silesian Voivodeship Governor's Office in Katowice, State Provincial Sanitary Inspector in Katowice. The endeavour to create the SWC in the territory of the Silesia Voivodeship was carried out by the Upper Silesian Waterworks Enterprise S.A., which is the biggest waterworks enterprise in Poland and one of the biggest ones in Europe. On 26th June 2007, in Katowice, the Upper Silesian Waterworks Enterprise S.A. put forward an initiative to sign the informal "Agreement on cooperation in the framework of the Silesian Water Cluster".

The main goal of creating this undertaking was the cooperation between waterworks and sewerage enterprises and those working for R&D units, higher education institutions and self-government units. Its purpose was to create conditions for development of these institutions and develop common policy in accordance with the National Development Strategy⁷⁰.

The main strategic goal of the Cluster is to maintain cooperation based on partnership that would lead to securing, improving and rationally using the available water resources of the Silesia Voivodeship⁷¹. The cluster's specialisation regards the water-supply and sewage-disposal branch according to the PKD 4100 (Polish Classification of Activity) as well as the environmental protection.

The Silesia Water Cluster's goals are as follows⁷²:

- common and multi-level activities for protection of the environment
- expanding and improving cooperation between business entities and institutions forming a cluster,
- creating opportunities of exchanging information on technologies and labour organisation of enterprises,
- creating common path of investment development,
- more efficient implementation of technical and scientific solutions, inventions, patents,
- efficient and effective leveraging of external financial means (structural funds for the years 2007-2013 for cluster members' activities),

⁷⁰ Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, June 2011, worked out within the framework of the systemic project carried out by the Marshal's Office of the Silesian Voivodeship 'Management, implementation and monitoring of the Regional Innovation Strategy of the Silesian Voivodeship'. The project was co-financed by the European Union within the framework of the European Social Fund – Operational Programme Human Capital for the years 2007-2013, Subaction 8.2.2 Regional Innovation Strategies.

⁷¹ Ibidem.

⁷² Official website of Silesian Water Cluster, www.klasterwodny.pl (downloaded on February 10, 2013).

- putting new products and services on the market,
- gaining foreign partners for cooperation,
- participating in international projects,
- more effective usage of potential of the personnel and providing possibilities of their education for the needs of the branch,
- creating new jobs,
- constantly raising qualifications of the sector's personnel,
- promoting entrepreneurship and putting emphasis on pro-innovation attitudes,
- creating attitudes of respect for the environment through more effective co-operation with education institutions,
- creating the best possible image of the Cluster by means of common promotional actions of individual members, creating the cluster's official website, logo, establishing contacts with media.

The main areas of the cluster's activity are⁷³:

- leveraging external financial means;
- common actions for environmental protection;
- activities for increase in productivity;
- implementing new products and services;
- conducting research and scientific works conducive to the development of the water-supply system of the Silesia Voivodeship;
- developing internal cooperation, partnership and cooperation with regional, domestic and foreign partners and, among others, organising economic missions, events, exhibitions;
- promotional and information activities.

The goal of the cluster is to coordinate actions conducive to the improvement of reliability and security of functioning of water-supply systems and the implementation of sustainable sewage economy for the purposes of protecting water and land ecosystems⁷⁴. The cluster possesses common website and promotional materials (e.g. folders, leaflets).

⁷³ On the basis of: Statut Stowarzyszenia Śląski Klaster Wodny [Articles of Association of the Silesian Water Cluster], www.klasterwodny.pl.

⁷⁴ Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, June 2011, worked out within the framework of the systemic project carried out by the Marshal's Office of the Silesian Voivodeship 'Management, implementation and monitoring of the Regional Innovation Strategy of the Silesian Voivodeship'. The project was co-financed by the European Union within the framework of the European Social Fund – Operational Programme Human Capital for the years 2007-2013, Subaction 8.2.2 Regional Innovation Strategies.

6.2.1. Cluster's organisational structure

The Cluster consists of three main types of entities operating in the framework of the cluster on the basis of the triple helix concept: enterprises, primarily branch enterprises, public institutions (self-government units, supporting institutions), research community institutions

The founding members of the SWC are⁷⁵:

- **Branch companies (water-supply and sewage-disposal companies):** Upper Silesian Waterworks Company S.A. in Katowice, District Waterworks and Sewerage Company S.A. in Tychy, District Waterworks and Sewerage Company S.A. in Katowice, Waterworks and Sewerage Company Sp. z o.o. in Tarnowskie Góry, Waterworks and Sewerage Company Sp. z o.o. in Gliwice, Municipal Waterworks and Sewerage Company Sp. z o.o. in Piekary Śląskie, Waterworks and Sewerage Company Sp. z o.o. in Chorzów-Świętochłowice, Waterworks and Sewerage Company Sp. z o.o. in Zabrze, Waterworks and Sewerage Company Sp. z o.o. in Dąbrówka Górnicza, Municipal Waterworks and Sewerage Company Sp. z o.o. in Będzin, Municipal Engineering Company Sp. z o.o. in Czechowice-Dziedzice;
- **Public institutions (self-government units):** Marshal's Office of the Silesia Voivodeship, District in Pszczyn, Commune Council in Chybie;
- **Research community institutions:** Silesian University of Technology in Gliwice, University of Silesia in Katowice, University of Economics in Katowice, Cracow University of Technology;
- **Non-waterworks institutions:** Institute of Meteorology and Water Management in Warsaw, Centre for Research and Environmental Control in Katowice, Chamber of Commerce and Industry in Katowice, Museum of Upper Silesia in Bytom.

The cluster consists of 64 members⁷⁶:

- 14 large water-supply and sewage-disposal enterprises,
- 26 small and medium-sized enterprises,
- 4 institutions supporting the business-oriented institutions,
- 14 other institutions, including self-government institutions.

⁷⁵ Silesian Water Cluster, www.klasterwodny.pl (downloaded on February 10, 2013).

⁷⁶ Stachowicz J., Knop L., Machnik-Słomka J., Olko S., Stachowicz-Stanusch A., Baron M., Jabłoński M., Ekspertyza – klastry województwa śląskiego – rekomendacje dla dalszego rozwoju, Politechnika Śląska, June 2011, worked out within the framework of the systemic project carried out by the Marshal's Office of the Silesian Voivodeship 'Management, implementation and monitoring of the Regional Innovation Strategy of the Silesian Voivodeship'. The project was co-financed by the European Union within the framework of the European Social Fund – Operational Programme Human Capital for the years 2007-2013, Subaction 8.2.2 Regional Innovation Strategies.

The number of Cluster's members is expected to grow.

The main coordinator and leader of the cluster is the Upper Silesian Waterworks Company (USWC). In March 2009, the Silesian Water Cluster Association was established. The cluster's structure consists of: Coordinator, Governing Body of the Cluster's Association, General Assembly of the Cluster's Members.

6.2.2. Managing the cluster and results of the initiative

The core of the cluster consists of waterworks and sewerage branch companies, including suppliers and producers of devices and means necessary for the technological process of conditioning water and sewerage as well as suppliers of laboratory equipment. In the framework of the Cluster, these enterprises cooperate with supporting, research and scientific institutions and self-government units from their environment. Communication within a cluster is based on: regular meetings of entities in a cluster, common integrative events, common communication platform (such as the website, phones, e-mails, mail). Participating in the SWC provides the opportunity to access markets through common workshops, conferences, meetings, trade fairs and by establishing domestic and foreign cooperation.

The main cluster effects are:

- taking common promotion actions,
- common trade fair and exhibition activity
- organising cyclical meetings and integrative events,
- organising technological workshops, conferences,
- organising trainings,
- international cooperation, among others, with the Catalan Cluster.

In the field of activities connected with promotion and implementation of innovation in waterworks companies, the SWC, mainly in cooperation with the Upper Silesian Waterworks, Regional Centre for Innovation and Technology Transfer operating in the Upper Silesian Agency for Transformation of Enterprises S.A. and the Silesian University of Technology in the framework of the Enterprise Europe Network, organised the Water Forum, technological workshops entitled "New technologies in the water-supply and sewage-disposal management" and a trip to Lyon in order to participate in the broker meetings during the POLLUTEC Trade Fairs⁷⁷. Actions initiating cooperation between the R&D sector and waterworks companies in the framework of, among others, submitting common EU research projects are taken.

⁷⁷ Machnik-Słomka J., Rola klastrów w podnoszeniu innowacyjności przedsiębiorstw i regionów na przykładzie Śląskiego Klastra Wodnego oraz Katalońskiego Klastra Wodnego (in:) Machnik-Słomka J., Kłosok-Bazan I. (ed.), Wdrażanie innowacji w gospodarce wodociągowej, IBS PAN, 2009.

In the framework of the cluster's activity, a couple of projects have been prepared and submitted, among others in the framework of; the Polish Agency for Enterprise Development's programme entitled "Supporting the cluster's development"; "Technological Initiative"; Seventh EU Framework Programme – Regions of Knowledge. Although these projects did not receive any subsidies, they still are a prime example of activity of cluster's members, particularly of the Upper Silesian Waterworks Company. Currently, the SWC Association implements a project subsidised from the means of the Regional Operational Programme of the Silesia Province for the years 2007-2013 entitled "Development of the Silesian Water Cluster".

The cluster's activity is financed, among others, from the SWC Association's membership fees, which was formed in March 2009. The current activities are financed from the means of the project implemented by the Association which is subsidised from the means of the Regional Operational Programme of the Silesia Province for the years 2007-2013 entitled "Development of the Silesian Water Cluster".

Both domestic and foreign cooperation are established in the framework of the SWC activity. The SWC established cooperation with the Catalan Water Cluster (Catalan Water Partnership) which was formed abroad, on 30th April 2008 as the Association for Innovation and Promotion of the Catalan Water Sector. The aim of the cooperation between these Clusters is to exchange experiences, cooperate in the aspect of implementing innovation and transferring technologies⁷⁸. Cooperation between these Clusters consists in visits and participation in organised conferences and trade fairs. Moreover, economic mission to the Catalonia has been organised. Also, the cooperation in the framework of the Upper Austria – Upper Silesia Economic Platform has been established.

Representatives of the cluster participate in meetings, trainings and conferences at the regional level. These events provide an opportunity to exchange experiences between various clusters in the framework of the Silesian Cluster Forum.

Final remarks

The Silesia Voivodeship is an example of the region in which numerous enterprises regarding innovation policies are implemented. These enterprises are based on cooperation between three communities (triple helix). The triple helix model can ensure more optimal cooperation between three types of organisations: R&D sector institutions, public institutions and enterprises. The regional cooperation is not solely based on traditional innovative Triple Helix model, which based on relations between universities, industry and public authorities. Nowadays, the concept

⁷⁸ Ibidem.

based on fourth (Quadruple Helix) and fifth Helix element (Quintuple Helix) is becoming more and more significant. From the point of view of the fundamentals of media and public fundamentals of culture, the Quadruple Helix innovation system introduces also the community⁷⁹. On the other hand, Quintuple Helix puts an emphasis on natural social environment for creating knowledge and innovation⁸⁰.

The key project in the region based on cooperating in accordance with the Triple Helix concept connected with the innovation policy is the “*Management, implementation and monitoring of the Regional Innovation Strategy*” project. Enterprises and projects on supporting the creation and development of cooperation networks and clusters through implementation of various instruments of the innovation policy deserve special attention.

What is very important for the cluster development in the region, i.e. for the analysed Silesian Water Cluster is the system supporting their development in the framework of the regional system of innovation, or the eco-system of innovation. One of the fundamental aims in the Silesia Voivodeship is to develop the regional system of innovation and transform it into the eco-system of innovation which will provide conditions for creating innovation and will have the ability of self-improvement. The goal is to create such system of innovation that will both improve internal connections and simultaneously gain resources and develop connections on a larger scale. The image of the future of the region – the main concept of its innovative development – can be expressed in the eco-system of innovation of the Silesia Voivodeship based on dynamically changing innovative communities⁸¹.

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⁷⁹ Carayannis E., Campbell D., *Open Innovation Diplomacy and a 21st Century Fractal Research, Education and Innovation (FREIE) Ecosystem: Building on the Quadruple and Quintuple Helix Innovation Concepts and the “Mode 3” Knowledge Production System*, Springer Science+Business Media, LLC, 2011.

⁸⁰ Ibidem.

⁸¹ *Regionalna Strategia Innowacji Województwa Śląskiego na lata 2013-2020*, Katowice 2012.

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7. Metal Cluster of The Lubuskie Region – Interaction in The Triple Helix

7.1. Cluster policy of the Lubuskie region

Cluster policy is formulated and implemented in respective continents and states at various levels. Unlike e.g. Spain, Slovenia or Italy⁸², Poland has not developed national cluster policy so far, even though the European Commission encouraged to do so in its communication in 2008⁸³. Institutionalisation of this policy at a macro-level in Poland did not occur until after the half of the first decade of the 21st century and in an indirect way, through reference to clusters in numerous documents on innovation, knowledge transfer and competitiveness⁸⁴. It is a new way of creating competitiveness of enterprises, regions and economy e.g. thanks to the concept of using internal socio-economic resources.

In a narrow view, cluster policy is understood as public support for creation and development of clusters, including any actions supporting cluster initiatives, using various instruments. In a broader context, it is understood as an element of economic policy supporting clustering, intelligent specialisations connected with the whole technological infrastructure and actions for innovation and competitiveness, thought the development of entrepreneurship and cooperation. Its implementation at the meso-level (regions) is varied. It is well-justified by the determinants of development, i.e. needs, specific factors, the quality of business environment, the role of public entities in shaping clusters etc. This determines the detailed goals of the province's cluster policy.

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⁸² Barras S., Tsagdis D., *Polityki klastrowe w Europie. Przedsiębiorstwa, instytucje i zarządzanie*, PARP, Warszawa 2011.

⁸³ *Kierunki i polityka rozwoju klastrów w Polsce*, Ministerstwo Gospodarki, Warszawa 2009, p. 16.

⁸⁴ *Raport otwarcia nt. polskiej polityki klastrowej*, PARP, Warszawa 2008, p. 21.

In Poland, the development of clusters takes place, to a small degree, through the involvement of private means and to a much larger degree through the involvement of domestic and foreign funds. The Sixth and Seventh EU Framework Programme and the EU structural funds, including the Regional Operational Programmes (ROP) played a very important role in the latter group. The Norwegian Financial Mechanism and the Swiss-Polish Cooperation Programme were also considered significant to some degree.

It is important to emphasise one more that cluster policy is not an independent phenomenon in Poland. It always occurs with other policies: industrial, cohesion, social, sustainable development and innovation and competitiveness policies. However, in some provinces there are separate actions from the ROP for clusters and in others there are indirect actions or virtually no support whatsoever⁸⁵. These are grass-roots initiatives of the local authorities and local communities regarding methods of economic activation of the region.

The Lubuskie Voivodeship, where 10 existing clusters were indicated in 2006⁸⁶, is a region characterised by exclusively indirect methods of supporting their development by realising goals of increasing innovation, competitiveness, knowledge transfer etc.

The evaluation of the cluster policy in the Lubuskie region was carried out below, taking into consideration six principles formulated in the Polish Agency for Enterprise Development's document on the increase of efficiency of future cluster policy in Poland⁸⁷ which can be compared with the triple helix model. The aforementioned principles have been presented below.

1. Supporting the network character and cooperation e.g. through cluster coordinators, development of intelligent specialisations, granting public means for projects regarding cooperation and partnership.
2. Combining grass-roots (initiative) and top-down (creating favourable conditions and incentives) approaches in supporting clusters development.
3. Creating an effective ecosystem of institutions for supporting clusters.
4. Focusing public support on clusters having the biggest potential of developing intelligent specialisations.
5. Coordinating public instruments and policies round the key clusters.
6. Private co-financing of clusters development.

It is worth mentioning that organised actions for creating and developing clusters can have grass-roots or top-down beginnings. This process depends on

⁸⁵ Ibidem.

⁸⁶ Cichoń J., Figiel S., *Konkurencyjność polskiej gospodarki a rozwój klastrów*. VIII Kongres Ekonomistów Polskich nt. Polska w gospodarce światowej; szanse i zagrożenia rozwoju. PTE Warszawa 2007.

⁸⁷ *Kierunki i polityka rozwoju klastrów w Polsce*, Ministerstwo Gospodarki, Warszawa 2009, p. 23.

the level of social capital, activity of managers of enterprises, state policy (formal institutions and instruments of support) and entrepreneurship of local governments and knowledge sector entities (R&D sector, higher education institutions). Therefore, respective initiatives will have different periods of developing and transforming into clusters or failing in cases of unfavourable development conditions⁸⁸. This is why there are currently 8 cluster initiatives and 8 clusters in the Lubuskie Voivodeship, including the most developed Lubuskie Metal Cluster (LMC)⁸⁹.

Characteristic features of the Lubuskie region that determine its development are high level of area forestation, low population density, low urbanisation level, small number of small, medium-sized and large enterprises (micro-enterprises are predominant) and entities of technological infrastructure (R&D). However, even though the data of the Central Statistical office shows that the level of urbanisation of the Lubuskie Voivodeship is low, this sector offers the most jobs and is followed by the trade and repair sector in this regard. Education was ranked third⁹⁰. Therefore, the *2020 Development Strategy for the Lubuskie Voivodeship* points out the chances resulting from the inter- and intra-regional cooperation, including international cooperation. The strategic and operational goals included in the strategy focus on increasing the level of entrepreneurship and innovative approach through the growth of the innovative potential of the science sector, educational level of the society, facilitation of the mechanisms of transferring innovation and technologies and the improvement of cooperation between the economy and scientific organisations.

The aforementioned goals lack any reference to the role of local governments and financial support in the presented subject of deliberations. It had not been encompassed until the *2010 Regional Strategy for Innovation*, which focused not only on financial assistance but also on “clusters of enterprises (cluster) and animation of innovative environment through combining business services with various forms of aid for companies in the framework of technological parks, business spheres and industrial parks on a specified developed terrain”⁹¹. The operational goal no. 3.2 of this strategy includes “the support for the system of cluster creation”⁹². Also, the *Regional Operational Programme for the Lubuskie Voivodeship for the years 2007-2013* indicates the significant role of the cluster structures in development of this voivodeship and the need for providing support for financing of these initiatives as well as the transfer of knowledge and innovation (activity no. 2.4). Moreover, “the development of the cluster concept is supported also by the biggest association of

⁸⁸ Raport otwarcia nt. polskiej polityki klastrowej, PARP, Warszawa 2008, p. 19.

⁸⁹ Data acquired from the Agency of Regional Development S.A., Zielona Góra, status as at the end of 2012.

⁹⁰ Klastry w województwie lubuskim, PARP, Warszawa 2011 p. 3.

⁹¹ Lubuska Regionalna Strategia Innowacji 2010-2015, p.131

⁹² Lubuska Regionalna Strategia Innowacji 2010-2015, p.108.

entrepreneurs in the Lubuskie voivodeship, i.e. the Lubuskie Region Employers' Organisation in the field of consulting and training courses regarding clustering.

Summing up, it can be assumed that although the regional policy reflected in the aforementioned document contains the possibility of cooperation encompassed by the triple helix model, it has not been much active yet. It is proven by the fact that the principles defined by the Polish Agency for Enterprise Development for the domestic cluster policy have not been fully reflected in these documents as regards the Lubuskie Voivodeship (some of them have not been reflected at all). Moreover, there is no priority of outlays on actions conducive to innovative activity. Outlays on R&D in this region are among the lowest in the country. It seems that the hypothesis on mutual conditions for development of clusters and regions has been confirmed in the Lubuskie Voivodeship⁹³. Therefore, the current cluster policy carried out in connection with other policies can be treated as a prelude to the anticipated horizontal, soft and more direct policy. Such way of strengthening of this policy and making it independent could result in the creation of the Western series of intelligent development of border regions.

7.2. Lubuskie Metal Cluster – good practices

Lubuskie Metal Cluster was established in 2007 as a result of the agreement on the cluster initiative of the metal branch enterprises' group from Gorzów Wielkopolski and northern part of the Lubuskie Voivodeship (Strzelce Krajeńskie, Drezdenko, Stare Kurowo, Barlinek). Enterprises associated in a cluster are performing the following activities: production of steel constructions for the industry, building trade, agriculture, energy sector and environmental protection, production of machines, devices and automated production lines for motor industry, power industry, processing industry, spare parts production, machines and devices components, aluminium parts processing, pressure-moulded mainly for the motor industry. Main technologies the LMC is focused on are: machining, welding technologies, machines and devices assembly, plastic working and cog wheel working. The cluster also undertakes actions supporting technical education in vocational schools in the Lubuskie region and the promotion of the metal industry in this Voivodeship. Integration of metal enterprises and enterprises operating in its environment as well as the exchange of the economic information between cooperating entities of the metal industry were the result of the cluster's activity.

The LMC was established in response to the need of increasing the level of competitiveness of the metal industry in the Lubuskie Voivodeship. Its primary goal

⁹³ Putkiewicz W., Stokowska D., *Klastry a rozwój regionalny i lokalny. Wzajemne uwarunkowania*, (in:) Bojar E. (ed.), *Klastry jako narzędzie lokalnego i regionalnego rozwoju gospodarki*, Politechnika Lubelska, Lublin 2006 p. 223.

was to implement in-depth organisational, technical and technological changes in enterprises grouped in a cluster. The aforementioned goals are:

1. Integration of metal enterprises and enterprises operating in its environment and implementation of common economic initiatives;
2. Providing support for development and promotion of economic entities in the metal branch; coordination of actions connected with solving organisational, technical, commercial, cooperative, developmental and training issues;
3. Assistance in the exchange of information between cluster members and the economic, administrative and research and science environment'
4. Cooperation with local governments and state administration, research institutions and non-governmental organisations in the field of creating favourable conditions for grouped economic entities;
5. Promotion of the metal industry of the region.

The cluster executes its goals through organising a system of collective purchase of materials and components for production, organising a transaction system for purchases and selling production capabilities, organising the system of hiring and training the employees in professions and specialisations needed by grouped enterprises. It also conducts analyses and studies for improving competitiveness, innovative character of products and processes, development of human capital, gaining funds for development, developing ready markets, consulting and counselling, realisation of various forms of production and collective gaining of funds for statutory activity. These actions were defined as cluster's *competences*⁹⁴.

7.2.1. LMC's organisational structure and roles played by respective entities

The LMC association was registered in the National Court Register on 30th May 2008 by 19 employees from metal branch enterprises and business environment institutions. Currently, the Association has 24 members, including 15 enterprises from a branch strictly related with the metal industry, 3 enterprises indirectly connected with industry but cooperating and integrated in a cluster, 4 business environment institutions, 1 associated research and scientific entity – the State Higher Vocational School (SHVS) in Gorzów Wielkopolski and 1 post-secondary school – Mechanical Engineering School Complex in Gorzów Wielkopolski. The LMC enterprises employ a total number of 2320 persons and specialise mainly in: production of welded steel constructions (HOLDNG-ZREMB GORZÓW, METPOL-BARLINEK, MEPROZET-DREZDENKO, MEPROZET Stare Kurowo, POM PPHU, ENERGOREM), production of wood processing machines (GOMAD

⁹⁴ On the basis of: *Klasy w województwie lubuskim*, Wyd. PARP, Warszawa 2011, p. 11.

Wood Processing Machines Factory), production of steel constructions, machines and devices for industry, including motor, aerial and agricultural industries (HTMP – L&P Group, PUH TEST, SPARTHEM, MESTIL), technologies of metal moulding and processing (AE GROUP POLSKA, HACON), energy and industry sectors construction, creation of industrial installations, relocating production lines and factories (GOTECH, ENERGOREM, STILTRANS).

Companies associated in a cluster from outside the metal branch cooperate with the members of the cluster in the field of passengers and goods carriage, transport, motor services, spare parts trade (PKS Sp. z o.o.). They support the cluster members with IT solutions (ProSYSTEM) and provide assistance services such as: machines and forklifts repairing and maintenance, waste management (STILTRANS, Waste Management Facility in Gorzów).

Institutions from the business environment operating in a cluster and for the cluster are: Employer's Organisation of Lubuskie (under a current name of Employers of Lubuskie) which role is to protect the right and represent interests of associated members, Association of Polish Engineers and Mechanical Technicians (department in Gorzów Wielkopolski) which purpose is to promote science, technology, innovation and information in the field of mechanics, technologies of production and extraction and technical safety of products with the possibility of certification of products, among the LMC members, as well as the Provincial Facility of In-Service Training (seated in Gorzów Wielkopolski) which provides the cluster's members with assistance, consulting and information services. It is also a member of the LMC training projects.

The supporting role is also played by the Kostrzyn-Słubice Special Economic Zone, where operates the enterprise (with the Dutch capital) actively involved in the HTMP cluster - High Tech Mechatronics Poland, which creates and assembles industrial devices, machines, components and produces spare parts in the L&P Group.

The higher education institution associated in the LMC is the State Higher Vocational School in Gorzów Wielkopolski. It has a dual purpose in the cluster. On one hand, the cluster's members are involved in practical in-service training of engineers, mechanics and automation experts for the labour market of Gorzów Wielkopolski. On the other hand, partners take common actions for creating Technological Park for the Metropolitan Area of Gorzów Wielkopolski. In the framework of the in-service training, thanks to common efforts of the cluster's members, a new technical department was created in 2010 – *Machine Engineering and Design*. In its framework, the cluster organises paid internships for students in cluster's enterprises, as well as trainings for graduates. It has also subsidised purchasing of the specialist technical literature for the State Higher Vocational School's library and rendered measuring laboratories available for the practical classes, which was a condition for starting such a specialisation. Currently, compa-

nies associated in a cluster transfer their own devices and industrial equipment to the aforementioned higher education institution in Gorzów in order to establish a very basic didactic laboratory for technical specialisations in the State Higher Vocational School.

In order for the cluster to be a successful economic initiative, it is necessary to establish cooperation between local governments. Therefore, the LMC signed a proper cooperation agreement with the Mayor of Gorzów Wielkopolski at the beginning of 2009. This cooperation has led to measurable activities in the field of creating the Technological Park for the Metropolitan Area of Gorzów Wielkopolski.

In the framework of the common initiative taken by the cluster, city's authorities and the State Higher Vocational School, an agreement on creating technological park in Gorzów under the name of Technological Centre of Gorzów (TCG) was signed in 2012. One of the three elements of this Centre, apart from the Research and Development Centre ECO-INNOVATION and the Continuing and Vocational Education Centre, is the Environmental Laboratory for engineering specialisations of the State Higher Vocational School. The On 2h May 2012, the Governing Body of the Lubuskie Voivodeship defined the creation of the Park in Gorzów as one of the key regional investments to be considered in the *2020 Development Strategy for the Lubuskie Voivodeship* and in the project of updating the *2010 Regional Strategy for Innovation*.

In March 2013 at the conference on *Principles of the Regional Operational Programme for the Years 2014-2020 in the context of supporting higher education and R&D infrastructure*, a schedule of works on implementation of the concept of creating TCG was presented.

In 2010, the LMC also signed an agreement with the University of Zielona Góra on scientific, research and training cooperation and in the field of practical training. The cluster's members declared the willingness to use laboratories of the University, which is the biggest higher education institution in Lubuskie, and to undertake common actions to develop and market new technologies. Simultaneously, the cluster allows students of technical specialisations at the University of Zielona Góra to undergo paid professional trainings in one of the LMC enterprises.

Enterprises from the metal industry that are members of a cluster subsidised the purchase of a specialist technical literature for the State Higher Vocational School's library and equipped the Mechanical Engineering School Complex in specialist didactic accessories. Moreover, classes that train students as mechanical technicians began to operate under the auspices of these enterprises.

Research activities of the cluster's members are executed also at the two lab and research centres, which are members of the group associated in the LMC. These centres are the PUH "TEST" Materials Research Laboratory (the Laboratory is the real member of the "POLLAB" Polish Club of Research Laboratories) and the Waste Management Facility's Laboratory.

In March 2013, the cluster signed a cooperation agreement with the Local Government of the Lubuskie Voivodeship. The aim of this agreement was to improve innovation in the Lubuskie region and promote the metal industry as vital for the region's economy. It has to be emphasised that the metal industry was ranked first as regards the sold production size of the industry in 2012 and amounted to PLN 7.226.6 million for the year 2012 (the wood industry and food processing industry were ranked respectively second and third), which was 28% of the total sold production of the industry in the Lubuskie Voivodeship⁹⁵. Simultaneously, the metal industry production provides 33% of jobs in the Voivodeship. The scale and size of the metal branch lead to an assumption that this field may become a regional speciality.

7.2.2. Organisational and legal form, characteristics and actions' results of the LMC

The LMC operates as an association pursuant to the *Law on associations* act of 7th April 1989 and adopted statute. According to the LMC's source documents, the LMC Association is the coordinator of the industrial cluster. This association was formed by 19 natural persons – directors and chairmen of companies or institutions that later on joined the cluster as supporting members⁹⁶.

Such organisational and legal form was necessary as it provides greater flexibility in management (in comparison with partnership), greater freedom of voluntariness and social involvement of members and greater range of formalisation as compared to agreements, informal associations or partnership contracts. The

⁹⁵ Biuletyn Statystyczny Województwa Lubuskiego 2012 [Statistical Bulletin of the Lubuskie Voivodeship 2012], published by the Statistical Office in Zielona Góra, Zielona Góra, February 2013. The following values of production sold came under metal industry: production of metals, production of metal products, production of machinery and equipment, as well as the production of motor vehicles, trailers and semi-trailers.

⁹⁶ Those were: Ryszard Augustyn – High Tech Mechatronics Poland HTMP, Ryszard Barański – Lubuska Organizacja Pracodawców, Mariusz Batura – PUP Gotech Sp. z o.o., Witold Bohdanowicz – Stiltrans Sp. z o.o., Krzysztof Częstochoński – PKS Gorzów, Andrzej Graczykowski – Fabryka maszyn do drewna Gomad Sp. z o.o., Janusz Gramza – Lubuska Organizacja Pracodawców, Zbigniew Gińko – Meprozet Drezdenko, Jacek Iwaszuk – Inter Sicherheits Service Sp. z o.o., Janusz Jabłoński – Metpol Barlinek, Paweł Kochanowski – Spartherm Sp. z o.o., Janusz Kwilosz – Przedsiębiorstwo Produkcji Katalizatorów Lindo-Gobex Sp. z o.o., Tomasz Łacny – AE Group Polska Sp. z o.o., Czesław Magała – Gorzowska Fabryka Maszyn Goma Sp. z o.o., Zbigniew Marcinkiewicz – PPUH POM Sp. z o.o., Roman Mizerny – Holding Zremb Gorzów S.A., Dariusz Piasek – Staltech Sp. z o.o., Zbigniew Rudowicz – ZM Mestil Sp. z o.o., Cezary Stańczyk – Prosystem Systemy Komputerowe.

association consist of: members' general assembly, governing body and auditing committee. The association's statute contains provisions that only natural person can be the ordinary member. Legal persons and natural persons, i.e. institutions and enterprises, can be supporting members. According to the Association's Governing Body, organising cluster in such a way facilitates its functioning and is based on personal involvement of chairmen and directors – physical founders of the Association. Organisations, institutions and enterprises willing to join the cluster must issue a statement on joining the LMC Association. Then, the Association's Governing Body, by issuing a proper resolution, decides whether or not they can be accepted as members.

Pursuant to the Association's Statute, the LMC can be in possession of the following estate: real property, personal property, funds which must come from: registration and membership fees, donations, legacies, inheritance, incomes from the Association's estate, subsidies, subventions, incomes from business activity of the Association and supporting member's benefits. The main source of financing of the cluster's activity are fees which rate is defined by the Members' General Assembly. It has been assumed that fees for supporting members will amount to PLN 200 per month and PLN 100 per year for ordinary members. Fees cover office costs of the Association and ½ time salary of the LMC coordinator – the office director and ¼ time salary of the director's assistant – the LMC office secretary. Financing of the exhibition activity (trade fairs) or study visits of the cluster members usually comes from the cluster members' own funds or from financial means of implemented projects.

The cluster's governing body regretted that it had not applied for financial means from the 5.1 PO IG activity (Support for the development of cooperative connections of supra-regional importance) for cooperative connection in the early stage of development, i.e. connection that was made no earlier than 18 months before submitting an application to the SHVS. However, it has to be emphasised that the lack of public means for incubation did not bear any negative impact for the cluster's development.

7.2.3. Competitive activity and position

Although the LMC has a local character, it associates companies and institutions which are located mainly in the northern parts of the Lubuskie Voivodeship. It undertakes regional, nationwide and international initiatives. As a cluster, it participates in the Subcontracting Industrial Corporation Trade Fairs, which are a part of the International Trade Fairs of Poznań. It also participates in cooperative exchange and cooperates with the Cluster of Innovative Technologies in Production from the Voivodeship of Lower Silesia.

Exchange of knowledge and experiences in the field of innovation in a metal branch between Brandenburg and the Lubuskie voivodeship was a result of international cooperation of LMC in the TINA project. In the framework of TINA project, entrepreneurs had an opportunity of participating in a cyclical study visits to, among others, Linz, Austria or Cottbus, Germany. Such branch meetings allowed to become familiar with innovative technologies of, among others, welding or laser metal processing and to establish business relationships with foreign partners, transfer knowledge during technical workshops in the Brandenburg Technical University – BTU. In the view of the LMC Governing Body, it was invaluable to establish tighter cooperation between the LMC and the twin-profile cluster, i.e. profil.metall Netzwerk Stahl- und Metallverarbeitung in Brandenburg und Berlin and the aforementioned BTU and Panta Rhei GmbH, which is a company of this University.

Moreover, an agreement on establishing cooperation with *Netzwerk Stahl- und Metallverarbeitung in Brandenburg und Berlin* (Steel and Metals Processing Sector Cluster in Brandenburg and Berlin) was signed. The aim of this agreement is primarily to develop international connections between clusters, transfer knowledge together with the best possible practises and to create a common cooperation platform. The LMC is also a partner of the bbw Education Centre in Frankfurt on the Odra river ((bbw Bildungszentrum Frankfurt Oder GmbH) in implementing the INT LERNEN project – “*Supra-border development of the training personnel in the field of mechanics and electricity exemplified by the frontier region of Eastern Brandenburg – Western Poland*”, carried out from the means of the EFS Operational Programme of Brandenburg for the years 2007-2013.

The LMC Association is evaluated in a region as the only permanent tie in a form of a cluster in the Lubuskie Voivodeship⁹⁷. It consistently implements the policy of promotion of cluster’s activity and enterprises from branches associated in a cluster. It actively cooperates with schools in the field of in-service training (Mechanical Engineering School Complex in Gorzów Wielkopolski) by organising paid internships for students, training systems and by paying for the vocational exams (welder examination). Cluster’s members have also added more equipment to the school’s workshops. This equipment consisted of specialist teaching aids worth of PLN 100 thousand.

It is impossible not to appreciate the role of the Association in creating the Technological Park in Gorzów. The Technological Centre of Gorzów is advertised as a first stage of this Park. The agreement for the needs of the park creation was signed by the President of Gorzów Wielkopolski, the Vice-Chancellor of the SHVS, the LMC and the Waste Utilisation Facility in Stanowice. Through this action, the

⁹⁷ See also: Benchmarking klastrów w Polsce – edycja 2012. Raport z badań. Pub. PARR, Warszawa 2012.

investment was listed as a key project in the 2020 Development Strategy of the Lubuskie Voivodeship. In 2011, the LMC established a cooperation with the Innovation and Science Park of Lower Silesia S.A, as a result of which the a few days' study visit of the Cluster of Innovative Technologies in Production's members (CITP) in the LMC in October 2012. Additionally, it resulted in sharing experiences and knowledge during the cooperation exchange. The latter enabled the meeting between 20 enterprises - the LMC's members – and 16 companies representing the CITP. The exchange participants admitted that B2B meetings are considered to be one of the best forms of establishing permanent business relationships.

During the meeting of both clusters, a conception of establishing a common platform for exchange of free capacities has been submitted. The CITP's Governing Body has put forward a concept of such a platform and outlined the possibilities of mutual realisation of orders and projects, which allows good knowledge of capabilities of respective partner enterprises both in qualitative terms, i.e. type of technologies, and quantitative terms, i.e. capabilities of capacities. Moreover, a postulate has been submitted which assumed that information should be rendered available in every moment for all of the cluster's participants. An issue of the necessity of its update has also been raised as schedules are often changed which forces the need of modifying the content of the offered economic capacity. The LMC's members defined this as a first step to organising a system of collective purchasing of materials and components and organising a system of transactions for purchases and selling of economic capacities, as declared by the cluster. The project of such a platform, outlined in the field of common activities of both clusters – form the Lubuskie and Lower Silesia Voivodeship – would be a great success of both cluster and the region itself.

The cluster heavily supports new technological solutions of its members, as well as technologically advanced products, mainly through promotional activities, by presenting at trade fairs, seminars, branch meetings and conferences such technologically innovative products as: automatic draining diaphragm press, mobile system of servicing and operating rail rolling stock (with automatic geometry adaptation of platforms dependant on shape and size of operated traction vehicles) and technologies of welding new materials. It also undertakes common activities in order to create technologically advanced product in the field of eco-innovation, such as gas generator, technology of producing compost out of waste and devices for implementing this technology, as well as technology of utilising hazardous waste together with devices for implementing this technology. A fine example of a successful common activity taken by the cluster's members is also the project entitled "Designing and examining the project of the vertical axis wind turbine".

7.2.4. Reasons and social and legal conditions for creating the cluster

The LMC came about as a result of the major international project entitled *Cross-Border ClusterNet*, which was coordinated by the European Business Network (EBN) from Brussels. EBN is a leading non-governmental Pan-European network associating over 200 companies and organisations from business environment and innovation centres from the entire Europe. It supports incubation of enterprises and their internationalisation. The goal of the aforementioned project was to support the cross-border cooperation between the Lubuskie Voivodeship and Brandenburg. At the time, the Lubuskie Region Employers' Organisation was a participant of the project and it became a promoter of the clustering in the region. Simultaneously, it contributed to creating a cluster initiative and forming the LMC Association, ensuring protection of rights and representation of interests of associated members. The Lubuskie Region Employers' Organisation (Employers of Lubuskie) also supports the cluster in organisational aspects, as the LMC Association's Office is located at the headquarters of the Lubuskie Region Employers' Organisation in Gorzów Wielkopolski. Moreover, the LMC was the first activity of this sort in the region⁹⁸. The cluster was formed as a result of relations established in a group of metal industry enterprises during seminars and conferences realised in the framework of the *Cross-Border ClusterNet*. Favourable conditions that the project provided for small and medium-sized enterprises from the metal industry granted the entrepreneurs a wider access to new products, services and allowed them to gain new experiences. The idea was mainly based upon the necessity of providing logistical, financial and organisational support for metal industry companies. Because of the members' participation in the project, it can be assumed that it is a grass-roots initiative (self-contained). Therefore, the motive for creating the cluster was an own initiative of natural persons and companies. Initiators were granted organisational and substantial support in the framework of the project. Cluster – as the only one from the Lubuskie Voivodeship – also participated in the project entitled *2010 Cluster Benchmarking in Poland* and *2012 Cluster Benchmarking in Poland* executed by the Polish Agency for Enterprise Development in 2010 and 2012 in the framework of the system project financed from the means of the European Social Fund in the framework of the Human Capital Operational Programme (HCOP) – “*Human resources development through promoting knowledge and transferring and popularizing innovation*” (Sub-activity 2.1.3).

⁹⁸ One year before, the Wine and Honey Route of the Lubuskie Region had been created. However, it was not treated as a cluster, but rather as a sort of a tourist product. It did not have any organisational and legal form and was managed by the Winemaking Association of Zielona Góra. In 2008, the members of the Winemaking association of Zielona Góra and some other entities signed an accession to a cluster initiative [author's note].

All of the founding members are still being the most active in a cluster. They not only develop its activity, but also promote the clustering concept in the region. Thanks to their promotion activities and organisational support, an Educational Cluster was created in the region, together with the Lubuskie Cluster of Renewable Energetics and Energy Efficiency in Sulechów.

7.2.5. Coherence with nationwide and regional innovation policy

Despite having tradition of many years, the metal industry in the region has only recently been noticed by the local governments of the Voivodeship. This is undoubtedly a result of the cluster's activity for promoting the metal industry as a vital element of the region's economy. The LMC's activity is encompassed by the Lubuskie Regional Innovation Strategy's (LRIS) goal number 3. *Improving the entrepreneurship and competitiveness of the region* and, in particular, operational goal number 3.2. *Development of specialist institutions for supporting the transfer of technology and increasing the number of innovative solutions implemented into economic practice*. The 3.2. goal mentions common actions, i.e. supporting the development of technological parks in the region and the system of creating clusters⁹⁹. The LRIS emphasises the role of clusters in stimulating the development of high-tech sector in the region. "A very important role in developing the specialisation of the region might be played by the cluster structures. However, currently there are no distinct ties suggesting that the clusters are being created"¹⁰⁰.

The LMC is also included in the 2020 Development Strategy for the Lubuskie Voivodeship (2020 DSLP) strategic goal no. 1. *Competitive and innovative regional economy*, particularly in operational goal no. 2.1 *Development of entrepreneurship and improving professional activity*, where, among the directions of intervention of the operational goal no. 1.2 the "development and promotion of clusters corresponding to regional economic specificity"¹⁰¹ was indicated. The LMC is indicated in the 2020 DSLP as an example of leading sector in the field of research and development, which affects the enterprise sector¹⁰². Additionally, it was mentioned as a key centres for supporting innovation in the region. "The LMC is one of they key centres for supporting innovation in the region. The production of metal products, machines, devices and vehicle spare parts are a vital branch area of the Lubuskie Voivodeship as regards the value of sales and employment rate. There are hundreds of local handicraft workshops in the metal branches. From the point of view of

⁹⁹ Lubuska Regionalna Strategia Innowacji, Pub. Urzędu Marszałkowskiego Województwa Lubuskiego, Zielona Góra, February 2010, p. 108.

¹⁰⁰ Ibidem, p. 54.

¹⁰¹ Strategia Rozwoju Województwa Lubuskiego 2020, Załącznik do Uchwały nr XXXII/319/12 Sejmiku Województwa Lubuskiego z dnia 19 listopada 2012 r., p. 35.

¹⁰² See also: Strategia Rozwoju Województwa Lubuskiego 2020..., p. 92.

the region's economy, this is a tremendously valuable potential which, through improving competitiveness and innovation, can become the Province's specialisation, particularly in prospective specialisations, such as: ecology, renewable energy and environmental protection. The LMC Association seated in Gorzów Wielkopolski implements goals in the field of improving competitiveness and innovation which have been defined in the LRIS¹⁰³.

On the other hand, the role of clusters in creating innovative economy is being emphasised at the state level. According to the report entitled *Directions and principles of cluster policy in Poland by 2020*, the primary goal of the future cluster policy should be to strengthen the innovation and competitiveness of the Polish economy on the basis of the intensification of cooperation, interaction and knowledge transfers in the framework of the clusters, as well as supporting the development of strategic economic specialisations (key clusters)¹⁰⁴. During the sitting of the parliamentary Commission for Innovation and Modern Technologies in February 2013, an importance of clusters in innovation policy and economic development of the state was emphasised.

According to the Working Group on cluster policy, the most effective clusters are grass-roots ones, which have 60 members and the more business-oriented institutions they include in their structure the better. However, the downside of Polish clusters is their low innovation level and the lack of activity in gaining funds from outside the public assistance field. Moreover, only the small number of clusters implement common market activity¹⁰⁵. The LMC undertakes common economic activity (e.g. the platform for exchanging capacities) and innovation activity (e.g. promotion of high-tech products of enterprises associated in a cluster, participation in innovative projects) and gains financial means from outside the public assistance field.

Clusters were included in the horizontal principles of the *Strategy for Economy Innovation and Effectiveness – 2020 Dynamic Poland* as a way of effective allocation of resources which speed up the innovation processes, the support for identifying niches with comparative advantages and the facilitation of the scientific research commercialisation¹⁰⁶. Clusters were also recognised as a fundamental from of implementing intelligent specialisation of the Polish economy as a grass-roots initiative of every stakeholder (enterprises, business-oriented institutions, research and scientific units) involved in the field of research and innovation. The LMC is

¹⁰³ Strategia Rozwoju Województwa Lubuskiego 2020..., pp. 18-19.

¹⁰⁴ Kierunki i założenia polityki klastrowej w Polsce do 2020 roku. Rekomendacje grupy roboczej ds. polityki klastrowej, Wyd. PARP, Warszawa 2012, p. 11.

¹⁰⁵ www.sejm.gov.pl/komunikaty (downloaded on March 14, 2013)

¹⁰⁶ See also: Strategii Innowacyjności i Efektywności Gospodarki – Dynamiczna Polska 2020 (projekt z dn. 17.12.2012), Ministerstwo Gospodarki (dokument elektroniczny www.mg.gov.pl (downloaded on March 14, 2013) p. 34.

also such a grass-roots initiative, which, through its activity, has led to the fact that the metal industry in the region has become visible and was indicated in the 2020 DSLP. It has a chance to become a key regional cluster in the Lubuskie Voivodeship.

7.2.6. LMC's cooperation in the Triple – Helix

The LMC identifies its organisational form as the Dutch model (institutional) with high level of governmental involvement and major role of the research and scientific centre. The characteristic features of the Dutch-type cluster are: putting emphasis on innovation and technologies, active policy of government and tight cooperation with research and scientific centre¹⁰⁷. The cluster's development model has been presented in figure 27.

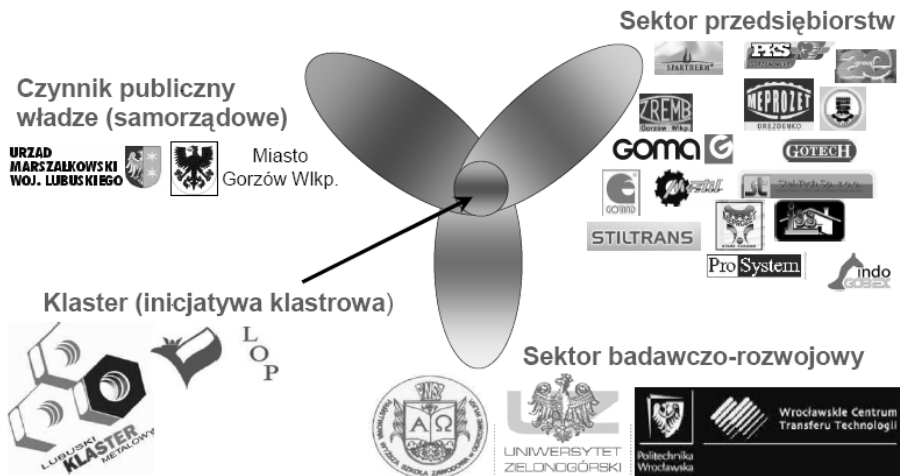


Figure 27. Helix model

Source: LMC's source materials

In this model, the cluster indicates the activity of public authorities in the initiative. However, it is the cluster's Governing Body that strives to establish a cooperation with local governments. The role of public factor in the cluster's development was somehow caused by the activity of the LMC. Only recently in March 2013 an agreement between local authorities of the Lubuskie Voivodeship and the cluster of Gorzów on cooperation for innovation in the region was signed. Only

¹⁰⁷ See also: Benchmarking klastrów w Polsce – edycja 2012. Raport z badań. Pub. PARP, Warszawa 2012, p. 18.

then, after intensive promotion actions performed by the cluster, did the local authorities notice the role of the metal cluster in the region. This is why there is doubt whether this is a Dutch-type organisational model or did the cluster simply force the reaction of the public authority organs. The cluster's Governing Body expects the Province's local government to create a regional system of financing of the clusters in the period of incubation and development proportionally to the level of involvement of the founders' funds. The metal branch and the cluster's suggestion to perform a stock taking and analysis of development perspectives of this branch in the region have become the level of agreement with the Marshal Office of the Lubuskie Region. This could become a model activity to implement in other industrial branches in the region (wood industry, food processing industry). The Regional Authorities have acknowledged the role of the LMC and in the future financial perspective of the EU they are willing to take actions for innovation trough, among others, the development and promotion of establishing cluster connections in the Voivodeship.

The cooperation between the LMC and the local government, i.e. the authorities of the City of Gorzów Wielkopolski, is very promising. The agreement signed with the President of the City of Gorzów Wielkopolski in 2009 was conducive to mutual actions for establishing the Technological Centre of Gorzów. The city supports activities of the cluster mainly through promoting the clustering, promoting the metal branch in the region, participation in cluster's activities and working meetings of the cluster. Most of all, it is an "organisational umbrella" for the LMC's activity. Prime examples of supporting the LMC's initiatives by local authorities are taking common actions in the field of improving vocational education in the region, pursuing establishing of the Technological Park for the Metropolitan Area of Gorzów Wielkopolski and – what the LMC's Governing Body considers to be the most valuable aspect – the cluster's participation in the city's scheduled investment decisions and consultations with the cluster on future city's investments

What is characteristic of the cooperation between the LMC and public authorities is the fact that the latter are not members of the cluster and they merely operate on the basis of cooperating agreements with the cluster. Authorities do not support the cluster financially, but at this level of development the cluster does not expect such support and does not strive for it. In the Cluster's Governing Body's view, substantial and organisational cooperation for region's development is much more valuable and financial support should be implemented only for the specific research, educational and scientific projects. The ability of the cluster to function and develop without public funds proves that the cluster is well-developed, has stable position and solid base for functioning on the basis of its own funds.

The cooperation between the LMC and the science sector in the Lubuskie Region should be assessed as regular and institutionalised on the basis of signed agreements, which contributes to major involvement of the cluster in the system

of vocational education in the region, supporting the development of technical specialisations, subsidising specialist literature of the higher education institution in Gorzów and cooperation in the field of organising vocational internships for students, as well as trainings for graduates, as mentioned earlier in the article. A very valuable aspect of cooperating with the SHVS is enabling the students, in the framework of practical classes, to have access to measuring laboratories of enterprises associated in a cluster. Moreover, this cooperation provides entrepreneurs with the opportunity to train future personnel to suit their needs and identify the best students as future employees during the lab classes

The agreement signed between the cluster and the University of Zielona Góra aims at tightening the cooperation between the university and industry. These actions begin with students realising practical degree and temporary thesis. The cluster has submitted a declaration on specifying the set of topics concerning practical technical or organisational problems of the metal industry and a declaration on the possibility of providing teams involved in works with financial support under the condition that this would bear measurable business benefits for the cluster's enterprises.

The cooperation with the University of Zielona Góra is at the early stage. There are no leaders from the part of the university that would be more actively involved in research and scientific and educational projects. Partners, i.e. the university and the cluster, have not developed cooperation mechanisms yet. There is no conviction that this cooperation can be effective. Therefore, due to the closeness, the cluster is more willing to cooperate with the SHVS. This cooperation has been much more successful so far. Because of the specificity of the school, these actions for developing technical education in the region, education for the labour market of Gorzów and quality practical training, were successful and based on mutual trust. For the needs of research works, the cluster is strongly striving for establishing a didactic and scientific lab for the SHVS in the framework of the Technological Park for the Metropolitan Area of Gorzów Wielkopolski. In the Cluster's Governing Body's view, such a laboratory would set a base for innovative activity of the LMC's companies.

The number of LMC members is relatively stable, as cluster values strong ties with the cluster members and does not dynamically change the Association's makeup. Currently, 5 entrepreneurs left the cluster, mainly because of liquidation of their business activity. Cluster members cooperate with one another, promote one another and even when running a similar type of activity (such as steel constructions), which could lead to potential competition, they are still able to find an agreement in the field of specialisation on a market. The leading specialisations of companies – members of the LMC are: steel constructs for the industry, building trade, agriculture, energy sector and environmental protection; production of machines, devices and automated production lines for motor industry, power

industry, processing industry, spare parts production, machines and devices components, aluminium parts processing, pressure-moulded mainly for the motor industry¹⁰⁸.

The success of the LMC is the cooperation based on mutual trust, respect for ethics in business and transfer of information concerning the market. Cluster members emphasise that the key to success is to select such persons for the cluster's office who are not associated with branch companies, as this guarantees representing interests of each and every cluster member.

Common actions taken by entrepreneurs are based primarily on: mutual promotion of products, technical solutions, services and technologies, promotion of metal industry in the region, cooperation in works on cumulative products and technology (e.g. eco-innovation), transfer of economic information in a branch, cooperative exchange and common actions in the field of vocational education, training for the needs of the labour market and involvement in the initiative of the Technological Centre of Gorzów.

Cluster is currently working on the *Lubuskie Metal Cluster Development Strategy*, which will allow to set aims for development of enterprises associated in a cluster and specify common goals of activity. The cooperation offer in the cluster's framework is open for every subject from metal industry in the region. However, the selection of partners for cooperation (requirements for joining the cluster) has to be approved by the Cluster's Governing Body and usually takes place after the recommendation carried out by members who are already associated in a cluster. The LMC is interested primarily in establishing solid ties among entrepreneurs based on business trust rather than dynamically improving the number of members.

All of the cluster members are responsible for establishing economic ties and searching for partners for cooperation. The office is also responsible for organising common business trips, conferences, branch meetings and trade fairs. The Cluster's Governing Body is focused on the cluster development strategy and the cooperation with higher education institutions and public authorities in the region.

The cluster of Gorzów is noticed both in the region and in the country. Two times – as the only cluster from the Lubuskie region – it participated in the *Cluster Benchmarking in Poland* project (in 2010 and 2012 editions). Apart from promoting the clustering concept and assistance in local cluster initiatives, it also establishes cooperation with other clusters in Poland and participates in international projects. It has signed an agreement with the twin-profile Steel and Metals Processing Sector Cluster in Brandenburg and Berlin (profil.metall – Netzwerk Stahl- und Metallverarbeitung in Brandenburg und Berlin) and has established cooperation with the Cluster of Innovative Technologies in Production from the Lower Silesia Region (CINNOMATECH).

¹⁰⁸ Kłustry w województwie lubuskim..., op. cit., p. 13.

It realised the TINA project concerning international exchange of knowledge and experiences in the field of innovation in metal industry between Brandenburg and the Lubuskie Voivodeship. Moreover, it is also preparing for another similar project, which is a follow-up to TINA. The aim of these trans-border actions is to analyse the branch potential and identify the structure of metal industry and essential business parameters of the branch in Brandenburg and the Lubuskie Voivodeship.

The cluster is a partner in the INT LERNEN project: *Supra-border development of the training personnel in the field of mechanics and electricity exemplified by the frontier region of Eastern Brandenburg – Western Poland*” which highly successful results contributed to planning follow-up activities.

For the first time, the cluster participated in the Subcontracting Industrial Corporation Trade Fairs, in the framework of the 2013 International Trade Fairs of Poznań. The main goal of the Subcontracting Meetings was to associate bidders of subcontracting services in the field of metal processing with potential clients.

Development plans of the LMC also include establishing long-term cooperation with the Cluster of Renewable Energetics and Energy Efficiency.

Regardless of such small organisational structure of the cluster, the project tasks are executed collectively, mainly through the LMC Office, by commissioning selected cluster members to carry out specific tasks. Popularisation of information on currently implemented projects and scheduled works is carried out by means of cluster’s official website and common marketing activities of the cluster members.

7.2.7. Success factors

The LMC cluster operating in the Lubuskie Region achieves the greatest successes out of all clusters in the Province. The success factors of clusters can be divided into two categories: factors determining the cluster’s success that provide an answer to the question: “which factors determine the cluster’s development?” and factors determining development of the clusters in the region that provide an answer to the question: “which factors contribute to the emergence and development of clusters in the region?”. These factors can be included in 5 groups:

1. Cluster can emerge only when a given branch forming a cluster in a given territory is properly represented and is somehow associated with a business profile of the region. A major success of the LMC in the Lubuskie Region is the fact even though the metal industry is not a dominant profile, the cluster still exists, operates and resiliently develops. There is a phenomenon which is opposite to the premises of factors determining development of the clusters, because it was the emergence and functioning of the cluster that contributed to noticing the metal branch in the region.

2. The key success factor is perfection in management. Creating a cluster in a limited area allows to manage it in a better way, as coordination of activities is always impeded by the factor of distance. The LMC is the coordinator in the Lubuskie Region. It has its own office and significantly facilitates communication between the cluster members. The success of the LMC is the cooperation based on mutual trust, respect for ethics in business and transfer of information concerning the market. Cluster members emphasise that the key to success is to select such persons for the cluster's office who are not associated with branch companies, as this guarantees representing interests of each and every cluster member. Proper management is also conducive to cooperation with other domestic clusters such as the cluster of Lower Silesia - Cluster of Innovative Technologies in Production or German Steel and Metals Processing Sector Cluster in Brandenburg and Berlin. Cooperation consists in the transfer of experiences and designing platform for exchanging capacities and carrying out common projects.
3. Providing support from public means (primarily at the early stage of cluster creation) is considered to be one of the threshold conditions for the cluster's success. The region has to develop efficient system of financing basic activities and create perspectives of financing investment undertakings. In the Lubuskie Region there was no actions taken by local governments that would support clusters in a measurable way. At the beginning of the cluster creation, the Association did not apply for public means and did not use them during the early years. It was focused on establishing non-financial cooperation with local government in the field of creating the Technological Park for the Metropolitan Area of Gorzów Wielkopolski and contributed to including the Technological Park of Gorzów in the 2020 Development Strategy for the Lubuskie Province and in the update project of the Lubuskie Regional Innovation Strategy. It was not until March 2013 that the cluster signed an agreement on cooperation with the Local Government of the Lubuskie Region. The aim of the agreement is to improve innovation in the Lubuskie region and promote metal industry branch as vital for region's economy. Cooperation with local government can therefore be estimated as prospective and slowly developing.
4. Focusing science on selected fields and establishing effective ties between science and business in the region. The cooperation between the LMC and science can be assessed very positively. The cluster cooperates both with the secondary school and SHVS, achieving mutual benefits. The educational party has the opportunity of sending students to vocational internships. In return, the LMC is provided with qualified employees. The only downside is insufficient and underdeveloped scientific and research cooperation between the LMC and the University of Zielona Gora.

5. The cluster's success factors are properly selected marketing tools that serve dual purpose: they position the cluster and create recognizable brand. It is directly connected with gaining investors and it allows to develop new technological solutions. Implementing proper marketing tools such as trade fairs, seminars and branch meetings supports the already existing technologies.

7.2.8. The role of marketing activities in cluster positioning

Marketing activities of the LMC representatives are focused on creating its image and the brand as an environment for commercialising innovation. Currently, the Cluster is focused on building trust and the cooperation network, as well as the coherent system of technical education, because they are the factors determining the success of the whole enterprise at such high level of integration. The most important actions in implementing this task, out of all marketing instruments, are those concerning the field of communication, particularly Public Relations and advertising. The main purpose of activities in the field of PR is to help cluster members in creating and maintaining social conditions in which they could well develop. It is worth mentioning that the actions have to be scheduled and continuous. Thanks to them, the organisation will gain and maintain understanding, liking and support of those who are objects of its interest, either now or in the future¹⁰⁹. Therefore, these are the target groups of communication: cluster members, current and potential future partners, public administration, non-governmental organisations, owners, research centres, receivers, higher education institutions, technical education units and media. There is a need of preparing goals of communication activities and selecting proper channels and tools of communication for each and every group. In a long run, coherent and consistent policy in this field will contribute to positioning of the cluster in its environment. Moreover, it will optimize promotional enterprises and dynamize the knowledge transfer. As a result, participation in a cluster allows to achieve a synergy effect and simultaneously reduces costs through their distribution among greater number of entities. The potential areas of marketing activities are:

- creating a common system of comprehensive cluster identification;
- using the Internet through making professional websites, posting information on events regarding the cluster, using the social media and developing e-commerce;
- carrying out actions leading to increasing awareness of the existence of the cluster by focusing on effects and results of member subjects;

¹⁰⁹ Wójcik K., Public Relations. Wiarygodny dialog z otoczeniem. Podręcznik dla teoretyków, poradnik dla praktyków, Wydawnictwo PLACET, Warszawa 2009, p. 27.

- cooperation with media leading to creation of desired image – contacts with journalists, press releases debates;
- participating in exhibitions and trade fairs;
- common lobby towards authorities, scientific and academic communities;
- providing funds for technical education;
- common actions in the field of advertising¹¹⁰;
- creating common databases;
- subleasing initiatives of common marketing research.

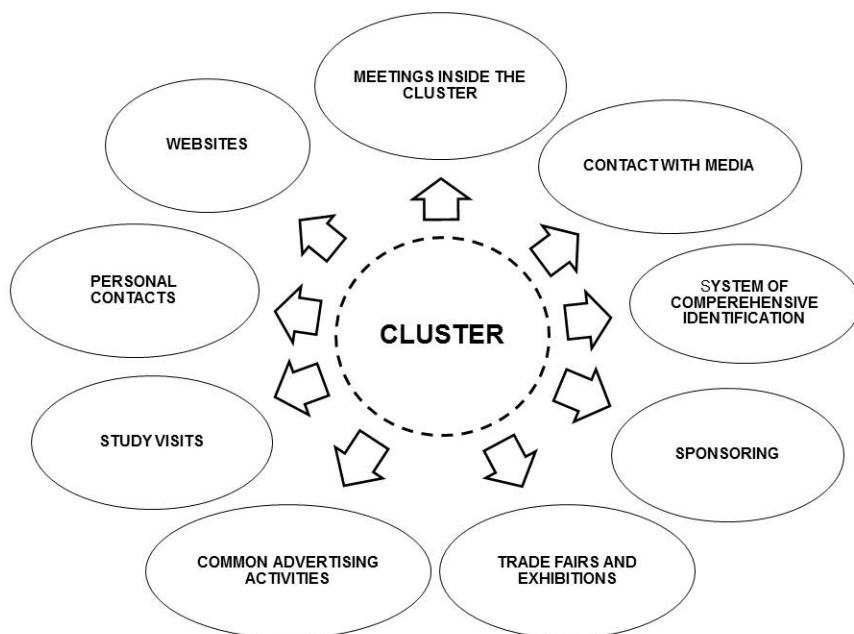


Figure 28. Marketing actions used in the Lubuskie Metal Cluster

Source: author's own analysis

One of the most important activities carried out in the framework of the LMC is the promotion of metal industry as vital for region's economy, as well as creating its brand perceived as environment for commercialising innovation. Such an approach gives companies viable benefits in a form of support for development and promotion

¹¹⁰ Benchmarking klastrów w Polsce – 2010. Raport z badań, Zespół Sektora Publicznego Deloitte Business Consulting S.A., Warszawa 2010. <http://www.pi.gov.pl> (downloaded on March 14, 2013)

of economic entities of the metal branch: supporting participation in exhibitions and creation and promotion of common logo, password etc. From the point of view of a single subject, there is a possibility of using common communication resources in this field. This is conducive to improving competitiveness of the cluster and its members and therefore it contributes to the development of the region.

Establishing a solid position of the cluster requires uniform involvement of each and every participant. This will be conducive to its consolidation and strengthening. A strong cluster branch will ensure strong position of its members and will be conducive to gaining new members, as it provides certain reputation at the entry level. Creating positive image of the cluster contributes to its transfer into respective members in accordance with the aureole effect. It is worth mentioning that it will allow to establish relationships with customers and improve bargain position of the whole group.

A very important marketing element is to create a system of visual identification for the cluster, consisting of a graphic logo identifying the organisation, colours and typographies – all of which has been defined in the analysed cluster. Please note that the LMC is located in a specified territory, therefore the “area” where it is located has been encompassed in its communication strategy, which is proven by the very name element: “lubuski” and by using the colours of the Lubuskie Region in its logo. In its communication strategy, the cluster strongly identifies itself with the region. The emphasis put on territorial affiliation proves that the business conditions in this territory are particularly favourable and attractive for the development of the metal branch.

In order to promote the LMC, a website containing updated information on the cluster has been created. It includes: the idea of forming a cluster together with related documents, contact data, information on subjects and partners of the cluster and information on implemented projects. Perfecting this form of communication can be achieved through improving functionality and interactivity of the website, e.g. by using new tools such as forum, multimedia, content search, database, downloadable files, social media. The cluster’s Governing Body plans to modernise this form of communication and use it for the purposes of internal communication by means of newsletters and e-mail in order to transfer vital information.

Other very important tools for promoting the analysed metal cluster are exhibitions and trade fairs. They contribute to creating its image and strengthening ties between its members. Trade fairs are a perfect way for mobilising the personnel and allow to compare cluster’s offers with offers of the competition. Participating in trade fairs allows to:

- present cluster members’ offer and receive feedback;
- establish new relationships with traders, agents and representatives of research communities;
- learn the new trends;

- observe behaviour of the competition;
- obtain inquiries concerning cluster's own offer;
- search for potential clients;
- establish relationships between members of the cluster;
- conclude agreements and contracts;
- improve image and brand of the cluster and its members.

The first common trade fair took place in March 2013 during the Subcontracting Industrial Corporation Trade Fairs, which are a part of the International Trade Fairs of Poznań. 6 cluster members participated in the aforementioned event. The goal of the trade fair was to acquaint bidders of the subcontracting services in the field of metal processing with potential clients. Trade fair also allowed the cluster members to get to know one another. The cluster representatives also participate in various Career Fairs. Such a participation allows to obtain well-educated and well-qualified employees, trainees and interns. Moreover, employers get the opportunity to present themselves to students and graduates. In the nearest future, the internationalisation of these actions through participation in trade fairs in Lipsko is planned. However, it is necessary to intensify actions aimed at creating greater sense of solidarity among the cluster members, as there is a risk that the associated entities will be focused entirely on building their own brand. This means that there is a need of intensifying internal communication leading to creating, among others, the sense of community and consolidation of the cluster's image internally. Overcoming the mental barrier can be crucial in this case, as cluster members tend to think that cooperation with others bears more threats than benefits¹¹¹.

The LMC representatives take necessary lobbying actions in the field of stimulating cooperation with local governments, research and development units, higher education institutions and business-oriented institutions. This cooperation is aimed at strengthening the cluster's position as an important partner in the region, improving the possibility of gaining public means and securing the level of competitiveness. These actions are both formal and informal, and what is particularly useful are the forms of direct communication, such as meetings with local government's authorities and representatives of the higher education institutions. It is necessary to emphasise that formal and informal cooperation between enterprises and local institutions of horizontal and vertical character is one of the necessary conditions for the cluster's functioning¹¹².

¹¹¹ Staszewska J., *Komunikacja w klastrach*, (in:) Bojar E. (ed.) *Klustry jako narzędzie lokalnego i regionalnego rozwoju gospodarczego*, Wydawnictwo Politechniki Lubelskiej, Lublin 2006 p. 63.

¹¹² Skawińska E., *Teoretyczno-praktyczne aspekty rozwoju gron firm na przykładzie meblarstwa w powiecie poznańskim* (in:) Bojar E. (ed.) *Klustry jako narzędzie lokalnego i regionalnego rozwoju gospodarczego*, Wydawnictwo Politechniki Lubelskiej, Lublin 2006 p. 372.

In the framework of the initiative taken by the cluster and the SHVS of Gorzów, the Technological Center of Gorzów was created (it consists of the Research and Development Centre ECO-INNOVATION, the Continuing and Vocational Education Centre and the Environmental Laboratory). It is worth mentioning that only recently did the metal industry become noticed in the region as an economic potential. In fact, it was not even mentioned as an important factor for formulating the Development Strategy for the Lubuskie Voivodeship. It was the intensive activity of the cluster representatives that led to including the Technological Centre of Gorzów in the list of key regional investments encompassed by the updated 2020 Strategy for the Lubuskie Voivodeship. The LMC was also included in the project of updating the Lubuskie Regional Innovation Strategy. The cluster members are actively involved in works of various organisations, such as the Lubuskie Innovation Council and the Association of Polish Engineers and Mechanical Technicians which is conducive to strengthening of its image and popularisation of the clustering concept.

The existing cluster also provides the possibility of influencing the education system, as the integrated group of organisations is much more efficient partner of educational posts specialised in vocational training. Common lobbying activities aimed at research communities and vocational trainings also born anticipated results – the LMC cooperates with higher education institutions in order to develop exact sciences and technical sciences at academic level and to create effective connections in the region between business and science, which is reflected in cooperation with the SHVS and the University of Zielona Góra. So far, the lobbying activities have resulted in starting the Machine Engineering and Design specialisation at the higher education institution in Gorzów. The cooperation with the University of Zielona Góra allows to gain access to laboratories and enables students to apply for internships in metal industry companies. A fine example of cooperation between entrepreneurs and vocational training units is the agreement concluded with the Mechanical Engineering School Complex which carries out exams for graduates. Therefore, after graduation, they obtain the licence to practice their professions. The cluster companies pay for services and in return they obtain qualified employees adjusted to the needs of their workshops¹¹³. In order to improve technical education and research and scientific potential, numerous sponsoring actions have been carried out, e.g. funding specialist literature for the State Higher Vocational School's library, co-organising with the aforementioned higher education institution the scientific conference on Education on the labour market and equipping the didactic workshops in the Mechanical Engineering School Complex. Initiatives supporting technical education at the level of primary

¹¹³ Official website of Lubuskie Metal Cluster (www.lubuskiklaster.pl) (downloaded on March 12, 2013).

school help popularise technical knowledge and overcome negative stereotypes concerning unattractiveness of technical professions. The project on *promotion of technology among children and teenagers* is a good example of such activities.

The forms of direct marketing communication used in the LMC are: meetings of associated members, study visits, branch meetings and trips. A good example is the TINA project (Trans-boarder exchange of experiences and knowledge on innovative labour policy in the metal branch between Brandenburg and Poland), in the framework of which a study visit at the Oestalpine power plant in Linz, Austria took place, as well as at the Brandenburgische Technische Universität Cottbus laboratory in Germany. Moreover, the LMC representatives are cyclically participating in “Synergy with steel” conferences, organised by the Metal Cluster Network of Berlin and Brandenburg. In October 2012, a study visit of the members of the Cluster of Innovative Technologies in Production in the LMC took place. In the same month, a business meeting on innovation and current technological trends in metal branch took place. It emphasised the issues connected with modern welding technology. The representatives of the Welding Institute Scientific Council and the National Centre for Research and Development participated in the meeting¹¹⁴. The aforementioned initiatives are conducive to the flow of information, exchange of knowledge, hidden knowledge and experiences not only domestically, but also internationally. In order to strengthen the ties between the cluster members, there are quarterly meetings organised in the respective statutory offices of the cluster members.

The implemented forms of media communication in the framework of the LMC’s PR activities have their advantages – most importantly, they allow to promote the idea of creating a cluster even outside its geographical range. Nevertheless, it is not a very important channel of communication. The Governing Body does not initiate contacts with media. Usually, such contacts are initiated by media representatives. These contacts are rather incidental and are connected with important events, such as signing the agreement on cooperation. Some events initiated by the LMC were presented in the radio, television or press. In the author’s view, it would be reasonable to think about tighter cooperation with media, e.g. by means of various communications.

There are numerous actions in the LMC in the field of common advertising enterprises through common design of folders, leaflets and presentations. Implementing such solutions is conducive to the cluster’s visibility, consolidates its image and strengthens its brand.

Creating common brand is beneficial for the LMC members, the region, local units and education posts, as it contributes to gaining new investors, popularising technical education, stimulating innovation and improving competitiveness.

¹¹⁴ Ibidem.

Building a solid brand of the cluster requires involving multiple entities which often prefer to build their own brands and that can lead to a conflict. Therefore, when creating the communication strategy of the cluster, it is reasonable to harmonise it with strategies of the region and its individual members. It is necessary to work out a compromise. This is a very important task, as the very idea of a cluster is to improve the development. Due to the fact that participants often create their own brands, there is also a need of promoting cluster idea among the entrepreneurs and other environments (including local governments). This is the way of creating a brand of subjects forming a given cluster. So far, the actions that have been taken lead to establishing a stable system of connections based on trust and conscious selection of members, whose possible excessive rotation might have negative consequences for the LMC's image. A professionally managed, efficient and coherent system of communication and the cluster's brand can be really conducive to its market positioning. Thanks to the brand, it will be possible to permanently plant it in the minds of the most important target groups and interested parties. Please note that the implemented marketing instruments should lead to consolidating and strengthening the LMC's brand. Finally, it is worth reminding that creating a cluster is not a simple project, but a process requiring time. It is a purposefully directed chain of consecutive events¹¹⁵. In order for it to be smooth and efficient, it is necessary to create strategies focused on image and brand building of the cluster, using multiple communication tools. The LMC's achievements so far have been very positively evaluated by the Polish Agency for Enterprise Development. It is possible that in the future it will gain a recommendation to obtain a status of the leading cluster.

Final remarks

There are 8 clusters currently operating in the Lubuskie Region. However, it is the LMC that achieved the greatest success, despite numerous unfavourable circumstances at its early stages. This success would not be possible if it was not for determination and involvement of the Association's governing body.

The example of this cluster proves that grass-roots initiatives can indeed stand the test of time and develop. The subject literature often mentions that the cluster can achieve success only if it has approximately 60 members and the small number of members is said to be the downside of Polish clusters. The LMC has only 24 members. However, it is important to say that new enterprises admitted as

¹¹⁵ Bojar E., Bis J., Czynniki zagrażające klasteringowi – efektywnemu kreowaniu i funkcjonowaniu klastrów gospodarczych w Polsce (in:) Bojar E. (ed.), *Klastry jako narzędzie lokalnego i regionalnego rozwoju gospodarczego*, Wydawnictwo Politechniki Lubelskiej, Lublin 2006, p. 172.

members of the LMC are chosen by means of target selection and are pre-recommended by the cluster members. This results in a well thought-out membership and small rotation. Over a span of the last 6 years only 5 enterprises have left the cluster due to the liquidation of their business activities.

What is also important is the fact that the cluster has built its brand slowly, using numerous marketing techniques and was always oriented to quality and cooperation. The crucial aspect for the LMC is to be recognisable in a branch. The cluster does not care much about being present in mass media aimed at large audiences and does not want to become popular.

Undoubtedly, the border territories in which the LMC operates facilitates cooperation with the entities from Brandenburg. The goals of the cooperation between clusters are the knowledge transfer, the best practices and creating the platform for cooperation.

The downside of the cluster's functioning in the Tripe Helix model is the early stage of cooperation with the biggest university in the region, i.e. the University of Zielona Góra. While in 2010 the agreement in the field of practical training, pursuing new technologies and marketing them was concluded, so far the conditions of the agreement have not been specified. The university also has not appointed the cooperation coordinator.

The cooperation with local authorities is based on non-financial principles. The cluster did not use public means even during the early stage of its functioning. The support of the local governments consisted in e.g. signing an agreement on creating the Technological Park in Gorzów and including it in the list of key regional investments to be encompassed by the 2020 Development Strategy for the Lubuskie Voivodeship. In March 2013, the schedule for creating the first stage of the Technological Park, i.e. the Technological Centre of Gorzów, was introduced, which was a great success.

To sum up, it can be assumed that the functioning of the LMC is a good sign and contribution to the creation and development of other clusters in the region.

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