

Report on the regional potential of the Moravian-Silesian Region

EMERGING INDUSTRIES

- Active Aging
- Sustainable Development / Green Economy
- Sustainable / Intelligent Mobility

CROSS-CUTTING ISSUES

- Internationalization
- Technology & Knowledge Transfer
- Gender in Innovation, including diversity aspects

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1. Introduction

The Moravian-Silesian Region (MSR) has been historically known for its heavy industries (coal mining, steel works and heavy machinery). After the restructuring started in 1990's (major reduction of jobs in the traditional industries), the region experienced the highest unemployment in the Czech Republic. To improve the situation, the cluster concept was piloted in the MSR in 2002, as the first region in the Czech Republic where the cluster mapping process was implemented and where the first cluster organisations were established. The case of the MSR enabled that cluster organisation support and development were included in the national funding program based on the EU Structural Funds in the programming periods of 2004-2006 and 2007-2013. The regional authority of the MSR has been supporting the cluster development by different tools, such as funding the cluster specific activities and setting-up the regional ClusterNet initiative to improve the communication between the public sector and cluster managers as well as for their mutual cooperation. Nowadays, the MSR is the region with the most cluster organisations in the Czech Republic. There are 14 cluster organisations existing in the region, 12 of them are functional, and two are not active. Four clusters are focused on different aspects of energy (nuclear power, energy savings and self-sustainability, alternative energy sources, waste to energy technologies). Four clusters are traditional industries (automotive, machinery, wood processing, and forestry), four clusters are technological (ICT, mobile networks providers, safety technologies and hydrogen-related technologies), one cluster is in the service sector (tourism), and one in the knowledge management in enterprise.

The MSR with 1.225 million inhabitants is the third most populated region in the Czech Republic (after Prague and the Central Bohemian Region). The GPD per capita in 2011 was 12,938 € which makes the MSR the fourth highest GPD per capita region in the country. In 2009, the region invested 0.86% of the then total GDP in R&D while in 2011, it was already 1.26% and the M-S region again scored in this indicator as the fourth region in the Czech Republic. However, the R&D investment is slightly below the national average. This is mainly due to the fact that the Prague region's GPD is more than four times higher than the average GPD of other Czech regions and also the Prague R&D investments are even six times higher than the average R&D investments in other Czech regions. Not only the MSR trend of the R&D investments but also the trend of employees working in R&D has been steadily growing since 2008, approximately by 10 % each year and the trend of the growth is also increasing. In 2008, there were 2,931 employees and in 2011 the number increased to 3,965 employees in R&D (all recalculated to full time employees in R&D). The MSR trend of employment in science and technology is also growing but not steadily, there are minor fluctuations. In 2007 there were 173.9 thousand employees, in 2008 it was 171 thousand, in 2009 the number grew to 188.4 thousand and in 2010 it has fallen to 181.5 thousand employees in science and technology.

The main traditional specialization of the region is machinery, power engineering, metallurgy, mining and automotive. There is also intensive corporate research and development in these traditional areas of industry. The alternative specialization has emerged recently. There is a successful development of new materials, technologies in car lighting, ventilation and air-conditioning systems, ICT development and research, development of special measurement

devices for the metallurgy, mining and machinery industries, development of special devices for power industry. The ICT sector became one of the fastest growing industries in the region and serves to its industrial and R&D base. One of the key projects in this field is the “IT4Innovations” Centre of Excellence in Ostrava, as the successful project of the Operation Programme R&D for Innovation within the Ministry of Education of the Czech Republic. R&D activities take place also in areas of industrial automation, robotics, electronics and chemistry. All R&D activities in MSR have resulted in 10 patents in 2009, 14 patents in 2010 and 24 patents in 2011.

The main corporations in the MSR follow the main industries. Two main employers are machinery and steelworks, one large company operates coal mines, two big corporations are within the automotive industry. The biggest FDI branch set up in the MSR is in wood processing, the Hyundai branch for Europe in automotive. Among those most important, the following corporations can be found in the MSR:

- Vítkovice : steelworks, heavy machinery
- ISPAT NOVÁ HUŤ: steelworks
- OKD: coal mining, production of coke
- Třinecké železářny – Moravia Steel: metallurgy
- Autopal, s.r.o. (VISTEON Group) : development and production of car parts
- Mayr-Melnhof Holz Paskov– wood processing
- Hyundai Motor Manufacturing Czech s.r.o. - automotive

2. Emerging Industries

The emerging industries in green economy as well as sustainable mobility are well positioned in the MSR. Several clusters and universities are already intensively engaged in the research and development in these two fields, several businesses have been identified and interviewed within the mapping carried out in the MSR region.

The main research focus on usage of waste for energy generation purposes and research of non-traditional energy sources appears in the field of green economy. The sustainable mobility is represented especially by electro mobility and by the energy recuperation of locomotives.

Within the active aging especially biomedicine is seen as the new regional industry and thus as the advantage of diversification within the Regional Innovation Strategy which is being implemented by the Regional Development Agency of Ostrava.

In the area of active aging there are two strong areas which drive this emerging industry in the MSR forward. These are biotechnology and biomedical engineering on one hand and slow tourism and tourism for disabled people on the other hand. The gap has been identified in the

field of social innovation including social enterprise support and smart services for elderly people and people threatened by social exclusion.

- a) Biomedicine: The biotechnology and biomedicine research is performed in the Faculty Hospital Ostrava. This research is mostly dedicated to studying the human tissues and cells regeneration (using biotechnology, nanotechnology and environmental diagnostics). The research is carried out for various international pharmaceutical companies due to the critical amount of patients – the clients of the hospital with regard to the high population of Ostrava and the MSR. The biomedicine research interacts with the Department of Biomedicine Engineering of the Faculty of Electrical Engineering and Informatics of the VŠB – Technical University Ostrava.

Another important factor in this emerging industry is the recent establishment and development of the Medical Faculty of the Ostrava University also covering the Department of Biomedicine.

- b) Tourism: This industry is mainly represented by the Moravian-Silesian Tourism Cluster - the KLACR, which takes part in cross-border projects with Slovakian and Polish partner clusters focused on special groups of tourists such as disabled people, seniors, and families with small children or tourists with pets who are interested in tourist centres in lower mountain areas, relaxation centres, wellness procedures and spas with special services in accommodation and transport. The cross-border Slovak-Czech “Travelling without barriers” project has generated a list of local showplaces with the guarantee of no barriers for disabled people. Such offer is to be a part of a new portal enabling further on-line services.
- c) Social enterprises: While the industrial sectors of the MSR develops well and are subject to a number of innovation, R&D and cluster support schemes and incentives, the social sphere has not applied (which actually concerns the whole Central Europe) the cluster concept in the social sector. At the same time, there is no reason to doubt that the coordinated cluster-based network building will not lead to better knowledge sharing, synergies, economies of scale and more innovative solutions of the complex social issues, such as job creation for people threatened by social exclusion. The emerging industries in ICT and other sophisticated fields of R&D focused on social innovation and social sectors can be the opportunity also for the MSR.

Identified issues for Active Aging:

- Lack of qualified researchers in biomedicine, the need for enhanced mobility;
- Lack of public funding of applied research in biomedicine and of upgrading the tourism industry with a higher level of ICT applications in customer services;
- Low interconnection of the social enterprises with regional industry clusters, the need for more strategic social innovation in practice.

In the area of **green economy** the two main directions have been identified in the MSR, such as the usage of waste for energy generation purposes and research of non-traditional energy sources.

- a) The usage of waste for energy purposes: The AGRO-EKO company has developed technology for transformation of biowaste in energy which is patented (biowaste2energy technology). Another technology development in the region is performed by the HOKS company and is focused on rubber tyres recycling for secondary/energy use. The ENVICRACK cluster is engaged in the research of waste pyrolysis.
- b) Research of non-traditional energy sources: The research in the fields of energy savings, power engineering, nuclear power engineering is performed by the Moravian-Silesian Energy Cluster and the Czech Machinery Cluster. The HYDROGEN cluster examines the possibilities of hydrogen as source of energy on the level of the university research. Further, ENET - the Centre of Environmental Technologies (Regional R&D Centre of the Technical University of Ostrava for the non-traditional resources of energy) builds on the completion of the national and regional long-term strategies of the research and exploitation of these energy resources.

Identified barriers for green economy:

- Financing: the low availability of funding and capital for the development & demonstration phase;
- Legislation: the issue of the barrier to classify the biologically decomposable waste as an input for the energy conversion.

Regarding the **sustainable mobility**, there are two potential emerging industries in the MSR. These are the electromobility and energy recuperation for locomotives.

- a) Electromobility – This industry is evolving especially in the new approaches to cars with electric propulsion (Vawemobile), systems of charging stations and systems of passive park houses. The research is being made in the nanotechnology and advanced materials which are necessary for the contactless transmission in docking stations for cars. Several companies cooperate with the Technical University Ostrava on the development and realization of the dock stations for the electric cars located in the parking houses. These solutions already exist.
- b) Recuperation of energy for locomotives – Sustainable mobility and green economics are connected in some industries, which is the case of the technology for the locomotives kinetic energy recuperation. This technology is being developed by the ENVICRACK cluster. The research and development phase is almost finished. The massive commercialization and focus on the East Europe markets should be the next step.

Identified barriers for sustainable mobility:

- Missing concept and plan for the infrastructure of docking stations as well as city/municipality relevant policies are barriers on the regional level within electromobility. According to the Moravian-Silesian Cluster, the focus should be on the air pollution improvements of the Ostrava city, while the energy

consumption as such would not be lower and thus the price of electrocars would be too high for a general market.

As results from the above, the Moravian-Silesian Region has the potentials in energy technologies and competencies, machinery, ICT and newly developed industries, such as biomedicine. Among the supportive factors, there are the long-term cluster concept application in the MSR and a strong university and R&D background. Still, the incentives and assistance for start-ups, spin-offs and entrepreneurship as such are important targets of the regional policy. Clusters can then be the platforms to strengthen the education for entrepreneurship and innovation, involving SMEs and even self-employed entrepreneurs.

To make the full use of the holistic character of a cluster, the regional cluster policy should be adopted by the regional government. The Certified Methodology for the Regional Cluster Policy prepared by the Tomas Bata University of Zlin as a research output (a grant of the Technology Agency of the Czech Republic) will be available by the end of 2013 for regional authorities in the Czech Republic to apply them hand in hand with the RIS3 mapping and implementation. The smart specialisation will be then the result of the synergic effect of both approaches. The financial allocations for the cluster policy should then be targeted to the systemic support of the most important and innovative areas with the highest competitive advantage of the region. The developed cluster concept and its tradition in the MSR (the Czech Machinery Cluster of Ostrava has celebrated its 10th anniversary in March 2013) makes it a proven tool and can be successfully employed in other areas, such as social economy and creative industries. Therefore the cluster of social enterprises has been proposed by the National Cluster Association as the CluStrat pilot project to be implemented in the MSR.

The strategy of the project partners NCA (Moravian-Silesian Region) and possibly GAPP (Upper Silesia region) suggests the piloting the new concept of the cluster application in the social policy together with the pilot implementation of the regional cluster policy certified methodologies. As a result, the Cluster of Social Enterprises (CloSE) will be analysed and facilitated to set up its development strategy with regard to exploiting the potentials offered by existing traditional clusters and enabling technologies.

Promoting such social innovation entails a number of factors that the cluster cooperation platform can deliver:

- adopting a prospective view of needs/expectations/possibilities consistently with a logics of investment;
- mobilising a wide range of actors whose (non-)action has an impact on protection/inclusion/cohesion/well-being;
- combining skills/backgrounds and cultures/business and public services to offer innovative responses.

In the active aging area the MSR has a strong potential in:

- the clinical research and applied biomedicine research topped by the Biomedicine Technology Park under construction within the Faculty Hospital Ostrava premises;
- the medical furniture design and manufacturing and medical instruments production

- the research and cross-border collaboration in special tourism services performed by the KLACR (M-S Tourism Cluster)

The MSR's green economy potential lies in the areas of nuclear power engineering where the Czech Machinery Cluster acts as prime technology and equipment supplier taking part in international tenders. The patented biowaste to energy technology is the most potential emerging industry in the MSR together with the future research capacity of the Centre of Environmental Technologies established at the Technical University Ostrava.

Strong potential for commercialization within the sustainable mobility is represented by the applied research in electric car with charging mechanism based on technology of contactless transmission of energy. The license for the smart parking houses already exists. Another promising area is the progressed development of the locomotive energy recuperation R&D.

Best practice in green economy:

The AGRO-EKO company provides research, development and construction in clean combustion technology and developed a breakthrough green technology – patented biowaste2energy technology for processing biologically decomposable waste, sludge and other biological waste due to controlled aerobic thermophile fermentation. The EWA (Ecological Waste Apparatus) aerobic fermenter is a certified device for processing of biodegradable waste with outputs to be used as compost for the agricultural use (mulch-compost) or for power generation (biofuel).

The transfer of knowledge was already used for the EWA prototype. The method of conversion of biodegradable hygienically non-stabilized substrate into hygienically stabilized product was patented in 2005. The commercialised product is currently sold to municipalities in the Czech Republic, Slovakia and Poland. The internationalisation of the technology reached a Sweden customer to solve a local problem – the utilisation of waste from horse stables. The training how to operate the EWA aerobic fermenter is also the subject of the transfer. The product placement is aimed at markets all over the world (Europe, Arabian countries, Mongolia, Ceylon). Foreign collaborative entities are mostly situated in isolated localities. AGRO-EKO is the leader of the recently established Green Horizon cluster.

3. Cross-cutting Issues

The gender in innovation and diversity aspects, internationalisation and transfer of knowledge and technology (KTT) are the cross-cutting issues playing an important role in the MSR's Regional Innovation Strategy, however not at the equal level. The most emphasis is put on technology transfer and internationalization, while the gender and diversity is not considered as the main theme for the region by the involved public and private sector players. The topic of gender in innovation is a new perspective for regional businesses and new opportunity for regional decision-makers in preparing the development policy tools. So far this topic has not appeared in any official strategic document on the regional level. There are several non-profit organisations in the MSR running projects related to gender in terms of equal opportunities, education and employability of women. The Regional Authority holds the competition for companies and municipalities in social responsibility including the equal opportunities and

balance of the professional and family life. The diversity aspect is more frequently dealt with, however not in terms of the benefits for innovation (Roma minority inclusion, handicapped people employment etc.).

The KTT is recognized by the regional authorities, universities as well as by clusters and companies as a crucial tool for staying competitive and is being used by many organisations. The internationalization as the support for export efforts is also recognized and broadly implemented by businesses. Still, the regional clusters lag behind the developed European regions in the internationalisation strategies building and realisation of international activities. The gender and diversity aspects in innovation are, on the other hand, not recognized by clusters or companies in MSR.

The following achievements belong among the strong aspects of **internationalization** in the MSR:

- Internationalization is included in the Regional Innovation Strategy of the MSR for the years 2010-2020;
- The Centre of International Trade was created by the Chamber of Commerce in Ostrava;
- An extensive international cooperation of the MSR's clusters take place (OP CENTRAL, cross-border projects, cluster organisations of the M-S region are listed in the database of the European Cluster Observatory);
- Eight regional clusters are registered in the ECCP (European Cluster Collaboration Platform)
- There are several institutions in the MSR which provide the internationalisation support; several of them organize business missions (CzechTrade, EEN regional representation etc.)

The weaknesses of internationalization in the MSR include the missing internationalization strategy of clusters, and low or none funding for internationalization efforts of clusters.

The knowledge and technology transfer has a very strong position in the MSR. Among the strengths there are:

- KTT is included in the most important national as well as regional strategic documents, such as the Regional Innovation Strategy of the MSR for the years 2010-2020, The Concept of SMEs Support for the year 2014, National policy for research, development and innovation 2009-2015 and National Innovation Strategy 2011;
- Plenty of players within the frame of regional innovation infrastructure (universities and centres for technology transfer, science & technology parks, business innovation centre);
- Clusters provide the functional platform for cooperation between industry and universities for innovation and KTT with tangible results.

The weaknesses in the KTT, on the other hand, include a low number of spin-offs, it is difficult to identify the data about start-ups from public statistic databases, there is a difficult access to information about performed transfers, especially international ones, and nearly

impossible to obtain data about the results of KTT, transfer of abilities and competencies and about transfer of methods and processes on national level with involvement of regional actors.

Another significant obstacle in KTT is the missing pre-seed funds or other new invention financing scheme in the Czech Republic.

The MSR's strengths in the **gender in innovation including diversity aspects** consist in:

- Several engaged institutions on the regional level are present: The Institute for Women, Athena, Equal Opportunities and Mutual Coexistence (Roma minority inclusion);
- A number of studies are available, especially on the national level provided by the Gender Studies institute in Prague;
- Several EU funded projects within the Human Resources and Employment Operational Programme run by ARR - the Regional Development Agency of Ostrava.

However the gaps are in a low or none inclusion of the gender in the innovation issues of the RIS and other strategic development documents and little awareness of clusters and companies of the topics of the non-used potential of women in innovation and the potential of women as final market customers.

Based on the mapping of the EI and CCI in the MSR, several key strategy elements are proposed for implementation to the MSR. In those areas where opportunities and gaps were identified, the partnership with more advanced regions would be of help to analyse the cooperation potential or to learn from the existing best practice.

Clear regional strategy for the development of emerging industries is missing in most regions in the Czech Republic including the MSR which can be compensated by the on-coming RIS3 mapping and programming. For all of the interested actors (businesses, cluster organisations, NGOs) more subsidies are required to be allocated to the applied research and emerging sectors development. Also, concerning the KTT, the period of new product/service development requires a pre-seed capital & specialist consulting, such as Proof-of-Concept-Fund. Low attention is paid to the issues of gender in innovation and diversity both from the public (missing statistics, no incentives or support tools) and private (no initiatives taken) sectors.

A significant recommendations aim at the regional and national cluster policy issue. In the Czech Republic, the non-technological and non-manufacturing clusters (this concerns services, creative industries, social sector etc.) are not supported financially. As the national level supports the technological or manufacturing clusters only, the service or creative oriented clusters need to be supported on the regional level. The regional cluster policy can support starting clusters or clusters in industries desired by the region (linked with the smart specialization) and lead these clusters towards excellence, include into this policy also emerging industries and gender in innovation, internationalization and KTT topics. Certified methodology for such regional policy is being prepared within the research grant of the Tomas Bata University in Zlin financed by the Technology Agency of Czech Republic.

NCA proposes the regional as well as national governments to adopt the certified methodologies of the cluster policies and bring the clusters towards excellence to incorporate emerging industries, gender, KTT and internalization criteria.

Best practice in gender with regard to diversity:

There is an annual Award of the President of the Moravian-Silesian Region for the Corporate Social Responsibility. This regional contest announced by the M-S Region is unique in the Czech Republic.

The contest contains specific awards for segments of small, medium and big companies and, newly, organisations from the public and non-profit sector. Although the contest is primarily aimed at the increasing of the job creation dynamism and job maintenance issues, equal opportunities and employment are among the evaluation criteria of this contest and thus the contest motivates firms and municipalities in CSR improvements including equal opportunities and balancing personal and professional life of employees.

The success of the Moravian-Silesian Tourism Cluster - KLACR related especially to diversity innovations is another area that could be shared with other regions as the best practice. KLACR runs a tourism project targeted at special groups, such as handicapped people, families with children, tourists with pets, and senior people. As a result, a web portal has been built which provides the customer groups relevant tourism options, such as hotels which allow pets, touristic goals reachable by handicapped people, seniors or families with small children etc. Another internationalisation activity of KLACR is the participation in a cross-border project together with Slovak and Polish tourism clusters. This project collects data about foreign tourists in all three countries and the KLACR creates a multilingual web portal www.ms-dovolena.cz about touristic destination in the Moravian-Silesian Region and offers various options for the diverse customer groups. Currently the portal provides information about selected destination, hotel or restaurant with the contact. In the future, there will be also the application for online reservation.

4. Conclusions for pilot development

The application of the new regional cluster policy in the cluster initiatives funding can be tested on the case of the Cluster of Social Enterprises (CloSE) which represents the pilot project of the MSR within the CluStrat project. The cross-cutting issue concerned in this pilot project cover the gender in innovation including diversity aspects, with the stress on diversity (the group of population threatened by social exclusion), and the new cluster concepts through the application of the cluster concept to social policy which represents a social innovation.

Another innovative dimension will be open – the inter-cluster cooperation within the MSR in order to create new business linkages (outsourcing, subcontract and supply opportunities in product and services) between the existing clusters in manufacturing, processing and service sectors and the CloSE. Among these, the Moravian-Silesian Automotive Cluster, IT Cluster and KLACR will be engaged. In this way a new regional know-how for the support of employment and entrepreneurship will be created in the MSR. The CloSE pilot project has

been proposed to be simultaneously implemented in the Silesian Region which is represented by GAPP of Katowice in the CluStrat project.

There is very strong potential for the CloSE cluster creation as already six social entrepreneurs – leaders in each of the MSR districts expressed interest in the project. Other important actors are engaged, such as the Silesian University of Opava and the Ostrava University, employment offices, social advisory institutions etc. The regional stakeholder of this pilot project, the Moravian-Silesian Region, declares the support of the social enterprise in the programme statement of the Board of the MSR and accepted the proposal of NCA to start the facilitation of the CloSE at the Regional policy dialogue meeting in Ostrava on 4 July 2014.

The alternative pilot project to be analysed for implementation will be focused on the biomedicine sector as a vital emerging industry in the MSR. The transnational cooperation potential would be mapped with an existing biomedicine cluster which would be conducive to create a new cluster organisation in the MSR with strategic segments of R&D, mobility, production & services and business exchange. The Saxony Economic Development Corporation (SEDC) could be the transnational partner for NCA in this pilot representing the biomedicine sector in Lower Saxony. The internationalisation of the clusters and KTT would be the target cross-cutting issues for this alternative pilot project.