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Regional Innovation Strategies
in Mazovia Region.



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List of abbreviations

R+D/R+D+I	Research and development/research, development, innovations
CIP	Competitiveness and Innovation Framework Programme
SO	Strategic Objective
TO	Thematic Objective
EIB	European Investment Bank
EAFRD	European Agricultural Fund for Rural Development
EMFF	European Maritime and Fisheries Fund
EFPIA	European Federation of Pharmaceutical Industries and Associations
ERDF	European Regional Development Fund
ESF	European Social Fund
EFSI	European Fund for Strategic Investments
EIT	European Institute of Innovation & Technology
ERC	European Research Council in the scope of the Horizon 2020 programme
ETC	European Territorial Cooperation
FET	Future and Emerging Technologies under the Horizon 2020 Programme
CG	Capital Group
Horizon 2020	The EU Framework Programme for Research and Innovation
ICT	Information and Communication Technology
INNOCHEM	Sectoral program INNOCHEM of National Centre for Research and Development
BEI	Business Environment Institutions
JRC	Joint Research Centre
KIS	Domestic smart specialisation
c. / cc.	city / capital city
MUEUPI	Mazovian Unit for EU Programmes Implementation
MSCA	Marie Skłodowska-Curie Actions within the Horizon 2020 Programme
SME	Small and medium enterprises
NACE	Statistical Classification of Economic Activities in the European Community (<i>Nomenclature statistique des Activités économiques dans la Communauté Européenne</i>)
NBP	National Bank of Poland
NCRD	National Centre for Research and Development
NTS/NUTS	Nomenclature of Territorial Units for Statistics

WMA	Warsaw Metropolitan Area
PA	Priority Axis
ASI	Area of Strategic Intervention
RES	Renewable energy source
IP	Investment Priority
GDP	Gross Domestic Product
PKD	Polish Classification of Activities (<i>Polska klasyfikacja działalności</i>)
SG OP	Smart Growth Operational Programme 2014-2020
OP KED	Operational Programme Knowledge Education Development
PPNT	The Płock Industrial and Technological Park (<i>Płocki Park Naukowo-Technologiczny</i>)
RDP	Rural Development Programme
TS	Technical Support
general regulation	Regulation No 1303/2013 of the European Parliament and of the Council of 17 December 2013 <i>establishing common rules on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund; laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006</i>
ROP MV	Regional Operational Programme of Mazowieckie Voivodeship (concerning the timeframe 2014-2020, unless stated otherwise)
RIS	<i>Regional Innovation Strategy for Mazovia 2020. Innovation support system and smart specialization of the region</i> , constituting an annex to Resolution No. 23/15 of the Mazowieckie Voivodeship Assembly of 16 March 2015 with the amendment
RTI	Regional Territorial Investments
S3Chem	Project „Smart Chemistry Specialisation Strategy” funded by the Interreg Europe Programme
RCMV	Regional Council of Mazowieckie Voivodeship
TEN-T	Trans-European Transport Network
EU	European Union
ITI	Integrated Territorial Investments

1. Introduction

Present report is prepared as part of the implementation of the "Smart Chemistry Specialisation Strategy" (S3Chem), a project funded by the Interreg Europe Programme. The report concerns support for innovation and the chemical industry in Poland in the context of the implementation of the *Regional Innovation Strategy for Mazovia 2020*. In order to present the specificity of the document, as well as the specificity related to the implementation of its provisions, the region and its economy were characterized, with emphasis on factors affecting the development of the region. A separate chapter is devoted to the chemical industry and its development in Poland in recent years. Such approach allowed for the description of the specificity of the *Regional Innovation Strategy for Mazovia 2020* and the implementation programme for the Strategy.

The document also includes the 2014-2020 Regional Operational Programme of Mazowieckie Voivodeship, the Smart Growth Operational Programme 2014-2020, the Rural Development Programme and other programmes supporting innovations and chemical industry, i.e. Horizon 2020, Sectoral program INNOCHEM of National Centre for Research and Development, and other measures supporting chemical industry in this area, reflecting versatile possibilities of financing matters subjected to the analysis.

The management structure of the innovation process in the region of Mazovia¹ is separately presented, relating to the context of preparation, implementation, monitoring and updating the Strategy by identifying and describing stakeholders and indicating forms of cooperation in the scope of innovations in the chemical industry.

The adapted structure of the report enabled the identification of challenges related to the implementation of the Strategy. Subjecting said challenges to the analysis, reference was made to the expectations of stakeholders towards interregional cooperation. Given the adapted structure it was possible to identify the whole support system for the innovation of the chemical industry, from the presentation of the specificity of the industry, through the analysis of documents, to the presentation of the partnership principle implemented in the Mazowieckie Voivodeship in this respect. The comprehensive analysis resulted in conclusions concerning the challenges related to the implementation of the document.

¹ Following the *Regional Innovation Strategy for Mazovia 2020*, in this publication the term Mazovia refers to Mazowieckie Voivodeship- a unit of the administrative division of the country.

2. Characteristics of the Mazowieckie Voivodeship

2.1. General information concerning the region

Mazowieckie Voivodeship is one of the sixteen voivodeships in Poland, established as a result of the local government reform on 1 January 1999. The voivodeship consists of 314 communes of which 35 are of urban nature, 228 of rural, and 51- urban-rural communes². Almost 2/3 of the voivodeship's population lives in cities. The area of Mazovia is equal to 35 558 km², constituting 11.4% of the country. The capital city of the voivodeship is Warsaw, being at the same time the capital of the country. Given that, Warsaw is a significant centre of socio-political life on the national scale- most of the central offices and institutions of the state are located in Warsaw. Warsaw is also an important centre of academic and scientific life with as much as 69 universities in its area. This results in an increased interest in an emigration to Warsaw and nearby towns among the population in pre-working and working ages. The voivodeship's population amounts to 5 301 760 people, constituting almost 14% of the total population of Poland; the voivodeship is characterised by a positive birthrate (0.5 per mille)³. Given that, Mazovia has the most considerable demographic potential among all voivodeships - however, it is parallel to the high number of people registered as unemployed, with an unemployment rate significantly diversified in individual poviats.

Attention shall be drawn to the disadvantageous communication situation of the voivodeship, which is affected by the insufficiently developed road network. The total length of national roads in Mazovia is 2 279,297 km. The provincial road network consists of sections with a total length of 2 820,84 km. The total road network includes 22 national roads, including A2 highway and express roads S2, S7, S8, S17, S79. There are 146 carriers operating in the voivodeship, providing a regular transport for people within the national road transportation. It was noted that the number of bypasses is insufficient, resulting in the formation of so-called traffic bottlenecks, especially on approach roads to the capital city. Warsaw, mainly due to its location in the TEN-T node, is characterized by high traffic load, low network capacity, limited road capacity, as well as by problems in distributing traffic within the city, especially from inlet roads⁴.

In the voivodeship there are three passenger airports: in Warsaw (F. Chopin Airport- the largest airport in Poland), in Modlin and in Radom. In terms of the development of rail transport, the voivodeship has 1712 km of a standard gauge railway line, of which more than 82% are electrified lines. Mazovia, via the Central Railway Station in Warsaw, has rail connections of a significance in both national and international scope. However, the region ranks 14th in terms of the density of the railway network among all voivodeships.

2.2. Economy

Mazowieckie Voivodeship is the most developed region of Poland. In 2015, 22.2% of Poland's GDP was generated in Mazovia, generating approximately 19% of the sold production of the country⁵.

² Podregiony, powiaty, gminy. Województwo Mazowieckie (Subregions, poviats, communes. Mazowieckie Voivodeship), Central Statistical Office, Warszawa 2017, p. 16.

³ Ibidem, p. 18.

⁴ 2014-2020 Regional Operational Programme of Mazowieckie Voivodeship, Warszawa, 12 February 2015, pp. 19-20.

⁵ Rocznik Statystyczny Województw – Statistical Yearbook of the Region, Główny Urząd Statystyczny, Warszawa 2017, p. 56, 526.

By the end of 2017, nearly 790 000 business entities were registered in Mazovia. It is the largest number of entities of the national economy in the country. The region is thus characterized by a considerable level of economic activity. Moreover, the region's economy is characterized by high industry diversification, being less dependent on cyclical fluctuations than regions uniform in terms of the structure of the economy. The most significant employers of Mazovia include: Polski Koncern Naftowy ORLEN GK (Płock), Boryszew GK (Sochaczew) and Sokołów GK (Sokołów Podlaski).

In the structure of the economy, of special significance are the agri-food and petrochemical industries. The voivodeship's usable agricultural land covers about 65% of the area, hence the large role of horticulture, orcharding and related activities- in Mazovia there are nearly 1/3 of Polish orchards, constituting over 40% of all fruit production in Poland. Mazovia is the second region in the country in terms of cereal production and a leading region given the production of milk and meat. The energy, chemical and electromechanical industries are also of great significance for the region's economy. A characteristic feature of the Mazovian industry is the rapid development of innovative, modern industries. All of the above mentioned factors determine the fact that Mazovia has the highest turnover among all voivodeships: Mazovian companies are responsible for about 50% of imports and 50% of exports in the national scale⁶.

Another significant factor that influences the attractiveness of the region of Mazovia in terms of investing is the size of the regional market and the strategic location in the central part of Poland. Further advantage of the region is the access to highly qualified staff, resulting from a large number of higher education institutions located in the voivodeship. Furthermore, it shall be noted that the region's economic potential translates into a dynamic increase in the number of registered enterprises.

2.3. Voivodeship's development factors

The development of entrepreneurship in the region is primarily influenced by the existence of business incubators, including academic business incubators. In the largest scope they affect the development of activities characterised by a significant development potential. There are 6 business incubators in the voivodeship (5 in Warsaw, 1 in Radom) and 10 academic business incubators (8 in Warsaw, 2 in Płock). In 2014, there were 5 entities running innovation and entrepreneurship development centres, operating in the Mazowieckie Voivodeship⁷. Moreover, out of 137 business support institutions in the Mazovia region only 10 are accredited⁸. There are five Special Economic Zones operating in the voivodeship. Additionally, industrial and technological park (the only institution of this type in the voivodeship) operates in Płock. In opposition to the quoted data, attention shall be drawn to the insufficient number of investment sites and a difficult access of entrepreneurs to the services of business environment institutions. Despite that, Mazovian enterprises are leaders in terms of innovation in Poland. In 2016 23% of all Polish enterprises undertaking research and development activities were located in Mazovia⁹. However, in terms of the number of enterprises that managed to develop and introduce new or significantly improved products on the market, they accounted merely for 5.7% of all enterprises in the voivodeship, rating

⁶ Portal of the Regional Council of Mazowieckie Voivodeship: <https://www.mazovia.pl/wojewodztwo/krotko-o-mazowszu/gospodarka/> (access: 10.04.2018).

⁷ A. Bąkowski, M. Mażewska (Ed.), *Ośrodki innowacji w Polsce (z uwzględnieniem inkubatorów przedsiębiorczości) (Innovation centers in Poland (including business incubators))* Report on the research 2014, Polish Agency for Enterprise Development, Warszawa 2014, pp. 32-92.

⁸ Portal <https://innowacyjni.mazovia.pl/> (access: 11.04.2018).

⁹ Website of the Local Data Bank: <https://bdl.stat.gov.pl/> (access: 10.04.2018).

Mazovia 10th in the country. The decrease in the share of Mazovian enterprises in producing gross value added has been a characteristic trend in recent years.¹⁰

Attention shall be drawn to abovementioned significance of agriculture and orcharding for the development of Mazovia. A large percentage of agricultural areas and an attractive landscape of the region are conducive to conducting ecological activities, therefore contributing to the smart specializations of the region. The high variability of weather conditions, determining the change in the manner in which agricultural activities are conducted shall be noted. The development of this area is also influenced by substandard air quality- especially occurrence of smog in the autumn and winter. This provides an impulse to seek new solutions to eliminate the negative effects of smog formation and to minimize its causes and effects.

A factor determining the country's development is also the high level of education of the population, positively affecting locating the innovative enterprises in the territory of the voivodeship. At the same time, a large number of well-educated residents in the agglomeration translates into a concentration of enterprises and development processes in highly urbanized areas: in Warsaw and its suburbs. It shall be added that the internal expenditure of enterprises on research and development activity in the Mazowieckie Voivodeship is relatively high. In 2016, this amount amounted to 4673.8 million PLN and increased by 43% as compared in comparison with 2015¹¹. Of a significance is also the fact that in recent years the number of enterprises deciding to allocate funds for research and development activity has been systematically growing. In Mazovia in 2016, in the total number of 1,200 units that invested in the R+D sphere, enterprises accounted for 987 entities¹². To summarize, the most significant competitive advantages of the region, (being at the same time developmental factors), consist of:

- high number of population in working age and a high birthrate;
- growing internal demand in the region, associated with an increase in the number of population and an improvement on the economic situation;
- considerable level of scholarisation at the higher level of education, accounting for the regional market's abundance in highly qualified staff;
- location in the TEN-T network, positively affecting Warsaw as a significant transport point on an European scale;
- transregional role of Warsaw, connected to its role as the capital city of Poland;
- diversified nature of the labour market¹³.

¹⁰ Trendy rozwojowe Mazowsza. Diagnoza, Z. Strzelecki (ED.), Warszawa 2013, p. 64.

¹¹ Local Data Bank: <https://bdl.stat.gov.pl/> (access: 10.04.2018).

¹² Ibidem.

¹³ Trendy rozwojowe Mazowsza..., p. 64.

3. Chemical industry and bioeconomy

3.1. Description of the industry including classification (NACE)

Chemical industry may be divided into 4 categories:

- mass chemistry (high-tonnage and mass-used products, excluding fuels),
- chemical processing (production of end products based on high-tonnage products),
- fuel
- low-tonnage chemistry (high-margin products used in low quantities).

The first two groups constitute for almost 90% of the value of sold production of chemical industry products in Poland¹⁴. Chemical industry is used in numerous other sectors of economy, including the food industry. For the purpose of present report, taking into consideration both the NACE and PKD classifications, chemical industry will be subjected to the analysis including production of:

- chemical products;
- pharmaceutical products;
- rubber and plastic products;
- coke and refined petroleum products.

The chemical industry is the third largest industrial sector in Poland, employing approximately 292 thousand employees¹⁵. Chemical industry in Poland produces products with a value exceeding PLN 206 billion (EUR 49 372 064 040)¹⁶, which corresponds to 17% of the total value of sold industrial production in Poland¹⁷. Moreover, Polish chemical industry is growing dynamically - its growth is higher than the average for the entire Polish industry, placing Poland among the world leaders in this scope¹⁸. Chemical industry, next to the ICT sector, is also one of the main activities among enterprises in the Mazovia region. Mazowieckie Voivodeship is responsible for about 26% of the total domestic production of chemicals, chemical products and pharmaceutical substances and medicines, and for approximately 14.5% of the total sold value of these products nationwide¹⁹. Furthermore, in Mazowieckie Voivodeship operate:

- 22.9% of enterprises producing chemicals and chemical products;
- 31.5% of enterprises producing substances and pharmaceutical products, and medicines;
- 11.5% of enterprises producing rubber and plastic products²⁰.

Enterprises producing and processing coke and refined petroleum products operate in the voivodeship, which is related to the location of the largest oil industry in Płock. It shall be emphasized that enterprises from the chemical industry operate throughout the whole region, whereas the areas of their concentration can be indicated, consisting of:

- in the scope of the production of chemicals and chemical products: the Capital City of Warsaw, cities of Płock and Radom, and poviats of Radom, Mińsk Mazowiecki, Otwock, Wołomin, Grodzisk, Legionowo, Piaseczno, Pruszków, Sochaczew and West Warsaw;

¹⁴ Przemysł chemiczny w Polsce..., p. 10.

¹⁵ Ibidem, p. 7.

¹⁶ Unless stated otherwise, all amounts were converted according to the average NBP exchange rate as of the date of the report (19.03.2018) 1 PLN = 4.1724 EUR.

¹⁷ Przemysł chemiczny w Polsce..., p. 8.

¹⁸ Ibidem, p. 9.

¹⁹ Regional Innovation Strategy for Mazovia 2020..., pp. 17 and 111.

²⁰ Ibidem, p. 115.

- in the scope of the production of basic pharmaceutical substances and medicines and other pharmaceutical products: the Capital City of Warsaw, poviats of Legionowo, Nowy Dwór, Wołomin, Piaseczno, Pruszków and West Warsaw;
- in the scope of the production of rubber and plastic products: the Capital City of Warsaw, cities of Płock, Radom, and poviats of Radom, Garwolin, Legionowo, Mińsk Mazowiecki, Otwock, Wołomin, Grodzisk, Piaseczno, Pruszków and West Warsaw²¹.

The table below presents the number of enterprises within the chemical sector and their quantitative change in the scope of years 2005-2015. In 2015, the number of enterprises in the processing sector increased by 12,311 compared to 2005 and amounted to 207,579 enterprises of which as much as 11.18% operated in chemical industry.

Table 1 The number of chemical sector enterprises in Poland in 2005 and 2015, divided by enterprise sectors

Branch	Total		Public sector		Private sector	
	2005	2015	2005	2015	2005	2015
Production of coke and refined petroleum products	146	170	8	5	138	165
Production of chemicals and chemical products	2049	2311	34	10	2015	2301
Production of pharmaceutical products	212	342	8	2	204	340
Production of rubber and plastic products	9458	8779	17	8	9441	8771
Total	11865	11602	67	25	11798	11577

Source: Statistical Yearbook of Industry, Central Statistical Office, Warsaw 2016.

Enterprises operating in the chemical industry in 2015 generated added value in the total amount of PLN 56 123 100 (EUR 13 451 035,38), constituting an amount 50% higher than in 2005, which indicates the high growth rate of enterprises in the chemical sector. The largest share in the production of this value was held by the rubber and plastic production sector, providing 42% of the abovementioned amount.

Table 2 Value added generated by enterprises operating in the chemical industry

Branch	2005		2010		2014		2015		2005	2015
	in million PLN	in million EUR	in million PLN	in million EUR	in million PLN	in million EUR	in million PLN	in million EUR		
<i>Production of coke and refined petroleum products</i>	6799,2	1629,57	9101,7	2181,41	5870,6	1407,01	9890,3	2370,41	3,1	2,4
<i>Production of chemicals and chemical products</i>	8550,1	2049,20	11047,4	2647,73	14016	3359,22	16697,7	4001,94	3,9	4
<i>Production of pharmaceutical products</i>	2497,3	598,53	4845,5	1161,32	5793,4	1388,51	5456,3	1307,71	1,1	1,3
<i>Production of rubber and plastic products</i>	10026,2	2402,98	16131,1	3866,14	22282	5340,33	24078,8	5770,97	4,6	5,7
Total	27872,8	6680,28	41125,7	9856,61	47962	11495,06	56123,1	13451,04	12,7	13,4

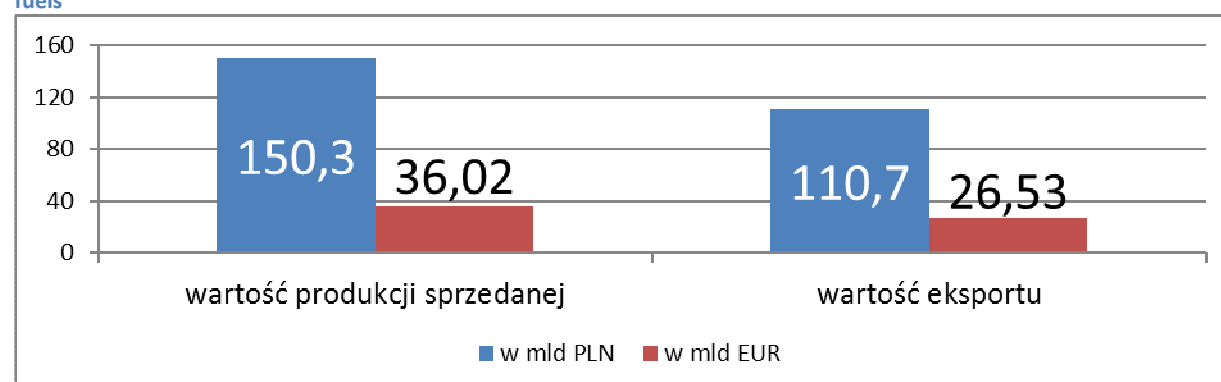
Source: Statistical Yearbook of Industry, Central Statistical Office, Warsaw 2016.

The chart below illustrates the ratio of the value of sold production in the chemical sector to the value of exports of products manufactured in this sector in 2016. It is possible to observe a considerable value of exports in both the amount and the value terms. Nearly 75% of the production

²¹ Ibidem, p. 115.

sold consists of exported products. Detailed information on the value of imports and exports for selected countries is presented in Annex No. 1.

Chart 1 Ratio of the value of sold production to the value of exports in the chemical sector in 2016, excluding fuels



Source: own research based on Przemysł chemiczny w Polsce. Pozycja, wyzwania, perspektywy (Chemical industry in Poland. Position, challenges, perspectives), Report prepared as part of the "Polish Chemistry" Campaign, Polish Chamber of Chemical Industry, Warsaw 2017, p.22.

The total turnover of enterprises from the chemical industry in the first half of 2016 amounted to EUR 28 540,6 million and decreased as compared to the same period of 2015. Nevertheless, they constituted 16.2% of the total turnover in the country. Detailed information concerning this matter is presented in the table below.

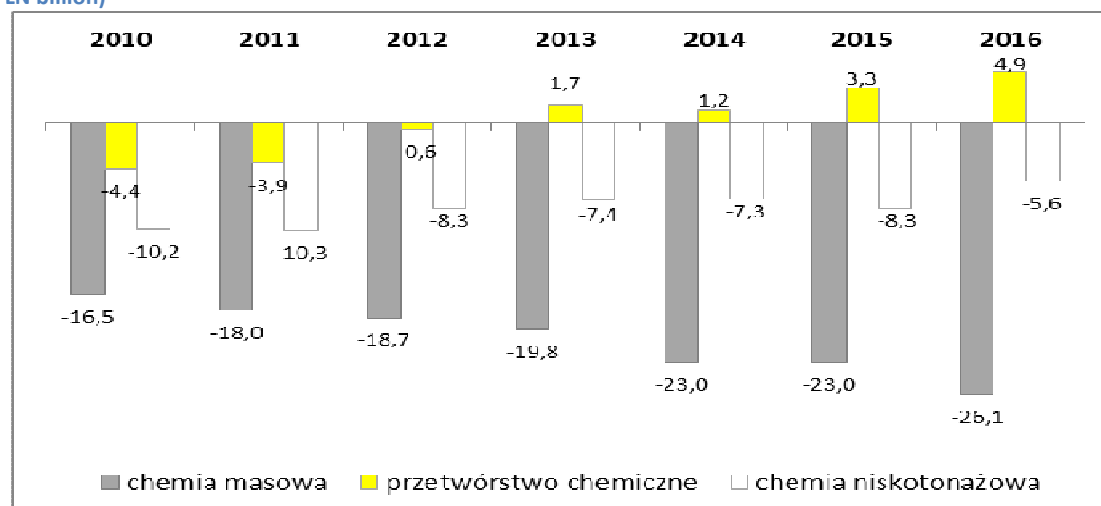
Table 3 Turnover in foreign trade in chemicals in the first half of 2016.

	Export		Import		Balance	
	millions of EUR	1st half-year 2015 = 100%	millions of EUR	1st half-year 2015 = 100%	millions of EUR	1st half-year 2015 = 100%
Turnover in the country	90 462,8	102,1	86 266,3	99,8	4.196 6	191,9
Chemical industry in total	12 625,8	105,7	15 914,8	106,6	-3.289 0	101,3
Share of the chemical industry in turnover of the country [%]	14,0	x	18,4	x	x	x

Source: own research based on J. Paprocki, Handel zagraniczny w I półroczu 2016 (Foreign trade in the first half of 2016). International statistics 2015, "Chemik" 2016, vol.70, no.10, p.650.

The balance of trade in the chemical industry is unfavourable for Poland. Poland continues to be an exporter of mass and low-tonnage chemistry processing products. A positive trade balance concerns merely industrial processing. Attention shall also be drawn to the trend of the deterioration of the trade balance in relation to mass and low-tonnage chemistry, but also of the improvement of the balance in relation to chemical processing, which proves considerable development opportunities of the industry and high development needs with the possibilities of using products.

Chart 2 Balance of trade in mass chemistry and chemical processing, and low-tonnage chemistry in Poland in 2010-2016 (in PLN billion)



Source: own research based on *Przemysł chemiczny w Polsce. Pozycja, wyzwania, perspektywy (Chemical industry in Poland. Position, challenges, perspectives)*, Report prepared as part of the "Polish Chemistry" Campaign, Polish Chamber of Chemical Industry, Warsaw 2017, p.22 (Low-tonnage chemistry presented for illustrative purposes).

Of a significance is also the increase in expenditures on innovations in enterprises in the chemical industry, predominantly in the rubber and plastic products branches as well as the branch of chemicals and chemical products, which have the largest share in generating the value added of the sector. The increase in expenditures on innovations in said enterprises from 2013 to 2015 amounted to 19%, in 2015 being the total value of PLN 2 174 million²². Moreover, it seems worth noting that in terms of the share of enterprises that introduced new or significantly improved products or processes among enterprises in a given processing sector, the production of coke and refined petroleum products could be rated first in comparison with all sectors of the processing industry (68% of enterprises in a given sector), production of pharmaceutical products- 2nd (65% of enterprises), production of chemicals and chemical products - comes 3rd (65% of enterprises), production of rubber and plastic products - 13th (42% of enterprises)²³. The analysis of applications for co-financing submitted under the call in the INNOCHEM Sector Programme divided by Strategic Areas of Research and Development indicates that nearly 45% of applications were submitted in the area of new technologies, 17% in horizontal areas, 16% in the area of basic products production, and 15% in the area of production of specialist products. Only 7% of applications concerned the area of obtaining raw material²⁴. Abovementioned fact reflects the high innovativeness of enterprises of a given industry.

3.2. Development challenges of the chemical industry and bioeconomy

Chemical industry faces considerable challenges related to trends changing both on an European and a global scale. Major development challenges which should be identified as having a significance for the development of the Polish chemical industry shall include:

a) Lack of an access to competitively priced raw materials

Said issue in the largest scope is connected with the lack of diversification of sources of strategic raw materials supply to Poland. Polish concerns (i.e. PKN Orlen and GK Lotos S.A.) make efforts to increase the extraction of strategic raw materials, but their effects could relate to a relatively small scale, in an inconsiderable manner satisfying the needs of enterprises and deciding about the need

²² *Przemysł chemiczny w Polsce...*, p. 30.

²³ *Ibidem*, p. 30.

²⁴ *Ibidem*, p. 31.

to import raw materials on a large scale. Access to raw materials is one of the most predominant needs of enterprises operating in the chemical industry. So far, research has shown that for almost half of Polish enterprises the cost of raw materials purchase accounts for almost 50% of company costs and reflects an upward trend in recent years²⁵.

b) The need to comply with regulatory requirements

It increases the operating costs of enterprises operating in chemical industry. Enterprises associated in the Polish Chamber of Chemical Industry have stated that if they did not have to bear costs to adjust their activities to regulatory requirements, funds earmarked for this purpose would be devoted to conducting research and development activities²⁶. Polish legal system is required to implement changes resulting from European Union's legislation on a current basis, however, the activity of the industry is significantly affected not only by the sphere of law, but by the whole of the country's economic policy. The idea that shall be considered relates to the strengthening of cooperation between industry and the legislator at the national level. e.g. in the form of the Parliamentary Group on the Chemical Industry, aimed at stimulating the development and innovation of the Polish chemical industry with the means of:

- creating conditions for the implementation of good business practices of foreign companies and solutions supporting the acquisition and investment of the Polish chemical industry in the world,
- coordinating legislative activities with the development of the chemical industry,
- conducting consultations with Polish and European environments and industry organizations for the diagnosis of needs and manners to solve problems of the domestic chemical industry²⁷.

c) Improvement of innovations

In the scope of improving innovation, Polish chemical industry companies identify significant scale of needs, resulting in, among others, high level of interest in financial support in the form of subsidies available on the market. These companies, however, note that despite the existing forms of financial assistance, support in this regard is still necessary for the Polish chemical sector to match the competitiveness of enterprises operating on European and global markets. Furthermore, the chemical sector entrepreneurs recognize the need for cooperation in ensuring regulatory requirements and establishing stronger cooperation between the worlds of science and business, providing a stimulant for innovation.

Moreover, some companies operating in the chemical industry act as suppliers of raw materials or subcontractors for larger enterprises, which generates low added value and has low development potential. Nevertheless, this situation does not have a significant impact on the Mazovian chemical industry. The supply of raw materials is a natural stage in the process of functioning of enterprises from the chemical industry. Given that, this phenomenon should not be considered a significant influence on the Mazovian chemical industry.

²⁵ Ibidem, p. 57.

²⁶ Ibidem, p. 58.

²⁷ Regulations of the Parliamentary Group on the Chemical Industry, <http://www.sejm.gov.pl/> (access: 10.04.2018).

4. Regional Innovation Strategy for Mazovia 2020.

4.1. Objectives and challenges of the Strategy

*Regional Innovation Strategy for Mazovia 2020*²⁸ is a detailed specification of the *Development Strategy for the Mazowieckie Voivodeship 2030*²⁹ in the scope of activities aimed at increasing the competitiveness and innovativeness of Mazowieckie Voivodeship. This is the major document, on which the implementation of the concept of smart specialization is based. Concerning smart specialisations, this term should be understood as an integrated, local programme of economic transformation, constituting an element of the new European Union policy towards the regions³⁰. Given above, the region's smart specialisation is the economic sector, selected on the basis of an analysis of strengths and weaknesses of the region, which, due to its importance in the region and the potential to implement innovative solutions, has a chance to develop and become an industry favourable to the development of the area. During the selection of smart specialisation of the region of a significance is the thematic concentration, i.e. focusing on a certain number of objectives and development priorities for more effective, concentrated spending of funds allocated to support innovation. In the current EU financial perspective, smart specialisation is a prerequisite for supporting investment in strengthening research, technological development and innovation, and improving access to information and communication technologies, and the use of high quality ICT.

The need to implement the Regional Innovation Strategy for Mazovia 2020 is associated with the necessity to effectively support innovation and the development of the region, and the need to meet the challenges identified in the region, including primarily:

- strong competition from foreign agri-food processing plants, dominance of basic agricultural production, insufficient processing position;
- Metropolitan Area of Warsaw as an area of high concentration of demand for products and energy;
- low level of development and technical condition of infrastructure (in particular transport) in areas located in a distance from the centre of the voivodeship;
- growing competition from other centres in the country;
- concentration of services in the central part of the voivodeship and their low availability in peripheral areas;
- shortage of technical staff;
- polarization of the region: stratification between the centre and peripheral areas in terms of accessibility of infrastructure and services for residents.

In response to the indicated challenges and in accordance with the developmental factors of the region, the main and strategic objectives of Regional Innovation Strategy for Mazovia 2020 were formulated. The major objective of the document is to increase Mazovia's innovativeness, leading to an acceleration of growth and an increased competitiveness on the EU scale. It was assumed that innovation should include the diffusion of effects while not being exclusive. The inclusiveness

²⁸ Regional Innovation Strategy for Mazovia 2020. Innovation support system and smart specialization of the region, constituting an annex to Resolution No. 23/15 of the Mazowieckie Voivodeship Assembly of 16 March 2015 with the amendment.

²⁹ Development Strategy for the Mazowieckie Voivodeship 2030. Innovative Mazovia, annex to the Resolution No. 158/13 of the Mazowieckie Voivodeship Assembly of 28.10.2013.

³⁰ Regional Innovation Strategy for Mazovia 2020..., p.8.

of innovation is significant due to the large social stratification in the region³¹. The implementation of the predominant objective corresponds with five strategic objectives, of which the first three focus on the development of processes and mechanisms leading to the increased innovation of the region, while the other two ensure the potential for innovation by affecting measures and developing competences among the society. The chart illustrating objectives of the strategy is presented below.

Chart 3 The chart of objectives of the strategy



Source: own research based on Regional Innovation Strategy for Mazovia 2020. Innovation support system and smart specialization of the region, constituting an annex to Resolution No. 23/15 of the Mazowieckie Voivodship Assembly of 16 March 2015 with the amendment., p.26.

4.2. Chemical industry and bioeconomy in Regional Innovation Strategy for Mazovia 2020

The chemical sector is of an use in terms of activities in the scope of the Mazovian smart specializations, among others, in the following areas:

- *Quality food*: crop and breeding monitoring system, production and packaging process, quality system for raw materials and products, food packaging, quality assurance and testing equipment, cultivation protection products and techniques, veterinary measures, bio pesticides, closed circuit solutions;
- *Intelligent management systems*: safe and environmentally friendly transport means and systems, including hazardous substance transport systems, control and measurement equipment, diagnostic equipment, hazard detection and prevention system, industrial waste utilization and recycling system, energy production from waste;

³¹ Said stratification occurs despite the introduction on 01.01.2018 of a new NTS division under the Commission Regulation (EU) 2016/2066 of 21.11.2016 amending the Annexes to Regulation (EC) No 1059/2003 of the European Parliament and of the Council on the establishment of a common classification of Territorial Units for Statistical Purposes (NUTS), Journal of Laws UE L 222/1, 29.11.2016. Despite the separation of the Capital City of Warsaw as a separate region, the concentration of enterprises in close proximity to Warsaw is still observed.

- *High quality of life*: advanced pharmacy, including biological medicines, advanced dietetics, development and dissemination of the use of materials and inert substances for living organisms and the environment - e.g. hypoallergenic paints³².

It is necessary to emphasize the fact that the above catalogue is not a closed set. Attention should also be paid to the potential of the chemical industry sector, which was emphasized in RIS. As many as 11 out of 50 innovative enterprises operating in the Mazowieckie Voivodeship belong to the sector producing chemicals and chemical products, pharmaceutical substances and products, as well as medicines and products from rubber and plastics³³. A significant potential of clusters of regional enterprises in the scope of chemical industry was observed.

The priority research directions in Mazovia include smart specialisations of the region and are designated within individual specialisations and specified by research objectives. The identification of directions was subjected to a bottom-up process and aimed at the largest possible degree of involvement of representatives of entities that could potentially be interested in the implementation of projects within the research and development sphere. They operated as part of working groups on smart specialisations³⁴. Attention shall be drawn to a large involvement of representatives of entities in the scope of the cosmetics industry in the undertakings of working groups. Given that, the priority research directions not only contribute to provide RIS with more details, but also their implementation would be a response to the needs of regional entrepreneurs, resulting in an achievement of the synergy effect. Mutual connection of directions with smart specialisations ensures more efficient targeting of financial support.

Implementation of smart specialisations is also included among objectives of the Regional Innovation Strategy for Mazovia through, among others, the objectives due to be achieved. The strategic objectives of the document include those that directly affect the level of innovation in the region, ensuring a development of relations between business, science and the environment, development of network structures, increase in foreign direct investment from high-tech industry and the number of research and development centres (or their parts) established by foreign investors, guaranteeing a sufficient level of cooperation with the local environment or increasing the ability to use digital technologies and the scope of digital inclusion³⁵.

It shall be concluded that implemented documents direct the support in an detailed, measured manner, therefore contributing to the possibility of fulfilling the objectives in a considerably large scope.

4.3. Implementation programme for the Regional Innovation Strategy for Mazovia 2020

The implementation programme 2015 for the Regional Innovation Strategy for Mazovia 2020 was adopted in the form of Resolution No. 433/32/15 of the Regional Council of Mazowieckie Voivodeship of 07.04.2015, updated in 2017 by Resolution No. 693/242 /17 of the Regional Council of Mazovian Voivodeship dated 16.05.2017. Said document provides means to implement the objectives of the Regional Intelligent Specializations by defining the financial framework, detailed measures and indicators to be achieved at a given implementation stage.

³² Regional Innovation Strategy for Mazovia 2020..., pp.76-80.

³³ Raport o innowacyjności gospodarki Polski w 2011 r. (Report on the innovativeness of the Polish economy in 2011), ed. T. Baczko, INE PAN, Warszawa 2012, pp.235-263, [in:] Regional Innovation Strategy for Mazovia 2020. Innovation support system ..., p.113.

³⁴ Priority research directions within the smart specialisation of the Mazowieckie Voivodeship, version 2.0, Warszawa 2017, p.8.

³⁵ See: Regional Innovation Strategy for Mazovia 2020..., pp.25-38.

2015 was the year of the first stage of the implementation of RIS, being a transition period between the previous and the current financial perspectives of the European Union. This determined the need for a particular focus on activities related to the implementation of the Strategy. The major challenge in this respect was to complete the implementation of projects initiated in the previous financing period, as part of the Human Capital Operational Programme. It was also necessary to provide financing for the pro-innovation measures pursued by the Regional Council of Mazowieckie Voivodeship and to establish a system of coordination and monitoring of the implementation of pro-innovation measures, taking into consideration the partnership principle. Furthermore, this was the period in which the implementation of the ROP MV 2014-2020 was due to be initiated, including the conditions resulting from RIS.

The update of the Strategy resulted from the completion of measures aimed at the implementation of the abovementioned undertakings. However, new difficulties occurred: the priority was still given to providing pro-innovation financing for the measures conducted by RGVM and the system of continuous monitoring of smart specialisations. In 2017 it was also planned to finalize the implementation of the Action Plan to fulfil the precondition for the first thematic objective of the ESI Funds in the Mazowieckie Voivodeship. Among the priorities of the updated document, the integration of RIS with the implementation of the ROP MV 2014-2020 has been mentioned- it was indicated that it would be necessary to continue and diversify activities undertaken as part of the innovation process, and to expand the group of stakeholders. Moreover, it is planned to initiate work on the RIS review. The tasks listed in the Implementation Programme include::

- Ensuring the functioning of the information management system concerning the state of the regional economy and innovation, based on the implemented IT platform;
- Organization of subsequent editions of the competition to promote innovations among Mazovian entrepreneurs and young scientists;
- Formulation of the project objectives and preparation of documentation necessary to finance the project of the Regional Council of Mazowieckie Voivodeship within I PA of ROP MV, 1b, in the scope of development of the regional innovation support system and maintenance of the continuous entrepreneurial discovery process, and within the III PA of ROP MV, 3a, in development and integration of business environment institutions in the region;
- Ensuring continuity of the entrepreneurial process of discovering, involving regional institutions and interested entities in the sphere of science, business and its environment, as well as support for monitoring the rate of return on investment in RIS Mazovia, calculated for the ERDF and ESF;
- Identification of cooperative relations of strategic importance for the development of entrepreneurship and innovativeness of the voivodeship in the context of smart specialisation;
- Development and professionalization of BEI services and support mechanisms implemented by them for the development of enterprises;
- Development of a regional innovation support system based on the cooperation network of the RIS Mazovia Managing Authority with other entities, using synergies between regional specializations and policy implementation instruments at the regional, national and international levels;
- Undertakings for cooperation, improving competences and creating synergic links between science, technology and industrial parks;
- Organisation of the call for proposals for funding under I and II PA of the ROP MV 2014-2020 and as part of SG OP and KED OP activities complementary to RIS Mazovia.

The abovementioned measures were assigned primarily to the RIS Managing Authority. Some of the activities that have been identified as necessary to be undertaken in order to implement the Strategy are performed by the Managing Authorities of numerous Programmes: ROP MV, SG OP and KED OP. To implement the Strategy, the planned funds would amount to at least PLN 3 509 904 971 (EUR 841 219 674,77). A significant share of this fund would be assigned from SG OP and ROP MV (in total, nearly 75% of the maximum amount). Private funds in the form of own beneficiaries' contribution, which will cover about 20% of the expected amount are also of a significance. The funds from private entities are engaged in the activities of enterprises not only in the form of own contribution, but they also constitute a part of the internal financing of their research and development activities. The participation of private entities in this aspect is crucial given the fact that it reflects the recognition of the importance of research and development activities to maintain competitiveness in the industry market by the managers of companies. The budget of the Regional Council of Mazowieckie Voivodeship and funds provided for the Technical Assistance of the ROP MV will constitute a insignificant percentage of the amount involved in the implementation of RIS due to the fact that part of the tasks will be undertaken by the Regional Council of Mazowieckie Voivodeship as part of its operational activities. The detailed involvement of the amounts foreseen for the implementation of RIS is presented in the table below.

Table 4 Sources of financing for the implementation of the Regional Innovation Strategy for Mazovia 2020

Source of financing	Funds		%
	PLN	EUR	
SG OP	1 598 392 711,00	383 087 122,76	45,54%
ROP MV 2014-2020	965 943 100,00	231 507 789,28	27,52%
Private funds	641 083 953,00	153 648 728,07	18,26%
KED OP	301 974 258,00	72 374 234,97	8,60%
Funds of RCMV	1 410 190,00	337 980,54	0,04%
TS ROP	1 100 759,00	263 819,14	0,03%
Total	3 509 904 971,00	841 219 674,77	100,00%

Source: own research based on the Implementation Programme for the Regional Innovation Strategy for Mazovia 2020, constituting an annex to Resolution No. 693/242/17 of the Council of Mazowieckie Voivodeship of 16.05.2017.

The vast majority of the tasks listed in the Programme will constitute the activities planned for implementation under the Strategic Objective 1 (Increasing and strengthening cooperation in innovation and innovation development processes) and Strategic Objective 3 (Increase of effectiveness of support and financing pro-innovation activities in the region).

5. 2014-2020 Regional Operational Programme of Mazowieckie Voivodeship

5.1. Document structure

2014-2020 Regional Operational Programme of Mazowieckie Voivodeship is one of 16 regional programmes developed in the current financial perspective of the European Union by the self-governments of individual voivodeships. The Programme for Mazovia was prepared by the Regional Council of Mazowieckie Voivodeship in accordance with the document adopted between Poland and the European Commission, titled Programming of the 2014-2020 financial perspective- Partnership Agreement, approved by the European Commission on 12.02.2015.

ROP is coherent with strategic documents at the EU and national level, i.e. Europe 2020: A strategy for smart and sustainable and inclusive growth. The separate chapter in the Programme is devoted to the diagnosis of the situation related to financing and creating development conditions for research and development activities of Mazovian enterprises. Strategic objectives being an aim of the Programme have been formulated basing on said diagnosis. Along with the Partnership Agreement the documents were used to select thematic objectives and related to them investment priorities, both supported by the implementation of the Programme. Moreover, the document identified the allocation of funds for the implementation of individual thematic objectives and investment priorities. Then, abovementioned objectives and investment priorities were assigned to 10 Priority Axes³⁶. The description of each Priority Axis consisted of the identification of results which the region intends to achieve as with the means of targeting the intervention.

The Programme ensures the integrated approach to territorial development, which in the case of the Mazowieckie Voivodeship was based predominantly on the use of instruments, i.e. Integrated Territorial Investments (ITI) for the Capital City of Warsaw and its functional area, and the support for regional ASI through regional territorial investments (RTI) for 5 subregions (NTS 3): Ciechanów, Płock, Ostrołęka, Siedlce and Radom through preferences or dedicated competitions. Those projects are consistent with macroregional strategies, primarily with the EU Strategy for the Baltic Sea Region. Diagnosis and support are also dedicated to areas particularly exposed to poverty, discrimination and social exclusion, and susceptible to the occurrence of negative trends in demography and the environment.

The Program aims at the coordination between cohesion policy funds, EAFRD, EMFF and other EU and national financing instruments, as well as the EIB at the programming, managing and implementation stages. In accordance with the Regulation No. 1303/2013³⁷ the use of financial resources in the current financial perspective depends on meeting the requirements of pre-conditions (ex-ante), that is ensuring defined initial conditions enabling an effective implementation of programmes co-financed from European funds. The Programme includes ex-ante conditions at the regional level, necessary to be met in order to use resources for each thematic objective and for the Programme in general. An analysis of the scope of implementation of particular conditions applicable to the ROP MV was conducted, indicating measures necessary to be adopted in order to achieve the

³⁶ XI PA is intended for the Technical Support.

³⁷ Regulation No 1303/2013 of the European Parliament and of the Council of 17 December 2013 establishing common rules on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund; laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006.

objectives by the time the document is implemented. ROP also aims at a reduction of administrative burdens for beneficiaries and a description of horizontal principles related to the development of the Programme. The document contains a description of the institutions and entities involved in management, control and audit stages. The description of the scope of their significance is covered in the next subsection of present report.

5.2. Institutions and entities for management, control and audit, and the role of individual partners of the Programme

The Regional Council of the Mazowieckie Voivodeship is the Managing Authority for ROP VM 2014-2020, also performing the duties of the Certifying Authority. In order to ensure the separate performance of the function and independence of the Certifying Authority, a separate, independent in terms of organisation and duties unit was established within the Managing Authority. The role of the Audit Institution is performed by the Ministry of Finance's Department for Protection of EU Financial Interests. In order to efficiently conduct tasks resulting from the ROP MV, the RCMV assigned the Mazovian Unit for EU Programmes Implementation (MUEUPI) to act as an intermediary institution. Its duties include, among others, activities related to the preparation of programme and competition documents, recruitment of applications and selection of projects recommended for co-financing, information and promotion undertakings and conducting tasks related to the monitoring process, verification of payment applications and payments to beneficiaries, as well as controlling³⁸. In order to implement the principle of partnership, constituting a fundamental principle in the current financial perspective at the programming stage, including public consultations of objectives and the project of ROP VM 2014-2020, the coordinating institution on the preparation of the Programme (Department of Regional Development and EU Funds of the Marshal's Office of the Mazowieckie Voivodeship) ensured the largest possible participation of socio-economic entities. At the implementation stage of the Programme, the participation of socio-economic partners is envisaged by ensuring their membership in the Monitoring Committee of ROP VM 2014-2020, an advisory support for beneficiaries and information and promotion activities.

5.3. Priority Axes and allocation of financial resources

ROP VM 2014-2020 is a programme financed from two funds: the European Regional Development Fund and the European Social Fund. The Mazowieckie Voivodeship is the only region in Poland with a special status, foreseen by the Regulation No. 1303/2013, as a more developed region which was a less developed in the previous perspective. The estimated allocation for the Programme amounts to EUR 2 089 840 138, with the ERDF allocation amounting to EUR 1 544 686 317, and ESF 545 153 821 EUR. The ERDF to ESF ratio is respectively 74% to 26%, while the level of co-financing from EU funds is up to 80% per Priority Axis. The ROP VM foresees the involvement of national public and private funds. Given above, the final involvement of national resources at the Programme's closure stage may be higher, depending on the scope and degree of granting state aid. The financial structure of the document has been prepared in accordance with the principle of ring-fencing, identified by the Partnership Agreement. The limits indicated in the Programme result from documents adopted at the EU, presented as follows:

- PLN 165 756 619 are planned to support integrated actions for sustainable urban development under the ITI;
- Technical assistance funds will amount to EUR 72 991 719 (3.5% of the allocation);

³⁸ Portal ROP VM 2014-2020: <http://rpo.mazowia.eu/> (access: 10.04.2018).

- Funds for supporting the R+D+I area as well as SME development and increasing energy efficiency, RES use amount equal to 62.8% of ERDF allocation, including 21.0% of ERDF allocation for energy efficiency and renewable energy purposes;
- 31.6% of the Programme allocation was used to promoting social inclusion and combating poverty;
- The total level of expenditure on rural areas will constitute a minimum of 11% of the Programme allocation;
- For purposes of mitigation and adaptation to climate change, 18.00% of the Programme budget was allocated.

The allocation of funds to particular Priority Axes is presented in the table below.

Table 5 Priority axes of ROP VM 2014-2020, including the amount of EU support, thematic objectives and investment priorities

Priority Axis	Funds	Funds from the EU [EUR]	% of the allocation for the Programme	Thematic Objective	investment Priority
I. <i>The use of research and development in the economy</i>	EFRR	278 217 130	13%	OT 1	1a, 1b
II. <i>Increase of Mazovia's e-potential</i>	EFRR	153 599 843	7%	OT 2	2c
III. <i>Development of innovative potential and entrepreneurship</i>	EFRR	213 369 786	10%	OT 3	3a, 3b, 3c
IV. <i>Transition to a low-carbon economy</i>	EFRR	324 359 153	16%	OT 4	4,a, 4c, 4e
V. <i>An environmentally friendly economy</i>	EFRR	91 442 566	4%	OT 5, OT 6	5b, 6a, 6c, 6d
VI. <i>Quality of life</i>	EFRR	116 411 947	6%	OT 9	9a, 9b
VII. <i>The development of the regional transport system</i>	EFRR	367 285 892	18%	OT 7	7b, 7d
VIII. <i>Development of the labour market</i>	EFS	137 885 055	7%	OT 8	8i, 8iv
IX. <i>Supporting social inclusion and combating poverty</i>	EFS	172 375 061	8%	OT 9	9i, 9iv, 9v
X. <i>Education for the development of the region</i>	EFS	161 901 986	8%	OT 10	10i, 10iii, 10iv
XI. <i>Technical Support</i>	EFS	72 991 719	3%		

Source: own research basing on 2014-2020 Regional Operational Programme, p.38-50.

6. Other innovation and chemical industry support programmes

6.1. Smart Growth Operational Programme

The Smart Growth Operational Programme 2014-2020 (SG OP) was developed on the basis of Regulation No. 1303/2013 and the Act of 11.07.2014 on the principles of implementing programmes in the field of cohesion policy financed in the financial perspective 2014-2020³⁹. The European Commission accepted the Programme by Decision No. C(2015)855 of 12.02.2015. The SG OP is a national programme financing research, development and innovation in order to increase the innovativeness of the Polish economy. The projects envisaged for implementation as part of the measures and sub-measures included in the Programme provide for strengthening the links between business and science, which will have a positive impact on the degree of commercialization of the results of research and development and their practical use. The Programme implements two thematic objectives:

- Thematic Objective 1. *Strengthening research, technological development and innovation and*
- Thematic Objective 3. *Strengthening the competitiveness of small and medium enterprises.*

Projects implemented within TO 1 should reflect consistency with smart specialisations. The documents defining smart specialisations at the regional level are strategies concerning smart specialisations of the region, while at the national level it is a document entitled National Smart Specialisation, constituting an annex to the Enterprise Development Programme. As part of the National Smart Specialisation (NSS) implementation, the Programme provides for 2% of TO 1 allocation for financing experimental activities resulting from the entrepreneurial discovery process and being part of NSS monitoring.

SG OP is responsible for the implementation of 71.8% of the total allocation foreseen for Poland under TO 1. The total allocation for the Programme amounts to EUR 8 613 929 014, including EUR 6 116 056 353 for TO 1 and EUR 2 200 878 402 for TO 3. 5 Priority Axes are implemented in the Programme:

- OP I: Support for conducting R+D works by enterprises;
- OP II: Supporting the environment and the potential of enterprises to conduct R+D+I activity;
- OP III: Support for innovation in enterprises;
- OP IV: Increasing the scientific and research potential;
- OP V: Technical Assistance.

6.2. Rural Development Programme

Rural Development Programme for 2014-2020 (RDP) was developed on the basis of Regulation No. 1305/2013⁴⁰. It is one of the elements constituting the country's development policy system, predominantly through the Partnership Agreement mechanism. The main objective of the RDP is to improve the competitiveness of agriculture, sustainable management of natural resources and activities in the field of climate, as well as balance territorial development of rural areas⁴¹. The

³⁹ T.j. Dz. U. z 2017 r. poz. 1460, 1475.

⁴⁰ 29. Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17.12.2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005 and acts delegated and executive of the European Commission, Journal of Laws. UE L 347/487, 20/12/2013

⁴¹ <http://www.minrol.gov.pl/> (access: 10.04.2018).

Programme implements all six priorities set for the EU's rural development policy for 2014-2020. The Programme also supports innovation- said support is implemented as part of the TO 1, implemented through the following strategic objectives of the RDP and their corresponding activities indicated below.

Table 6 List of activities supporting research and development activities under RDP 2014-2020

Thematic Objective	Strategic Objective RDP	Measures RDP	Total planned EU contribution [in EUR]
TO 1	1A	Measure. 1. Knowledge transfer and information activities	36 905 246,00
	1B	Measure. 2. Advisory services, farm management services and substitute services	47 722 830,00
	1C	Measure. 16. Cooperation	43 267 246,00
Total			127 895 322,00

Source: own research based on the Rural Development Programme 2014-2020, Warszawa, 18.04.2017.

Measure 1 includes support for vocational education and skills acquisition (sub-measure 1.1) and support for demonstration and information activities (sub-measure 1.2). Its aim is to increase the knowledge base and innovativeness in rural areas and to strengthen the links between agriculture and forestry, and research and innovation. The total funds provided to support RDP research and development activities under the EAFRD are almost EUR 128 million. The entire EAFRD funds allocated for the implementation of the Programme amount nearly to EUR 8.7 billion. Therefore, 1.47% of the total funds provided for implementation of the RDP will be allocated to R+D in agriculture⁴².

6.3. Horizon 2020

The objective of the EU Framework Programme Horizon 2020 is to support the creation and functioning of the European Research Area, in which the free movement of scientists, scientific knowledge and technology will be possible by strengthening cooperation both between the European Union and its Member States, as well as between Member States themselves⁴³. Horizon 2020 is the largest European Union programme in the field of research and innovation. It includes three separate programs supporting research at EU level, i.e.:

- The EU Framework Programme for research, technological development and demonstration;
- Part of the Framework Programme for Competitiveness and Innovation (CIP) dedicated to innovation;
- Activities of the European Institute of Innovation and Technology (EIT).

Horizon 2020 is based on three mutually complementary priorities:

- *An excellent scientific base*, consisting of specific objectives:
 - European Research Council in the scope of the Horizon 2020 programme (ERC);
 - Future and Emerging Technologies under the Horizon 2020 Programme (FET);
 - Marie Skłodowska-Curie Actions within the Horizon 2020 Programme (MSCA);
 - European research infrastructure, including e-infrastructures.
- *Leading position in industry*, consisting of specific objectives:
 - A leading position in the field of enabling and industrial technologies;

⁴² Rural Development Programme 2014-2020, Warszawa, 18.04.2017

⁴³ Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11.12.2013 on regulations for the participation and dissemination of Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Regulation (EC) No. 1906/2006, i.e. Journal of Laws. UE L 347/81, 20/12/2013.

- Access to risk finance;
- Innovation in SMEs.
- *Social challenges*, constituting a response to the most important social challenges identified in the Europe 2020 strategy, including:
 - Health, demographic change and well-being;
 - Food security, sustainable agriculture and forestry, research on seas and inland waters, and the bioeconomy;
 - Safe, clean and effective energy;
 - Intelligent, bio and integrated transport;
 - Activities in the field of climate, environment, effective resource management and raw materials ⁴⁴.

The listed Priorities are supplemented by specific objectives:

- Ensuring wider participation;
- Science involving society and for the society.

The allocation for the Programme amounts to EUR 77 028,3 million, and its division is presented in the table below.

Table 7 Allocation for individual projects of the Horizon 2020 Programme

Measure	Allocation [in mln EUR]
Priority Social Challenges	29 679,00
Priority Excellent Scientific Base	24 441,10
Priority Leading Position in the Industry	17 015,50
European Institute of Innovation and Technology	2 711,40
Direct actions of the Joint Research Centre (JRC), not belonging to the nuclear field	1 902,60
Detailed objective Science with the participation of society and for society	462,20
Specific objective Ensuring wider participation	816,50
Total	77 028,30

Source: own research based on the website <http://www.kpk.gov.pl> (access 7.03.2018)

The programme includes, among others, the following activities:

- An SME instrument implemented by individual SMEs or their consortium for the implementation of innovative solutions - aimed at implementing existing, innovative technology to fill a gap in the market or solve a specific problem; in 2018, 4 call dates for applications for phase 1 (feasibility study) and phase 2 (implementation) are envisaged;
- Marie Skłodowska-Curie Actions- research and training, as well as innovation and training projects: financing projects in each area of research and innovation in accordance with the topics proposed by the applicants- actions provide remuneration for newly employed researchers, cover research costs, delegate employees, participation in trainings and conferences as well as administrative costs of the project implementation. The action enables participation in RISE projects (Research and Innovation Staff Exchange) aimed at the exchange of knowledge, ideas leading to the development of new solutions, products and services. They consist in exchanges for up to 12 months of employees between the institutions forming the project consortium and located in different regions of the world;
- Eurostars-2: is the Eureka Initiative program that supports projects implemented by research-performing SMEs. It aims at the implementation of the project results within 2 years of its completion. A consortium participating in the program should consist of at least

⁴⁴ Website of the National Contact Point: <http://www.kpk.gov.pl/> (access: 10.04.2018).

one SME conducting R+D activities in international cooperation with other SMEs or other types of units from a given supply chain (i.e. universities, research institutions).

- Fast Track to Innovation - innovative projects implemented by project consortia aimed at commercialization of the solution: the initiative is dedicated to innovations that demonstrate high potential for implementation on the market. The initiative concerns ideas in any technology area- the entrepreneurs themselves define the topic in which they submit the application, thus the competitions are a fully bottom-up initiative. The initiative supports advanced and specialized R+D solutions, including activities related to setting standards, advanced testing, pilotage and demonstrations. 50-70 projects are planned to be supported each year. The maximum amount of the grant is EUR 3 million, with a co-financing rate of 70% of the project value. Non-profit organizations (e.g. universities, research institutes) could apply for funding at the level equal to 100%. The initiative requires creation of a project consortium consisting of a minimum 3 and a maximum 5 partners from EU Member States and countries associated with Horizon 2020. 3 calls for proposals are planned for 2018⁴⁵.

6.4. INNOCHEM

INNOCHEM is a Sectoral Programme implemented by the National Centre for Research and Development under Measure 1.2 of the SG OP. It is an initiative specific to the chemical sector. It is the third program focused on a specific industry, launched by the National Centre for Research and Development - the previous ones are INNOMED and INNOLOT. The programme was launched in response to the demand reported by entrepreneurs from the chemical industry based on a feasibility study submitted by the Polish Chamber of Chemical Industry.

The main objective of the Programme is to improve the competitive position of the Polish chemical sector on international markets by strengthening the ability to generate innovative solutions in cooperation with the science sector in the perspective of 2023. This objective is defined by three specific objectives that concern:

- increasing the use of new alternative raw materials and new methods of waste management in the chemical industry;
- increasing the production of new or improved basic chemical materials and products;
- reduction of energy consumption, raw material consumption and impact of the chemical sector on the environment;
- increasing the production of new products and solutions of the chemical sector manufactured on the basis of advanced technologies;
- increasing the use of technologies allowing for the optimization of currently used manufacturing processes in the chemical sector⁴⁶.

The thematic areas on which the Programme's activities will focus are: sourcing of raw material, production of basic products; manufacturing of specialized products, new technologies and horizontal areas (optimization of processes, low-emission manufacturing technologies). In accordance with the Programme's research agenda, these areas constitute Strategic Areas of Research and Development⁴⁷. The amount for co-financing projects amounted to PLN 120 million under the first competition and PLN 180 million under the second competition.

⁴⁵ Ibidem (access: 10.04.2018).

⁴⁶ Research Agenda of the Sector Programme INNOCHEM, p.2.

⁴⁷ Ibidem, p.3.

6.5. Other activities supporting innovation in the chemical sector

Moreover, there are also other activities supporting innovation in the chemical sector. One of them is the Euratom Fusion Programme which concerns research and training activities related to nuclear fission and radiation protection. The main issues of the Programme include: improving the safety of nuclear technologies, nuclear energy safety, radiation protection and, in the long term, resigning of the use of coal as a source of energy. The total budget of the Programme is EUR 1 603 329 million; the funds foreseen for 2018 are EUR 69.79 million⁴⁸. The implementation was planned for 2014-2018, but the European Commission plans to extend the Programme by the end of 2020⁴⁹. In Poland, Euratom Fusion is implemented by the Institute of Physics, Plasma and Laser Microfusion, and the information about it is provided by experts from the National Contact Point for EU Research Programmes.

Activities financed under the Programme have been developed in accordance with Regulation No. 1314/2013⁵⁰. They are divided into 7 thematic sections:

- Nuclear safety;
- Reclamation of degraded environmental elements and elimination of degradation sources;
- Management of radioactive waste;
- Education and training;
- Radiation protection;
- Promoting innovation in nuclear safety;
- Research on nuclear fusion⁵¹.

Another noteworthy activity involving the chemical industry is the Innovative Medicines Initiative 2 Joint Undertaking (IMI2 JU). The initiative is a public-private partnership between the European Commission and the European Federation of Pharmaceutical Industries and Associations, EFPIA. The project implementation period was planned for 2014-2024, however, the announcement of competitions was planned until the end of 2020. The budget provided for the Programme is EUR 3.27 billion, with some of the funds allocated from the Horizon Programme (EUR 1.638 billion), from EFPIA (EUR 1.425 billion) and the remaining part (EUR 213 million) from other members and associated partners. The funds are targeted at the SME sector and public entities, patient organizations, hospitals, regulatory agencies, health technology assessment bodies, and others. It is assumed that research projects will be implemented in cooperation with a research consortium financed by the European Commission and an enterprise that are part of EFPIA. Funds are foreseen to finance research in biomedical areas, aimed at accelerating the development of better and safer medicines for people. The priority research areas of the Programme concern:

- biomedical imaging;
- medical information technology;
- diagnostics;
- animal testing;
- other areas, including advanced research for the prevention of disease, diagnosis and treatment with a high impact on public health.

⁴⁸ Euratom Work Programme 2018 (European Commission Decision C(2017)7123 of 27 October 2017), <http://ec.europa.eu/> (access: 10.04.2018).

⁴⁹ Ibidem.

⁵⁰ Council Regulation (EURATOM) No. 1314/2013 of 16.12.2013 on the research and training programme of the European Atomic Energy Community (2014-2018) complementing Horizon 2020 - Framework Programme for Research and Innovation, Journal Office UE L 347/948, 20.12.2013.

⁵¹ Euratom Work Programme 2018..., p. 7.

Funded research covers new generation vaccines, personalized medicines and treatment, faster implementation of effective and stable health care, use of public funds and industry to meet public health needs, support the global competitiveness of the European pharmaceutical industry⁵². The programme covers the entire innovation cycle, from discovery, through development, application, to monitoring. Project activities aim at the increase of the efficiency of research and development and accelerating the availability of innovation for the patient. In 2018, two calls for proposals are envisaged as part of the programme.

⁵² Website of the National Contact Point: <http://www.kpk.gov.pl/> (access: 10.04.2018).

7. The structure of management of the innovation process in the region

7.1. Involvement of the Stakeholders at the stage of developing, implementing, monitoring and updating the Strategy, including innovation in the chemical and bio-economic sectors

The Regional Innovation Strategy for Mazovia 2007-2015 was adopted in 2008. It was a strategic document prepared in accordance with the Development Strategy of the Mazowieckie Voivodeship. The requirements of the European Commission in programming the intervention of European funds in the financial perspective 2014-2020 caused the need to update the document. The Regional Innovation Strategy for Mazovia 2020 adopted by resolution No. 23/15 of the Regional Council of Mazowieckie Voivodeship of 16.03.2015 is, therefore, a continuation of the document described above. The strategy has been prepared with the continuity of goals and activities to extend the substantive scope of the document.

The draft document in accordance with art. 6 of the Act of 6.12.2006 on the principles of conducting development policy⁵³ was subjected to social consultations, which were based on the possibility of submitting comments using the form accessible on the website as well as traditional and electronic mail. The consultations were open. A wide range of stakeholders was able to submit comments: enterprises, public administration bodies, non-governmental organizations, persons and other entities interested in the document. Apart from posting the document on the Internet, its project was available for inspection at the headquarters of the Marshal's Office of Mazowieckie Voivodeship, at Al. Solidarności 61 in Warsaw. In addition, it was presented at the meeting of the Voivodeship Committee for Social Dialogue in Warsaw, Mazovia Council for Public Benefit Activities, the Mazowieckie Voivodeship Parliamentary Committee: Regional Development Strategy and Spatial Development, Economic Development, Infrastructure and Counteracting Unemployment, Agriculture and Rural Areas, and the Mazovian Entrepreneurship Council. The Mazowieckie Innovation Council also participated in the work on the document. Due to the link between the document and ROP VM 2014-2020, work on updating the RIS continued after the consultations. The changes introduced at that time resulted solely from the European Commission's comments regarding the fulfilment of the ex-ante conditions in the framework of negotiations of the ROP VM 2014-2020.

In total, 11 working meetings were organized in order to develop a coherent vision of the Regional Intelligent Specialisation and updating the document (in Warszawa, Radom, Ostrołęka, Siedlce, Ciechanów, and Płock). As a result of the public consultations, 17 entities submitted 203 comments. 66% of comments concerned substantive changes, 33% - technical changes, and 1% were comments being an opinion.

7.2. Characteristics of partners and functioning forms of cooperation in the field of innovation and chemical industry

In order to support and develop innovation in the region, various types of agreements regarding cooperation in the chemical industry are established. There are 39 clusters in Mazovia, of which in the context of the chemical industry and the bioeconomy mentioned should be, as follows:

- EFA – Energy from Algae;
- BioTechMed Cluster;
- Cluster of the Biomedical Engineering Center;

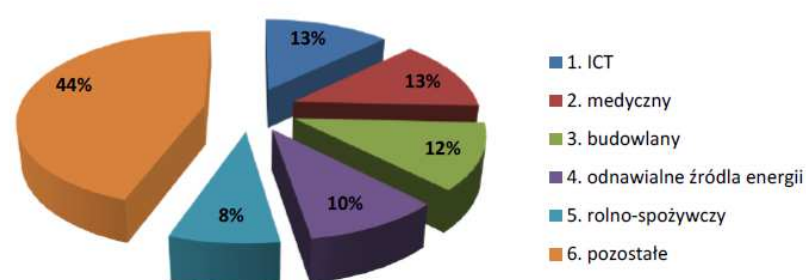
⁵³ Journal Of Laws from 2017, item 1376, 1475.

- E-innovations cluster;
- INNOWATORZY Cluster;
- Cluster of Medical and Biomedical Sciences "Alice-Med";
- Lacto – Feed The development of nutritional treatment technologies;
- Mazovian Cluster of Energy Efficiency and Renewable Energy Sources;
- Mazovian Chemical Cluster;
- Mazovian Energy Cluster;
- Mazovian Peptide Cluster;
- Mazovian Energy Alliance.

The aforementioned clusters set the technological development with regard to activities aiming at an innovative approach to the enterprises associated with them as their main objective. Cooperation within clusters and networks has a considerably significant role in the activities undertaken by the Regional Council of the Mazowieckie Voivodeship. It is expressed by the indication of said objective in the region's strategic documents. The Development Strategy of the Mazowieckie Voivodeship 2020 through the operational objective 1.3 development of regional cooperation networks and the flow of modern technologies states that clusters constitute a significant element that enables ensuring a friendly environment for entrepreneurship and development of cooperation on the line business-science-environment⁵⁴.

Intensive development of clusters' activity was observed in the 2007-2013 programming period, which resulted from the possibility of obtaining co-financing for the development of cooperation within the framework of ROP MV 2007-2013. Financial support was also possible to be obtained from the initiative of JESSICA, in the form of loans. After the end of the project's implementation period, some of the clusters formed in such way suspended their activities, however, the remaining ones operate on the local market. The graph below presents the profile of activities of cluster initiatives operating in Mazovia.

Chart 4 Profile of activity of cluster initiatives operating in Mazowieckie Voivodeship



Source: Regional Innovation Strategy for Mazovia 2020. Innovation support system and smart specialisation of the region, Warszawa 2015, attachment to Resolution No. 23/15 of the Mazovian Regional Assembly of 16.03.2015, p.43.

Furthermore, the existence of working groups for the smart specialisation of Mazovia shall be indicated. In accordance with the regulations of working groups, the aim of these groups is to support the RIS Managing Authority in creating and monitoring the development potential of the region's economy and recommending activities undertaken under the regional innovation system, in particular in the area of smart specialisations⁵⁵. The groups are open, ensuring that any interested entity involved in the implementation of innovative projects could participate in the

⁵⁴ Klastry w województwie mazowieckim [Clusters in Mazovia], Polish Agency for Industry Development, Warszawa 2012, p.9.

⁵⁵ Regulations of working groups on intelligent specialisation of the Mazowieckie Voivodeship, article 1, para. 3.

work of working groups. Such engagement is aimed at ensuring the continuity of the entrepreneurial discovery process and the effective implementation of the concept of smart specialisation⁵⁶. For this purpose groups may create task teams in accordance with the needs identified in the course of their work, and select a Leader responsible for organizing and moderating group work. The basic tasks of groups are to develop priority research directions (research agendas for areas of smart specialisation); cooperation in creating implementation programmes for RIS; participation in the RIS monitoring process; verification of areas and participation in the RIS update process; consulting support instruments under RIS; identifying barriers and threats to the region's economic development in connection with areas of smart specialisation. Recommendations, conclusions and proposals for changes developed by groups or teams are submitted to the Coordinator (an appointed employee of the section of Development and Management of the Regional Innovation Strategy in the Department of Regional Development and European Funds of the Marshal's Office of the Mazowieckie Voivodeship).

Moreover, Mazowieckie Voivodeship has concluded 70 agreements⁵⁷ with entities operating for innovation and implementation of regional smart specialisation. Among entities with which agreements are concluded, a leading group consists of research units and research institutes, which constitute over 32% of all partners (22 of the 69 agreements in force were concluded with said entities). Next, the foundations and associations with which 29% of agreements were concluded (20) and commercial companies, which constitute (in terms of the number of concluded agreements) almost equally large group (17 agreements). Among analysed entities, local self-government units are also included (10). The list of entities with which agreements have been concluded is provided below, including the type of the entity.

Table 8 List of entities with which the Regional Council of Mazowieckie Voivodeship concluded an agreement in the scope of cooperation for innovation, divided by the type of entity

Scientific institutes, science and research units	Foundations and associations	Companies	Local government units
<i>Instytut Optyki Stosowanej im. prof. M. Pluty (Optoklaster – Mazowiecki Klaster Innowacyjnych Technologii Fotonicznych)</i>	<i>Stowarzyszenie „Radomskie Centrum Przedsiębiorczości” (Fundusz Poręczeń Kredytowych)</i>	<i>Sekwencja Sp. z o.o. (Klaster Teleinformatyczny Klaster.Info)</i>	<i>Gmina Łomianki</i>
<i>Przemysłowy Instytut Motoryzacji (Polska Platforma Technologiczna Biopaliw i Biokomponentów)</i>	<i>Polska Izba Gospodarcza Zaawansowanych Technologii</i>	<i>Płocki Park Przemysłowo-Technologiczny S.A.</i>	<i>Office of the Capital City of Warsaw</i>
<i>Rada Główna Instytutów Badawczych</i>	<i>Europejskie Biuro Fundacji TECHNOLOGY PARTNERS</i>	<i>Aerfinance Ventures Sp. z o.o.</i>	<i>Powiat Płocki</i>
<i>Centralny Instytut Ochrony Pracy – Państwowy Instytut Badawczy (Polska Platforma Bezpieczeństwa Pracy w Przemysle)</i>	<i>Stowarzyszenie Rozwoju Społeczno-Gospodarczego "Wiedza" - koordynator Mazowieckiego Klastra ICT</i>	<i>Mazowiecki Inkubator Technologiczny Sp. z o.o.</i>	<i>Powiat Łosicki</i>
<i>Szkoła Wyższa im. Pawła Włodkowica w Płocku</i>	<i>Fundacja na rzecz Rozwoju Polskiego Rolnictwa</i>	<i>Akcelerator Innowacji NOT Sp. z o.o.</i>	<i>Powiat Mławski</i>
<i>Instytut Technologii Eksploatacji Państwowy Instytut Badawczy</i>	<i>Geodezyjna Izba Gospodarcza</i>	<i>Agencja Rozwoju Mazowsza S.A.</i>	<i>Powiat Przasnyski</i>
<i>Ośrodek Przetwarzania Informacji - Państwowy Instytut Badawczy</i>	<i>Fundacja Poszanowania Energii</i>	<i>Poręczenia Kredytowe Sp. z o.o.</i>	<i>Powiat Otwocki</i>
<i>Politechnika Warszawska - Centrum Zarządzania Innowacjami i Transferem Technologii</i>	<i>Stowarzyszenie Organizatorów Ośrodków Innowacji i Przedsiębiorczości w Polsce</i>	<i>Mazowiecka Agencja Energetyczna Sp. z o.o.</i>	<i>Powiat Warszawski Zachodni</i>
<i>Przemysłowy Instytut Automatyki i Pomiarów</i>	<i>Fundacja Kreatywne Mazowsze</i>	<i>INVESTIN Sp. z o.o.</i>	<i>Powiat Żuromiński</i>

⁵⁶ Ibidem, article 1, para. 4.

⁵⁷ One of the agreements was terminated on 31.03.2016, currently 69 agreements are in force.

<i>Institut Kreowania Przedsiębiorczości</i>	<i>Fundacja Przedsiębiorczości Technologicznej</i>	<i>Solar - Energy S.A.</i>	<i>Powiat Siedlecki</i>
<i>Institut Badań Stosowanych Politechniki Warszawskiej</i>	<i>Fundacja Rozwoju Innowacji Med INN</i>	<i>4 CF Sp. z o.o.</i>	
<i>Wojskowa Akademia Techniczna im. Jarosława Dąbrowskiego</i>	<i>Polska Izba Informatyki i Telekomunikacji</i>	<i>Agencja Promocyjna INVENTOR Sp. z o.o.</i>	
<i>Szkoła Główna Gospodarstwa Wiejskiego w Warszawie</i>	<i>Związek Pracodawców Business Centre Club</i>	<i>Atfin Sp. z o.o.</i>	
<i>Warszawski Uniwersytet Medyczny</i>	<i>Fundacja Małych i Średnich Przedsiębiorstw</i>	<i>Green Energy S.A.</i>	
<i>Narodowe Centrum Badań Jądrowych</i>	<i>Związek Pracodawców Warszawy i Mazowsza</i>	<i>Sekwencja Sp. z o.o.</i>	
<i>Institut Wysokich Ciśnień PAN</i>	<i>Fundacja Zaawansowanych Technologii</i>	<i>techBrainers Sp. z o.o.</i>	
<i>Institut Innowacji w Biznesie Sp. z o.o.</i>	<i>Fundacja Innowacja i Wiedza</i>	<i>Radomskie Centrum Innowacji i Technologii Sp. z o.o.</i>	
<i>Institut Fizyki PAN</i>	<i>Krajowa Izba Gospodarcza</i>		
<i>Institut Mechaniki Precyzyjnej</i>	<i>Fundacja Wspomagania Wsi</i>		
<i>Politechnika Warszawska</i>	<i>Polska Fundacja Komunikacji</i>		
<i>Institut Tele- i Radiotechniczny</i>			
<i>Institut Badawczy Dróg i Mostów</i>			

Source: own research based on data provided by the Office of the Marshal's Office of Mazowieckie Voivodeship (as of 27.02.2018).

The broad understanding of the partnership principle within RIS is demonstrated by the open manner of conducting consultations and their multiplicity for the implementation, monitoring and updating of RIS. Attention shall also be drawn to the networking between clusters operating in the region, which is a significant element of the development of innovation, enabling the mobilization of various actors and the accumulation of ideas (which, in turn, leads to the launch of new projects and can contribute to the increase in the level of innovation). In order to increase competitiveness, it is also possible to create so-called meta-cluster, i.e. connections within a network of clusters characterized by a similar range of activities, operating in a large geographic distance from each other⁵⁸. It affects the increase of competitiveness of companies operating within such clusters and of the entire region.

The Płock Industrial and Technological Park operates in the voivodeship. It offers to investors about 60 ha of transportable investment areas equipped with technical infrastructure. Moreover, PITP offers office space to investors. The investment includes three components consisting of an industrial park, a technology park and a science and research park. It is a joint venture of the self-government authorities of the City of Płock and PKN ORLEN S.A. The Park's operating profile is related to the activities of PKN ORLEN S.A., Basell Orlen Polyolefins Sp. z o.o. and PCC Rokita S.A., i.e. one of the largest chemical companies in the region. Within the Park, such entrepreneurs as Elektrobudowa S.A., Flexpol Sp. z o.o., Grupa OPEUS Sp. z o.o., IZO-BET, Masterflex Polska, NEO-TEC Sp. z o.o., NOVA-GIPS S.A., PaChemTech Sp. z o.o., PCC Exol S.A. and PUPH Politechnik operate. Due to undertakings of PITP, investors can use the Corporate Services Centre and the Central Laboratory, launched, respectively, in 2014 and 2015⁵⁹. Given the performed tasks, it is also possible to offer modern research and implementation services and business solutions to interested investors.

⁵⁸ RIS 2020..., p. 41.

⁵⁹ All information about the PITP's operations has been based on the Płock Industrial and Technology Park's website: <http://www.pppt.pl/> (access: 11.04.2018).

An example of a well-developed and well-functioning cooperation within clusters can be described given the Mazovian Chemical Cluster, created in 2014. The Cluster unites entities from both Mazovia and throughout Poland, and also cooperates with foreign border clusters, among others with the North East England Processing Industry Cluster. At the same time, it belongs to the European Network of Chemical Regions, uniting representatives of 20 regions with a strongly developed chemical industry⁶⁰. This cluster's major objective is to improve competitiveness and increase the innovative potential of enterprises in the chemical industry through cooperation, exchange of knowledge and experience with R+D and cooperation with companies related to the chemical industry (e.g. transport, logistics, recycling companies, training, providing engineering and design services, or TI) in order to achieve maximum business benefits for cluster participants⁶¹. Therefore, it could be observed that cooperation within clusters, as exemplified by the Mazovian Chemical Cluster, contributes to the growth of potential and the development of innovation on both regional and national scale.

⁶⁰ Mazovian Chemical Cluster's website: <http://www.klasterchemiczny.com/> (access: 10.04.2018).

⁶¹ Ibidem.

8. Challenges related to the implementation of the Strategy and expectations for interregional cooperation

The challenges related to the implementation of the Strategy result predominantly from the weaknesses of enterprises operating in the chemical industry in Mazovia and from the threats they encounter on the regional market. Said challenges can be analysed in the division into internal and external ones. Furthermore, it should be noted that they result from negative phenomena in three interrelated areas: social, economic and scientific areas. Analysis of both the situation of the chemical sector in Poland and the Regional Innovation Strategy, allows to identify the most important challenges currently identified in chemical industry, including:

A. In the economic sphere:

- deepening economic polarization of the region;
- a decline in the competitive position of Poland and Mazovia on the European scale in favour of, among others, the Baltic States, which causes a decrease in the region's investment attractiveness;
- low level of development of business environment institutions in non-metropolitan areas;
- reducing funding for R+D from public funds;
- the socio-economic polarization of the region;
- deepening spatial diversification of the level of entrepreneurship in the voivodeship.

In the analysed area in recent years, it is possible to observe a significant improvement related to the increase in expenditures on research and development, however, a strong competition from other European enterprises results in the marginal position of chemical industry in Poland. It is influenced by the low level of development of clusters, science and technology parks as well as industrial and technological parks and business environment institutions both in Mazovia and in the whole country. The situation is aggravated by the fact that the region is internally diversified, resulting in the concentration of innovative activity in the core of the Metropolis. The low level of social and economic cohesion results in the deepening diversification of the level of entrepreneurship in the voivodeship. An opportunity to overcome this negative trend is a new division of territorial units in accordance with Regulation No. 2016/2066, in force since 1.01.2018⁶². The division of Poland on all three NTS levels has changed. With regard to the Mazowieckie Voivodeship, the Capital City of Warsaw was distinguished from the rest of the voivodeship.

B. In the research sphere:

- education system unfavourable for the development of pro-entrepreneurial and creative attitudes among children and youth;
- maladjustment of the inhabitants' education profile to the needs of the labor market resulting from the devaluation of vocational schools;
- the tutor system and the cooperation system with graduates insufficiently developed;
- low supply of services for technology and industrial parks, lack of science and technology parks;
- a low number of patent applications filed with the European Patent Office;

⁶² the Commission Regulation (EU) 2016/2066 of 21.11.2016 amending the Annexes to Regulation (EC) No 1059/2003 of the European Parliament and of the Council on the establishment of a common classification of Territorial Units for Statistical Purposes (NUTS), Journal of Laws UE L 222/1, 29.11.2016.

- weakness of the intellectual property rights protection system;
- relatively high expenditures on R+D not translating into scientific potential on the international scale;
- low level of trust or lack of knowledge in the field of business cooperation with the R+D sector;
- scientific potential focused primarily on the WMA, with the low level of potential in the rest of the region;
- low expenditure on R+D in relation to the EU average.

In the field of science and education, the most significant challenge associated with the implementation of the Strategy is the maladjustment of the education profile of the inhabitants of the region to the needs of the labour market and the need to take measures in order to change identified situation. There is also a lack of pro-innovative attitudes in the education system, which results from the specificity of the education system at all levels. Conditions that hinder the implementation of the document also include the lack of a tutor and patron system, which would motivate pupils and students for undertakings in a given industry.

C. In the social sphere:

- permanent outflow of qualified employees (labour migration);
- low birthrate resulting, inter alia, in the risk of a decrease in the number of students and, as a consequence, a shortage of qualified staff;
- low level of social cohesion.

Social factors hindering the implementation of the Strategy are mainly related to labour migration, especially in terms of the young, well-educated part of society. Moreover, low birthrate causes a shortage of well-educated, competent staff to work in a given industry. In the social sphere, shortages in terms of staff are the most significant challenge.

In terms of expectations regarding forms of interregional cooperation, attention shall be drawn to large needs, noticed both by representatives of institutions providing support under the ROP MV 2014-2020, as well as by beneficiaries.

Respondents stated that such cooperation occurs in Poland in a inconsiderable scope, therefore measures should be taken to increase its dynamics. It was indicated that functioning within clusters and undertaking interregional cooperation by enabling communication is a stimulant for the development and exchange of knowledge, information and experience within the industry.

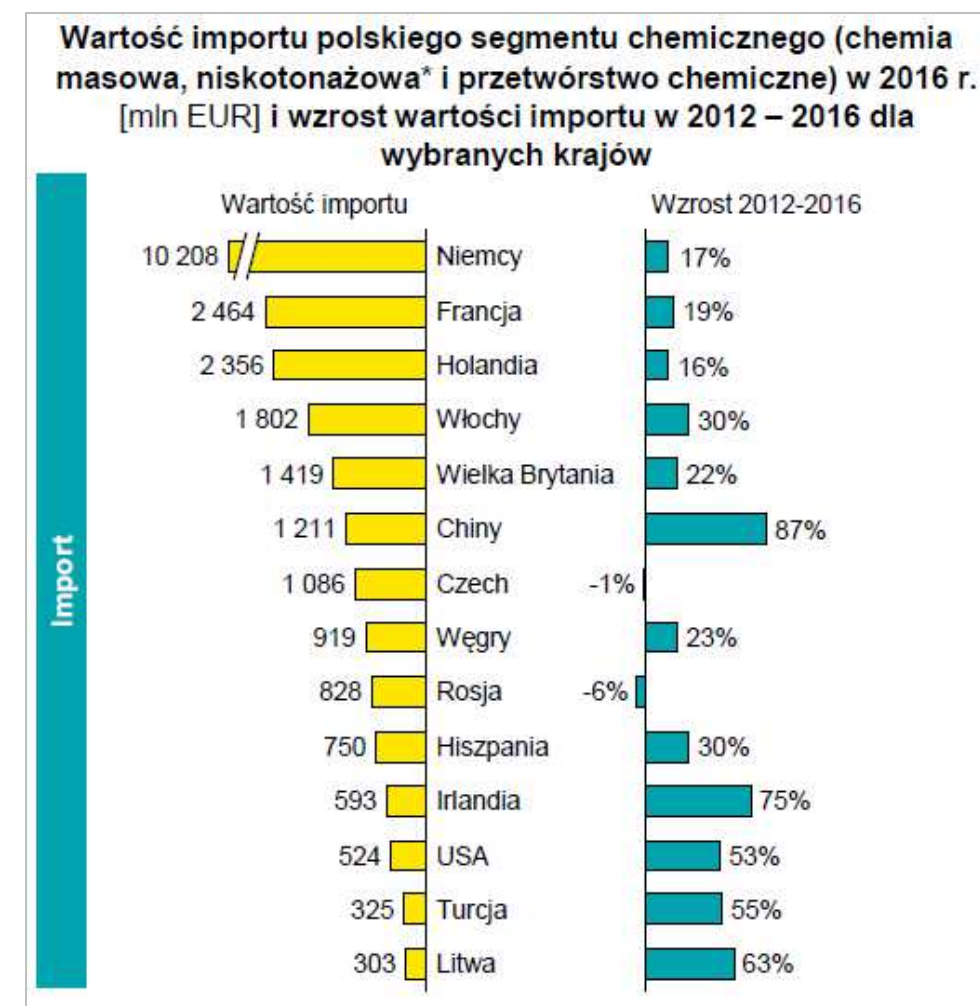
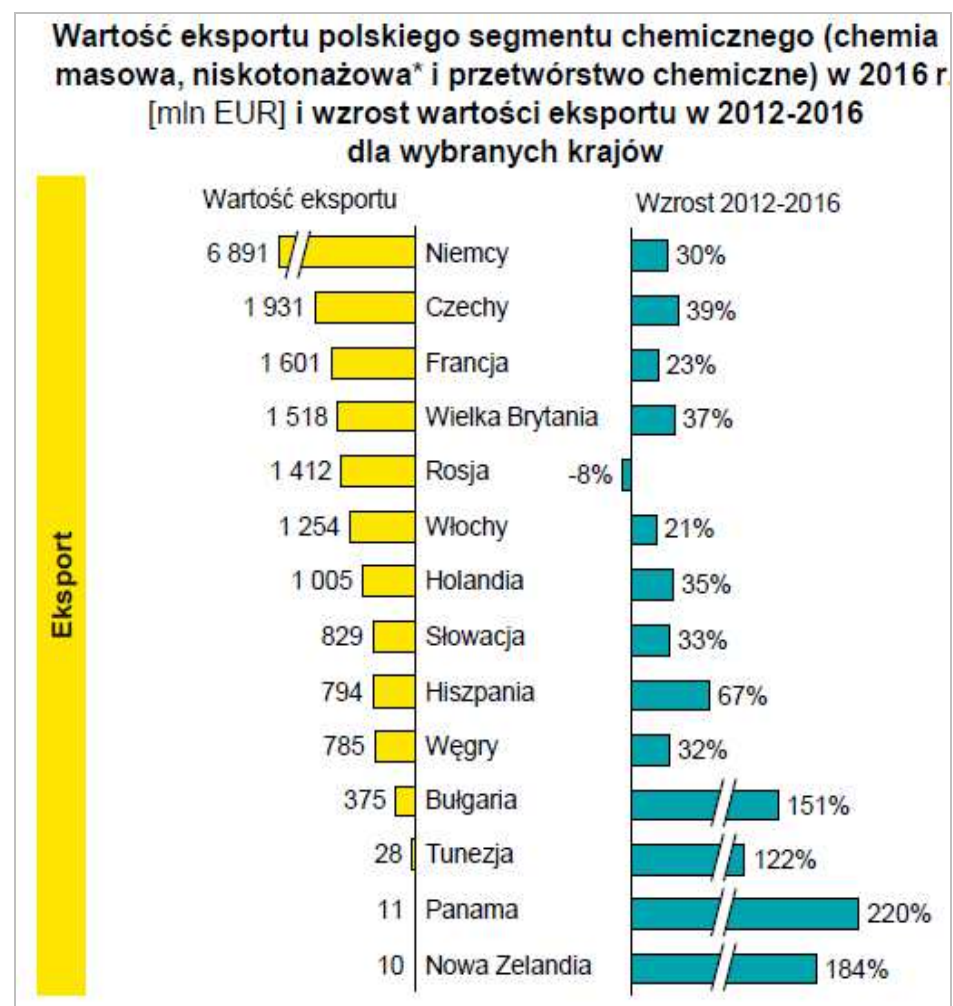
It should also be noted that they expressed the will to establish cooperation within the so-called meta-clusters, i.e. clusters located not only in the region, but also outside the country. Establishing cooperation within the framework of meta-clusters would allow to increase innovativeness by establishing cooperation in order to implement projects, share ideas and knowledge. It was added that there should be a separate financial envelope for this purpose; the existence of European Territorial Cooperation is not sufficient for the needs in this area. Operations financed from the ETC provide for local rather than supra-regional and transnational impact. It was noticed that it is necessary to increase the financing of such undertakings, establishing a separate sector of funds under the ROP MV. The financial support was the main expectation of the beneficiaries, the fulfilment of which would affect inter-regional cooperation to be more dynamic- Beneficiaries noticed the opportunities for the development of interregional enterprises and their sustainability in financing.

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Annex No 1



Source: Przemysł chemiczny w Polsce. Pozycja, wyzwania, perspektywy (Chemical industry in Poland. Position, challenges, perspectives), Report prepared as part of the "Polish Chemistry" Campaign, Polish Chamber of Chemical Industry, Warszawa 2017, p. 22.