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Process of Emergence of Smart Specialisation in Pomeranian Voivodeship in Poland

Dorota Kamrowska-Zaluska[a,*] Jacek Soltys[a]

[a]*Gdańsk University of Technology, ul. Narutowicza 11/12, 80-233 Gdańsk, Poland*

Abstract

The European Commission puts a growing emphasis on the smart specialization as a tool of regional development. This term is present in a number of strategic development documents in the European Union, including Europe 2020, published by the European Commission in 2010. It implies the need for countries and regions to specialize as well as focus the development of innovation on areas that are consistent with their endogenous potentials.

Objectives of this paper are: (1) to present the method and results of the process of identifying smart specialization in Pomeranian Voivodship; (2) to analyse evolution of the fields of smart specialization; (3) to identify problems and challenges which occurred during this process. In this research, following methods have been applied: (1) analysis of existing documents including application forms for the competition of Pomeranian smart specialization, (2) individual in-depth interviews with members of partnerships and representatives of the Voivodeship Marshal's Office, (3) authors' observations while participating in this process. The authorities of the Pomeranian Voivodeship see the smart specialization as an area with high potential, relevant to the development of the Voivodeship, based on the unique resources of the Region and their innovative use. It is assumed that, among others, implementation of R & I is contributing to the development of existing economic specialization and having an impact on the growth of competitiveness of the Pomeranian Region on the national and international arena. The process of identification of smart specialization has been implemented in three phases.

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Keywords: innovation strategy; Pomeranian Voivodeship; regional competitiveness; regional knowledge-based development; smart specialisation;

The first one is determination of the economic profile of the region. The second step is discussions, consultations and partnerships building various forms of interviews, workshops and meetings with the stakeholders, incl. business, R & D institutions, clusters,

* Corresponding author. Tel.: +48-502-32-88-00.
E-mail address: dzaluska@pg.gda.pl

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regional bodies, non-governmental organizations, local governments, academia, Pomeranian Boards of Education and others. The last phase is organization of the competition for Pomeranian Smart Specialization.
Presented research shows that the important feature of this process has been a bottom-up approach. Regional Government invited all actors to create a partnership. They worked on identifying potentials, and then based on this analysis, developed a common strategy for the development of smart specialization. The method of identification of the priorities and implementation of the actions assumes that the process itself should be flexible, meaning that adopted priorities and allocation of resources need to be reviewed and modified if such a need occurs.

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 [1]. There are several publications analysing both in theory and in practice possibilities of implementation of Smart specialization as political instrument, but also showing challenges and the difficulties involved in its implementation [1, 2, 3]. At the same time, there is a limited number of studies analysing still ongoing process of implementation of Smart specialization in Poland, though it is important to mention works of Kardas [4], Malik [5, 6], Strzelecki [7], Sztorc [8], which give theoretical background of this process.

There are several definitions of the concept of Smart specialization. The most substantial one comes from work of Prof. Dominigue Forey [9]. It emphases that this idea 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. Foray [9] also noted a sequence that 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 routinized 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. Definition promoted by the JRC S3 Platform [10] stresses that "Smart specialization involves a process of developing a vision, identifying competitive advantage, setting strategic priorities and making use of smart policies to maximize the knowledge-based development potential of any region." [11].

The authorities of the Pomeranian Voivodeship (region) define the Smart specialization as an area with high potential, relevant to the development of the region, based on its unique resources and their innovative use. It is assumed that, among others, implementation of R & I contributes to the development of existing economic specialization and has an impact on the growth of competitiveness of the Pomeranian Region on the national and international arena [12]. The authors are inclined to adopt it as it covers most of the aspects mentioned by classic definitions stressing component of competitiveness.

It is also vital to ask the question how the process of defining and supporting implementation of Smart specialization should be conducted in an effective way. What are the conditions for Smart specialization to be an instrument of improving of competitiveness and securing its socio-economic development. Strategy elaborated by experts (often with strong public involvement in this process) is one of the methods, adopted in most of the Polish Regions, and the other is bottom-up approach adopted in Pomeranian Voivodeship.

The aims of this paper are as followed: (1) to present the method as well as results of the process of identifying Smart specialization in Pomeranian Voivodship; (2) to analyse evolution of the partnerships for Smart specialization and definition of their scopes of activity (3) to identify problems and challenges which occurred during this process. To achieve abovementioned aims following research methods have been applied:

- analysis of existing documents including application forms for the competition for Pomeranian Smart Specialization,
- interviews with members of partnerships and representatives of the Voivodeship Marshal's Office
- observation from authors participation in this process.

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2. Smart Specialization on European, national and regional level

The Lisbon strategy evaluation indicated that goals set for increasing the competitiveness were not entirely met. There was a need for new approach towards innovation development. The term Smart Specialization is present in a number of strategic development documents in the European Union, including Europe 2020 [13]. It implies the need for countries and regions to specialize, as well as focus the development of innovation on areas that are consistent with their endogenous potentials. Development of the concept of Smart specialization is seen as part of the implementation of Europe 2020 Strategy's priority - development of an economy based on knowledge and innovation.

At national level The European Commission's guidelines on cohesion policy implementation for the period 2014-2020 state, that identification of Smart specialization is a prerequisite (ex-ante) for the Polish 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) and outlines the process of monitoring and updating. National Smart Specialization Strategy is an open document, which will be subject to ongoing review and updating on the basis of the monitoring and ongoing socio-economic changes. The result of the development of national RIS3 is an indication of the National Smart Specialization, which is a priority for science and innovation policy by 2020. RIS3 can also be a useful instrument to meet global challenges, such as demographic changes, limited access to natural resources, energy security and climate change [14].

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 [15]. Guide to Research and Innovation Strategy for Smart Specialization (RIS3), a set of mandatory guidelines for the preparation of the design methodology, formulation and implementation of regional research and innovation strategies for Smart specialization indicates that RIS3 should meet five important criteria: (1) focused policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development, including ICT-related measures; (2) build on each country's/region's strengths, competitive advantages and potential for excellence; (3) support technological as well as practice-based innovation and aim to stimulate private sector investment; (4) get stakeholders fully involved and encourage innovation and experimentation; (5) be evidence-based and include sound monitoring and evaluation systems.

Regional Development Strategy 2020 (RDS 2020) emphasizes, that public intervention will be focused on launching and using potentials relevant to the region's industries and emerging Smart specialization of the region. Pomeranian Regional Government committed to set up a mechanism to identify and verify the areas of economic activity, which can determine the future competitive position of the region. This mechanism will enable the concentration of the intervention and its flexible adaptation to changing market conditions. The mechanism will be based on the following principles: (1) continuity of building the analytically underpinned public intervention; (2) the use of incentives for grassroots mobilization of all the stakeholders; (3) openness of the initiative for interested stakeholders; (4) transparency of processes and decision making criteria; (5) negotiation approach to building relations between regional authorities and interested actors; (6) reproducibility; (7) EU Guidelines for the selection of Smart specialization. [16].

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 will be implemented with the participation of the expert committee based on criteria, which have previously undergone public consultation process [17]. The process of identification of Smart specialization was implemented in the following 6 phases:

- Determination of the economic profile of the region.
- Discussions, consultations and partnerships building – various forms of interviews, workshops and meetings with stakeholders
- The organization of the competition for Pomeranian Smart Specialization

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- Negotiations to support the development of smart specialization between the authorities of the Pomeranian Voivodeship Regional Government and partnerships.
- Signing of agreements for the Pomeranian Smart Specialization between Pomeranian Voivodeship Regional Government and partnerships.
- Monitoring of implementation of selected Smart specialization [18].

The phases 1 and 2 were carried out as one project by external consultants from a Warsaw company (ResPublic). The abovementioned procedure (steps 1-6) will be launched by the regional authorities every two years. The first started in 2013 [18]. The 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.

3. Study on segments of the economy, specializations and technological convergence

The aim of this study was to clarify the specific of Pomeranian endogenous resources and comparative advantages, and identify areas of economic activity with the highest growth potential in this area at the interface between different sectors, industries and technologies, together with an indication of the possible directions of technological convergence. Technological convergence in this study was defined as a phenomenon of using the technologies from different sectors for the creation of a new specialization in order to gain a competitive advantage. Wojciechowski [19] points out that technological convergence in Poland is forcing a close cooperation between actors in different areas. 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 to meet the needs of the customers together [20].

In the first step, based on a set of areas specified by the contracting authority, segments of the economy were established (in a different division than NACE [21]). The definition of 12 segments (table 1) and their list was confirmed in a panel discussion. These segments include 42% of employees in the Voivodeship and 35% of GDP is created in the region. The second step was the preparation of Expertise – analysis and assessment of the potential of different segments. For each of the 12 segments data were collected and 17 indicators were developed [20]. Part of them are presented in the table. 1.

Table 1. Comparative analysis of segments (fragment)

An example of a column heading	Employees	GDP	Share of companies that have introduced innovation average in 2010-12	New and significantly improved products in % average in 2010-12
ICT	2.1	2.7	42.1[a]	36.6
Energy and environmental engineering	5.1	5.7	11.7	0.0
Business services / BPO	1.9	2.7	38.3	12.5[d]
Light chemistry, biotechnology	0.5	0.6	50.0[a]	6.3
Creative industry	1.3	0.6	11.0	0.7
Shipping and Logistics industry	8.4	6.0	15.5	3.4
Construction	11.5	7.8	16.2[b]	0.0
Tourism, sport, recreation	3.3	1.2	12.5[c]	0.0
Automotive industry	1.9	1.2	30.0	10.5[e]
Furniture industry	1.5	1.5	5.2	3.4
Food processing	3.8	3.9	2.9[a]	2.4[e]
Clothing industry	0.8	0.8	7.0[a]	8.1[e]

[a] in 2011, [b] in 2008, [c] in 2009, [d] in: 2009, 2010 and 2012, [e] in 2011-12

Source: (Identyfikacja, 2014)

Results of comparative analyses are presented for all 12 segments. For each segment SWOT and PESTER analysis were drawn out based on information obtained during the research. The PESTER analysis assesses the determinants of development of each segment: Political (P), Economic (E), Social (S), Technological (T), Environmental (E) and Regulatory (R). An "asset map" showing current and potential resources was prepared. It allows to evaluate the present level of development and the potential of each segment [20].

In the next stage the study included, among others, 28 individual in-depth interviews (IDI) and three focus group interviews (FGI). In IDI representatives of different sectors took part: entrepreneurs, business support organizations,

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clusters, R & D and local government. 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. FGI were attended by a total of 20 persons – representatives of businesses, R & D institutions, clusters and business institutions. Discussions were raised primarily around the fastest developing specialization in the Pomeranian Voivodeship, and future directions of technological and functional convergence. 12 broad segments (like in Expertise) were evaluated. The ones with the highest level of innovation, those which are a showcase of the Pomeranian region in Europe or Poland, as well as those having the greatest potential for development in the next 10-15 years were indicated. From the ones having the highest ratings, narrower specializations were separated and they were put through the same process of evaluation. The list was expanded by technologies and products. Respondents indicated: (1) specialization or technologies that have developed at the border with other sectors or developed through the use of technology from other sectors, (2) specialization, which combine the functions of various sectors to better meet the needs of customers.

For each specialization and technology, these issues were added: a list of companies that are successful in the market, centres and research units conducting research connected with particular specialties or technologies, rating the level of research in the Pomeranian region. It was assessed, which specializations and technologies have the greatest potential for growth and are most likely to develop in the Pomeranian region. The conditions which should be met for analysed specializations and technologies to reach a high level of development were indicated.

In the next stage, the directions of convergence were specified using participatory approach. Four workshops for a wide group of different sectors private and public (incl. academia) representatives were conducted. Using the results of previous work, 35 potential directions of functional and technological convergence at the interface between 12 segments surveyed were identified. They have been subjected to evaluation in Delphi study. Forty experts pointed out directions with the highest potentials within each of 5 criteria: the level of development of enterprises, the level of scientific institutions, human resources, organization and cooperation, external factors affecting the direction. After summarizing the points, the following 8 directions obtained the most points (in bracket): port services and industry (19.6), amber jewellery (19.5), offshore technologies (19.4), technologies and products in biotechnology and medicine (17.6), business-logistics hub / advanced business services (17.5), smart building and energy-efficiency (16.5), "smart" tourism / leisure industry (15.2), functional nanotechnology (14.5).

For the 8 above-mentioned directions in-depth analyses were carried out. They covered: SWOT analysis, analysis of the resources including human resources and other assets accumulated in the region, creating a list of leaders and scientific institutions. Scenarios creation of development of specializations was the last step of the process.

4. Competition for Pomeranian's Smart Specializations

The competition for the selection of Smart Specializations of Pomeranian was announced on May 2014 [12]. Partnerships connected with development of potential smart specializations have been invited to present the concept of their activities. The selection procedure of Pomeranian Smart Specialization consists of two stages. Stage I involves the following steps: Submission of the initial application by the partnership, formal evaluation of this applications, analysis of the initial application by the Selection Committee and the formulation of conclusions and recommendations to present during the meeting of partnerships with members of the Selection Committee, formulation of written conclusions and recommendations for partnerships. Successful partnerships were invited into second stage which consists of:

- Submission of the final application by the partnership proposing Smart specialization.
- Formal and substantive assessment of final application by the Selection Committee.
- Meeting of partnerships, which submitted proposals for Smart specialization with Selection Committee (presentation applications, verification of strategies and possibilities of achieving the planned objectives).
- 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 [12].

Proposals for Smart specialization should have been described according to the following criteria, which will be the same for evaluation: (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 [12, 22].

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

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European policies goals; (2) describe the potential economic, technological and scientific centres within the region, and the future potential for development of specialization for next eight years; (3) identify key location advantages in the region comparing with other parts of Poland, Europe and the world, incl. one's which are unique for Pomeranian Region; (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 [17].

Till September 30, 2014, 28 partnerships for potential Smart Specializations submitted preliminary applications (table 2). They positively passed the formal evaluation and were then assessed by experts of the Competition Commission. The result of this step were to identify the strengths and weaknesses of the concepts, as well as formulate recommendations aimed at strengthening the impact of the proposed specializations on the competitiveness of the region. At these stage experts only pointed out weaknesses of the proposals in particular areas and formulated a list of recommendations and would not eliminate any proposals [23].

Table 2. Partnerships for smart specializations for stage I and stage II, Propozycje... [24]

Stage I – Sept. 2014 – 28 partnerships	Stage II – Dec. 2014 – 7 partnerships
1. Multifunctional materials, nanomaterials and innovative production technologies for medicine and the environment 2. Designing, testing and implementation of innovative materials, devices and methods of treatment of cardiovascular failure - epidemic of the XXI century 3. Innovative technologies in the prevention, diagnosis and treatment of diseases of civilization 4. Research, prevention, therapy and education in the field of diseases of civilization	Long Healthy Life – Innovations in the prevention, diagnosis and therapy of civilization diseases and aging society
5. Universal design (Smart Quality) 6. Plasm Energy - burning of waste in plasmas process 7. Electric Mobility 8. Prosument energy 9. Smart Energy Networks 10. Innovative Construction Smart E +	Construction SMART 3E – efficiency, ecology, energy
11. Smart Systems 12. Advanced Business Services 13. E-zone - research for development of new technologies in Pomorskie (multimodal human-machine interfaces, embedded systems for intelligent space, data, databases, intelligent processing of big data, cloud computing)	Smart Interactive Systems – Innovative products, services and technologies for intelligent environments
14. Automated logistics and transport 15. SMART & PORT CITY 16. The innovative e-tourism XXI century	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
17. The economic use of resources of the sea - offshore industry 18. Modern, intelligent buildings and research facilities and instrumentation 19. Dual – use Unmanned Platforms 20. Precision engineering - automation, plastic processing, scientific research instruments and tooling nanoadecuate 21. Future of ecological processes, production in social life and public safety systems 22. Sustainable economic use of marine resources 23. Maritime Robotics 24. Blue City	Smart equipment and technologies in economic activity in the seas and coastal areas
25. Integrated Higher Education 26. Self-learning region POMORZE (EDUPOMORZE)	EDUPOMORZE – Education and Self-learning Region
27. Extraction and refining of crude oil	Intelligent Energy and Fuel Technologies
28. Smart Craft Design - Creative Arts	Partnership didn't apply

The main weakness of this approach was that the list of partnerships reported in the first stage of the competition was very fragmented with high number of fairly narrow range of 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 December 1, 2014 for the second stage of the competition only 7 partnerships merged from 28 reported in the first stage (table 2). Only one partnership from 28 did not apply for the second stage.

Most of 8 directions of functional and technological convergence with the highest potential defined in the previous stage describes in chapter 2 (except amber jewelry), was among the 28 specialization and then 7 partnerships.

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5. Pomeranian's Smart Specializations

In April 9, 2015 by decision of Pomeranian Regional Board, four Pomeranian Smart Specializations (PSS) were adopted (see table 3). These specializations were considered relevant for providing a competitive advantage for Pomeranian Voivodship's economy over the long term. To exploit synergies of particularly developed industries and the ones with the greatest potential for growth in the region, Pomeranian Regional Board entered into negotiations and signed agreements with Partnerships, which has received a positive recommendation from the Competition Commission (in table 3).

Table 3. Partnerships for Potential Smart Specializations (December 2014), Sources: Propozycje [24, 25].

PSS	Areas covered	Name of partnerships	No. of partners
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) and technologies in the ports and their facilities, d) energy-efficient and low carbon technologies in the of 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	59
		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	51
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
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 prosume; 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 biofuels; h) the energy use of waste	Construction SMART 3E - efficiency, environmental protection, energy	64
		Intelligent Energy and Fuel Technologies	25
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

Pomorskie Regional Board set a period of negotiations starting from 15th of June 2015. In January 2016 agreements specifying conditions and criteria for access to 2014-2020 Regional Operational Program (ROP) funds in the PSSs were signed as results of negotiations. Moreover if in the agreements the parties specify concrete projects important for development of the PSSs, these projects will have priority in accessing funding under the ROP 2014-2020. Agreed projects, which will be eligible for funding at the national level, will become part of the Regional Development Strategy. They will be promoted by Pomorskie Regional Board in the framework of Territorial Contracts and other instruments on national level.

6. Results and discussions

Smart specialization strategy shouldn't be set as a policy process to select and prioritize fields or areas where a cluster of activities should be developed. It should be introduced by letting entrepreneurs discover the right domains of future specializations, so smart specialization strategy can be effective only at a certain point in the development cycle, where a degree of local commitment and development is already achieved [26]. This approach was taken by Pomeranian Voivodeship. It is the only region in Poland, where the emergence of Smart specialization was implemented as a bottom-up process, through competition.

The research described in this paper shows analysis of the process of identifying PSS and defines problems and challenges which occurred during this process. To answer the question how to choose the most suitable PSS which

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would support development of the region if the future remains unknown, PSS were defined by partnerships which will realize them, not by Regional Board, which only accepted them. The adopted procedure does not guarantee success, but it makes it highly probable. Extensive and detailed content of application documents and expert assessments strongly contribute to this situation. PSS Applications needed to indicate the business feasibility of each Smart Specialisation. This bottom-up process lead to applicable strategies of implementation not just theoretical concepts.

The main challenge of the process was a need to reduce number of Smart Specialisations which apply in first stage. To define PSSs which will cover aims of several initial partnerships. Creating larger agreement and seeing broad objective of the specialization was a challenge for partnerships, naturally focused on their own very specialized fields. Combining 27 partnerships in 7 and then in 4 PSS was a major success and it was an important lesson of cooperation. Moderation of the process by Marshal's Office employees played important role in this process.

Another challenge for partnerships was meeting the requirements of the European Union - understanding specific vocabulary used in European Commission documents by companies accustomed to the day-to-day business activity.

Except formal procedure described in previous sections it is possible to indicate the following phases of building partnerships and PSS formation:

- Thinking in terms of self-interest, the perception of others as competitors; lack of trust is a common phenomenon in this phase.
- Waking consciousness; noticing that others do something similar.
- Understanding that the merging can increase chances for achieving success; establishing relationships and finally self-organization.

7. Conclusions

Both formal and informal procedure of PSS identification, including problems and challenges were identified fulfilling objectives of presented research. Creating a credible business concept and integrating multiple partnerships in PSS which could contribute to providing a competitive advantage for Pomeranian Voivodship's economy over the long term can be considered as the main challenges.

It would be valuable to continue future research of Smart specialization in Poland carrying study of the implementation process of the PSS, followed by evaluation of its efficiency using monitoring by Pomeranian Voivodeship authorities. Comparison research with regions using more top-down approaches are also planned. There were to include other coastal regions as the areas of similar conditions.

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