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## THE ASSESSMENT OF SMART SPECIALIZATION EMERGENCE PROCESS. THE STUDY OF COASTAL REGIONS IN POLAND

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**Abstract:** The policy set by the European Commission for Programming Period 2014–2020 introduced new instruments supporting regional development but also posed new requirements that must be met by European regions. One of them is smart specialization. To implement Strategy for Europe 2020, published by the European Commission in 2010, EU Member States and their regions develop strategies for smart specialization that show directions for providing support to the strengthening of research, development and innovation. Smart specialization is an important instrument for strengthening of competitiveness as well as for defining and building the knowledge-based economy. This article presents analysis of processes responsible for identifying smart specialization in Pomeranian and West Pomeranian Regions (in Polish: Voivodeships). This analysis is a continuation and extension of the research on the process of emergence of smart specialization in Pomeranian Region by the inclusion of the West Pomeranian Region into this study. Both Regions are situated on the southern coast of the Baltic Sea and are seats of main Polish harbours and shipyards. Their regional capitals Gdańsk and Szczecin are the cores of emerging metropolitan areas. The aims of the article are: (1) assessment of methods of smart specialization emergence and selection; (2) analysis of differences and similarities of areas of smart specialization of two coastal regions. In Pomeranian region the process of emergence of smart specialization was a bottom-up one where the Regional Government organized the competition and invited actors to build partnerships. In other regions of Poland it was more of a top-down process, but with participation of stakeholders. The West Pomeranian Region is an example of this approach. Methods of the research applied for this study include: analysis of literature, documents from Voivodeship Marshal Offices, individual interviews, participation in the process of emerging of smart specialization in Pomeranian Voivodeship and comparative analysis of the methods of their emergence in both regions.

**Keywords:** coastal regions; Pomerania; regional knowledge-based development; smart specialization; West Pomerania

**JEL codes:** O18, R11, R12, R58

## 1. Introduction

The concept of smart specialization is relatively new but it already took its place as an important instrument for creating innovation strategy at the state and regional level, as well as for defining and building a knowledge-based economy (David et al. 2009). There is a growing number of publications analysing both in theory and in practice possibilities of implementation of smart specialization as political instrument, but also show challenges and the difficulties involved in its implementation (McCann & Ortega-Argilés 2013; David et al. 2009; Foray et al. 2011).

The term smart specialization is present in a number of strategic development documents in the European Union. It implies the need for countries and regions to specialize, as well as focus the development of innovation in areas that are consistent with their endogenous potentials (European Commission 2010). Identification of smart specialization is a prerequisite (*ex-ante*) for the regions to have access to the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD).

The Polish Ministry of Regional Development took measures to create a system of strategic documents at the national, and regional levels, which will be the justification for the choice of instruments to support and ensure the attainment of that condition in the regulation for programs for the period 2014–2020. On 8th April 2014 the Council of Ministers adopted the Enterprise Development Program, which is an integral part of the National Smart Specialization Strategy (national RIS3). The document presents the analytical process of selecting smart specialization at the national level (areas of R & I) (Ministerstwo Gospodarki... 2014).

Research and innovation strategies (RIS3) for smart specialization should be a determinant of innovative development for the regions. The mode of action in determining these priorities for RIS3 at regional level has been termed the entrepreneurial process of discovery, a bottom-up, evidence-based learning process for discovering the R&I activities or niches, in which a region can expect to excel (Fotakis et al. 2014).

This article presents analysis of processes of smart specialization emergence in Pomeranian and West Pomeranian Voivodeships (in Polish: województwo). These analysis is a continuation and extension of the research on the process of emergence of smart specialization in Pomeranian Region by the inclusion of the West Pomeranian Region into this study. Both Regions are situated on the southern coast of the Baltic Sea and are seats of main Polish harbours and shipyards. Their regional capitals Gdańsk and Szczecin are the cores of emerging metropolitan areas which are economic engines of Polish economy.

The aims of the article are:

- assessment of methods of smart specialization emergence and selection;
- analyses of differences and similarities of areas of smart specialization of two coastal regions with particular emphasis on the specifics of the seaside location and endogenous potential of both regions.

Methods of the research applied for this study includes: analysis of literature and documents from Voivodeship Marshal Offices, individual interviews, participation

in the process of emerging of smart specialization in Pomeranian Voivodeship and comparative analysis of the regional Smart Specializations and the methods of their emergence in both regions.

## 2. Theoretical basis of the smart specialization and methods of their selecting

The concept of smart specialization was developed by, established in 2005, Expert Group “Knowledge for Growth”, which was chaired by the EU Commissioner of Research J. Potočník. Deputy Chairman of the Expert Group was prof. D. Foray, the author of the first studies on smart specialization. The aim of the smart specialization is the optimal use of diverse development potential of countries and regions of the EU through the best possible matching of education and science to the specific socio-economic conditions (Ślowska-Helpa 2013, p. 87). According to the DG Regional Policy of the European Commission such specialization may provide an increase in the competitiveness of regions and, consequently, their faster development.

The idea of smart specialization is based on two observations: 1) regions are not able to achieve high excellence in science, technology and innovation without suitable strategies and instruments, 2) regions should promote what will make them exceptional (knowledge, resources) and give them advantage. Focus on specific areas will strengthen advantages of economy of scale, as well as develop distinctive and original areas of specialization. A sequence is essential if smart specialization is to become an important drive force of industrialization and diversification. The first step is entrepreneurial discovery, which is exploring a new domain of opportunity, it precedes ‘routinised’ innovation and is a decisive link, that allows a system to reorient and renew itself. Second phase he defined as an entry and usage of agglomeration advantages, leading to clustering. The process is established, when the last phase namely the structural change is taking place (Foray 2014).

On the other hand, some authors noticed, that the theory is “scattered across different innovation models with no solid foundation in any of them” (Ranga 2013, p. 14), “the concept is not tight in particular as an academic concept [...] There is a growing gap between the policy practice and the theory” (Foray et al. 2011). Nazarko (2014, p. 248–249) argues that the creators of the smart specialization concept “in a fairly arbitrary (even syncretic) way derive from the existing achievements of science.” He lists, except from above mentioned entrepreneurial discovery, six additional theories and concepts which form bases for smart specialization concept, among them, in other studies mentioned: general purpose technologies – GPT (Kardas 2011; Nowakowska 2016) and quadruple helix (science – economy – government – civil society). Dziemianowicz and Peszat (2014) specify the following development concepts and theories present in the smart specialization concept: endogenous development theory, theory of growth poles, and particularly the theory of industrial district, the economic base theory, location theories, product-cycle

theory, concepts of networks (including Porter's cluster). Słodowa-Helpa (2013) also mentions other concepts: the basic product, flexible production, the diamond of competitive advantages (five Porter's forces), and new theories of growth, institutional economics and economic geography.

Nowakowska (2016) points need for integration the two perspectives of capacity building innovative regions – sectoral and regional – as the core of the concept of smart specialization. She also lists the following elements important in the context of a sectoral perspective:

- global perspective and competitive advantage of specialization (smart specialization areas should have an international strength and competitive advantage allowing to build the international economic position of the region);
- bottom-up and entrepreneurial process of identification of domains of specialization with the involvement of business partners;
- search for specialization between various economic sectors and the creation of cross-fertilizations;
- strong relationship of domain with the science and R & D sector.
- fusion of technology resources forming the critical mass.

Smart Specializations have been designed in all Polish voivodeships (regions). There is a growing number of studies analysing process of implementation of smart specialization in Poland. Strzelecki (2012), Sztorc (2012), and Malik (2013) give theoretical background of this process. Kardas (2011) introduced the concept of smart specialization on the background of the theories and concepts of specialization in the field of economy, science and technology, and also pointed out the main challenges related to the implementation of this concept while Nazarko (2014) presents possibility of integrating foresight into the smart specialization identification and implementation process and discusses the results of a review of smart specialization indicated by the Polish regions. In their work, Piatkowski et al. (2014, p. 51) present seven potential methods of selecting Smart Specializations according to World Bank:

- Analysis of science and technology – quantitative screening.
- Identification of Clusters – quantitative identification of a region's outstanding economic specializations.
- Foresight – an expert-driven process to explore regional strengths and sectors with large potential for future development that defines strategic vision. Involves a comprehensive analysis and predictions about the development of future trends and markets.
- Market selection suitable for regions with unknown comparative advantages – self-selection of Smart Specializations by actors, who experiment (market entry-exit) and try to discover a region's strengths.
- Competitive selection – suitable for well-developed regions, driven by firms (group of firms) which shape specializations by competing with companies or clusters from other sectors of the economy in gaining access to financing. Bottom-up character of the process.
- Case-studies – value chain analysis; selection of the industries with the highest potential.

- Gravity model – reveals geographical distribution of strengths or development potentials at the subregional level – municipality/district (qualitative and quantitative assessment of sector strength). Expert and analysis-oriented rather than bottom-up approach, although selection of analysed themes might be bottom-up. Gulc (2015) presents methods utilized in smart specialization designing in Polish regions: desk research, statistic methods, SWOT analysis, individual In-Depth Interviews, Focus Group Interview, Five Porter's forces analysis, experts panel, public consultations. He also compares the methods used in Polish regions. Czyżewska and Golejewska (2014) compares Smart Specializations and methods of their identification in selected Polish and French regions. Some information in these publications are not up to date because the process of emerging of Smart Specializations was still ongoing.

### 3. Process of identifying Pomeranian Smart Specialization

Pomeranian adopted a bottom-up process for the emergence of smart specialization: stakeholders from business and academia were indicated, later they selected regional specializations with the greatest potential for growth. It was assumed that the process of selection of smart specialization would be implemented with the participation of the expert committee basing on criteria, which have previously undergone public consultation process (Kryteria... 2014). The process of identification of Pomeranian Smart Specialization (PSS) was implemented in the following 6 phases:

1. Determination of the economic profile of the region.
2. Interviews, workshops, discussions, and meetings with stakeholders.
3. The organization of the competition for PSS.
4. Negotiations to support the development of smart specialization between the authorities of the Pomeranian Voivodeship Regional Government and partnerships.
5. Signing of agreements for the PSS between Pomeranian Voivodeship Regional Government and partnerships.
6. Monitoring of implementation of selected PSS (Proces... 2014).

Phases 3–6 will be launched by the regional authorities every two years. The first started in 2013 (Proces... 2014). Agreement is going to last for no more than three years, with an option to prolong it in a situation when the parties positively assessed the outcomes and prospects for cooperation.

The phases 1 and 2 were carried out by external consultants (company ResPublic) as one project – Study on segments of the economy, specializations and technological convergence. The aim of this study was to clarify the specific to Pomeranian endogenous resources and comparative advantages, and identify economic activities with the highest growth potential at the interface between different sectors, industries and technologies, together with an indication of the possible directions of technological convergence. Technological convergence was defined as a phenomenon of the use of technologies from different sectors for the creation of a new specialization in order to gain a competitive advantage. Functional convergence is

the combination of solutions from different sectors to create innovative expertise to meet new needs of the customer. Directions of functional convergence are defined as specializations in various industry sectors, that allow them together to meet the needs of the customers (Identyfikacja... 2014).

In the first stage assessment of the potential of 12 segments of the economy were prepared. For each segment SWOT and PESTER<sup>1</sup> analysis were drawn out (Identyfikacja... 2014). In the second stage the study included, among others, 28 individual in-depth interviews and three focus group interviews (FGI). In IDI interviews were primarily designed to: identify strengths and weaknesses of the individual segments, as well as trends that most strongly influence them, find the leading industry in the region, as well as directions of the technological and functional convergence. Discussions were raised primarily around the fastest developing specialization, and future directions of technological and functional convergence. In the next stage, these directions specified during workshops. Using the results of previous work, 35 potential directions of functional and technological convergence were identified. They have been subjected to evaluation in Delphi study. The following 8 directions obtained the most points: port services and industry, amber jewellery, offshore technologies, technologies and products in biotechnology and medicine, business-logistics hub / advanced business services, smart building and energy-efficiency, "smart" tourism / leisure industry, functional nanotechnology. During the next workshop for the 8 directions in-depth analyses were carried out, covering SWOT analysis, and analysis of the resources. Scenarios creation of development of specializations was the last step of the process (more in: Kamrowska-Zaluska & Soltys 2014).

The competition for the selection of PSS was announced on May 2014. The selection procedure consists of two stages. Stage I involves the following steps: 1) submission of the initial applications by the partnerships proposing Smart Specializations, 2) formal evaluation of this applications, 3) analysis of the applications by the Selection Committee and the formulation of conclusions and recommendations for partnerships. Successful partnerships were invited into second stage which consists of: 1) submission of the final applications, 2) assessment of these applications by the Selection Committee, 3) meeting of partnerships with Selection Committee (presentation applications, verification of strategies and possibilities of achieving the planned objectives), 4) meeting of the Selection Committee and the formulation of the evaluation of individual applications along with a justification and recommendation for the Pomeranian Voivodeship Regional Government (Regulamin... 2014).

Proposals for PSS should have been described according to the following criteria, which will be the same for evaluating: (A) Challenges, trends and potential markets; (B) Economic and technological potential; (C) National and international benchmarking; (D) Strategy and Action Plan; (E) Potential of partnership (Karta... 2014; Regulamin... 2014). The scope of the application form was very extensive. The task was, among others, to: (1) demonstrate the ability of smart specialization to develop without long-term subsidies and its consistency with regional, national and European policies goals; (2) describe the potential economic, technological and

<sup>1</sup> Political (P), Economic (E), Social (S), Technological (T), Environmental (E) and Regulatory (R).

scientific centres within the region, and the future potential for development of specialization for next eight years; (3) identify key location advantage of in the region comparing with other parts of Poland, Europe and the World, including one's which are unique; (4) describe the future research and development program, show key research projects and horizontal projects essential for achieving the objectives from RDS 2020. It is vital to show that partnership is representative by listing previous activities (3–5 years), that support development of the specialization.

Till 30 September 2014 28 partnerships for potential Smart Specializations submitted preliminary applications. They passed positively the formal evaluation and were then assessed by experts of the Competition Commission. At this stage experts only pointed out weaknesses of the proposals and formulated recommendations and would not eliminate any proposals (Samorząd... 2014). The main weakness of this process was high number of partnerships reported in the first stage of

Table 1. Pomeranian Smart Specialization – areas and partnerships

No	Pomeranian Smart Specializations	Areas covered	Name of partnership	No of partners
1	Off-shore, port and logistics technologies	a) specialized vehicles, equipment and structures able to work in the marine environment; b) equipment and underwater systems; c) technologies in the ports and their facilities, d) energy-efficient and low carbon technologies in the maritime and coastal zones e) equipment and renewable sources energy acquisition systems in the coastal zone; f) new ways to use sea resources	Smart equipment and technologies in economic activity in the seas and coastal areas SMART PORT & CITY: Intelligent processes and technologies in the ports and their facilities, as the generator of accessibility growth in communication and information in Pomerania	59      51
2	Interactive technologies in information systems milieu	a) multimodal human-machine interfaces; b) embedded systems for intelligent space, Internet of things; c) transmission of data, database, data security, processing big data, cloud computing	Smart Interactive Systems – Innovative products, services and technologies for intelligent environments	74
3	Eco-efficient technologies in the production, transmission, distribution and consumption of energy and fuel	a) energy – demand and consumption in construction and transport; b) renewable energy, distributed generation and energy prosumment; c) smart grid transmission system and distribution of energy; d) energy storage; e) vehicles with alternative propulsion; f) the exploration, extraction and processing of energy resources; g) of bio-components and bio-fuels; h) the energy use of waste	Construction SMART 3E – efficiency, environmental protection, energy Intelligent Energy and Fuel Technologies,	64      25
4	Medical technologies connected with lifestyle diseases and the aging	a) prophylaxis, diagnosis and therapy; b) systems of care for the disabled and elderly	Long Healthy Life –Innovations in the prevention, diagnosis and therapy of civilization diseases and aging society,	99

Source: (Propozycje... 2014; Wybór... 2015)

the competition and high number of narrow specializations. Marshal's Office tried to persuade partnerships to connect. Overcome the tendency to individualism was a big challenge for partnerships but this process was a success. On 1 December 2014 for the second stage of the competition 7 partnerships merged from 28 reported in the first stage. Only one partnership from 28 did not apply for the second stage.

In April 2015 Pomeranian Regional Board accepted four Pomeranian Smart Specializations (Table 1) and entered into negotiations with Partnerships, which has received a positive recommendation from the Competition Commission (in Table 1). Agreements signed as results of negotiations in January 2016 specifies conditions and criteria for access to 2014–2020 Regional Operational Program funds in the PSSs. Moreover if under the agreements the parties decide on concrete projects important for development of the PSSs, they will have priority in accessing funding under the Regional Operational Programme 2014–2020.

#### 4. Process of identifying West Pomeranian Regional and Smart Specialization

West Pomeranian Region adopted a multistage, evolutionary determination of Smart Specialization. The first stage was the identification of Regional Specialization, on the basis of which Smart Specialization were selected, (Urząd Marszałkowski... 2016).

The Marshal's Office conducted the research. Its goal was a preliminary identification of economic sectors that could be potential regional specializations. This study was based solely on data from the Statistical Office and the Tax Office (the number of taxpayers, net revenues in all tax rates, revenues from exports, the acquisition of fixed assets and other acquisition). In this process a broad set of PKD<sup>2</sup> sectors were used (The Marshal's Office... 2014). Five regional specialization, distinguished in the region, have been identified:

- bio-economy and industrial areas,
- maritime activities and logistics,
- metallurgy and mechanical industry,
- services of the future,
- tourism and health.

The **second stage** was to identify Smart Specialization. Marshal's Office proposed an approach basing on identification and co-operation of three areas:

1. key areas of economy with growth potential – identified as areas in which the market stimulates economic growth and innovation and companies with stable potential for innovation;

<sup>2</sup> Polska Klasyfikacja Działalności – Polish Classification of Activities, according to NACE (for the French term “*nomenclature statistique des activités économiques dans la communauté européenne*”) – the industry standard classification system used in the European Union.



2. business support institutions (BSI), which includes counterparties of key companies as well as universities and R&D institutions;
3. other support institutions, e.g. local governments, business institutions and clusters involved in for example implementing employment policy, vocational training, education and infrastructure.

Key actions in the process of the Smart Specialization identification were as follows:

- Identification of companies with development potential.
- In-depth interviews with representatives of the above-mentioned companies – to diagnose their needs, barriers, deficits, development plans, R&D facilities, level of internationalization, as well as to identify key trends for regional branches of specialization and their value chains, including network connections. The study was also used to map economic environment, including counterparties of key businesses, universities and R&D units.
- Identification of operators cooperating on the market with the above-mentioned companies by examining the value chain and describing their market needs and development barriers.
- Identification of key business support institutions BSI in terms of specialization (many of them in clusters) – their needs, capabilities and plans.
- Verification of West Pomeranian universities potential in the context of key companies' demand for research.
- Consultations with local governments – understanding their development plans, cooperation proposal and presenting the Smart Specialization process (Process... 2014; Urząd Marszałkowski... 2016).

Marshal's Office conducted a survey among entrepreneurs concerning, among others, the development innovation potential, barriers, needs, deficits, R&D resources, plans for internationalization, and the demand of enterprises for R&D (Urząd Marszałkowski... 2016). Marshal's Office also organized:

- Focus Meetings for each specialization (attended by entrepreneurs, R&D and BSI institutions and administration), which purpose was to initiate or strengthen cooperation between business and its environment.
- A series of meetings with key entrepreneurs dedicated to getting to know the real needs and analyse the innovation potential of leading entrepreneurs.

Marshal's Office was also a co-organizer of cooperative fairs: business-to-research which aim was to bring the world of business and science through bilateral meetings (Urząd Marszałkowski... 2016). An important component of the entrepreneurial discovery process was Regional Government Contract (RGC), which served as a catalyst for the process of selecting the key industries around which intervention at the level of communities will focus. Preparations for the implementation of this instrument required to indicate the potentials and barriers relevant to the development of sectors covered by RGC. The next step was to assess if sectors represented in RGC should be considered West Pomeranian Smart Specialization (Urząd Marszałkowski... 2016).

Marshal's Office also commissioned studies to support and complement regional process of entrepreneurial discovery included:

- Evaluation of the potential of West Pomeranian Universities – how they meet business demand for research connected with sectors of Smart Specializations.
- Identification and analysis of business support institutions and clusters.
- The role of ICT sector in the development process of regional and Smart Specialization (Urząd Marszałkowski... 2016).

The basis for the delimitation of Smart Specialization was PKD at the level of sub-classes. Entity was included in Smart Specialization taking into account not only its main code PKD, but also additional codes and economic links of activities with a particular specialization. e.g. within one value chain.

Smart Specialization is seen as process of entrepreneurial discovery leading to economic transformation. This process requires identification of the field the region finds its potential to be more competitive than other regions. In this process it is important to discover and monitor the **value chains**, to explore new ideas in the value chains and access to new value chains (The Marshal's Office... 2014).

During the process of emergence of the Smart Specialization from Regional Specialization the following horizontal principles were taken into consideration:

- Refinement: from one Regional Specialization several, one or none of Smart Specialization may arise.
- Narrowing towards quality growth (concentration rule): Areas of Smart Specialization should cover a smaller part of the economy of the region than the areas covered by Regional Specializations.
- Market orientation: Smart Specialization should be associated with one type of product or group of products similar or transitional in the value chain.
- Preservation of critical mass: Each Smart Specialization should include a significant part of the economy of the region.
- Independence: Each Smart Specialization should be part of the other ones or cover common activities
- Derive from numerous sources: in justified cases, the Smart Specialization can be derived from more than one Regional Specialization (Urząd Marszałkowski... 2016).

Considering the abovementioned rules, detailed criteria were adopted to identify a Smart Specialization:

- economic criterion, which includes the four following components: importance in the country, the importance in the region, competitiveness and company innovation.
- activity of entrepreneurs criterion, which verifies that the companies operating within tested specialization are seeking together, to increase their competitive advantage through the introduction of new or improving existing products, based on endogenous resources of the region, including its academic resources, and regional R&D infrastructure.
- innovation criterion including two components: company innovation and the R&D potential.

It was assumed that each Smart Specialization must meet all the above listed criteria. The activity of entrepreneurs criterion is closely associated with the process of entrepreneurial discovery. Ratings within this criterion were made in a qualita-

Table 2. Matrix showing links between the Regional and Smart Specializations in the West Pomerania Region

Smart Specializations	Regional Specializations	Metallurgy and mechanical industry	Maritime activities and logistics	Services of the future	Tourism and health
	Bio-economy				
Large scale water and civic constructions	–	A	A		–
Advanced metallurgy	C	A	–	C	–
Wood and furniture products	A	B	–	–	–
Eco-packaging	A	B	–	–	–
Chemical and materials engineering products	A	C	C	–	C
Modern food processing	A	C	B		C
Multimodal transport and logistics	C	C	A	B	C
Products based on information technologies	C	C	C	A	B

A – considerable   
 B – partial   
 C – low   
 – – lack

Source: (Urząd Marszałkowski... 2016)

tive way. The evaluation of the R&D potential was based on a survey of all scientific institutions in the region. For others criteria indicators were calculated on the basis of the Statistical Office and the Tax Chamber in Szczecin. For each criterion component specific bands of indicators for the 3-point scale were elaborated (Urząd Marszałkowski... 2016).

On the basis of above-mentioned criteria eight West Pomeranian Smart Specialization have been identified and accepted by the Board of the West Pomeranian Voivodeship (Table 2). Individual Regional Specializations in various degrees contributed to the Smart Specializations – the strongest to Bio-economy, the weakest to Tourism and health (Table 2). Smart Specialization can be strongly or weakly linked to several Regional Specializations (Urząd Marszałkowski... 2016).

### 3. Comparison of methods for selecting a smart specialization

The processes of emergence of smart specialization in both regions are significantly different. In Pomerania it was an entirely bottom-up process and specializations were chosen by the way of the call for proposals. In Western Pomerania that process can be described as mixed or top-down with a significant participation of stakeholders. This participation has been reflected in several phrases in which bottom-up approach was mentioned, where “the market stimulates growth and innovation” (Urząd Marszałkowski... 2016). Participation of stakeholders (companies, R&D institutions and other business support institutions), however, had a different character in the two regions. In Pomerania Voivodeship it is basically the interested parties who introduce specializations, organizing themselves in the partnerships for their development. Voivodeship Marshal’s Office has created a framework for this process and then acted as initiator and facilitator. In West Pomerania entities were the source of information and opinions which were gathered during meetings,

through interviews and surveys. Some meetings were also an opportunity to establish cooperation and create joint plans, but they didn't have constituting role in the process of emergence of smart specialization. In Western Pomerania in parallel to the activities involving the stakeholders, the analytical work was conducted, mainly using quantitative data, aggregated by sub-class of the PKD. Types of work carried out in Western Pomerania were similar as in the first two phases carried out by an external company in Pomerania, where these phases were, however, of ancillary nature and had no continuation.

Entities that will be developing Smart Specializations were involved in the emergence process in both regions, though bottom-up method chosen in Pomerania has forced not only a greater contribution but also accountability of those entities. Expert responsibility of the Selection Committee in the process should also be noted. In West Pomerania a significant but not predominant part of defining smart specialization were quantitative analyses. In Pomerania quantitative analyses were carried out only by an external company in the first phase on broadly aggregated 12 segments of the economy, covering 42% of employees in the Voivodeship and 35% of GDP created in the region. These analyses did not influence the choice of smart specialization, but the overall gathered information that helped the Marshal's Office to evaluate and accept suggested specializations.

Both processes consist of two stages, but they covered totally different activities: in Pomerania they were the stages of the competition while in Western Pomerania – the first step was selection regional specialization, the second – the smart specialization.

Methodological approaches used in examined regions are to some extent reflected in the methods from World Bank classification (Piatkowski et al. 2014) (Table 3). In Pomerania competitive selection was the main method, in West Pomerania – analyses of S&T and looking for clusters.

It is difficult to unambiguously determine which method is more appropriate, because both have proven to be effective. It is too early to determine whether and what would be the result using another method. It is theoretically possible to examine just what the outcome would be if in Pomerania quantitative methods were

Table 3. Comparison of methods for emergence and selecting smart specialization

Methods	Pomerania		West Pomerania	
	preliminary phases	competition	Regional Specialization	Smart Specialization
Analysis of science and technology	+	In frame of competition by partnerships	+	+
Looking for "clusters"	+		+	+
Foresight	Some elements		–	Some elements
Market selection	–	–	–	–
Competitive selection	–	+ Main method	–	Some elements
Case-studies	–	Some elements	–	Some elements
Gravity model	–	–	–	–

Source: own elaboration on the basis of Piatkowski et al. (2014)

used, such as in Western Pomerania. But there is no justification for such research, beyond the purely cognitive process. The analyses below indicate some features which were different and main advantages of each method.

Smart specialization in Pomerania were created by combining existing dispersed activities under the persuasion of the regional authorities and the compulsion forces by the terms of the competition. It is unknown whether the partnerships will survive beyond the period of implementation of projects funded by the EU. There was also, the process of growing awareness and self-organization. Smart specialization in Western Pomerania largely overlap with the already existing clusters of activities. In Pomerania the method necessitated greater cooperation of key players. There has been a process of evolution: from thinking in terms of self-interest and the perception of others as competitors, through noticing that others do something similar, to understanding that merging can increase chances for achieving success.

In West Pomerania within the clusters the co-operation focuses on key enterprises with economic support institutions. The Pomerania method forced to draw up extensive and detailed application documents in which business feasibility for each Smart Specialization had to be proved. The contents of these documents, tested and positively evaluated by the Selection Committee, can be considered important in giving credibility to the selected Smart Specializations. In West Pomerania the accuracy of selection may be proven right by the convergence of the results obtained by quantitative and participatory processes of stakeholder involvement – “entrepreneurial discovery”.

In Pomerania lack of a clear assessment of productivity should be noted. The importance of this analyses is emphasized by Nazarko (2014). Element of assessment – company income per employee – was one of the components within the criterion of “competitiveness” in the Western Pomerania. In Pomerania productivity and other characteristics of the area consisting of the specialization was verified by the Selection Committee. At the stage of formulating competition fiche it was considered that the assessment of productivity on the basis of statistical data according to PKD would be impossible due to the incompatibility the areas of smart specialization and PKD.

Synthetic comparison of methods for emergence and selecting smart specialization are shown in Table 4.

#### **4. Comparison of the areas of smart specialization**

The coastal location of both regions is reflected in the lists of specialization. This applies to one specialization in the Pomeranian Voivodeship and two in the West Pomeranian. In Pomerania Voivodeship this specialization is defined as “Off-shore, port and logistics technologies”. It is first on the list of PSS as the one that received the highest score and is the most specific for the region. Its scope can be analysed based on the criteria defined PSS in Pomerania Voivodeship Administration Act, which stresses that PSS 1 – will foster economically efficient and environmentally

Table 4. Comparison of methods for emergence and selecting smart specialization

Element of method	Pomerania	West Pomerania
Characteristic of the process	Bottom-up process, call for proposals	Mixed or top-down with a significant participation of stakeholders
Role of stakeholders	Constituting – creating specialization, organizing themselves for their development	Source of information and opinions
Proof of accuracy of selection	Application documents tested and positively evaluated by the Selection Committee	Convergence of the results obtained by quantitative and participatory processes of stakeholder involvement – “entrepreneurial discovery”

Source: own elaboration

safe exploration and harvesting sea resources due to commercialization of innovative solutions in areas such as:

- Universal constructions and technologies used to harvest sea resources.
- Vehicles and marine units used in sea and coastal environment.
- Devices, techniques, monitoring and sea purification systems and its supplies.
- Innovative ways and technologies for utilization of unique natural compounds produced by sea organisms.
- Technologies, devices and processes to promote safety and efficiency of logistic-transportation services in ports and its supplies” (Uchwała... 2016).

In West Pomerania Voivodeship specialization “Large-scale Water and Land Construction” has ties with traditions of shipyard industry which, due to the economic situation, had to alter production which quite suddenly led to revealing the industry’s significant potential. Some of the specialization development directions are:

- Shipyard industry reconstruction.
- Creation of pro-ecological solutions in the area of sustainable sea industry development.
- Introduction of new, large-scale products connected with wind energy.
- Logistical and transportation conditions improvement for large-scale cargo.
- Cooperation potential development for shipyard sector companies with R&D sector.
- Creation of investment plan regarding mutual shipyard infrastructure and accompanying elements both on land and sea.
- Gaining the ability to produce infrastructure and devices used for harvesting underwater mineral materials.
- Development of expertise in areas of city construction between land and water terrain.

A second specialization connected with the sea is “Multimodal transport and logistics”. Directions of the specialization development encompass the extension of rail and vehicular transport to the sea ports and airports with supplies, connection with the Central European Corridor CETC-Route65, airport development with cargo function, enabling navigability on the whole length of the Odra river and also:

- Building new installations in the outer port in Świnoujście, stressing the cargo port.
- Building infrastructure allowing for full multi- and intermodality of transport.
- Increasing usage in business of regional science output in the field of navigation and sailing safety.
- Creation of transport-logistic network to compete with important global operators.

There is a partial overlap of areas connected with ICT in both voivodeships. These are PSS no. 2 in Pomerania called “Interactive technologies in information systems milieu” and “Products based on information technologies” in West Pomerania. The scope of the specialization in Pomerania can be analysed according to the Table 1, but “space and satellite engineering” has been added to the list.

In Western Pomerania Voivodeship the specialization encompasses:

- Development of products and services in the cloud.
- Systems and applications connected with Big Data analysis.
- IoT – Internet of things.
- IT security.
- Systems and applications connected with mobile devices, mobile solutions which architecture is based on cloud platforms; data integration, solutions connected with BYOD trend (Bring Your Own Device). New technologies in social media.
- CXIT (systems supporting management and optimization of users/clients experiences).

One can clearly notice common elements in both regions, but a more accurate analysis of the similarities and differences require knowledge in specific smart specialization areas. Common areas in both regions may lead to the adoption of opposite attitudes of competition or cooperation. The latter can bring better effects than the competition because of the scale of the economy.

Only the future will allow to assess the relevance of selected smart specialization. There are several successive stages in which one will be able to assess the following issues:

- In the near future: Which projects will receive funding?
- In a few years: To what extent these projects has contributed to the development of the specialization? Whether and if yes, to what extent cooperation between entities will survive beyond the period of the implementation of EU funded projects?
- In the long term (e.g. 10 years): How a specialization will develop? To what extent will it affect the development of the region?

It is not certain whether the described above evaluation will allow for the comprehensive assessment of methods of selecting specialization. There may be many causes of possible failures. On the contrary, success will bring supposition that the method of selecting specialization was appropriate. As mentioned above, it would be difficult to prove that one or the other is better or worse.

## 5. Conclusions

The processes of emergence of smart specialization in both regions were analysed and compared. They are significantly different. In the Pomerania process was entirely a bottom-up one. It relied on the organization of the competition, in which stakeholders interested in the development of Smart Specialization united in partnership and developed application accurately describing the concept and its feasibility. In West Pomerania the process had two stages: first the emergence of Regional Specialization, and then Smart Specialization. In the second stage two approaches coexisted: analytical work, mostly the quantitative analysis of data based on sub-classes of PKD and “entrepreneurial discovery” process with the participation of stakeholders. They participated in the process in both regions, but their role was different.

It is difficult to unambiguously determine which method is more appropriate, as they both have proven to be effective. In Pomerania there was a stronger emphasis on participation and forming partnerships which is the core of process but this part also wasn't absent in West Pomerania. There are too many variables to determine what would be the result if a different method was used in each of the Voivodeships.

In Pomerania four Smart Specializations have been accepted by the regional authorities while in the West Pomerania – eight Smart Specializations. The specificity of coastal locations is present in lists of specializations, in both regions there are specializations related to the sea: in Pomerania “Off-shore, port and logistics technologies” and in West Pomerania “Large-scale Water and Land Construction” and “Multimodal transport and logistics”. In both Voivodeships Smart Specializations connected with ICT are present.

The assessment of the selection method for the emergence of smart specialization can be carried out only gradually (as the results will be seen over time), through the monitoring of projects, collecting data within the specialization and analyses of their impact on regional development. A full assessment can be only done after several years.

It is justified to conduct a comparative study of the methods for selecting the smart specialization in other regions. To reach the way to improve the existing methods and to elaborate the new ones is even more important.

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