

Conception and Implementation of Regional Innovation Strategy Based on Smart Specializations of Śląskie Voivodship

Sławomir Olko, Jan Brzóska

Silesian University of Technology, Poland

Abstract

The purpose of the paper is to investigate the process of selecting regional smart specializations in designing and implementing Regional Innovation Strategy (RIS). It presents conditions concerning selection of three smart specializations — i.e., power sector, medicine and information and communication technologies (ICT) on the background of selected smart specializations in the remaining regions of Poland and other EU states. They are characterized in the aspect of using the knowledge for the purposes of implementation of the goal adopted in RIS. The basic research problem (in the methodology aspect) was to create a model allowing for planning and implementing content-related works concerning innovation strategy, which should ensure development of a region and obtain necessary financing. The methodology implemented in the paper consists of two parts. The first one applies to developing (designing) RIS, the other to its implementation. The basic content-related assumption of the design stage is to support the concept and strategy implementation on smart specializations. This means effective and synergistic utilization of public support to strengthen innovative capacities by focusing on the most promising areas in which the region could reveal a competitive advantage. The second part of the methodology refers to the implementation model of RIS which is based on the assumption of smart specialization development in the region, but much more refers to the practical aspects: identified projects in the region and possibilities of financing them. The value of the paper consists in presenting a design method and RIS implementation model in one of the regions in Poland, namely Śląskie Voivodship. In particular, smart specializations selected in the region were characterized in a strategic aspect and their role in creating and implementing RIS was emphasized.

Keywords: innovation, Regional Innovation Strategy, smart specialization, Śląskie Voivodship

JEL: O32, R11, R58

Introduction

Every country and region of the European Union is obliged to specify their own smart specialization which are the grounds to build smart specialization strategy “the national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths with business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts. A smart specialization strategy may take the form of, or be included in a national or regional research and innovation (R&I) strategic policy framework. Smart specialization strategies shall be developed through involving national or regional managing authorities and stakeholders such as universities and other higher education institutions, industry and social partners in an entrepreneurial discovery process.”¹ Regions develop smart specializations considering both available regional resources and challenges of the future such as owning competitive economy.

1. See: Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006. OJ L 347, 20.12.2013, p. 289–302.

The RIS3 Guide specifies four principles related to smart specializations, called 4C: (1) choices and critical mass, (2) competitive advantage, (3) connectivity and clusters, and (4) collaborative leadership. The regions have thus received some guidelines how to specify smart specializations as well as implemented mechanisms evaluating political and social choices of the regions through the condition of failure to receive public assistance from EU resources. Practical issue is the answer to the question of how smart specializations have been specified in the regions and how will they affect the improvement of innovativeness and competitiveness of regions. This paper presents how smart specializations have been selected and implemented in the Śląskie Voivodship.

1 Literature Review

The Innovation Policy of the European Union (Derlukiewicz 2010), results directly from the European Strategy of Development—*Europe 2020*—based on smart development. The policy of smart specializations raise political, social and scientific disputes concerning the level of public support concentration, and impact on the level of regional product and unemployment rate (Łuszczuk 2014). Category of smart specialization (Foray 2009; Foray, David, and Hall 2009; Foray and Van Ark 2007; Kardas 2011), in particular, means that competitive edge is based on knowledge resources that allow for improvement, development and introduction of breakthrough solutions. Systemic support of innovations within the region concerns also the sector of companies which used the innovations to support business models (Brzóska 2013a, 2014; Brzóska and Szmaj 2013).

Process approach in implementing regional innovation strategy consists in identifying key innovative processes, which could be specified as networks of activities (Stachowicz and Olko 2015). Processes, meta-ventures or network of activities are phenomena which occur above the proposed projects and apply to repeatable activities of various players of the innovation system. According to process approach, region development strategy, in particular Regional Innovation Strategy, is a cumulative knowledge applied in reply to a question about vision (the target template of an organization) and method of vision implementation: processes and projects moving a region closer to achieving the vision, implemented by network players (people and institutions they function in). Processes, from such a point of view, are linearly sequenced statuses of implementation of mutually correlated ventures, which are resultants of so called action nets (Lindberg and Czarniawska 2006).

Works over development strategies have been a domain of regions for many years. Region development strategy is not only a useful planning and managing tool within a region, but it also results from the regulations. Functional strategies are an important complement of region development strategy, among which Regional Innovation Strategy (RIS) is of key importance and it is the basic document concerning formulation of territorial policy of innovation (Strahl 2010). Klasik (2001) says that regional strategy is implemented by projects, which bring regions closer to the category of a learning, smart and innovative region, thus the main pillars of region innovativeness.

Creating and implementing RIS is conditioned by the organizational networks existing in the region and awareness of processes existence, which are beyond complete or partial control of regional self-government. Development of innovations takes place in institutional and social networks related to each other of regional, national and global character (Carayannis and Campbell 2009; Lewandowska 2016; McCann and Ortega-Argiles 2015; Strahl 2010). For these reasons internal support of smart specializations in the region should be based on regional clusters representing sectors consistent with smart specializations (Knop et al. 2013). Clusters as an element of regional innovation ecosystems are supported by regional development institutions which in general can be called “competence centers” (Knop 2014).

Smart character of specializations result not only from assumptions of the European strategy of development but also from an older tendency used in public institutions and resources administration. One may notice concentration on smart mechanisms concerning creation and development of innovation—smart innovation patterns, which are of territorial nature (Camagni and Capello 2013; Capello and Lenzi 2013). Based on these recommendations, we may find that regional sources of knowledge, formed based on regional economic activities, are of key importance for the growth of products in the regions.

Thus it is necessary to consider smart specializations in the papers and operations in aid of regional development. From a historical point of view, smart specialization was proposed in 2007 by Foray and Van Ark (2007), and then developed by Expert Group “Knowledge for Growth.” The key motif of this concept is “entrepreneurial discovery,” according to which smart specialization is an “entrepreneurial discovery learning process to select R&D+I as well as non-technological activities in which a region can hope to excel, in other words: it’s a vision about opportunities in existing or emerging sectors” (Foray 2009). The term “smart specialization” is a concept and tool within the scope of innovation policy used to specify and create the current and future position of a region or country in the knowledge-based economy (Foray, David, and Hall 2009).

Benefits resulting from smart specializations should be noticeable first and foremost in the growth of companies’ innovativeness and improvement of public services. Effectiveness of innovation strategy development, thus success of the whole project, depends on the behavior of companies and their innovativeness. Innovativeness is the ability of a company to develop innovative projects, absorb innovations, apply and distribute them. It is a company attribute that allows for competing under conditions when its competitive edge is based on innovations (Hult, Hurley, and Knight 2004; Lynch, Walsh, and Harrington 2010).

2 Regional Innovation Strategy of the Śląskie Voivodship and its implementation plan

2.1 Methodology of designing RIS in Śląskie

The methodology of creation of RIS in Śląskie can be perceived as “design research” (Laurel 2003), because all of the methods have been subordinated to creation of the final product: Regional Innovation Strategy. Design is a holistic endeavor that involves the synthesis of numerous different concerns and methods (Faste and Faste 2012). The reason for opting for such a methodology considers the large number of internal and external stakeholders of the strategy and to a large extent the unpredictability of the environment. Considering the number of conditionalities (formal, political, social, technological and other) the design approach in the situation of regional strategy creation is probably the only one to ensure the integrity of the final document of the strategy. The authors of the article have the opportunity to participate in the development of RIS as members of a team of experts. The intent of the team of experts (representing various domains and sectors of knowledge), preparing the research model of the project and implementation of regional innovation strategy, was a prognostic approach to creating and supporting an innovative economy based on knowledge in relation to Śląskie Voivodship.

The role of the RIS is to activate a dialog and to regulate the activity of numerous actors in the region, which in the upcoming years will allow us to face the challenges of innovative development of the Śląskie Voivodship together. In the modern world the sense of closeness is blurring. Thanks to extensive logistic systems and the Internet as well as other means of telecommunication “within reach” may mean the same as “on the other side of the world.” Industrial district theories, business cluster theories and the like are proving ever less correct. A mode of thinking characterized by a global perception of resources and markets is becoming mainstream. In these circumstances, the innovative policy of the Śląskie Voivodship did not appear to be a result of perceiving the potential and activities encapsulated in the region’s administrative borders.

Preparing and implementing research and innovative strategies based on smart specializations consists in strengthening the regional innovation systems, maximizing benefits resulting from the growth of commercialization of knowledge within this area, and using intellectual and structural potential of the region (Brzóska 2013b). The foundation for designing the innovation strategy is the concept of balance of composing perspectives like in conception of the Balanced Scorecard (BSC) method developed by Kaplan and Norton (Kaplan and Norton 1996). The BSC was properly adopted but its classic conceptualization was modified. In the case of innovation strategy, the following four perspectives represented the grounds of the goals and initiatives structure: institutional, supply, demand and financial. In addition to the perspectives the general strategy concept is based

on, considerations stimulating development of innovations and technologies are its important elements as well (Brzóska and Szmal 2013). The adopted concept concerning the strategic balance allowed for developing a detailed methodology of research, based on which the research and design process concerning strategy development was executed. Since the beginning of works concerning RIS development for Śląskie Voivodship, proposals of scientific, business and administrative sectors have been taken into account. The approach of wide social consultancies was implemented which has proven its efficiency within the last edition of RIS 2003–2013.

2.2 Objectives of RIS in Śląskie and smart specializations

Analytical and design activities have been based on studies, expert opinions as well as panel and focus group discussions. During the design process workshops and consultations took place, gathering a wide range of actors of innovative processes. The team of experts also reached for a wide range of methods for defining smart specialization, as was used in other regions in Poland (Gulc 2015). Regional Innovation Strategy of the Śląskie Voivodship for the years 2013–2020, a result of this work, has been adopted by the Śląskie Voivodship Assembly. Main strategic decisions described in the RIS have been synthetically presented in table 1. Strengthening the regional innovation system and its conversion in the “ecosystem” direction is an ambition that integrated innovative communities of the Śląskie Voivodship, to which the following are subordinate: the agreed priorities of the region’s innovative development as well as common and individual activities of all participants of innovative processes in the Śląskie Voivodship.

Accepting the proposition to create an innovation ecosystem was an answer to the challenges of the modern regions. It was compliant with the recommendations of the European Commission in the scope of the so-called third generation innovations, included in the textbook published in December 2011 in relation to the “Smart Specialisation Platform” initiative. Introducing the notion of ecosystem into the regional innovation system is most of all related to the necessity of a more extensive approach to problems of the functions of actors in the innovative development of the economic, academic and civic society environment. Approaching them jointly allows underlining the diversity and value of the region and in this way the introduction of identity and regional specialization into thinking about the innovative development of the Śląskie Voivodship. Simultaneously, another factor is taken into consideration — namely, that in the logic of modern innovation management particular stress is put on the present globalization of resources. The importance of resource ownership and localization is being limited, while the importance of global scale resource accessibility is being raised. Therefore, the ability to participate in global value creation chains is a new competitiveness factor. Gaining this advantage becomes possible through developing proper relations among regional entities on a global scale. These challenges are reflected in the strategic decisions described in RIS and presented in table 1.

The process initiating determination of smart specializations in Śląskie Voivodship was started already within the period related to preparing RIS 2003–2013 even though no one talked about smart specializations back then, one assumed orientation of the support to specified types of activities. Within 2006–2008, foresight studies were developed within the region, so called Priority technologies for sustainable development of Śląskie Voivodship. Results of these studies were included in the works concerning selection of smart specializations and in the document RIS 2013–2020. Between 2009 and 2011, technological foresight was implemented concerning development of public services development within the Upper Silesian Metropolitan Area. This program provided thorough knowledge on development goals of services provided in the cities. The last element of determining smart specializations was the preparation of the RIS 2013–2020 document together with an implementation model.

The approach presented in RIS of the Śląskie Voivodship for the years 2013–2020 should not be confused with sector approach, since it opens a development perspective for small, medium and large companies, research and development institutions, support organizations as well as organized and individual users (prosumers) of innovations focused on specific topics, regardless of field. Key is the ability to join the value chains characteristic of particular thematic solutions, both on the regional and most importantly on the global scale.

Tab. 1. Vision and strategic objectives defined in RIS of Śląskie Voivodship

Strategic field	Priority 1. Increase and internal integration of the region's innovative potential	Priority 2. Creating smart markets for future technologies
Knowledge and innovation communes	Strategic objective 1.1. Supporting changes in innovative communities strongly cooperating with knowledge and information production centers on a global scale	Strategic objective 2.1. Co-creation of competence center network for the development of smart markets
Public service networks	Strategic objective 1.2. Reaching perfection in the field of medical services, realized in a partnership of clinical centers, high-tech, research and innovation units of businesses, including medical and biotechnological engineering	Strategic objective 2.2. Raising the quality of public service network, using digitalization, especially in the medical public administration and education sectors
Regional innovation ecosystem infrastructure	Strategic objective 1.3. Network co-creation and co-usage of research infrastructure by academic entities, universities, businesses and public utility institutions	Strategic objective 2.3. Construction of a new infrastructure of smart growth, based of low emission technologies and energy efficiency
SME in global economy chains	Strategic objective 1.4. Internationalization of SME sector via specialization of innovation support institutions' services	Strategic objective 2.4. High level of participation of SME sector businesses in regional and metaregional cooperation networks, increasing its participation in smart markets
Talents and competences	Strategic objective 1.5. Multiplication of knowledge, skills and competence of entities creating the innovation ecosystem	Strategic objective 2.5. Strengthening the activity of prosumer groups

Source: (Regional Innovation Strategy of the Śląskie... 2004; Regional Innovation Strategy of the Śląskie... 2012)

Tab. 2. Smart specializations of the Śląskie Voivodship on the background of other regions

Specialization	Number of regions in Poland opting for the specialization	Number of regions in EU opting for the specialization	Number of countries in EU opting for the specialization
Energy	8	149	20
Medicine	6	25	7
Information and communication technologies (ICT)	8	89	13

Source: Own elaboration using S3 platform, eye@RIS3 tool (<http://s3platform.jrc.ec.europa.eu/>), with 18 registered EU countries, 167 registered regions, including all 17 regions of Poland

Three smart specializations were selected in Śląskie Voivodship, which in general conceptualization are not unique specializations in Poland or the EU (tab. 2). Their specificity is determined at the level of application domains, company potential, scientific potential and market potential.

ICT as a smart specialization is of a horizontal nature—it is treated as an area covering Key Enabling Technologies that supports other thematic sectors, in particular smart specializations (energy and medicine). Medicine covers not only the sector of medical services, including specialist medical services, where Śląskie Voivodship has great potential but also the related sectors, such as: biomedical engineering, production of medical products, medical diagnostics and technologies supporting monitoring and medical prevention. Energy as a specialization includes not only sectors related to generation, transfer and distribution of energy, but also operations covering production and processing of materials for the energy sector (Brzóska 2013a; Ryszko 2015) and the other traditional sectors like the machine-building sector.

2.3 Implementation plan of RIS

The presented implementation model should execute the goals of RIS. It is based on the assumption of smart specializations development within the regions, positively affected by:

- operations performed within the scope of meta-measures;
- key processes developed within the region, that support meta-measures;
- actively operating players supported by various innovation transfer instruments;
- management and coordination systems, generating strategic business models applied within the region, which describe public governance; and
- monitoring system treated as learning process elements.

The RIS implementation model covers four areas of operations described on figure 1. The first area of operation (activity) is the definition of road maps of ventures, supported by information meetings and further works within the scope of animation of meta-measures implementation. The strategy distinguishes seven meta-measures: The Śląskie Academy (network cooperation of universities in Śląskie), Cooperation of cluster initiatives and innovative communities, Realization of pilot tasks under regional specializations, Labour market foresight, Regional pro-innovative fund, Design for innovation, and Cooperation with neighboring regions for innovation. The other key area is development of the most important processes responsible for dynamic growth of regional specializations. These processes will engage not only regional but also global resources, and their products and results will determine the effectiveness of the implemented strategy. The monitoring system of strategy implemented in the region will be developed based on them. The system is to evaluate RIS effectiveness and should have learning capabilities for the stakeholders implementing the strategy. The third area is related to identification of players and processes, and mobilization of players to implement the Regional Innovation Strategy for Śląskie Voivodship. These operations are supported by a technological and innovative audit performed within the scope of implementing the Technology Development Program that allows for evaluating technological and innovative potential. The fourth is related to developing management and coordination models within the region—i.e., determination of predominating business models within regional smart specializations, assumptions of public governance within RIS model and development of RIS monitoring as a learning system.

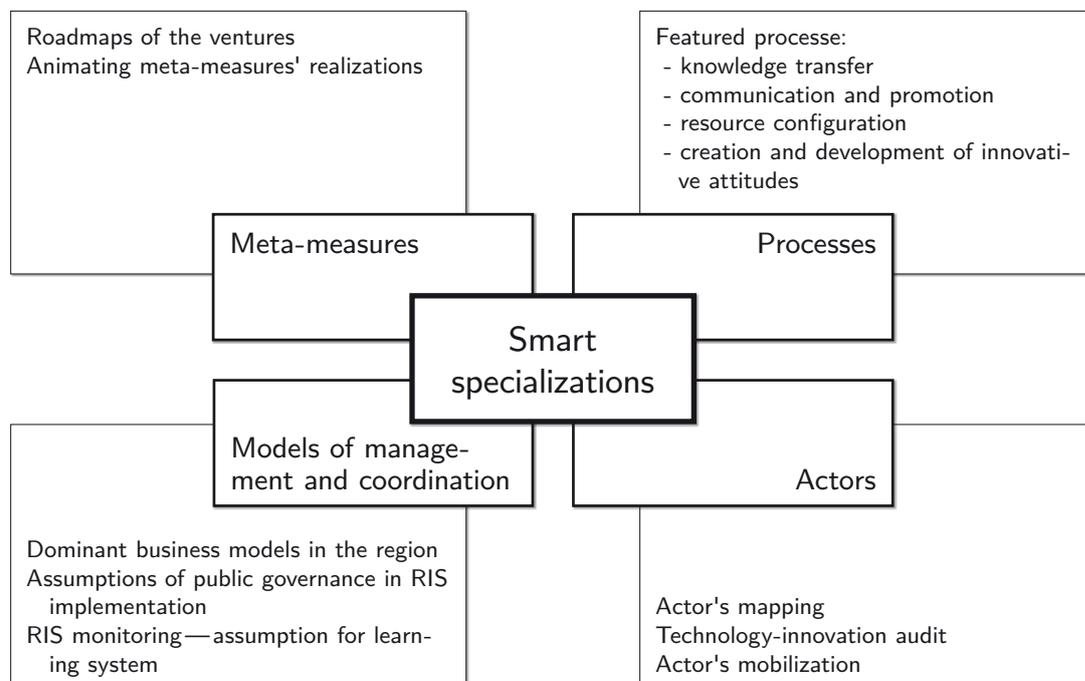


Fig. 1. Elements of RIS implementation plan in Śląskie Voivodship

Source: Based on document Model Wdrożeniowy Regionalnej Strategii Innowacji Województwa Śląskiego na lata 2013–2020 [Implementation Model of the Regional Innovation Strategy of the Śląskie Voivodship 2013–2020]. Zarząd Województwa Śląskiego, Katowice 2015, [a:] <http://ris.slaskie.pl/files/zalaczniki/2014/07/24/1406194806/1457359755.pdf>

The RIS implementation model presented synthetically includes elements of process management that strengthens effectiveness of RIS goal implementation and development of smart specializations within the region. Current implementation of RIS is a provision of project financing in conformity with RIS assumptions and monitoring implementation of the strategy. Assumptions related to both these operation implementations are given in the RIS and RIS implementation model. Financing innovative operations within a region is provided from various sources, which were mostly included in RIS. The most important division within this scope is financing from private and public resources. It is worth mentioning that voivodship self-government may only influence the flux of finances from the Regional Operational Programme and a small part of central resources, which are distributed through Regional Financing Institutions. The remaining sources of financing R&D&I operations come from central programmes which support different types of operations concerning regional scientific and business institutions as well as consortia of such institutions. The RIS implementation model considers also operations financed directly from the European resources such as Horizon 2020 and supra-national programmes. It is worth noticing that RIS does not exclude any kind of financing if it is in conformity with the spirit and strategic goals given in RIS. The intermediate impact of RIS consists in reference made in regional organizations strategies to RIS stipulations concerning visions, strategic goals and innovative processes. This is in particular about development strategies of subregions and, cities, as well as scientific and business institutions.

Monitoring RIS implementation consists in determining the method of monitoring as well as measures and indicators determining the level of strategy implementation. It is worth mentioning that a separate set of measures has been developed for each smart specialization, including aggregated measures of so called smart indexes. The essence of monitoring consists in verifying measures on two levels of strategy: vision implementation—creating a regional ecosystem of innovation and monitoring of priorities. The RIS implementation model presents data form indices monitoring, emphasizing their future value. Using the tools proposed in the implementation model of the Technologies Development Programme and the scope of Regional Specialist Observers operations as well as studies performed by the Marshall Office of Śląskie Voivodship, the following monitoring indexes positions were detailed: availability and sources of data, base values were determined (if calculated) and target values as well as methods of indices measurement.

Conclusions

Development of RIS requires inclusion of many aspects which should be considered in the final document, representing a synthesis of expectations of social players and internal beneficiaries. Like in the case of developing plans concerning innovative development of smaller organizations (companies, scientific institutions), preparation of RIS is related to the risk of unforeseen changes that condition directions of scientific research, implementation and development tasks as well as business operations of companies. Based on the performed research and analyses performed during development of RIS in Śląskie Voivodship, one can formulate the following detailed conclusions:

- In addition to strategic objectives defined in RIS smart specializations focuses all undertaken activities considered innovation activity. After three years of RIS implementation the importance of smart specialization in the case of public support of innovation is clearly observable.
- The applied project methodology allows for considering requirements related to functioning of smart markets and smart specializations in RIS for Śląskie Voivodship. Having developed the model of its implementation, it is currently implemented (implemented and monitored) in Śląskie Voivodship.
- Assumptions of smart specialization concepts are not free of risks. There is the risk of concentration of modern technologies development in the best developed regions, the fact of which may affect polarization of regions. High repeatability of smart specialization areas means competing and cooperation on the one hand and on the other limitation leading to some sort of “innovation monoculture”—supporting the region’s competitiveness on innovations only.

- The project approach proposed in the RIS implementation model for Śląskie Voivodship assumes distinguishing basic processes which encompass identified players of the innovation process, using the existing and newly developed resources (material and non-material).
- Implementation of RIS and its effects will depend on the degree of engagement of scientific sectors, regional and local authorities, business sector institutions and first and foremost: creative citizens of the region.

References

- BRZÓSKA, J. 2013a. Innovations as a Factor of Business Models Dynamics in Metallurgical Companies. Paper read at Metal 2013: 22nd International Conference on Metallurgy and Materials, 2013.05.15–17, at Brno, Czech Republic.
- . 2013b. “Regional Innovation Strategy—Driving Force of the Development and Restructuring of the Silesian Province.” In *Contemporary Economies in the Face of New Challenges. Economic, Social and Legal Aspects*, edited by R. Borowiecki, A. Jaki and T. Rojek, 563–570. Cracow: Foundation of the Cracow University of Economics.
- . 2014. “Inteligentne specjalizacje regionu jako szansa wzrostu innowacyjności przedsiębiorstwa.” In *Innowacyjność współczesnych organizacji. Koncepcje i modele. Cz. 1*, edited by H. Bieniok, 38–48. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego.
- BRZÓSKA, J., and A. SZMAL. 2013. “Rozwój specjalizacji regionu jako ważny czynnik wzrostu innowacyjności województwa śląskiego.” In *Nowoczesność przemysłu i usług w warunkach kryzysu i nowych wyzwań*, edited by J. Brzóska and J. Pyka, 657–666. Katowice: Towarzystwo Naukowe Organizacji i Kierownictwa.
- CAMAGNI, R., and R. CAPELLO. 2013. “Regional Innovation Patterns and the EU Regional Policy Reform. Toward Smart Innovation Policies.” *Growth and Change* 44 (2): 355–389. doi: 10.1111/Grow.12012.
- CAPELLO, R., and C. LENZI. 2013. “Territorial Patterns of Innovation and Economic Growth in European Regions.” *Growth and Change* 44 (2): 195–227. doi: 10.1111/grow.12009.
- CARAYANNIS, E.G., and D.F.J. CAMPBELL. 2009. “‘Mode 3’ and ‘Quadruple Helix’: Toward a 21st Century Fractal Innovation Ecosystem.” *International Journal of Technology Management* 46 (3–4): 201–234.
- DERLUKIEWICZ, N. 2010. “Innovation Policy and Innovation Initiatives Taken in European Union.” In *Spatial Economy. Contemporary Determinants, Trends and Tendencies*, edited by S. Korenik and M. Šašek. Warsaw: Committee for Spatial Economy and Regional Planning. Polish Academy of Sciences.
- FASTE, T., and H. FASTE. 2012. Demystifying “Design Research”: Design is not Research, Research is Design. Paper read at IDSA Education Symposium 2012, 2012.08.15, at Boston.
- FORAY, D. 2009. “ERA: Entrepreneurial Regional Action.” *Science & Technology* (2): 44–47.
- FORAY, D., P.A. DAVID, and B.H. HALL. 2009. “Smart Specialisation—the Concept.” *Knowledge Economists Policy Brief* (9).
- FORAY, D., and B. VAN ARK. 2007. “Smart Specialisation in a Truly Integrated Research Area is the Key to Attracting More R&D to Europe.” *Knowledge Economists Policy Brief* (1).
- GULC, A. 2015. “Analysis of Methodological Approach to Identify Smart Specialization on the Example of Polish Regions.” *20th International Scientific Conference—Economics and Management 2015 (Icem-2015)* 213: 817–823. doi: 10.1016/j.sbspro.2015.11.483.
- HULT, G.T.M., R.F. HURLEY, and G.A. KNIGHT. 2004. “Innovativeness: Its Antecedents and Impact on Business Performance.” *Industrial Marketing Management* 33 (5): 429–438. doi: 10.1016/j.indmarman.2003.08.015.
- KAPLAN, R.S., and D.P. NORTON. 1996. *The Balanced Scorecard. Translating Strategy into Action*. Boston, Mass.: Harvard Business School Press.
- KARDAS, M. 2011. “Inteligentna specjalizacja. (Nowa) koncepcja polityki innowacyjnej.” *Optimum. Studia Ekonomiczne* (2): 121–135.
- KLASIK, A. 2001. *Strategie regionalne. Formułowanie i wprowadzanie w życie, Prace Naukowe Akademii Ekonomicznej im K Adamickiego w Katowicach*. Katowice: Wydawnictwo AE.
- KNOP, L. 2014. “Competence Center for Clusters in the Regional Innovation Ecosystem: The Case of the Silesian Voivodeship in Poland.” In *Global Perspectives on Sustainable Development*, edited by I. Gorges, 79–95. Hamburg: Verlag Dr Kovac.

- KNOP, L., J. STACHOWICZ, M. KRANNICH, and S. OLKO. 2013. *Modele zarządzania klastrami. Wybrane przykłady, Monografia/Politechnika Śląska*. Gliwice: Wydawnictwo Politechniki Śląskiej.
- KRAWIEC, S., and A. BEREŚ. 2015. "Wpływ powiązań sieciowych na rozwój innowacyjności przedsiębiorstw w nowej perspektywie finansowej 2014–2020." *Barometr Regionalny. Analizy i Prognozy* 13 (4): 99–103.
- LAUREL, B. ed. 2003. *Design Research. Methods and Perspectives*. Cambridge, Mass.: MIT Press.
- LEWANDOWSKA, A. 2016. "An Integrated Approach to Innovation: the Way of the EU and Poland." *Barometr Regionalny. Analizy i Prognozy* 14 (1): 7–13.
- LINDBERG, K., and B. CZARNAWSKA. 2006. "Knotting the Action Net, or Organizing between Organizations." *Scandinavian Journal of Management* 22 (4): 292–306. doi: 10.1016/j.scaman.2006.09.001.
- LYNCH, P., M. WALSH, and D. HARRINGTON. 2010. Defining and Dimensionalizing Organizational Innovativeness. Paper read at 2010 ICHRIE Annual Summer Conference & Marketplace, 28–31.07.2010, at Caribe Hilton, San Juan, Puerto Rico, USA.
- ŁUSZCZYK, M. 2014. "Kontrowersje związane z wdrażaniem koncepcji inteligentnych specjalizacji w regionach." In *Projekty lokalne i regionalne. Najlepsze praktyki*, edited by H. Brandenburg and P. Sekuła, 24–35. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego.
- MCCANN, P., and R. ORTEGA-ARGILES. 2015. "Smart Specialization, Regional Growth and Applications to European Union Cohesion Policy." *Regional Studies* 49 (8): 1291–1302. doi: 10.1080/00343404.2013.799769.
- Regional Innovation Strategy of the Śląskie Voivodeship 2003–2013*. 2004. Katowice: Sejmik of the Śląskie Voivodeship.
- Regional Innovation Strategy of the Śląskie Voivodeship 2013–2020*. 2012. Katowice: The Śląskie Voivodeship Assembly.
- RYSZKO, A. 2015. Environmental Management Practices, Interorganizational Cooperation and Knowledge Sharing in the Steel and Metal Industry in Poland. Paper read at Metal 2015: 24th International Conference on Metallurgy and Materials, 2015.06.03–05, at Brno, Czech Republic.
- STACHOWICZ, J.K., and S. OLKO. 2015. "Procesy wdrażania regionalnej strategii innowacji jako reifikacja sieci działań — przykład województwa śląskiego." In *Gospodarka regionalna w teorii i praktyce*, edited by E. Sobczak, D. Głuszczyk and M. Obrebalski, 81–89. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
- STRAHL, D. ed. 2010. *Innowacyjność europejskiej przestrzeni regionalnej a dynamika rozwoju gospodarczego*. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego.