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THE LEAST INNOVATIVE REGIONS IN POLAND IN THE PROCESS OF SMART SPECIALISATION

Summary

Smart specialisation constitutes an important framework for regional innovation policy making in the EU. According to the EU documents, the process of smart specialisation can be applied in all types of regions: the most developed ones as well as the least innovative ones. It is thus of great importance for regions with a low level of innovation performance due to numerous innovation challenges faced by these regions (such a situation can be observed in the case of four least innovative regions in Poland).

The main objective of the paper is to assess the advancement of the least innovative Polish regions in the process of smart specialisation. In order to achieve this objective, the following detailed objectives are expected to be met: 1. presentation of innovation challenges for the least developed regions in Europe; 2. selection of the least innovative Polish regions on the basis of four indicators; 3. assessment of the advancement in the smart specialisation process in selected regions with reference to their economic, social and innovation potential. As research methods, the authors used descriptive analysis, analysis of strategic documents, case studies analysis and statistical analysis. As results from the analysis, the approach to the identification process of smart specialisations in the least innovative Polish regions was diverse. Depending on the maturity level of work on updating Regional Innovation Strategies, awareness of competitive advantages at the sectoral and technological level, used methods, different concepts of their identification have been adopted.

Key words: national and regional smart specialisation, innovation policy, Poland

JEL: R58, O39

1. Introduction

The notion of smart specialisation is an important framework in the structural funding period 2014-2020. Although the original academic concept of this policy was sectorally oriented and focused on the productivity gap between the EU and the US, it is increasingly

applied to regional innovation context[1]. Having scarce resources and limited budgets, regions should allocate them taking into account external influences (e.g. global competition) and internal factors (e.g. sectoral specialisations, university-industry linkages, innovation infrastructure). Within the smart specialisation process, every region should nominate activities that aim at exploring and discovering new technological and market opportunities in order to open perspectives for regional competitive advantage [Foray at al., 2009, quoted by: Baier, Kroll, Zenker, 2013, p. 1]. The initial concept of smart specialisation is thus connected with the concentration of public resources in knowledge investments on particular activities in order to strengthen comparative advantage in existing or new areas [OECD, 2013, p. 11]. The smart specialisation concept expands its influence to regional innovation policy making as the elaboration of smart specialisations at regional level is seen as an *ex-ante* conditionality for the cohesion policy programmes in the perspective 2014-2020. Regions are thus invited to design regional innovation strategies for smart specialisation (RIS3) as a translation of the principles of smart specialisation into operational elements of regional innovation strategies [Czyżewska, Golejewska, 2014]. In other words, smart specialisation can be considered as a regional policy framework for innovation driven growth.

It is highlighted in the European Commission's documents that the process of smart specialisation can be applied in all types of regions: the most developed ones as well as the least innovative ones [European Commission, 2010; Asheim, Grillitsch, 2015, p. 3]. The smart specialisation approach suggests regions that are not leaders in any of the main science and technology domains to focus in R&D and innovation on few key priorities [OECD, 2013, p. 28]. The innovation challenge in regions with different level of innovation performance will vary taking into account their economic structure and specialisation of key regional agents: firms, universities and public research institutions [OECD, 2013, p. 28][2]. Research on the smart specialisation process is in many cases devoted to the best performing European regions. It seems thus more important to focus scientific attention on the least developed regions that have to tackle different socio-economic and innovation challenges while participating in the smart specialisation process. This is one of the main reasons to pursue an empirical examination of the advancement of the smart specialisation process in selected regions in Poland. While in theory smart specialisation should be a strategy for all regions, the practical implications are challenging for a number of the least developed regions as to whether they can gain the benefits from the efforts involved in the elaboration of the smart specialisation strategies.

[1] The theoretical framework of the smart specialisation concept has been developed in particular in the following papers: [OECD 2013; Foray, David, Hall, 2009; McCann, Ortega-Argiles 2013; Camagni, Capello, 2013].

[2] There exist different classifications of innovation-related groupings of regions. According to the categorization of regions by the OECD with the use of socio-demographic, economic and innovation-related variables, different regions have different levels of innovation performance. The regions have been classified into three macro categories: knowledge hubs, industrial production zones and non-S&T-driven regions. Some OECD regions perform better than their national average, nearly all of the knowledge hubs belong to the countries that are considered to be innovation leaders. According to this ranking, all Polish regions belong thus to the last category. The paper provides as well a review of approaches for other innovation-related groupings of regions [Ajmane Marsan, Maguire, 2011, pp. 30-31].

If smart specialisation strategy meant a high technology strategy it would not be applicable for all types of regions. There exist however wider interpretations of this notion that give opportunities for most regions [Charles, Gross, Bachtler 2012, p. 6][3]. Poland has been selected as an example of a catching-up European economy. Within Polish regions a selection mechanism has been used to indicate the least innovative NUTS 2 regions based on the Eurostat statistics (see point 3).

The main objective of the paper is to examine the advancement of the least innovative Polish regions in the process of smart specialisation. In order to achieve the main objective of the paper, the following detailed objectives are expected to be met: 1. presentation of literature review of challenges for the least developed regions in Europe, in particular in Poland; 2. selection of the least innovative Polish regions on the basis of four indicators: GDP *per capita*, population aged 25-64 with tertiary education attainment, R&D expenditure and patent applications to the EPO; 3. assessment of the advancement in the smart specialisation process in selected regions with reference to their economic, social and innovation potential.

As research methods, the authors used descriptive analysis, analysis of strategic documents and statistical analysis. The statistical analysis is based on Eurostat Regional Statistics. The lack of actual and comparable regional data for the whole group of regions caused the choice of the year 2011, as the reference year. In case of patent applications the last analyzed year was 2010.

2. Innovation challenges for less developed regions in Europe

Regions are increasingly recognized as a relevant level of innovation policies given the weight of agglomeration economies (the more connected the firms clustered together, the greater the network and learning effects, the lower the cost of production), [OECD, 2013, p. 28]. There is a vast literature testing the relevance of different theoretical concepts and challenges related to innovation and socio-economic performance in developed regions in Europe while this is much less so in the case of less developed regions in Europe, especially those with the post state-socialism background [Blažek et al., 2014, p. 13].

Regional economies of less developed regions, especially those of Eastern European countries, are integrated into European economy due to the following strengths: relatively cheap labour force (offering good qualifications) available in close geographic proximity to the West European market, in case of selected regions also strong industrial tradition, and the existence of basic infrastructure. Therefore, these regions were able to attract a large amount of foreign capital in the form of greenfield investment or in the process

[3] Charles, Gross and Bachtler [2012, p. 5] do not see a great difference between the new idea of smart specialisation and previous regional innovation systems and strategies. However, according to them, the smart specialisation concept is a focus on diversity of economic activity. The most successful regions have the advantages in implementing smart specialisation and innovation which are partly connected with the diversity of regional economy. As diversity leads to greater opportunities for growth, specialisation in weak or non-innovative activities can lead to weak growth.

of privatization of the former state-owned companies (regions with post-socialist tradition). Consequently, these regions were able to benefit from the transfer of know-how but they became to a significant extent dependent on decision-making process of the large foreign firms [Blažek et al. 2014, p. 27].

There is a great variety of economic structures of regions with less developed research and innovation systems. Therefore, according to Blažek et al. [2014, pp. 28-33], at least three broad categories of regions should be enumerated: 1. metropolitan regions with diversified economic structure, 2. old industrial regions and 3. economically weak regions (mostly peripheral and rural regions). There are however several features of economic structure of these regions. The first feature is the branch-plant character of their economic base (functional division of labour among the regions within a single industry: high-level functions such as headquarters and R&D centers are located in metropolitan regions, production of new products in highly developed industrial regions and the production of standardized goods in less developed regions). In consequence, in most cases less developed regions attract activities requiring low qualifications. In order to succeed in acquiring some higher level functions to less developed regions, the regional authorities should cultivate the overall environment in the region (institutions, education system, intermediary institutions) and engage all triple/quadruple helix actors. The second feature of less developed regions is that many local firms operate as lower-tier suppliers of global value chains. It is important to highlight the fact that lower tier suppliers are charged with production of large quantities of standardized goods based on a well-known technology. Consequently these companies are expected to provide mainly cost-saving measures and not any innovative solutions. The third feature of these regions is their weak endogenous sector as these regions have long-lasting low level of innovativeness and entrepreneurship (due to bureaucratic procedures, low availability of external finance, low prestige of entrepreneurs in the society and low ability to take up risks).

The main conclusion resulting from the study of Kravtsova and Radosevic[4] [2012] is that Eastern European countries have lower productivity level that might be expected from production and R&D capabilities and lower level of science and technology outputs (namely patents and papers) given the number of their researchers. According to Kravtsova and Radosevic [2012, p. 123], there exist three main challenges for these countries. Firstly, a prominent policy feature of EE is the lack of vision related to its education/training systems. Secondly, a key challenge at firm level is how firms can make the transition from mastery of production to technological (R&D and innovation) capabilities as the process is not automatic and requires changes within firms and in the national innovation systems. Thirdly, a reorientation of R&D systems from the current exclusive focus on knowledge generation to knowledge diffusion and absorption orientation is suggested (as essential competence for catching-up in the knowledge based economy).

In less developed regions one can also observe the immature institutional framework, a lack of trust among regional stakeholders and a general lack of networking culture

[4] This study refers to the national level of analysis but innovation challenges mentioned by the authors are the same for the regional level in Eastern European countries.

and capabilities, which can make difficult the selection of domains of potential specialisation. Another challenge is related to an immature governance system that can result in a danger of a capture of the SS process by strong actors [Blažek et al., 2014, p. 26]. Plawgo et al. [2013] have therefore observed that the higher the level of innovativeness of a region, the higher is decision makers' readiness to take actions to strengthen regional innovation system even further.

Instead of developing their own research and innovation strategies based on comprehensive understanding of underlying preconditions, in many instances regions with less developed research and innovation systems design only imitative regional innovation strategies, focused on copying foreign best practices. This was often done without a proper adaptation of these best practices to the specific features of the particular region or without a proper diagnosis of the innovation potential[5]. Nowadays one can observe more strategic and adapted approaches in designing innovation strategies at the regional level [Blažek et al., 2014, p. 23]. In this perspective, a new approach toward innovation would be welcome at regional and national level. As stated by Gorzelak et al. [2010, p. 4], Poland is lacking an overall, general strategy for the entire society and public institutions aiming at supporting innovative thinking and behavior and creating general innovation awareness among different social groups in the country.

All these observations and arguments have important implications for a suitable design of smart specialisation process in regions with less developed research and innovation systems, especially that according to Gorzelak et al. [2010, p. 12] attempts to make innovation and R&D projects one of the key priorities in less developed regions have not been successful yet. And this situation is not very surprising taking into account all deficiencies listed in this subchapter. Moreover, in the case of many regions with less developed research and innovation system numerous barriers for innovativeness combine to create a negative synergy and regions differ in the scale of these barriers. It is thus even more important to design smart specialisations in a way it helps overcome some of the mentioned challenges.

3. The least innovative Polish regions and their advancement in the smart specialisation process

The selection of Polish regions that have been taken into account in the empirical analysis concerning the advancement of the smart specialisation process is based on 4 S&T related indicators:

1. Regional gross domestic product per capita (in EUR) by NUTS 2 regions in 2011;
2. Population aged 25-64 with tertiary education attainment in 2011;
3. Total intramural R&D expenditure (GERD) by NUTS 2 regions as % of GDP in 2011;
4. Patent applications to the EPO by priority year by NUTS 2 regions (number of applications per million of inhabitants), 2008-2010 average.

[5] For details about Poland in this respect see: Gorzelak et al. 2007.

The regions have been ranked according to each of these four indicators. The scores in four separate rankings have been averaged and finally, a composite rank has been built for each region (Table 1.). On the basis of the results, four worst performing regions in Poland have been identified: Warmińsko-Mazurskie, Opolskie, Kujawsko-Pomorskie and Świętokrzyskie. The selected regions differ in terms of the structure of the economy, geographical, historical and social conditions. Only one out of 4 selected regions – Świętokrzyskie - belonged to the group with the low socio-economic potential, while other regions to the group with the lowest socio-economic potential [Golejewska, 2015].

TABLE 1.

Ranks for Polish regions

Regions	GDP per capita, Euro, 2011	Population aged 25-64 with tertiary education attainment, 2011	R&D expenditure, % of GDP, 2011	Patent applications to the EPO, number of applications per million of inhabitants, 2008-2010* average	Average	Rank
Mazowieckie	1	1	1	3	1.5	1.
Małopolskie	7	2	2	1	3	2.
Dolnośląskie	2	6	8	5	5.25	3.
Pomorskie	5	4	4	9	5.5	4.
Łódzkie	6	8	7	2	5.75	5.
Śląskie	3	5	9	8	6.25	6.
Wielkopolskie	4	10	6	7	6.75	7.
Lubelskie	15	7	5	6	8.25	8.
Podlaskie	13	3	11	15	10.5	9.
Podkarpackie	16	12	3	11	10.5	10.
Lubuskie	9	14	16	4	10.75	11.
Zachodniopomorskie	8	11	13	13	11.25	12.
Świętokrzyskie	**12**	**9**	**12**	**14**	**11.75**	**13.**
Kujawsko-Pomorskie	**10**	**15**	**14**	**12**	**12.75**	**14.**
Opolskie	**11**	**16**	**15**	**10**	**13**	**15.**
Warmińsko-Mazurskie	**14**	**13**	**10**	**16**	**13.25**	**16.**

Source: Eurostat Regional Statistics, own calculations

In the Warmińsko-Mazurskie region one of the most important causes of economic weakness was closing down of state farms initiated during economic transformation. Despite poor economic situation, the region develops steadily. Industries of vital importance to the region are indicated in strategic documents. These are: wood and furniture sector, food processing (in particular dairy industry, beer production, organic agriculture and manufacturing of high-quality food produce) and tourism. Industrial structure of the region's cluster initiatives corresponds to the regional economic specialties [PARP, 2012a, pp. 3-8]. Scientific potential of the region is concentrated on its capital, where the biggest regional state school - the University of Warmia and Mazury is based. Its rich educational offer compensates for the lack of technical schools in the region. The region

is facing a problem of very low public R&D expenditure (23 times smaller than in the capital region) and weak linkages between science and economy. Half of the representatives of the region's R&D sector did not cooperate with economic operators in 2011-2013. The branch and size structure of firms and historical, geographical and environmental circumstances of the region determine the development path of enterprises. Their investment should not be limited solely to highly innovative projects, as most of them has not kept pace with the current-day economic challenges [*Regionalny Program Operacyjny Województwa Warmińsko-Mazurskiego*…, 2014, pp. 3-6].

The Opolskie region is the smallest one in Poland in terms of territory and population. It is characterized by an average level of economic development and high level of industrialization. The dominant sectors are: food-, energy-, chemistry-, non-metal materials-, machines and electromechanical-, metal- and furniture industry. A particular challenge for the region is to overcome a slow development of the service sector. In 2000-2011 the Gross Value Added in services grew by 78 per cent in comparison to 96 per cent as the country average. The economic system of the region is reinforced by 25 entities performing research and development activity. The biggest R&D institutes include universities located in the region's capital: the Opole University and the Opole University of Technology. For the region it is important to develop clusters initiatives [*Regionalny Program Operacyjny Województwa Opolskiego*…, 2014, pp. 10-15]. The sector-oriented structure of clusters initiatives is very diverse. Most of them operate in the tourism sector (3), as well as the construction and eco-construction (2). The areas of operation of single initiatives include such sectors as: chemistry, eco-energy, training and consulting, IT, medical and timber-furniture [PARP, 2012b, pp. 3-10]. The regional development of clusters is supported by numerous science oriented institutions as well as business support institutions such as innovation and entrepreneurship centers including: Opole Science and Technology Park, Kędzierzyn-Koźle Industrial Park, Academic Entrepreneurship Incubator associated with Opole University of Technology etc. [PARP, 2012b, p. 15]. Weaknesses of the region are: low level of financial assistance to R&D and low activity of entities forming Regional Innovation System [*Regionalna Strategia Innowacji Województwa Opolskiego*…, 2014, p. 29].

The Kujawsko-Pomorskie region is characterized by strong specialisation in industrial production. Five industries: food processing; manufacture of chemicals and chemical products; paper and paper products; metal products and rubber and plastic products generate almost three quarters of sales revenues of industrial processing. Electro-mechanical, wood and electronic industries play also an important role in the economy of the region. According to the European Cluster Observatory, there are two clusters in the Kujawsko-Pomorskie region: Bydgoszcz Industrial Cluster and Tuchola Forest Tourist Cluster. According to the results of studies carried out by the Torun Regional Development Agency, the printing, electronic industry, machine-tool, wood-furniture and tourist-spa industries are also favorable for the development of cooperation between entities [PARP, 2012c, pp. 3-8]. In many industries, firms from the Kujawsko-Pomorskie region are among the Polish leaders, generating a substantial part of the national output. They are also seen as leaders in innovativeness and technological development, as reflected in high exports and the active participation in linkages within global players. The number

of centers for innovation and entrepreneurship in the region is steadily growing. In 2007, there were 35 entities and in 2009, 2010 and in 2012: 37, 39 and 43 respectively. The present potential provides a very solid basis for future development of the region based on modern and innovative economy [*Regionalny Program Operacyjny Województwa Kujawsko-Pomorskiego*…, 2015, pp. 12-14]. However, it still lacks laboratories carrying out the research and development at the global level and commercialization of results of research units [*Regionalna Strategia Innowacji Województwa Kujawsko-Pomorskiego*…, 2015, p. 16].

The last least innovative Polish region, Świętokrzyskie, is divided into the industrial part (north) and the rural part (south and east). Its industrial potential was shaped mainly by activity of the Old Polish Industrial Region. The region's key branches are: metallurgy, machine construction, casting, construction and food processing. The level of entrepreneurial activity is relatively low, however the highest among the regions of Eastern Poland. Most of the enterprises operate in a relatively low-innovation level sectors (87.4 per cent in comparison to average 68.4 per cent in Poland). Most of the clusters are active in power engineering and tourism. There are also single clusters in food industry, ceramics, construction and design. There are 24 innovation and entrepreneurship centers in the region, including Kielecki Technological Park, Kielecki Technological Incubator, Regional Center for Innovation and Technology Transfer [PARP, 2012d, pp. 3-12]. The Świętokrzyskie region belongs to Eastern Poland Macroregion characterized by relatively low level of higher education sector development. There are 15 higher schools in the region, mostly non-public and only one technical school. There is a need to support the development of: fair and congress branch on the basis of Kielce Trade Fairs (the third centre of this type in Central and Eastern Europe), market gardening and horticulture production (organic processed food) and tourism sector services, based on the map of areas with the biggest tourist traffic [*RPO WS 2014-2020*, pp. 35-44]. Weaknesses of the region are: low efficiency of public R&D expenditure, low private spending on R&D and insufficient awareness of technology transfer mechanisms and commercialization [*Strategia Badań i Innowacyjności (RIS3)*, 2014, pp. 26-27].

The EU's regional development agenda stresses the importance of smart specialisation strategies as an essential tool for promoting sustainable, smart and inclusive growth. According to the results of the study carried out by the World Bank, in Poland, substantial work has already been done in designing regional innovation strategies based on the new smart specialisation concept. However, the resulting RIS3s may not yet be fully compliant with the EC's *ex ante* conditionalities within thematic objective 1 on strengthening research, technological development and innovation at national, macro-regional and regional levels [Piątkowski et al., 2013, p. 3]. At the regional level, it is still not clear how the issue of private sector investment in RTD will be tackled and what the basis for an eventual assessment of the success or failure of a given specialisation will be [Piątkowski et al., 2013, p. 29][6].

[6] However, if one takes into account the level of regional orientation on pro-innovative development paths that is measured by the proportion of pro-innovative objectives to all the objectives of Regional Development Strategy (RDS) the situation is a little bit different. Analysing this indicator, the Development Strategies of the Kujawsko-Pomorskie region, the Świętokrzyskie region and the Warmińsko-

Smart specialisations are based on combinations of branches and technologies. In the analysed regions they have been defined in different ways. In the Warmińsko-Mazurskie region, three selected specialisations: water economy, high quality food and wood and furniture have their specificities but also common areas and problems. The Development Strategy of Warmińsko-Mazurskie 2025 underlines the importance of the following horizontal issues: ICT, financing, logistics (poor transport accessibility and internal consistency), fairs and promotion (using existing fair and congress infrastructure) and public and business protection [*Strategia rozwoju społeczno-gospodarczego*…, 2013, p. 70]. The criteria for the selection of smart specialisations in the Kujawsko-Pomorskie region were: innovative potential, economic results, effects relevant to the Strategy and beneficiaries. With regard to the latter criterion, a broad spectrum of beneficiaries was taken into account (networks of suppliers, subcontractors, producers of final products, service suppliers, universities and R&D institutes), [*Regionalna Strategia Innowacji Województwa Kujawsko-Pomorskiego*…, 2015, p. 61]. In the Opolskie region, it has been assumed that smart specialisations occur when specified technology or its product is present in each of three phases of regional transfer of knowledge. Therefore smart specialisations can be identified in a region if specified technologies and/or their products are or become simultaneously:

1. a research object of regional R&D sector (institutes, laboratories and universities located in the region),
2. a subject to pilot implementation projects conducted by an enterprise located in the region,
3. a subject of purchase or sale at the regional and supra-regional market [*Regionalna Strategia Innowacji Województwa Opolskiego*…, 2014, p. 105].

When technology complies with all the three criteria it is recognized as smart specialisation. If only two criteria are met it is identified as potential smart specialisation. The fulfilment of one criterion enables it to be classified as regional specialisation (manufacturing or use), [*Regionalna Strategia Innowacji Województwa Opolskiego*…, 2014, p. 107]. In Świętokrzyskie two groups of smart specialisations were identified: key and horizontal specialisations. ICT, renewable energy development and fair and congress infrastructure should contribute to dynamic development of the key specialisations [*Strategia Badań i Innowacyjności (RIS3)*, 2014, pp. 32-33]. The implementation of smart specialisations in the Świętokrzyskie region is divided into three phases: 1. phase (2014) – preparation, 2. phase (2015-2016) – testing, 3. phase (2017-2020+) – improving and acceleration. "Population" of smart specialisations shall be all the enterprises operating in identified four specialisation areas. A priority target group shall be enterprises with a high growth potential and management able to use public resources effectively. This group should generate value added for the whole region [*Strategia Badań i Innowacyjności (RIS3)*, 2014, pp. 45-46]. Smart specialisations and methods of their identification in selected Polish regions are presented in Table 2.

Mazurskie region might be considered as the most oriented on innovativeness, in which all the objectives of the RDS contain an innovativeness component. Simultaneously, Regional Innovation Strategies (RIS) of these three regions are as closely as possible to the RDS [Plawgo et al., 2013, p. 62].

TABLE 2.

Smart specialisations in Polish regions and their methods of identification

Region	Smart specialisations with reference to EU RIS3 priorities	Methods of identification
Kujawsko-Pomorskie	1. Food safety and personalized food-processing, fertilizers, packages; 2. medicine, medical services, health tourism; culture, arts, creative industries; 3. tools, moulds and plastic products; 4. automotive, technical transportation means, industrial automation; 5. processing of information, multimedia, software and ICT; 6. bio-intelligent specialisation: natural potential, environment, energy; 7. transport, logistics and trade: waterways and land routes; 8. Cultural heritage, art, creative industries	Smart specialisations identified precisely, not as branches or technologies but as mutual dependency chains. Methods of identification: – foresight; – analysis of the strongest regional branches; – analysis of R&D potential (particularly science and technology parks); – public consultation. Process of implementation and monitoring precisely defined in RIS.
Opolskie	1. *group of technologies – smart specialisations* (polymers, rubber and plastics, organic chemicals, cleaning products, energy-efficient construction, cement and concrete, wood, power systems, design and manufacture of machines and equipment, metals, fuel production, manufacture of motors, high voltages, plant production, milk processing) 2. *group of technologies – potential smart specialisations* (health and physiotherapy products, spatially integrated regional tourism product, integration process of system of intermodal environmentally friendly transport)	Choice of areas, in which innovations go through all the stages of technology transfer (R&D, using in production, expansion on the regional and supra-regional market) and technologies used in the region and providing products and services. Methods of identification: – quantitative and qualitative approach (foresight); – identification of development areas, key scopes of activities and groups of key regional technologies. Systematic collection of data and analysis of indicators provided in Regional Development Strategy (RDS) and RIS.
Świętokrzyskie	1. *key specialisations*: resource-efficient construction; metal & foundry industries; health & wellness tourism; modern agriculture and food processing; 2. *horizontal specialisations:* energy efficiency; ICT; conferences & fairs;	Specialisations included in recently prepared RIS3. Methods of identification: – analysis of R&D potential; – analysis of economic specialisations; – foresight; – market selection (auto-selection); – public consultation. The RIS3 foresees a mid-term (in 2016) and final evaluation (in 2020).
Warmińsko-Mazurskie	1. water economy (accommodation and biological renewal, transport, sports, tourism, agri-food industry, machinery, yachts, environment, science); 2. high quality food (aqua and animal farming, food processing, manufacturing and services for livestock, production of agro machineries, and processing and disposal of farm waste, science); 3. wood and furniture (furniture production, carpentry, wood processing, design services and maintenance of wooden goods, science);	Smart specialisations defined as groups of related branches on the basis of the works of two projects teams (external and internal). Consultations of Socio-Economic Development Strategy for the Warmińsko-Mazurskie Region 2025 (SEDS) carried out with authorities of Pomorskie and Podlaskie. A new mechanism of actualization is not planned because within the region operates electronic Monitoring System of Strategy used for SEDS. On-going evaluation is planned for 2018/2019, ex-post evaluation for 2026.

Source: Authors based on: [*Regionalna Strategia Innowacji Województwa Kujawsko-Pomorskiego*…, 2014; *Regionalna Strategia Innowacji Województwa Opolskiego*…, 2014; *Strategia rozwoju społeczno-gospodarczego województwa warmińsko-mazurskiego*…, 2013; *Strategia Badań i Innowacyjności (RIS3)*…, 2014].

In 2015, the Board of the Świętokrzyskie region has accepted the list of the selected consortia for development of smart specialisations of Świętokrzyskie [http://www.sejmik.kielce.pl]. The consortia are represented by coordinators acting as market makers for a given smart specialisation. Enterprises engaged in various activities in the area of smart specialisations expect demonstration of advantages which can accrue if they invest in R&D. Therefore, it is planned to develop a business plan for each smart specialisation in the form of so-called "process sheet" presenting transformation process of a given sector, specifying aims, sources, reference values, the acceptance level of the market and the level of the return on public investment [*Strategia Badań i Innowacyjności (RIS3)*, 2014, p. 45, quoted after Czyżewska, Golejewska 2016, pp. 74-75].

The Warmińsko-Mazurskie region has identified narrow specialisations which can be recognized as specialisation niches. They correspond to potential of the region. Smart specialisations are reflected in Regional Operational Programme of Warmińsko-Mazurskie 2014-2020. In some measures the compliance with chosen specialisations is an essential requirement for funding that excludes many companies from possibility of applying. It can raise question, why one of the poorest regions in Poland limits the range of specialization so much but on the other hand if one want to be perfect in everything usually one is not perfect in anything.

Smart specialisations in Kujawsko-Pomorskie are reflected in the Regional Operational Programme of Kujawsko-Pomorskie 2014-2020. Several projects can be carried out and financed through the Regional Operational Programme if they are in compliance with the list of regional smart specialisations. Moreover, monitoring, evaluation and update of the regional innovation strategy containing smart specialisations will be funded from the technical assistance operational programme [*Regionalny Program Operacyjny Województwa Kujawsko-Pomorskiego*…, 2014].

Smart specialisations of the Opolskie region have also their transposition in the Regional Operational Programme of Opolskie 2014-2020, in particular with reference to the R&D activities of regional companies. As in the case of Kujawsko-Pomorskie, projects that are in compliance with the regional smart specialisations can be funded from the Regional Operation Programme [*Regionalny Program Operacyjny Województwa Opolskiego*…, 2014].

In general, as the regional operational programmes 2014-2020 are ongoing, we still need evaluation reports to see how smart specialisations have been in practice transposed into regional economies.

The issue of regional specialisations followed a thorough consultation process. Given the fact that the process of identification of smart specialisations took place differently in individual regions, the degree of complexity of regulations regarding specialisations in strategic documents was also diverse. It is indeed difficult to say today whether the above specialisations become real specialisations fostering development and competitiveness of the regions [Dziemianowicz et al., 2014].

4. Conclusions

The process of smart specialisation can be applied in all types of regions. The least innovative Polish regions selected for empirical analysis in the paper are facing numerous problems, such as low public R&D expenditure, low level of entrepreneurial activity, slow development of the service sector or weak linkages between science and economy. In less developed regions one can also observe the immature institutional framework and a lack of trust among regional stakeholders. Moreover, instead of developing their own research and innovation strategies based on thorough understanding of socio-economic preconditions, in many instances regions with less developed R&I systems design imitative regional innovation strategies, based on foreign best practices.

The approach to the identification process of smart specialisations in Poland was diverse. Depending on the maturity level of work on updating Regional Innovation Strategies, awareness of competitive advantages at the sectoral and technological level, used methods and technics and other factors, different concepts of their identification have been adopted. In consequence, each region has slightly different vision how the monitoring and evaluation processes should run. Evaluation system should aim at verification of expected and achieved effects of implementation of smart specialisations, show achievement of objectives, adjust prepared action plans, as well as respond to the changes in the environment. The suggested institutional solution could be the use of existing steering groups on evaluation at regional level, creation of subgroups on smart specialisations and steering group on evaluation of smart specialisations at national level [Stawicki et al., 2014].

Smart specialisations can be identified in different ways. The results of the empirical analysis have shown that methods of identification of smart specialisation in the least innovative Polish regions are quite similar. Polish regions selected specialisations as groups of industries, groups of technologies (smart and potential smart specialisations) or key and horizontal specialisations.

As stated by Dziemianowicz et al. [2014], the approach of regional smart specialisations gives a prominent role to cluster initiatives. Clusters can become an essential element of identification of priority areas and implementation of Regional Innovation Strategy. It is therefore essential to support regional cluster initiatives in conjunction with regional smart specialisations.

It is expected that RIS3 strategies should help regions to create their competitive advantage and overcome at least some of socio-economic and innovation challenges, however their results are expected once the strategies are fully implemented which indicates some avenues for further research. On the other hand, it is questionable whether implementation of the smart specialisation concept will not deepen regional disparities in the European Union. But still it will be possible to assess the level of regional disparities in a medium-time or in a long-time perspective.

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