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LOCAL GOVERNMENT ACTIONS TOWARDS INNOVATIVE REGION- LOWER SILESIA CASE STUDY

Introduction

Europe is currently facing serious economic challenges which require an ambitious economic policy for the 21st century. The European Union presented its vision of the European market economy in the Europe 2020 strategy (EUROPE 2020, 2013), which aims to confront structural weaknesses by employing three mutually enhancing priorities: smart development based on knowledge and innovation; sustainable development which promotes a more environmentally-friendly and competitive economy based on the efficient use of resources; development leading to social inclusion and the fostering of an economy based on high employment, which ensures socio-economic and territorial cohesion (GUIDE TO RESEARCH... 2012, p. 8).

The article concentrates on the first priority, i.e. smart development based on knowledge and innovation, and analyses this issue in relation to the Polish region of Lower Silesia. Today, in order to fully exploit Europe's potential, the regions are perceived as the place of breeding ground for innovation. Regions are seen as institutional partners for universities, research and development institutions, and small and medium enterprises (KUHN M., TOMASSINI M., SIMONS P. , 2006).

The interest in innovation, both at the level of the European Union, member countries and individual regions, is still one of the priorities regarding the influence of innovation on the social and economic development. This is confirmed by numerous strategic studies and financial support programs in the area of innovation for countries, regions and enterprises.

In the literature, apart from domestic or EU guidelines, the role of regional authorities is stressed as an important factor in boosting innovation of individual enterprises and of the whole economy. Regional authorities may influence the region directly through their socio-economic activities. It is worth noting that regional authorities are a part of the regional innovation system and it is at the regional level where most interactions and co-operation take place between participants of the regional innovation system.

A typical action taken by local authorities aimed at increasing innovation in regional economy is the development and implementation of regional innovation strategies (MORGAN K., NAUWELAERS C., 2003). With the search for solutions that would increase competitiveness and innovation in European regions, and in order to embrace the advantages and specialisations of regions, the concept of smart specialisations was proposed (BAIER E., KROLL H., ZENKER A, 2013). This does not mean that other development strategies were abandoned and that only one concept remains. Regional development is a complex process and, being based on the conditions and possibilities of the region, it is implemented with the use of other development concepts which depend on the specificity of the region. The identification of potential or existing „strengths” of a region is an opportunity for the diffusion of innovation. The process of identifying smart specialisations requires the participation of key partners and firms in the area of innovation: cooperation between enterprises, research and development institutions, universities (MEMPEL-ŚNIEŻYK A., 2013). Since these partnerships can contribute to the development of individual regions, smart specialisations are attracting the attention of regionalists and politicians, who have been initiating actions that support the development of partnerships between the aforementioned actors. One of the desired forms of such partnerships are clusters (cf. CHEN, 2005). Clusters, which serve as a bridge towards innovation policy, contribute to regional development, help create synergy between enterprises, universities and R&D centres and respond to market opportunities (EUROPEAN UNION, 2010). This is why clusters are “helpful” in identifying the most promising areas of specialisation in a given country or region (KETELS, 2013). Thus, clusters are elements of the regional smart specialisation strategy and they allow policy-makers to improve and direct the policy towards the so-called “development through innovation”. Economic development based on clusters helps to make use of the advantages in a given

region. Using other regions as models for building a development strategy may be unreliable as each region has its own strengths and offers different opportunities. Regions can also benefit by identifying the competitive advantages and needs of a cluster and creating its development strategy, which requires a continuous dialogue with enterprises and other economic entities in the cluster. Although the public sector cannot be the exclusive driver of cluster policy, it can play a central role in convening cluster members and working with private-sector cluster organizations. (CORTRIGHT, 2006).

In the context of innovation, clusters and smart specialisations form an important part of this article.

Since the above are important and current issues, this article focuses on those activities that are aimed at promoting innovation in the Lower Silesian region. The article analyses the changes that have taken place in the region of Lower Silesia to increase innovation. The paper also discusses the activities of regional authorities in the context of EU's call for a strategic and integrated approach to innovation, which would maximize the potential of the European, national, and regional economy of individual countries in terms of research and innovation. The authors are aware of the multitude of aspects connected with the implementation of innovation policy but the article concentrates on activities of local authorities in this respect. As mentioned above, regional authorities can help promote innovation by adopting an appropriate policy, which is why the article presents the objectives of the regional innovation policy for Lower Silesia until 2020. In order to achieve this aim, the paper adopts a qualitative research method to broaden the understanding of the studied phenomena, a review of current literature, and reports on the systematization of knowledge. The authors also analysed the significance of programs and initiatives undertaken by Polish authorities and local governments in order to improve the innovativeness of the Lower Silesian region.

1. The future of Polish regions – the role of smart specialisation in the development of an innovative region

The concept of smart specialisation has appeared as a response to the search for new, more sustainable concepts of growth and is still being developed. Smart specialisation is an alternative to a policy that promotes investments in several areas and sectors, regardless of the industrial structure in a given the region and its knowledge potential (related to human capital, universities, research organizations, etc.).

Also, the concept of smart specialisation has been proposed in response to the need to invest the limited public resources more efficiently in economic development of regions. The European Commission has recommended that national and regional authorities across Europe should develop research and innovation strategies for smart specialisations. Moreover, according to the cohesion policy proposed by the European Commission for the period 2014 - 2020, smart specialisation is a prerequisite for obtaining funds from the European Regional Development Fund in the years 2014-2020. This approach guarantees that funding for research and development is used more efficiently and profitably to finance the areas in which regions specialise, which ensures a more effective implementation of the Europe 2020 strategy.

The objectives of the smart specialisations concept are mainly based on the ideas of D. Foray, P. A. David and I B. Hall. They defined the process of identifying smart specialisations as: the process of discovering the domains of R&D and innovation in which a region is likely to excel. (FORAY, DAVID, HALL, 2009). Smart specialisation involves a process of developing a vision, identifying competitive advantage, setting strategic priorities to maximize the knowledge-based development potential of any region. (WHAT IS SMART..., 2013). Smart specialisations help to identify the unique characteristics and assets of each country and region and are based on a realistic assessment of what can be achieved with scarce resources, while providing a vision of the future (RESEARCH AND INNOVATION..., 2011). The concept of smart specialisation assumes that regions should identify their strengths, and focus their efforts on selected priorities and areas of development. According to this concept, regions should specialise in what they are best at (use their potential), and not only locally but on a global scale.

Smart specialisation is connected to the notion of clusters (PORTER, 1990). Regional cluster policy focuses on existing or potential strengths of the region (EUROPEAN COMMISSION, 2008). Since the functioning of the clusters is associated with investments in knowledge infrastructure and with the creation of a network of relations between regional authorities, enterprises and R&D institutions (EUROPEAN UNION, 2010), therefore clusters are “helpful” in identifying smart specialisations. In order to determine smart specialisations, regions go through a process of „discovering entrepreneurship”, i.e. involving key stakeholders in the field of innovation: enterprises, research centres and universities.

2. Clusters and smart specialisations in the Lower Silesian region

In response to EU recommendations regarding the identification of key sectors in the region, six Working Groups for Smart Specialisations were appointed in March 2015 in the

Lower Silesian region. Smart specialisations were identified using quantitative and qualitative assessment, as well as an evaluation of capabilities, opportunities and needs in the region, and by focusing on the areas of real potential and the strengths of the region. The process of identifying smart specialisations requires the participation of key partners and firms in the area of innovation: cooperation between enterprises, research and development institutions, universities. Therefore, the aforementioned Working Groups included representatives of key enterprises from selected industries in the region as well as representatives of the aforementioned institutions. The Working Groups covered the sectors of natural resources and advanced materials, functional foods and nutraceuticals, production of machinery and equipment, metalworking, the chemical and pharmaceutical industry, spatial mobility, ICT. Based on the activities of these groups, Lower Silesian Smart Specialisations were identified for areas that currently have the largest potential for innovation and competition, as well as scientific and technological specialisations, i.e. areas with the largest number of implementations and patents, which include the following (RESOLUTION NO 423/V/15..., 2015):

- Chemicals and Pharmaceuticals;
- Spatial mobility;
- High-quality food;
- Natural and recycled resources;
- Manufacture of machinery and equipment, processing of materials;
- Information and communication technologies (ICT)

It is worth noting that the identified specialisations serve as an instrument which helps to achieve the objectives defined in the Regional Innovation Strategy for Lower Silesia 2011-2020. It should also be added that the policy adopted by the regional government of Lower Silesia supports clusters. This approach is reflected in their support for cooperation and cluster projects and by the fact that clusters are included in the Development Strategy of Lower Silesia 2020 and in the new Regional Operational Program for 2014-2020.

Cluster policy appeared in Poland only after 2010, which does not mean that prior to this there had been no activities supporting network structures in the form of clusters. Until then there was no separate policy to support cluster structures. There was also no specific government document which directly addressed cluster policy. This policy was considered part of innovation policy but it was also found in research and industrial policy, and most references to these issues could be found in strategic documents on innovation (GULDA,

2008). To sum up, Poland did not have a national policy which would promote a comprehensive approach to supporting clusters and which would coordinate policy instruments from different areas with regard to clusters. A change occurred in 2011 when the Polish Agency for Enterprise Development and the Ministry of Economy established the Working Group for Cluster Policy, which included national representatives as well as representatives of the European Commission and international experts. The group defined the directions of cluster policy, which are described in the document *Directions and objectives of cluster policy in Poland until 2020* (KIERUNKI I ZAŁOŻENIA..., 2012). Following the recommendations of the European Commission, the Polish government adopted an approach aimed at using clusters in: designing and implementing the 3S Smart Specialisation Strategy, identifying regional competitiveness and resources, and defining priorities and competitiveness of the region.

Poland has made up for the lack of cluster policy and, in the last decade, has taken several actions to support innovation in the economy based on local and regional specialisations, in particular within cluster initiatives and cluster support. The project currently in progress in Poland are in accordance with the recommendations for Polish cluster policy based on the objectives adopted in government documents, such as the report *Poland 2030 Third wave of modernity, National Regional Development Strategy* and *National Reform Program Europe 2020*. Polish recommendations are in line with the Europe 2020 strategy and the concept of smart specialisation proposed by the European Commission (KIERUNKI I ZAŁOŻENIA..., 2012)..

Owing to the actions taken in Poland in 2015 at the governmental level, the so-called Key National Clusters with the greatest competitive potential were selected in order to attract public funds. As a result of a competition announced by the Ministry of Economy, 7 Key National Clusters were selected: Aviation Valley Cluster, Interizon Cluster, Metalworking Cluster, Mazovia ICT Cluster, Polish Aluminium Cluster, Eastern Constructing Cluster, West Pomeranian Chemical Cluster “Green Chemistry”, (KRAJOWE KLASTRY..., 2015). The criteria for selecting clusters included the following: critical mass, development and innovative potential, existing and planned cooperation, and experience and potential of the coordinator. Unfortunately, none of the selected clusters is not located in the region of Lower Silesia. This does not mean, however, that in the future such a Key Cluster will not operate in this region. Every year, the Polish Ministry of Economy will organize subsequent rounds of

competitions to award the status of Key National Cluster to other actors and is also planning to select Key Regional Clusters and Key Local Clusters.

In 2006 there were 44 clusters and cluster initiatives in Poland (Table 1) in the biomedical, aviation, agriculture and tourism sectors. The two cluster that were located in Lower Silesia were Ceramika Bolesławiec and Granit Strzegom (ROSA, 2016). It is worth noting that these were not advanced technology clusters and only in the following years cooperation was formalized in other sectors, including innovative sectors. According to the interactive Cluster Map there were 201 clusters located in Poland as of 02.02.2016 (Table 1). The highest activity in terms of cluster formation was observed in the Mazovia region, where the Polish capital is situated, while the Lower Silesian region, with 16 clusters, is one of the five Polish regions that in the last decade have actively shaped network structures and carried out activities aimed at promoting the cooperation of the business sector, business environment institutions, and the R&D sector.

Due to the high number of clusters in Poland the actions in the field of cluster policy are currently not focused on supporting the formation of clusters, but rather on supporting existing clusters, which are the most important for the country and individual regions in terms of innovation (cf. LUNDEQUIST P., POWER, 2002).

Table 1. Number of clusters in Poland in 2006 and 2016

No.	Region	Number of clusters and cluster initiatives including those in their conceptual phase in 2006	Number of clusters according to the interactive map in 2016
1	Lower Silesia	2	16
2	Mazovia Province	3	35
3	Małopolska Province	2	12
4	Wielkopolska Province	6	22
5	West Pomerania Province	1	12
6	Pomerania Province	2	10
7	Opole Province	0	3
8	Świętokrzyskie Province	3	8
9	Podlasie Province	3	10
10	Kujawy-Pomerania Province	0	5
11	Silesia Province	4	28
12	Warmia-Masuria Province	2	2

13	Podkarpacie Province	4	16
14	Łódź Province	2	8
15	Lubuskie Province	8	5
16	Lublin Province	2	9

Own study based on: Map of clusters in Poland <http://www.pi.gov.pl/parp/data/klastry/> 02.02.2016, K. Rosa: *Klaster jako forma powiązań przedsiębiorstw w gospodarce opartej na wiedzy* p.74 sbc.org.pl/Content/10638/rosa.pdf. 02.02.2016

According to the Interactive Map of Clusters in Poland there are 16 clusters in the studied region, most of which were created after 2011 (table 2).

Table 2. Clusters in the Lower Silesian region

No.	Cluster Name	Year of creation
1	Lower Silesian Metal Cluster	2012
2	ClusterRDI	2011
3	Knowledge and Innovation Community for Information and Communication Technologies (ICT Cluster)	2007
4	NUTRIBIOMED Cluster	2007
5	Cluster of Innovative Manufacturing Technologies CINNOMATECH	2012
6	Cluster for Power Generation and Energy Utilization in Mega- and Nano-Scale	2007
7	SIDE- CLUSTER	2009
8	Cluster Innovative Medicine	2013
9	Energy Technologies Centre Cluster	2008
10	National e-Health Cluster	2007
11	Lower Silesian Renewable Energy Cluster	2013
12	Radon Polish Cluster	2014
13	Stone Cluster	2013
14	Low Silesian Eco-energetic Cluster EEI - Energy, Ecology, Innovation	2006
15	Health Fashion Beauty Cluster	2013
16	Regional Producers Cluster	2013

Own study based on: Map of Clusters in Poland <http://www.pi.gov.pl/parp/data/klastry/#cont=7dc0c004498a572d66e16036434128a2&nokla=13&nowoj=9>

It can be added that according to a document prepared for the Lower Silesia Marshal Office (STUDIA NAD ROZWOJEM..., 2015) there are approximately 30 clusters in the region. These clusters were subsidized by local authorities and received a total sum of nearly 3 million PLN from the Lower Silesia Marshal Office in the years 2010 - 2014. The Interactive Cluster Map does not include clusters which ceased operation or did not register their business.

Since 2010 the authorities of Lower Silesia have shifted their policy towards clusters and by supporting them they have contributed to the implementation of many innovative projects. For example, within the Lower Silesian Eco-Energy Cluster EEI – Energy, Ecology, Innovation, cooperation between businesses and the Department of Biotechnology of the University of Wrocław has focused on new biogas technologies and four patent applications have been filed for technologies that are new on a global scale. In the Centre for Energy Technology Cluster the following projects are underway: cooperation between science and industry: interdisciplinary teams of researchers and practitioners, "CTE - towards photovoltaic specialisation", "From consumer to prosumer or why should Poland implement smart grids." Another example of innovation activities is the Nutribiomed cluster, which, until the end of 2014, developed 24 technologies, created and launched products such as the Omegaregen® series and OVOBIOVITA® Initium, and obtained patents and filed patent applications (STUDIA NAD ROZWOJEM..., 2015).

In the Lower Silesian region the basic instrument of support for cluster development was the Regional Operational Program of Lower Silesia. Competitions for applications were also organized which awarded grants for the development of cluster cooperation mostly to cluster coordinators. In 2011-2014 the region also took part in the international CluStrat project, whose aim was to implement pilot solutions in cluster policy for different regions.

The activities of regional authorities resulted in innovative products, services and technologies. The funding period 2010-2014 confirmed that coordinating particular projects, or funding them directly can be nothing but beneficial. Therefore, regional authorities have decided to continue implementing the pro-cluster policy.

3. Development of Lower Silesia until 2020 according to the Regional Innovation Strategy

As mentioned above, local authorities play a key role in boosting the innovation in regions – they directly influence the region through their own policies, and social and economic activity. Additionally, they have their own assets and resources, undertake

economic initiatives and invest in technical and social infrastructure. Regional development policy is often used in conjunction with innovation policy. According to art. 11.1. of the second chapter of the Act of 5 June 1998 on local government, regional authorities define their development strategies, taking into account such goals as the stimulation of economic activity and improvement of competitiveness and innovativeness of the regional economy (DERLUKIEWICZ N., 2013). Therefore, it is at the regional level where a growing number of actions are initiated aimed at improving innovation. One such action is the development and implementation of regional innovation strategies. (FELDMAN M. P., LINK A. N, 2011)

Lower Silesia had a regional innovation strategy since 2005 but in 2011 the Management Board of Lower Silesian Province adopted a new document *Regional Innovation Strategy for Lower Silesia for the period 2011-2020*. This document updated the previous *Lower Silesian Innovation Strategy*, created in 2005 (<http://rpo.dolnyslask.pl>) The main reason for updating the 2005 Innovation Strategy for Lower Silesia were changes which occurred in the region's economy over the previous five years. It should be emphasized that over the recent years the region has undergone significant pro-innovation changes and it can now be said that Lower Silesia is one of the leading regions in Poland to have appropriate infrastructure for the creation and spread of innovation. The region is also characterized by a coherent system of business environment institutions, a high quality higher education system with different areas of study, educated staff and a large number of enterprises open to innovation (<http://www.innowacje.dolnyslask.pl/>)

The new version of the Regional Innovation Strategy for Lower Silesia Province for years 2011-2020 takes into consideration the recent economic changes and includes a new mission statement, which is as follows: *Lower Silesia - a place of inspiration for innovative development*. In addition, the document defines four strategic objectives along with operational objectives, as well as the directions of activities for Lower Silesia (Marshal Office, 2013).

The following strategic objectives were defined for the region of Lower Silesia until 2020 (Marshal Office, 2013):

1. strengthening innovative skills and attitudes, which are key to a knowledge-based economy,
2. increasing the chance of success of innovative business projects,
3. increasing the innovative potential of Lower Silesian research centres,
4. developing cooperation in the economy in the area of innovation.

What is of particular importance in the innovation strategy is to implement various educational and promotional activities with a regional reach, which disseminate knowledge and promote innovative attitudes, and to involve entrepreneurs in the development of teaching programs and curricula at universities so as to reduce the future risk of skills and qualifications mismatch in the graduate labour market. Another crucial task is to support the innovation of enterprises by creating appropriate conditions in the region (financial support, infrastructure, training, consulting) and encouraging enterprises to conduct their own research and development activities (HARMAN A.J., 1971). Moreover, the document emphasizes the need to increase the transfer of knowledge and new technologies from universities to the economy and to develop cooperation between various economic and scientific communities in the region in the area of innovation. As shown above, particular attention was also paid to the development of clusters and to the development of cooperation between regional pro-innovative institutions.

In order to achieve the above objectives the directions of regional activities were established, among which the most important are as follows:

- supporting programs that promote entrepreneurship at universities,
- incorporating the innovative needs of employers in teaching programs, curricula and courses taught at universities,
- creating a culture of innovation in enterprises.
- developing R&D infrastructure in enterprises,
- improving qualifications and skills of researchers and doctoral students with respect to commercialization of knowledge and cooperation with businesses.
- encouraging businesses to build cooperation based on open innovation,
- developing knowledge and skills of staff in business environment institutions in terms of animating cooperation in the field of innovation,
- supporting the development of clusters and cluster initiatives,
- supporting innovative cooperation projects implemented by clusters and cluster initiatives.

For the innovative development of a region it is important not only to define goals and directions of development, but above all to provide financial motivation for the creators of innovation (European Commission, 2010), promote innovative achievements in the economy, and to develop and promote new information and communication technologies in households,

enterprises and the public administration (KAMIŃSKA, J. FRYC, B. Majecka, 2007). It is through financial support that regional authorities can have a real impact on innovative development in the region. The region of Lower Silesia is an example of how the local authority supports the development of innovation in the region by implementing various actions and projects.

4. Lower Silesia towards innovation - changes in the region, actions and projects of local authorities

A variety of actions are taken in the Lower Silesian region to promote the development of innovation. Apart from activities aimed at supporting clusters, selecting smart specialisations and updating regional strategies, there are other examples of activities that support the cooperation between universities and other research institutes and enterprises, which is crucial for the innovative development of the region. The most important are as follows:

- "Lower Silesia Voucher for Innovation" – the main goal of this project was to develop cooperation between Lower Silesian enterprises and scientific institutions in the field of R&D and implementation, which would effectively increase the innovation of the business sector. (<http://www.innowacje.dolnyslask.com>) The project consisted in the collaboration between a scientist and an enterprise aimed at developing an innovative solution for the enterprise. As a result of this project, innovative solutions emerged in the region in different fields through the cooperation between different universities, for example an ergonomic computer keyboard for one-handed operation, mobile cooking application, a comprehensive system of intelligent lighting control, a device for lifting and lowering wheelchairs on stairwells, a lighting fixture for lamps, a floor board with a special filling for underfloor heating, an innovative line of natural cosmetics or a photovoltaic parking canopy.
- "Innovation transfer", "Green transfer" – projects involving paid internships for scientists in enterprises aimed at developing innovative solutions for those enterprises,
- "Grant – support for research through scholarships for doctoral students" "Entrepreneurial doctoral student – investment in innovative development of the region" and "Grant Plus" – scholarship projects aimed at improving innovation and increasing the competitiveness of the region by investing in young scientists and by strengthening the links between science and industry. 90% of the surveyed grantees established new contacts with specialists in their fields, 45% stated they would continue cooperation after the completion of the project, 21% successfully

implemented the results of their research in the economy, and approximately 70% expect to implement them in the nearest future. So far, more than 500 young scientists received support within scholarship projects funded by local authorities.

- "Mozart" is a program adopted in 2012 by the City Council of Wrocław (the capital of the Lower Silesian region). Its aim is to support the Wrocław labour market by enabling companies to access the intellectual potential of scientists. The knowledge offered by members of the scientific community will lead to the development of products and services, enhancement of the potential of enterprises and subsequently to the creation of new jobs. The added value of the project will be the development of new curricula inspired by business practice, which will help to better prepare graduates for entry on the labour market. To date this project has created over 30 jobs and over 50 innovative products and services (e.g. development of a technology to obtain human stem cells for use in medicine, design and implementation of a model of LexCrm system, which supports customer relationship management in law firms, creation of a new, innovative, and economical LED lighting structure which and meets the strength requirements, etc.). As a result of this project, more than 15 employees of enterprises were involved in teaching students at universities, more than 40 courses were improved thanks to the experience acquired by scientists, inventions were made and patent applications were filed. In addition, more than 40 scientific papers related to the project were published, a number of partnerships were created and more than 130 students were involved in partner companies during internships or training (<http://www.wca.wroc.pl>)

For the development of innovation it is also important to promote entrepreneurial and pro-innovation attitudes in the society (and particularly among entrepreneurs) and to undertake actions that will serve as an impulse for the development of innovation. In the region of Lower Silesia actions were taken also in this respect, starting already with children, as in the case of "Entrepreneurial class" project, whose aim was to prepare school children for active and conscious participation in economic life and for various professional roles, as well as to promote entrepreneurial attitudes and encourage creativity among schoolchildren. Apart from the abovementioned projects, other activities were carried out in Lower Silesia, including numerous workshops and conferences aimed at increasing the awareness of innovation and promoting innovative attitudes among the public, especially entrepreneurs. All of these activities and completed projects will surely contribute to the socio-economic

development of the region (qualitative changes). The data in Table 1 also show the qualitative changes that occurred in recent years, i.e. an 81% increase in GDP per capita and 61% increase in disposable income of private household. There was a significant 66 percent drop in the unemployment rate (including long-term unemployment), which was 26.7% 10 years ago and 9.1% in 2014. In the context of innovative development of the region, an increase can be seen each year in the expenditure on R&D (increase by 56%), and in the number of patent applications to the EPO (increase by 384%). Additionally, the amount of human resources in the region increased by 64% in the field of science and technology, as well as employment in the sector of advanced technology (high-tech) (a 12% increase was observed).

Table 1. Indicators of socio-economic development and innovation for the region of Lower Silesia in the years 2004-2014

YEAR Indicator	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GDP (PPS per inhabitant)	11,100	11,900	13,200	14,900	15,200	15,700	17,600	19,000	19,700	20,100	-
Total intramural R&D expenditure (% of GDP)	0.41	0.45	0.34	0.4	0.44	0.52	0.51	0.54	0.7	0.64	-
Disposable income of private household PPS (based on final consumption) per inhabitant	6,700	6,800	7,200	8,100	8,400	8,900	9,700	10,000	10,800	-	-

Human resources in science and technology (% of active population)	25.1	29.4	31.4	32.3	31.7	33.4	34.5	35.5	36.9	38.6	41.3
Employment in high-tech sectors % of total employment	-	-	-	-	3.9	3.9	3.7	3.7	4.1	4.5	4.4
Patent applications to the European patent office (EPO) by priority year Per million inhabitants	2.922	3.356	4.504	7.185	5.371	10.073	10.474	11.213	-	-	-
Unemployment rate (%)	26.7	22.8	17.3	12.7	9.1	10.1	11.3	10.6	11.1	11.3	9.1
Long-term unemployment rate % of active population	13.0	12.2	9.7	6.6	2.7	2.7	3.6	4.4	4.4	4.8	3.9

Source: own study based on data from Eurostat: <http://ec.europa.eu/eurostat/web/regions/data>

To sum up it is worth noting that there are industries and sectors in the region characterized by their potential for significant dynamics of innovative development in the coming years. These are the sectors that can boost innovative development of the economy: chemical industry, pharmaceutical industry, automotive industry, electrical industry, including the production of home appliances and other equipment, IT industry and mining/raw materials industry. At the same time new sectors are emerging which, despite their insignificant share in the regional economy, have great potential for development and their importance for innovation in the region will increase in the future. These are: healthy food production, production of modern materials, industrial design, electronics industry, machine design. On the other hand there are scientific and technological specialisations of Lower Silesia, characterized by a high potential for innovation and implementation. These include: chemical sciences (including materials science and nanotechnology), medical science, biology and biotechnology, pharmaceuticals, food sciences, environmental technologies, measurement technologies, information and communication technologies, mechanics and automation, and civil engineering (Marshal Office, 2013) .

Conclusions

Over the last two decades Lower Silesia has adopted an approach to address the shortcomings related to the functioning of innovative economy.

Currently, Lower Silesia has considerable potential for creating an innovative economy in the region. Among the most important aspects of this potential are: strong science and research centres, numerous business environment institutions, technology parks and enterprises operating in high technology sectors. Through these institutions the region promotes cooperation with the research and development sector, enters into new areas of business therefore attracting innovative enterprises, and is constantly developing an innovative platform designed to exchange information about the needs and offers for businesses and the R&D sector. According to the Central Statistical Office, there is a significant positive trend in the region reflected by a 38.7% share of resources from the business sector in the financing of R&D activities, which puts the region in 3rd place.¹ The development of innovative services is the response of the contemporary region to the challenges posed by contemporary economy.

Among the economy-related investments completed in the region, special mention should be given to the numerous many centres of innovation and entrepreneurship that have been created, including business incubators, and centres for innovation and technology transfer, for example: Wrocław Industrial Park, Wrocław Technology Park, Subzones of Special Economic Zones, Lower Silesian Incubator of Science and Technology (DINT), Lower Silesian Park of Science and Innovation, Lower Silesian Incubator of Entrepreneurship, Technology Incubator and Innovation Centre, Wrocław Research Centre EIT+, Business Parks, Clusters and Agencies that support cooperation between science and business and promote innovation.

The creation of the Lower Silesian Innovation Strategy in 2005 was the first step towards the development of an innovative economy in the region. The objectives of the updated Regional Innovation Strategy for the Lower Silesian Province for the years 2011-2020 took into consideration the abovementioned changes and the document was also expanded by elements related to the system for implementing and funding projects, which the previous version was lacking. Generally, the Regional Innovation Strategy for Lower Silesia Province for the years 2011-2020 is clearly oriented towards building a creative, knowledge-based economy in the

¹ www.gus.gov.pl 10.12.2015

Lower Silesian region, driven by creative people, who are open to innovation, and innovative entrepreneurs, who cooperate with the world of science.

Significant role in promoting innovation is played by local authorities who, on the one hand determine the direction of development, and on the other hand financially support activities aimed at developing an innovative economy in the region, e.g. through the abovementioned projects that promote cooperation between science and business. The joint implementation of projects by firms and scientific institutions made it possible to overcome communication barriers in these communities. It has changed the awareness of Polish entrepreneurs and increased trust in the public administration. Moreover, it has contributed to the development of systems of communication and exchange of information among employees of companies and the R&D sector, and, consequently, improved the process of knowledge and innovation transfer.

The cooperation that started as part of the project is very likely to continue, even for large-scale projects. Owing to successful partnerships, the trust of entrepreneurs in the world of science is increasing. They are also becoming convinced that such a direction of cooperation may actually help develop their company and implement new or improved products and services, which, in turn, contributes to the development of an innovative region.

In the region of Lower Silesia, on the initiative of local authorities, a number of actions were taken and a great number of projects have been completed, which have contributed to the changes taking place in the region. Over the past 10 years there has been an increase in the region's GDP, the expenditure on R&D and the number of patent applications filed to the EPO (European Commission, 2014).

It can be stated that these changes are positive and they indicate that this region is transforming into an innovative region.

A very important role in the process of innovative development of the region is played by clusters, which are constantly supported in various forms, both indirectly and directly. It is significant that regional authorities are willing to educate entrepreneurs about the benefits of participating in clusters, and by organizing workshops and training within these projects, they encourage entrepreneurs to participate. As seen in surveys on cluster benchmarking in Poland, the environment of clusters is undoubtedly considered as pro-innovative and research has confirmed that companies within clusters are characterized by higher innovativeness compared to the average results across the business population (see. Plawgo, 2014).

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