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## Exploring Regional Innovation Policies and Regional Industrial Transformation from a Co-Evolutionary Perspective: The Case of Małopolska, Poland

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Marta Gancarczyk<sup>1</sup>, Marta Najda-Janoszka<sup>2</sup>, Jacek Gancarczyk<sup>2</sup>, Robert Hassink<sup>3</sup> (\*)

1. Institute of Economics, Finance, and Management, Jagiellonian University in Krakow, Poland, [marta.gancarczyk@uj.edu.pl](mailto:marta.gancarczyk@uj.edu.pl)
2. Institute of Entrepreneurship, Jagiellonian University in Krakow, Poland, [marta.najda-janoszka@uj.edu.pl](mailto:marta.najda-janoszka@uj.edu.pl), [jacek.gancarczyk@uj.edu.pl](mailto:jacek.gancarczyk@uj.edu.pl)
3. Dept. of Geography, Kiel University, Kiel, Germany, [hassink@geographie.uni-kiel.de](mailto:hassink@geographie.uni-kiel.de)

\* corresponding author

## Abstract

The Małopolska region in southern Poland has a long tradition of mature and heavy industries, but more recently also new, unrelated industries have been emerging in this region, such as knowledge intensive business services. At the same time, innovation policies have been decentralizing over the last 20 years in Poland and in the Małopolska region, therefore, the effects of regional innovation policies on regional industrial transformation (RIT) have grown. Against this background, the paper aims to explain the role of regional innovation policies in regional industrial transformation from a co-evolutionary perspective. For this purpose, it extends the common co-evolutionary theoretical framework with interaction mechanisms, i.e. the processes underlying policy-industry mutual influences, and thus explaining their co-evolution. Interaction mechanisms allow us to better understand the major directions in industrial development and in policy approach, namely, the exploitation of extant capabilities and the exploration of new economic areas. The role of innovation policy in the Małopolska RIT can be described as predominantly assisting and adjusting to industrial change with some level of proactive promotion of new industrial opportunities. Overall, we observe reciprocal relationships with regional industry rather than unidirectional influence of this policy. We find this dynamic interaction a positive phenomenon that enabled the evolution of policy to balance the exploitative and explorative approaches to industrial development.

**Keywords:** regional innovation policies, regional industrial transformation, co-evolution, Małopolska, Poland

*This is a pre-print, long version of a paper that will be submitted for publication to a journal.*

## **1. Introduction**

The Małopolska region in southern Poland has a long tradition of mature and heavy industries, but more recently also new, unrelated industries have been emerging in this region, such as knowledge intensive business services. At the same time, innovation policies have been decentralizing over the last 20 years in Poland and in the Małopolska region, therefore, the effects of regional innovation policies on regional industrial transformation (RIT) have grown.

Against this background, the paper aims to explain the role of regional innovation policies in regional industrial transformation from a co-evolutionary perspective (Gong and Hassink, 2019; Martin and Sunley, 2015). Our empirical basis is the case study of the Małopolska region in Poland after the accession to the EU in 2004.

The theoretical foundations of our study are therefore formed by the co-evolutionary perspective (Gong and Hassink, 2019; Martin and Sunley, 2006; 2015), the concept of regional industrial transformation (Hassink, Isaksen, and Trippel, 2019; Asheim, 2019; Isaksen et al., 2019), and the concept of public policies as institutions (North, 1990, 2005; Vatn, 2007; Ostrom, 2005; Grillitsch, 2014).

The paper follows a co-evolutionary approach in researching innovation policy in relations with regional industry (Gong and Hassink, 2019). We develop an explorative and longitudinal case study of Małopolska, based on structured content analysis of secondary sources, such as policy documents and evaluation reports (more than 14 thousand normalized pages), the analysis of public statistics, as well as 45 interviews with representatives of industry, regional government and regional business support institutions, conducted in the years 2006-2020.

This research provides theoretical and policy-relevant contributions. First, it contributes theoretically by extending the co-evolutionary theoretical framework with interaction mechanisms, i.e. the processes underlying policy-industry mutual influences, and thus explaining their co-evolution. Interaction mechanisms allow us to better understand the major directions in industrial development and policy approach, namely, the exploitation of extant capabilities and the exploration of new economic areas. Ultimately, they have capacity to highlight regional industrial transformation (RIT). Second, we contribute to the literature on how innovation policies can contribute to regional industrial transformation, in general (Oinas, Trippel, and Höyssä, 2018; Hassink, Isaksen, and Trippel, 2019; Asheim, 2019), as well

as more specifically in the context of Eastern Europe and Poland (Gorzelać, 2020; Swianiewicz, 2010; Smętkowski and Wójcik, 2012; Stryjakiewicz, 2009; Pylak and Kogler, 2021). Third, our study adds to policy practice by addressing the challenges that might prevent the accomplishment of progressive and sustainable RIT. The case study shows how the regional government of Małopolska tackles typical shortages of Polish national regional policies, such as lack of focus or excessive focus in the objectives and target industries, as well as imbalance between extant capacities and the development of new prospective industries (Gorzelać et al., 2007; Wojnicka-Sycz, 2020). We identify how policies evolved and upgraded in this regard.

In the following, we will first present the conceptual framework in Section 2, whereas the methodological approach is described in Section 3. Section 4 will analyze the evolution of the Małopolska industry after the EU accession, and in Section 5, we will elaborate on the evolution of regional innovation policies in Małopolska from 2005 until 2020. Section 6 will focus on the interactions between innovation policies and industry, whereas Section 7 will then provide a discussion and conclusion.

## **2. Conceptual framework**

### **The co-evolutionary perspective on regional innovation policy**

The evolutionary perspective has a long and fruitful tradition in explaining regional industrial dynamics (Martin and Sunley, 2006, 2015; Frenken 2007; Frenken and Boschma, 2007; McKinnon et al., 2009). Its value consists in reflecting the complexity of industrial change, including a plethora of actors and factors interacting within geographical space and time. These complex interactions and causalities lead to regional dynamics and can be synthesized as the co-evolution concept (Ter Wal and Boschma, 2011). Recently, Gong and Hassink (2019) have specified this concept from theoretical and methodological angles, focusing on the co-evolution between industry and institutions, the latter understood both as rules, regulations, and organizations. In this vein, institutions are also represented by regional innovation policies, which encompass both rules (policy priorities, measures, and budgets) and agency (regional government, support organizations, and public decision-makers) (Grillitsch, 2014).

The evolutionary perspective is particularly relevant for the positive approach to regional innovation policy that explores how development processes relate with and are

stimulated by policy instruments (MacKinnon et al., 2009; Uyarra, 2010; Gong and Hassink, 2019; González-López, 2019). On the other hand, the knowledge of how regional development is accomplished forms a basis for the design and implementation of policies, i.e., for the normative approach to policy (Indergaard, 2019; Brown and Mawson, 2019; MacKinnon et al., 2009). The co-evolutionary perspective brings about new insights as to the impact of policies on regional industrial dynamics. Namely, this approach departs from the unidirectional impact of policies, in which particular priorities, measures and budgets affect industrial structure (Gong and Hassink, 2019). The ultimate impact of policies stems from the interactions with industry, i.e., mutual influences and feedback relationships in setting up and in the implementation of policy.

These interactions bring about the value of better understanding industry needs and policy priorities, as well as the improvement of policy implementation tools (Schrock and Wolf-Powers, 2019; Brown and Mawson, 2019). Nevertheless, information asymmetries, uneven power, and under- or overrepresentation of interests of particular entities may also raise barriers to progressive industrial change. Therefore, it is important to explore and evaluate the processes underlying mutual influences of policy and industry (Brown and Mawson, 2019). We conceptualize these processes as interaction mechanisms that lead to the change in one or both co-evolving populations with a consequence for the both populations (Gross, 2009; Murmann, 2003, 2013). Interaction mechanisms encompass actors, factors (critical events, decisions, actions, external shocks) and causal relationships they induce in policy and industry. We expect these mechanisms to be internally-driven relative to studied populations (such as entrepreneurial discovery leading to industrial changes and affecting policy) (Brown and Mawson, 2019), or externally-driven (such as EU or country-level policies that influence regional policies targeting industry) (Fothergill et al., 2019). Interaction mechanisms are underexplored in the literature on the co-evolution of industries and institutions (Gong and Hassink, 2019). Nevertheless, the explanation of these processes is necessary to trigger the upgrade of policies and regional progressive change.

### **The co-evolution of regional innovation policies and industry in the process of regional industrial transformation**

One of the major targets of regional policies, particularly innovation policies, is progressive regional industrial transformation. RIT represents changes in the industrial

structure of the region and related innovation system (Hassink, Isaksen, and Trippel, 2019; Isaksen et al., 2019; Asheim, 2019). These changes can be linked with industrial path trajectories, such as path extension, renewal, branching, creation, exhaustion (Isaksen et al., 2018; Grillitsch, Asheim, and Trippel, 2018; Isaksen et al., 2019). Although related to path trajectories, regional industrial transformation is a broader phenomenon than path developments that refer to the dynamics of individual industries (Hassink, Isaksen, and Trippel, 2019; Martin and Sunley, 2006). Namely, RIT comprises the overall industrial dynamics in a region as configurations of different path trajectories (Asheim, 2019). These configurations comprise the major development path (such as path creation) and other paths of extant regional industries (Hassink, Isaksen, and Trippel, 2019). The extant industries may undergo either progressive (e.g., path renewal) or regressive dynamics (path exhaustion), or they remain stable in response to the major development path (path extension). RIT is focused on the dynamics of an industrial structure, however, it acknowledges a wider context of these dynamics as reflected in the regional innovation system's structure, agency, and governance (Asheim, Isaksen, and Trippel, 2019).

The literature recognizes the referred types of path development, however, there is still a research gap in how these paths are accomplished and combined into regional industrial transformation (Oinas, Trippel, and Höyssä, 2018). One of the explanations might be the interaction and co-evolution of industry and innovation policies. In this process, policies can assume the role of contradicting (opposing industrial change), reinforcing (leading and strengthening industrial change), accommodating (adjusting to and following industrial change), complementing (supplementing and supporting industrial change) or substituting (proactively creating industrial change) (Zukauskaitė, 2017; Helmke and Levitsky, 2004; Hooton and Tyler, 2019; Fothergill et al., 2019). The same applies to industry, which may contradict with policy (industrial change develops against policy priorities) (Indergaard, 2019), reinforce policy (industrial change leads and strengthens policy priorities) (Wolfe, 2016), accommodate to policy (complies with or adjusts to policy priorities), or complement policy (supplement and support selected policy priorities) (Foray, 2014; Rodrik, 2014; McCann and Ortega-Argilés, 2016), and substitute for policy (industry replaces policy in setting up development directions and measures) (Indergaard, 2019). The referred roles can either support or impede the progressive change in both entities, being mutually reinforcing, contradicting, accommodating, complementing or substituting.

The ultimate expected outcome of the co-evolution between innovation policies and industry is regional industrial transformation. Nevertheless, whether RIT will be progressive,

oriented towards growth, depends also on the nature of changes in industry and policy. The concept of smart specialization promotes RIT through specialized, related diversification that builds upon region-specific capacities and region-specific entrepreneurial opportunities to enable sustainable growth (Foray, 2014, 2017; Rodrik, 2014; McCann and Ortega-Argilés, 2016). Considering an evolutionary and long-term perspective, progressive RIT requires both *exploitation* of the extant capabilities and entrepreneurial *exploration* of opportunities in new economic areas (entrepreneurial discovery and expansion), acknowledging the specificity of a particular regional context (see Figure 1) (Sirén et al., 2012; Danneels, 2012; Grillitsch, 2018; Foray, 2014; McCann & Ortega-Argilés, 2016; Grillitsch et al., 2019). However, both firm-level strategies and the entire industrial system weigh towards the exploitation of extant competence base, since exploring new economic domains involves risks rather than certainty. The overreliance on exploitation is one of the explanations of path-dependent rigid specialization and related lock-in (Martin & Sunley, 2006; Hassink, 2010). Therefore, both regional innovation policies and industry should advance towards a balance between exploitative and explorative activities (Foray, 2014, 2017; Rodrik, 2014; McCann & Ortega-Argilés, 2016).

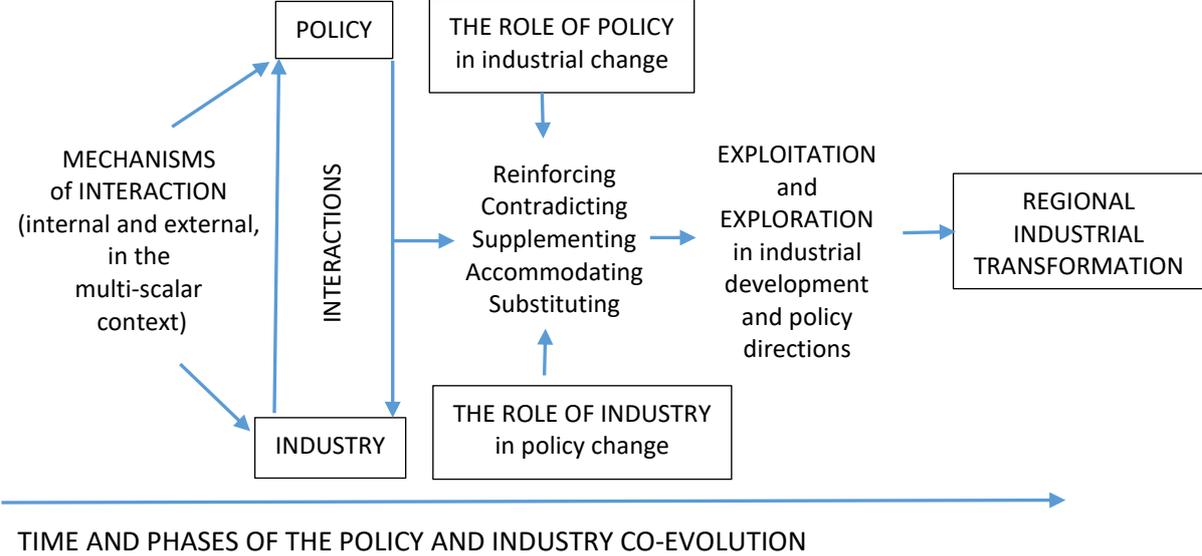
### **A research framework of the role of innovation policy in RIT from a co-evolutionary perspective**

The above theoretical considerations have been summarized in Figure 1 that presents a research framework for our empirical investigations.

The focus of this paper is on the role of regional innovation policy in RIT from the co-evolutionary perspective. In order to identify the policy role, we will not only study the impact of policies on industry, but we will also analyze how industry affects policy formulation and implementation. Consequently, this study will investigate policy and industry interacting and assuming such potential roles as reinforcing, contradicting, supplementing, accommodating or substituting their development priorities and implementation tools. Regional industrial transformation as a progressive change can be accomplished upon balancing these priorities and tools towards a concurrent exploitation and exploration in industrial evolution. The framework acknowledges internal and external mechanisms of interaction in the multi-scalar context. These mechanisms induce the change in policy and/or industry and launch interdependencies between these two objects, ultimately, leading to their co-evolution. Moreover, this framework is naturally embedded in time perspective and seeks

to identify distinct phases of the policy-industry co-evolution, marking the pathways to regional industrial transformation.

Figure 1. A research framework



Source: own elaboration.

**3. Methodological approach**

**Method and case study selection**

Considering the conceptual background reflected in Figure 1 and the objective of this research, the case study method was selected to identify the role of innovation policies in regional industrial transformation. The evolution of policies and industries, as well as regional industrial transformation, represent phenomena that are long-term, region-specific and influenced by a multitude of antecedents (Martin and Sunley, 2015; Gong and Hassink, 2019; Oinas, Trippl, and Höyssä, 2018). Such characteristics suggest the use of the case method that can provide foundations for analytical generalization and theory building (Yin, 2018; Hoon, 2013). Moreover, the case method is suitable, since it facilitates deepened, qualitative analyses of complex relationships among factors, including their changes in time, and comprehensive multi-scalar contexts (Yin, 2018).

The current case study is explorative and aims to highlight fundamental understanding of a complex phenomenon rather than its general patterns, therefore a single case is more appropriate than a multiple-case to generate a well-founded theory (Eisenhardt and Graebner,

2007). The case study of the Małopolska region in Southern Poland after the accession to the EU in 2004 was selected based on theoretical sampling, with the following sampling criteria. First, the region underwent regional industrial transformation throughout this period (Małopolska Regional Government Office, 2012, 2018). Second, within the referred time, Małopolska government had both launched and developed regional innovation policies, therefore, we can investigate a long-term experience in setting up the foundations, refining and upgrading the policy (Gancarczyk, Najda-Janoszka, and Gancarczyk, 2020). Third, this region is relevant to track interdependencies among industry, business organizations, as well as local governments in the development processes. Industry and business organizations are at the country's forefront in the absorption of policy support measures (STOS, 2017). Moreover, the local governments of Małopolska are active in advocating and promoting development needs of their territories within the regional government policy, and they often liaise with local business communities in this regard (Małopolska Regional Development Observatory, 2015). Fourth, the evolution of regional innovation policies in Małopolska reflects and addresses the major challenges and shortcomings of regional innovation policies in Polish regions, both in designing and implementing the support for progressive RIT and smart specializations (Fundacja GAP, 2014).

### **Research procedure and sources of data**

The research procedure follows the co-evolutionary approach by investigating innovation policy in relations with regional industry (Gong and Hassink, 2019). Three steps will be implemented, namely: i) the identification of populations studied and their evolution paths in the multi-scalar and historical context; ii) the identification of mutual interactions and influences between the innovation policies and industry within the referred period; iii) the identification of the interaction mechanisms that constrain and enable the co-evolution of policies and industries towards RIT.

The co-evolving populations we study are Małopolska regional innovation policies and Małopolska industry after Poland's accession to the EU in 2004, and within the regional, national and the EU contexts. The two populations and their interactions suggest agency as a research focus, namely organizations of regional and local governments, businesses and business organizations, supporting organizations, as well as individual decision-makers and entrepreneurs (Murmans, 2013). Decisions and actions of these entities can be inferred from the artifacts, such as policy documents, evaluation reports, research reports, and public statistics over the referred period (Wright et al., 2018). To ensure research validity we use

data triangulation, and complement artifacts of policy and policy-related documents with the interviews with the agents representing policy and industry. Considering the longitudinal perspective, it is difficult to avoid subjectivity and retrospection bias in the accounts of past events. Therefore, we combine the most recent interviews and the interview material performed within earlier studies referred to in Table 1 (Wright et al., 2018). These sources of data comprise the authors' own research or research with their involvement as experts.

Consequently, to develop the case study as the major method, we applied the analysis of secondary sources, such as policy documents, evaluation reports, and public statistics, as well as 45 interviews with policy and industry representatives conducted in the years 2006-2020. The sources of data and utilized evidence are presented in Table 1.

Table 1. The sources of data and evidence used in the research

TYPE OF DATA SOURCE	DESCRIPTION	RESEARCH EVIDENCE	
		Number of documents	Number of pages
<b>Policy and policy-related documents</b>	<b>Regional strategies and plans, measures and budgets, evaluation reports and other relevant research in the multi-scalar context of the country, the EU, and local economies of Małopolska</b>		
Plans (regional, national, and EU levels)	Regional innovation strategies of Małopolska	8	4094
	Regional development strategies of Małopolska	4	645
	Other region-level documents	5	723
	National Development Plans	17	2208
	The EU Framework Programs	3	156
Measures & Budgets (regional, national, and EU levels)	Regional action plans	3	366
	Regional Operational Programs	5	1152
	National action plans	2	269
	Sectoral Operational Programs	8	1528
	EU action plans and policy tools	5	348
Evaluation reports (regional, national, and EU levels)	Evaluations of Regional Innovation Strategy	11	1179
	Evaluations of Regional Operational Programs	9	889
	Evaluations of Sectoral Operational Programs	5	656
	Other national level evaluations	2	273
	EU level Smart Specialization evaluations	2	66
	Eurostat RIS reports	7	398
Other reports, including local-level research related to regional policy in Małopolska	Research reports and evaluations in particular areas of the region's economy and administration (labor market, information and consulting, R+D, knowledge-intensive business services)	16	1300
	Foresights	4	367
Total number		116	14 017
<b>Interviews</b>	<b>Interviews among the agents from the policy-related and industry populations</b>	<b>Interview dates</b>	<b>Number of interviews; evidence</b>
Interviews with industry agents	Interviews with 4 companies-beneficiaries of the investment support; semi-structured, Skype-enhanced interviews with a focus group	2020 <sup>1</sup>	1 (a transcript of the focus group interview)
		2014-2015 <sup>2</sup>	

	Interviews with high-growth entrepreneurs in Małopolska; (two-round direct, structured and semi-structured interviews (2 start-ups and 4 mature enterprises))	2013-2014 <sup>3</sup>	6 (audio-recorded, transcribed narratives)
	Interviews at one enterprise – a policy beneficiary (semi-structured and direct interviews - 2 interviews with the owner-manager, 7 interviews with the company’s top and middle management)	2014 <sup>2</sup> , 2007 <sup>4</sup>	9 (audio-recorded, coded information)
	Interviews with representatives of business organizations (semi-structured, direct interviews)		4 (interviewer’s notes)
Interviews with policy-related agents	Interviews with representatives of regional government institutions (direct, semi-structured interviews)	2018 <sup>5</sup> 2006-2007 <sup>4</sup>	4 (1 audio-recorded and transcribed, 3 interviewer’s notes)
	Interviews with representatives of non-profit business support organizations involved in the public provision of business services (direct, semi-structured, as well as e-mail and skype-enhanced interviews)	2020 <sup>1</sup> 2014-2015 <sup>2</sup> 2007 <sup>4</sup>	21 (1 transcribed, 2 interviewer’s notes, 18 coded information)
Total number			45

Besides the above data sources, we also analyzed Polish and EU public statistics, as well as other published studies on Małopolska’s development over the case study period.

#### **4. The evolution of the Małopolska industry after the EU accession**

##### *4.1. The industrial profile of Małopolska before the studied period*

Małopolska is an historical region of Poland, with cultural and geographical frontiers rooted in the origins of the Polish state. Located in southern Poland, Małopolska had been traditionally below-average-income area of Poland, with low industrialization and massive labor migration before the II World War, predominantly to the USA and Germany.

During the communist times (since 1975) and until the 1998 administrative reform, it was divided to three smaller regions that developed separate administrative, social and economic structures. These included the Krakow region with the city capital of Krakow (old capital of Poland as well), and two other units centered around medium-size towns. In those times there emerged the major industrial profile of heavy industries, such as mining, metallurgy, railway equipment maintenance, as well as heavy chemicals and food processing. At the same time, higher education and cultural institutions of Krakow held the leading position in Poland, and relatively actively cooperated with Western countries. The strength of academic community, large student population, and well-qualified human resources represented well recognized, although underexploited development potential.

*1990-1997 - early economic transformation and entrepreneurial boom*

The migration abroad, largely prevented under the communist regime, accelerated just after the launch of political and economic transformation in the end of 80. XX. It resulted in the transfers of earnings to the parent country, and in business knowledge and relationships for those who returned to Poland. The latter mechanism that could currently be labeled “brain circulation” and well-educated, entrepreneurial human resources matched with the launch of market economy institutions, formed the foundations for the private enterprise boom in the breakthrough of 80. and 90. XX. The “explosion of entrepreneurship” resulted in a population of small and medium-sized enterprises, some of which entered rapid growth and became the “captains” of private industry and international hidden champions in the area of meat processing, manufacturing of industrial gates, wooden roof windows, as well as cables and wires. A unique high technology success story in the Małopolska periphery was Optimus. Launched in 1988 as a personal computer manufacturer, it became the largest personal computer manufacturer in Poland and in Central Europe in 90. XX. In 1996, it turned to Onet Group, one of the first Polish internet portals (Pawłowski, 2003).

Concurrently to the entrepreneurial boom, the large state owned enterprises were restructured and privatized, which often led to job losses and high unemployment rate in the first half of the 90. XX. The restructuring processes invited brown and green field investors, predominantly in low technology and/or low value adding activities., such as bottling and distribution of soft drinks (Coca-Cola), tobacco (Philip Morris), and assembling car radiators (Valeo) (OME, 2012).

Ultimately, in this early transformation period the industrial structure comprised dominating mature industries in the restructuring process, newly developed and rapidly expanding private enterprises, few foreign subsidiaries and the population of SMEs. Although dominating as a population, small businesses were a dispersed group with limited representation and minor position to ensure their interests relative to large industrial players.

*1998-2003 - the pre-accession period (exploitation and initial exploration; path extension and nascent path creation)*

In 1998, the nationwide administrative reform combined the earlier 49 regions into 16 units (NUTS-2). This marked the return to Małopolska historical borders with the capital of Krakow and 22 counties centered around medium and small towns. The region was formed as the twelfth among Polish regions by area, however, it held the fourth position by population

(the population of 3 237,2 thous.; 8% of Poland's population), and the fourth or fifth position by the share in the country's GDP (MRGO, 2005). Krakow as capital city and metropolitan area has become the chief administrative and business center, attracting the major foreign investment and human capital both from other locations in Małopolska, and from around Poland. Additionally, inward migrations ensured positive population dynamics and the population age below the national average.

Małopolska was reestablished as one of the most polarized Polish regions in terms of economic development and one of the most diversified in terms of industrial profile. Due to low level of urbanization, 50% of population lived in rural areas with the smallest farm agriculture in Poland. The associated GDP *per capita* and wages ranked below the national average (WYG, 2006; MRGO, 2005).

Mature industries with low efficiency and low competitive capability dominated in the regional economy, accompanied by the growing computer manufacturing. According to the share in sales value, the leading industries were manufacture of food and beverages (19,8%), electrical machinery and apparatus (15,6%), and chemicals (10,6%). Some of the regional manufacturing industries held the major shares in these industries' national production, such as 87% for manufacturing of computer and microcomputer systems, 84% for textiles, 75% for wires and cables, 27% for manufacture of computers, and 18% for polymers (MRGO, 2004). All these major industrial shares were due to the operations of large, vertically integrated enterprises, both high growth companies established after the launch of the systemic transformation, and former state-owned enterprises, either in the restructuring process or acquired by foreign investors. SMEs did not significantly contribute to any of these specializations.

The representation of foreign investors continued to be modest and predominantly in low-technology and lower value-adding activities. Nevertheless, the important shift in this regard was marked by the R&D centers of Motorola, ABB, Sabre, Capgemini, and Delphi, using the opportunity of highly qualified engineers from the Krakow Technical University and AGH University of Science and Technology. Comarch, Polish ICT company, ABB and Motorola established their operations in the Krakow Technology Park, initiating and attracting high-tech businesses (OME, 2012).

The entrepreneurial and innovation activity in Małopolska ranked high among other regions in the Polish transition economy. Nevertheless, the region was underperforming in these areas relative to the EU and other developed market economies. In the area of

entrepreneurship measured as the number of SMEs per 1000 population, Małopolska held the fourth position among Polish regions. However, the entrepreneurial activity concentrated around the metropolitan area, while the periphery performed low (MRGO, 2004). The development stage of the SME sector can be illustrated by its only 40% share in regional jobs, the figure much below that in developed market economies. Although the region's unemployment indicator was either the lowest or second lowest in the country, it still reached 13,4% in 2002 and 15,6% in 2003. According to the investment in innovation by medium-sized manufacturing enterprises, Małopolska ranked third in Poland. However, the research among SME entrepreneurs revealed weak connections between business and academia. Małopolska's R&D employment and the number of research institutions was just behind that of the country's most developed capital region of Mazowieckie (Statistics Poland, Local Data Bank, 2020). However, Poland's R&D spending in 2002 was only 0,59% of GDP, with predominance of government expenses and basic research relative to business expenses and applied research.

The regional industrial development was dominated by the exploitation of extant competence base in mature industries with innovations leading to incremental improvements and to the overall path extension. Nevertheless, explorative efforts of few local high technology enterprises and foreign subsidiaries initiated new path creation.

As regards the enterprise structure and representation of industrial interests, the pre-accession period laid foundations for the strong position of large employers, both those being restructured and privatized, new growth firms going international, and foreign investment subsidiaries. SME population and entrepreneurial start-ups were developing, but still weak in economic contribution, and in their representation in regional government structures. Moreover, the influence of industry representation on innovation policy was not specified in these structures. More interaction could be observed between entrepreneurs' associations and local governments to address such issues as investment areas, local taxes and infrastructure. In 2003, this cooperation was formalized as the Joint Commission of Local and Business Governments in the Małopolska Regional Government Office. Repetitive and often informal relationships with the group of entrepreneurs active in business associations and business support organizations were established, enhancing the interests of incumbent firms in regional development activities.

*4.2. 2004-2011 – after the EU accession and throughout the economic crisis – exploration and exploitation (new path creation and path extension)*

The important external factors of change in this phase of industrial evolution were Poland's accession to the EU and the economic crisis 2007-2009. The EU accession opened the European markets enabling local firm expansion, ensured the infusion of the Structural Funds, and accelerated inward investment from foreign companies. Poland proved less vulnerable to the crisis due to the sound financial system and investment support from the Structural Funds. Nevertheless, some of the heavy and mature manufacturing industries were more exposed to the decline in demand and related cost pressures during the crisis. Metallurgy, mining, metal, tobacco, textiles, food, and computer manufacturing recorded job reductions and reduced employment dynamics. Still, the general base of heavy and mature industries remained dominant in the region's employment (Eurostat, Regions, 2020).

The macroeconomic slow-down negatively affected Małopolska entrepreneurial dynamics. This particularly concerned innovation-based new ventures and growth-oriented start-ups that might offer higher-value adding and knowledge-based workplaces (Fundacja GAP, 2014). At the same time, both the UE accession, cost pressures from the crisis, and qualified human resources attracted to the Krakow city the efficiency-seeking inward FDI in business services that substituted for local entrepreneurship in creating job opportunities. Combined with the decline in some of mature and heavy industries, all the referred factors stimulated industrial structural changes.

The highest employment dynamics was observed in business services, including those knowledge-intensive. In 2009-2011, growth reached 77% in office and other business support activities, 37% in information and communication, 37% in scientific research and development, 36% in professional, scientific and technical activities, 29% in employment activities, and 20% in activities of head offices (Fundeko, 2012). These activities also classified as the Business Service Sector (BSS), comprising Business Process Outsourcing, Shared Services Centres (SSCs), IT, and R&D centres, were predominantly occupied by foreign direct investors (ABSL, 2018; OME, 2012). FDI integrated a number of the Krakow city advantages and synergies, such as human potential and young talent pool, relatively low costs of wages, and a number of research institutes and universities. Besides the expansion of incumbent foreign investors, new knowledge-intensive FDI entered the regional market, such as Akamai, Cisco, Shell, Lufthanza. Moreover, extant foreign subsidiaries, e.g. Motorola and Valeo, were branching out and expanding from manufacturing or engineering towards SSCs performed for parent companies.

The relationships of foreign subsidiaries with local business environment were limited. Eager to absorb the local talent pool, the FDI branches were proactive in recruitment activities and input to educational programs at universities. However, their business links focused on parent companies rather than on local industry. Externalities stemmed from employee learning and mobility, as well as from co-location of large foreign investors and SMEs in the Krakow Technology Park. Nevertheless, interrelations among FDI and innovation and entrepreneurial ecosystems were side-effects, and not purposeful actions or proofs of local embeddedness.

The policy measures available to businesses in 2004-2011 largely strengthened extant industrial base and exploitative development path. Małopolska enterprises could benefit from cohesion-oriented regional and national programs for basic infrastructure development rather than from innovation policy. The absorption of infrastructure investment grants proved one of the highest in Poland, however, it favored incumbent, stable and medium or small businesses over micro firms, would-be entrepreneurs and new ventures (WYG, 2007). Moreover, the available funding for start-ups targeted job creation to reduce unemployment rather than innovative and growth-oriented ventures.

Recognizing the benefits from investment grants, the entrepreneurs were much less aware of the need for investment in innovation that was emphasized in the first Regional Innovation Strategy (RIS) 2005-2013 (WYG, 2006). Moreover, the bottom-up initiatives of the Joint Committee of Business and Local Governments featured a more comprehensive business engagement than their representation in the innovation policy consulting bodies. The first Innovation Council established in 2006 comprised higher education and research institutions with limited engagement of business, predominantly large firms in mature industries (MRGO, 2006). Faced with economic growth increasingly centered around the Krakow city, entrepreneurs and local governments advocated the support for peripheral firms and the improvement of physical infrastructures for the sake of regional cohesion (Gancarczyk & Gancarczyk, 2008).

The EU support for tangible infrastructure and R&D potential combined with necessity-based entrepreneurship of the crisis period, resulted in the improvement of the regional innovation potential (input characteristics), but limited impact on entrepreneurial and innovative performance (output characteristics). Over the period 2004-2011 Małopolska was moderate innovator among European regions, making 54%-57% of the EU average score in this area (RIInnovScor, 2009, 2012). At the same time it was one of three top innovative Polish regions (RIInnovScor, 2009, 2012). The progress has been made in gross domestic expenditure

on R&D (GERD) from 0,92% (2004) to 1,0% (2011). The regional GERD exceeded that of Polish average, but it represented only 17% of the EU R&D per inhabitant in euro purchasing power standards (PPS) (Eurostat, Regions, 2020). Business sector expenditure on R&D (BERD) remained stable over the period, 0,23% (2004) to 0,25% (2011), scoring higher than for Poland but still much below the EU average (1,11% and 1,24% in the referred years) (Eurostat, Regions, 2020). In the Polish context, Małopolska excelled in the share of R+D personnel and researchers in total employment, number of R&D units (from 88 in 2004 to 208 in 2011) and people with tertiary education, still underperforming when compared to the EU mean. Growing business collaboration was reflected in 20 cluster initiatives specialized in life science and biotechnology, culture and leisure, tourism, and construction, among others. Two of the cluster initiatives qualified to the group of the country's leading clusters (life science and construction clusters). Moreover, three new technology parks and 101 research laboratories were established or modernized. Despite these initiatives, business-academia links remained weak (MRGO, 2008; Fundeko, 2012).

There was a recognized gap between the advancement in the R&D and innovation potential and the performance in this regard. The share of innovative enterprises dropped down to 21,25% (2011) relative to 39,05% (2004), evidencing weak commercialization of investment in R&D. Decreasing to stable share of net revenues from sales of new to market products in total sales and in export sales matched decreasing or stable product, process and non-technological innovations (Statistics Poland, Local Data Bank, 2020). Patent and trade mark applications exceeded the Polish average, still underperforming compared to other EU countries. Only design applications were stronger than the EU average, largely due to the activities of foreign R&D subsidiaries. Innovative activity was concentrated in the narrow group of large enterprises and these innovations were incremental adjustments rather than new or improved products.

Overall, the referred period featured exploitation and path extension reflected in the continuing importance of extant industrial base and incumbent businesses. The explorative new path of business services was largely initiated from the outside – by FDI's. This new path excessively concentrated around the capital metropolis, deepening the region's economic polarization. Insufficient regional growth towards higher value adding activities resulted in GDP per capita and related wages still much below the national and EU average. In 2004, the Małopolska GDP per capita in PPS represented 44% of the EU average relative to 50% for Poland, while in 2011, it increased to 58% (65% for Poland) (Eurostat, Regions, 2020).

Although the dynamics of high growth and innovative local enterprises was stable or declining over 2004-2011, the period laid foundations for high technology services and creative industries including ICT, particularly, video games. In 2011, one of the first high tech enterprises, Optimus, switched to computer games as the major activity with the background in the international success of its games. The company transformed to CD Projekt, the largest producer and distributor of computer games in Poland. The Optimus development path in a nutshell reflects the dynamics of ICT industries in Małopolska, advancing from high-tech manufacturing to internet technologies, to computer games. Other dynamic industries included biotech, automotive, tourism and leisure (Małopolska Government Office, 2018). The important role in the biotech R&D was played by the Life Science Cluster, while Krakow Technology Park specialized in high tech business development, in ICT and biotech industries, among others. Academic Enterprise Incubators at Krakow universities launched a start-up community in knowledge-intensive businesses, and venture capital funds invested in 121 innovative ventures.

*2012 onwards – smartly integrating exploration and exploitation (new path growth and path extension) and the call for new transformation*

Starting from 2012, the growth of Małopolska industry has accelerated. The external stimulants were favorable macroeconomic conditions in the EU economy and in Poland. The investment attractiveness of Krakow has been increasingly recognized by transnational enterprises. As in the earlier period, the framework conditions and the input into R&D and innovation potential continued to advance. More importantly, this potential started to raise the expected innovative and entrepreneurial performance. Although Małopolska's position as moderate innovator in the Regional Innovation Scoreboard remained persistent, it featured relative progress within the group of moderate innovators from 57% to 70% of the EU mean score (RInnovScor, 2009, 2012, 2016, 2017, 2019).

GERD indicator increased from 1,31% in 2012 to 1,85% in 2017, exceeding that of Poland (1,03% in 2017), still making only 60% of the Community mean per capita in PPS. Business R&D investment (BERD) progressed from 0,49% in 2012 to 1,66% in 2016, for the first time exceeding that indicator both for Poland and the UE, although dropping down to 1,17% in 2017. The collaboration between businesses and academia was still insufficient, however, Małopolska enterprises were the most active in business to business R&D collaboration relative to other regions (Statistics Poland, Local Data Bank, 2020).

The overall growing number of research units and R&D personnel was due to the engagement of private businesses rather than government. Particularly, the foreign investors were outcome-oriented and recorded the best output performance in the area of innovation among Polish regions (Statistics Poland, Local Data Bank, 2020). As per intellectual property rights, only design applications performed above the UE average, while patent and trade mark applications scored much below that average (Eurostat, Regions, 2020). Design applications can be treated as part of R&D process, nevertheless, they are not considered as technological innovations. This type of intellectual properties might suggest the involvement in non-core R&D development processes by the foreign research and development units in Małopolska. The enterprise investment in innovation was top in Poland, which translated into the growth of innovative output, also in the area of new-to-market products and economic outcomes from these innovations (Statistics Poland, Local Data Bank, 2020). In this regard, the UE Structural Funds represented important incentives and sources of investment. In the referred period, the funds' distribution was still complex and coming from different levels of government and variety of policies. However, the infusion of funding was more bound with the innovation activity and directed at new ambitious ventures. The new orientation raised the vibrant community of innovative start-ups located in Krakow and taking advantage of the technology park and business incubators.

Entrepreneurial activity reached and even exceeded the Polish average in the referred period. Particularly positive was quality of entrepreneurship evidenced as the second or third by the number of high-growth enterprises among Polish regions. The more the start ups' community has been recognized as growing population, the more visible were their unique needs and expectations relative to incumbent enterprises. The established, stable and profitable businesses continued to be the major beneficiaries of public measures. Those with long history of public grants treated public intervention as business investment based on efficiency contracts and with no need to be justified by market failures. High technology startups emphasized their growth potential, gaps in the market provision of capital, and uncertainty that requires risk-sharing arrangements (Gancarczyk, 2017).

Industry representation in the regional government bodies responsible for innovation policy has increased in Innovation Councils of 2015 and 2020 (MRGO, 2015a, 2020). Nevertheless, it still favors established and at least medium-sized businesses, while small and micro businesses, as well as new ventures remain underrepresented. As a result, the growing population of startups uses the opportunity to network and benefit from mentoring and capital support of selected public measures, however, with the increased participation of private

investors. Extant firms, predominantly large businesses, have expressed their interest in determining smart specializations and submitted a number of proposals in this regard. Working together in the MRGO committee, local governments and business associations advocated local (vs regional) smart specializations to attract public funds and to support regional cohesion against the uneven growth centralized around the Kraków capital city.

In 2019, the human resources were almost fully engaged, with unemployment rate below 3%, despite the inflow of predominantly Ukrainian work migrants. The specialization in business services affected career ambitions of young people and specializations in educational system (TNC subsidiaries conducted recruitment activities and development projects at universities), and ultimately, the overall industrial profile of the region. The highest progressive dynamics of employment and share in employment 2012-2017 was reported in services, such as legal and accounting services; information and communication; office administrative, office support, and other business support activities; activities of head offices; management and consulting activities (MRGO, 2018; Eurostat, Regions, 2020).

In 2019, the business service sector generated 70,000 jobs in Krakow, the largest employment among Polish cities in this activity (23% of the city employment). Krakow has become recognized as the largest BSS concentration in Central Europe and the sixth largest in the world (ABSL, 2020; OECD, 2019). What distinguishes Krakow from other cities is not the number of BSS subsidiaries, which is lower than in Warsaw, but the number of employed in these entities. This is due to large-scale operations by some TNCs that established their major SSC here, offering a large pool of standardised and low-paid jobs for students and interns.

Except for the medium-low manufacture of electrical equipment, the manufacturing industries recorded the highest employment dynamics predominantly in medium-low, and low-technology industries. The latter included manufacture of paper and paper products; manufacture of moto vehicles, trailers, and semi-trailers; printing and reproduction of recorded media; manufacture of furniture; manufacture of rubber and plastic products; manufacture of metal products except machinery and equipment; manufacture of food products (MRGO, 2018; Eurostat, Regions, 2020). The regional specialization (LQ quotient by employment among Polish regions) was evidenced in manufacture of leather and related products; manufacture of basic metals; accommodation; legal and accounting activities; travel

agencies; information service activities; printing and reproduction of recorded media; scientific research and development; and information and communication.

Another dimension of new industrial trajectories can be revealed through industrial cluster dynamics that focuses on collaboration and integration processes. Although the emerging industries are often related with regional clusters, they largely demonstrate cross-regional and cross-national linkages, becoming international and global, just as technologies they apply. Particularly in high-technology areas, such as pharmaceuticals, biotechnology, and ICT, the Małopolska clusters cooperated on a cross-regional and international scale (EOCIC, 2019)). This might have been one of the stimulants for the Małopolska industry being in the forefront of the EU regions that reveal the highest dynamics in the emerging industries. In the UE countries, ten new industries have been identified as results of convergence among related industries based on dense inter-industrial linkages over 2011-2016 co-patenting, alliances, agreements, acquisitions (EOCIC, 2019). Małopolska has been acknowledged in six new industries, namely, biopharmaceuticals (converged pharma and biotech industries), blue growth industries (traditional and technology-based maritime industries), digital industries (applications of information technologies in products and business models), environmental industries (goods and services directed at environment protection), experience industries (tourism, arts, culture, and leisure), logistical services (transport and logistics), and medical devices industries (medical instruments, materials and software). These prospective development trajectories and industrial interdependencies were only partly reflected in the region's smart specializations. However, they were targets of Structural Funds at national level and that focus proved effective in regional industrial transformations.

Both the industrial dynamics and structure 2012 onwards revealed the combination of exploitation in extant mature industries, and exploration of new knowledge-intensive activities. This makes the regional industrial transformation integrating path extension and new path growth. As evidenced in the growth of emerging industries, the resulting RIT is an outcome of industrial processes in the multi-scalar contexts of the region, country, EU and local communities. Moreover, the internal industrial transformative processes are not limited to the region, but the transformation nodes have been located in the country and international, industry-specific collaboration.

In 2012-2018, the regional growth by GDP per capita, progressed from 59% to 65% of the UE average, being still lower than the country level (from 67% to 70% of the EU average). Positive prospects create real GVA dynamics – the third highest among Polish

regions over 2012-2017 (even the highest in some selected years, such as 6% increase between 2016 and 2017) (Eurostat, Regions, 2020). Despite the advancement, there is still a need for entrepreneurship and growth of higher value adding industries that would uphold and even accelerate wealth creation and internal cohesion. FDIs are valuable for investment, employment and knowledge externalities. Nevertheless, overreliance on FDIs might lead to excessive specialization of resources and industries to the activities that are dependent on external investment decisions. Moreover, to protect core competencies and knowledge leakage, the subsidiaries predominantly focus on common technologies and standardized activities that might soon be replaced by artificial intelligence. Excessive focus on such areas might lead to the trade-off between available, moderately-paid job opportunities and high risk-high growth entrepreneurial opportunities. This trade-off could also be perceived as substituting exploration for exploitation, while sustainable growth depends on further concurrent pursuit of these both processes. Consequently, the current phase of the Małopolska industry evolution is economic growth phase, but it also marks the turning point calling for continued transformation process.

## **5. The evolution of regional innovation policies in Małopolska 2005-2020**

### *Regional Innovation Policy Development – RIS 2005-2013*

Building the Małopolska's innovation potential under the formal regional innovation policy was initiated shortly after the major territorial reform of the state in 1998, which established new regions (16 out of 49) and the regional self-government. Given that the key activities introduced by the Act on regional self-government included supporting innovativeness of the region's economy (Journal of Polish Law, 1998), the newly defined regional authorities became directly responsible for strengthening the innovative profile of Małopolska. However, assigned responsibility was not accompanied by any indicative guidelines regarding programming of socio-economic development at the regional level nor supported by a national level innovation policy. Nonetheless Małopolska regional government (MRGO) engaged in developing its first regional innovation strategy (RIS 2005-2013; MRGO, 2005), largely following the opportunity of obtaining external EU funds for its implementation. The work on the RIS was conducted in years 2002-2004, hence in parallel with the initial programming of the socio-economic development of Małopolska, as well as

with the development of the national level structural strategies and the European integration process (Poland joined the EU in 2004). It all affected the scope and the structure of the RIS on many levels. As a newly formed region Małopolska struggled with consolidation of provinces with diverse industrial profile and different levels of socio-economic development. Thus, the first RIS generally followed the inventorial approach of the Regional Development Strategy (RDS) of Małopolska 2000-2006 (MRGO, 2000), introducing a strong pro-public orientation (reforms and transformation of the public sector) and targeting broadly all areas of strategic development defined in the RDS. It exhibited a clear dominance of the exploitative logic. Further, a rather vague and incoherent concept of the national innovation policy spanning across dispersed programs (e.g., National Development Plan - Council of Ministers, 2003; E-Polska National Plan for the development of the information society - Ministry of Communication, 2001; Strategy for increasing R&D expenditures in order to achieve objectives of the Lisbon Strategy – Ministry of Economy, Labor and Social Policy, 2004; National Regional Development Strategy – Council of Ministers, 2000) did not provide a necessary systemic framework for the development of the regional innovation policy and system in Małopolska. Consequently, RIS 2005-2013 exhibited a rather unfocused approach characterized by questionable, selective priority setting for public investment (e.g. Development of agri-food processing; Development of agro-tourism and leisure industry) and going beyond the regional implementation possibilities at that time (e.g. Development of Technological Parks; Establishing a seed fund; Establishing a fund for supporting innovative R&D projects; Development and modernization of infrastructure and research equipment). In turn, European integration brought in priority lines for developing the innovative agenda and necessary financial resources on the horizon. Hence, the scope, content and timeframe of the RIS 2005-2013 was strongly subordinated to the economic policy of the EU and defined financial support lines from structural funds. In other words, the packages of available measures defined in operational programs, in particular those at the national level, shaped the action lines of the RIS.

Set priorities and objectives of the RIS to a large extent complied with the provisions of the Lisbon Strategy in relation to the R&D area, i.e., growth dependent on innovation, ICT development, education, recognition of the role of cooperation in research, the role of SMEs (European Commission, 2003). To ensure that compliance comprehensive analyses of the innovative potential of Małopolska were carried out to determine the state of innovation in the spheres of science, entrepreneurship and business environment (Frydrych, 2006; Kopyciński and Mamica, 2006). Drawing on those ex-ante evaluations developed action lines targeted all

key areas of science, entrepreneurship and business environment. . However, the vast majority of defined measures were directed towards infrastructural and institutional deficiencies of the regional innovation system, while the identified weaknesses with regard to knowledge commercialization and entrepreneurial activity were rather modestly addressed. Such a strong pro-public orientation was undoubtedly related to the infrastructural and institutional deficiencies of the regional innovation system, but the low level of social participation in the strategy development process also played an important role. Although there were teams of experts representing various institutions of innovation supply, the regional authorities, business, the participation in the meetings of the working panels was not regular nor intensive. Maintaining a largely centralized decision-making process resulted in visible concentration of support around the Krakow area. Further with the “institutional takeover” of the process the public sector with moderate-low risky projects dominated the overall agenda, while measures targeting newly established companies and risky innovative ventures remained scarce. Shifting financing support for the business area, and thus responsibility for that component, to the national level (national operational programs) confirmed its secondary importance in the developed RIS (Gancarczyk, Najda-Janoszka, and Gancarczyk, 2020).

The speed of changes taking place in the economy, the improvement of knowledge and pro-innovation awareness of regional entities but above all changes in the requirements of the European and national support system forced the updating of the RIS shortly after its implementation (update of 2008; MRGO, 2008). Modifications of the structure and scope of defined objectives and tasks corresponded with a greater appreciation of the regional dimension in the national level policies. Under the new financial perspective, the share of structural funds managed at the regional level raised up from 25% to around 50%. However, the funds managed by Małopolska were not listed as an independent source of financing for any of the twelve tactical objectives. Further, although the business area gained additional direct support measures financed at the regional level (e.g. Subsidies for development investments; Support for industrial and pre-competitive research of companies in the region), a strong input orientation (infrastructural development) across objectives, tasks and funds with a major support directed towards infrastructural development in areas of science, research and development, administration was maintained. The impact of the RIS remained channelled to predominantly basic research at the expense of commercialization of the generated new knowledge. Only 20% of funds of the intervention were allocated to innovation related projects of enterprises (SACADA, 2018; STOS, 2017). Undertaken efforts to engage a broader spectrum of stakeholders in the strategy development process through

established cross-sectoral and region-wide advisory bodies (Małopolska Innovation Council (2006), Joint Committee of Business and Local Governments (2007)), did not produce substantial changes in the priority setting or geographical diffusion of the intervention beyond the Krakow area. Nevertheless, some shifts were introduced, as the turn towards clusters as promising innovation agents (National Strategy for increasing the innovativeness of the economy 2007-2013 - Council of Ministers, 2006; Program for supporting cluster development in Małopolska - KPT, 2009). Such reorientation was strongly inspired by and followed the objectives of the European Regional Development Fund, which included support of business networks and clusters to promote regional competitiveness and employment. Again, the RIS was aligned to financing opportunities rather than the other way around.

The correction and adjustment of the innovation strategy took place in parallel with structural changes aimed at increasing the sustainability and continuity of RIS implementation activities and strengthening the partnership approach, i.e., establishing cross-sectoral advisory bodies (Małopolska Innovation Council, Joint Committee of Business and Local Governments), a separate organizational unit in the MRGO responsible for managing and monitoring RIS. Further addressing the calls of institutional stakeholders, basically those responsible for implementing the strategy, for a more operational nature of the strategy, a separate Action Plan (HMR Consulting, 2009). Its implementation was accompanied by the development of a formal monitoring system for the RIS (Grupa Gomułka, 2010; FundEko, 2012a) – practically four years after launching the first RIS. In other words, the capacity building for the evaluation of the regional innovation policy in Małopolska was conducted in parallel with the policy implementation. It took three years to build the system (2009- 2012), which was further evaluated (FundEko, 2015) to serve the new perspective of the RIS (2014-2020) already at the stage of its formulation.

The conclusions formulated in ex-post evaluations of the RIS 2008-2013 (STOS, 2017) and of the Regional Operational Program of Małopolska 2007-2013 (SACADA, 2018) confirmed that implemented measures satisfied the basic infrastructural needs across sectors in Małopolska but only modestly influenced the innovative and entrepreneurial performance. It was partially explained by the impact of the external shock of the financial crisis 2007-2009. Challenged by the crisis regional authorities prioritized job protection and financial liquidity of firms. Hence, some budgetary shifts were introduced and the majority of supported projects concerned modernization aimed at improving production efficiency than actual innovative activity. Nevertheless, the root cause of rather disappointing outcomes lied in risk-averse design and application of the intervention, which channelled the public support

to larger enterprises with greater potential and innovative experience while marginalized microenterprises, new ventures with risky innovative projects. . Development and implementation of the RIS were largely exploitation oriented. Set priorities as well as designed measures reflected the impact of most powerful regional stakeholders, hence contributed to strengthening of the extant industrial structure of Małopolska. However, it was also visible that the RIS development process ignited an important regional debate and became a milestone in building innovative awareness – exhibited among others by a radically more intensive and extensive social participation in the next RIS 2014-2020. Furthermore, some initial signals of the explorative path in policy design appeared. The priority lines and emerging financial possibilities of the new financial perspective of the EU (2007-2013) encouraged the regional authorities and business environment institutions to investigate longer-term development trajectories of science and technologies and their potential impacts on the economy, society and natural environment, i.e. to perform foresight studies at the regional level (Task - Establishment of a technology forecasting centre). Hence, in the years 2006-2013 six foresight consortium projects coordinated by organizations from Małopolska were implemented.

#### *Innovation Policy Development – RIS 2014-2020*

The work on the next RIS 2014-2020 started immediately after the introduction of the new Europe 2020 jobs and growth agenda (European Commission, 2010), however, before finalizing the national level programming. Hence, once again the framework for developing RIS was set by the EU level provisions, while national level strategies were still under construction. The management and coordination of the task was carried out by a formal MRGO team previously appointed and operating within the scope. Given that the new programming scheme brought in new requirements and challenges, providing experienced organizational structures allowed for an early start of preparatory work, as well as building knowledge capital for policy learning (Gancarczyk et al., 2020). That long-term organizational commitment turned out to be particularly valuable when the RIS changed from a voluntary tool into an obligatory instrument of the Cohesion Policy. Along with the more active role of the EU structures in the implementation of the Europe 2020, the management mechanisms regarding RIS were significantly strengthened at the Community level – hence, innovation policy development in individual regions, including Małopolska, was directly

consulted, controlled and monitored by EU bodies. Introduced ex-ante conditionality of RIS and regional smart specialization (RSS) to obtain EU financial support for planned innovation measures was accompanied by mandatory procedural steps included in the RIS3 Guide (Foray et al. 2012). Thus, unlike the case of the previous programming period, the work on the RIS 2014-2020 followed a detailed scenario established at the EU level. Earlier actions of regional authorities, being a largely intuitive response to quite general provisions, gained a new, structured framework. Provided guidelines, in the form of obligatory rules and detailed actions, referred to both the procedural dimension and the content of the developed regional innovation policy.

The new guidelines increased the emphasis on socializing the strategy-making process. The Małopolska regional authorities made attempts at social inclusion in decision-making processes already during the preparation and updating of the previous RIS – e.g., cross-sectoral expert groups, permanent advisory bodies, however, the effect of that effort in the form of stakeholder engagement was not very satisfactory. Provisions of the RIS3 embracing broad public consultation, entrepreneurial discovery process, creation of cross-sector task groups helped channel the effort towards more inclusive, wider discussion fora. Accordingly, the four rounds of public consultations conducted in years 2012-2015 reflected the growing interest and involvement in the process of shaping the Małopolska innovation policy. Communicated new approach regarding concentration of the public intervention in areas defined as regional smart specialization (RSS) raised both interest and concern of a broad spectrum of stakeholders. Public consultations became the arena of conflicting interests between experts calling for an ambitious and narrow scope, dominant incumbent businesses focused on protecting their position and area of influence, local governments advocating for a decentralized local rather than regional optics, young branches of industry struggling to establish legitimacy. Hence, the regional authorities faced the difficult challenge of balancing those pressures. Initial proposal defined by experts and based on the conducted foresight studies (KPT, 2010) introduced four RSS (MRGO, version 2012). The framework of those specializations underwent important modifications as a part of successive consultation rounds. The reached consensus resulted in seven RSS (including dominant extant and new expanding industries), additional indication of two promising specialization to be monitored, and a periodic verification schedule of the RSS (MRGO, version 2014). An important result of the consultation was also the provision of strategy support for extant, dominant industries not included in the RSS. Further work regarding detailed description of defined RSS was also conducted in a partnership framework, i.e., by dedicated cross-sectoral Working Groups

(MRGO, 2015b). Given that those descriptions de facto marked the real boundaries of RSS, the interest in participating in the work of those groups exhibited by business entities was very high. . It was a new and challenging experience for MRGO to manage the dynamic bargaining of numerous and highly motivated business stakeholders, while keeping the baseline criteria set by experts. As a result, discussion revolved around individual specializations – struggling for inclusion – rather than recognition of interlinked areas across defined RSS. Interestingly, a broader perspective appreciating the importance of synergy and complementarity between smart specializations was introduced at the national level, distanced from local impacts (Council of Ministers, 2014). Simultaneous yet parallel development of national and regional programming produced not only a multilevel, but also a two-speed innovation policy. The national level provided a stronger support for industrial convergence and hence, generated a more impactful growth leverage for emerging industries. The regional level remained bounded by achieved consensus regarding defined boundaries of RSS.

The business area became more visible not only along the consultation process, but also across measures of the developed RIS. Contrary to arguments formulated in the evaluation studies of the previous RIS 2005-2013, which put in question the possibility of regional public policies to impact the innovative activity of enterprises (SACADA, 2018), new strategy exhibited a clear turn toward support of business-driven innovations. It could be partly explained by the increase in innovative awareness, recognition of the excessive support directed toward infrastructure development, more active representation of business interests. However, undoubtedly, a strong source of the change was the new strategy Europe 2020 and provisions of the Cohesion Policy, calling for a more innovation output-oriented agenda. Moreover, the new guidelines introduced the “entrepreneurial discovery” as the central concept for creating and developing RIS. Hence, the Małopolska regional authorities were practically obliged to ensure pro-active involvement of entrepreneurial actors in strategy design and to shift the focus towards business sphere and commercialization of R&D results. That major change of the perspective was reflected across set priorities, defined measures and budget structure of the RIS 2014-2020. The changes were introduced in a comprehensive manner, as the new RIS was developed as an action plan for the Regional Development Strategy of Małopolska (MRGO, 2011). Unlike with the previous RIS, no additional operational plan was necessary. Following the provisions of RIS3 and involving business stakeholders in the decision-making process produced a coherent strategy. The strategy featured prioritization that clearly addressed the major weaknesses of the Małopolska innovation system as indicated in evaluation studies, namely weak entrepreneurial activity

and commercialization of knowledge. Instruments targeted at business activity accounted for almost 40% of the total budget of the RIS (in the previous strategy the level was below 20%), and almost 60% of EU funds managed at the regional level were directed toward business ventures (MRGO, version 2016). Importantly, this new approach addressed also the specific needs of new ventures with an extended spectrum of support measures. The strategy included an explicit recognition of new enterprises as innovative ventures by definition. Further, the entrepreneurial potential of the cooperation between business and science received a greater attention. Those enterprise-oriented action lines were accompanied by an integrated package of measures, ranging from financial, informative to infrastructural assistance.

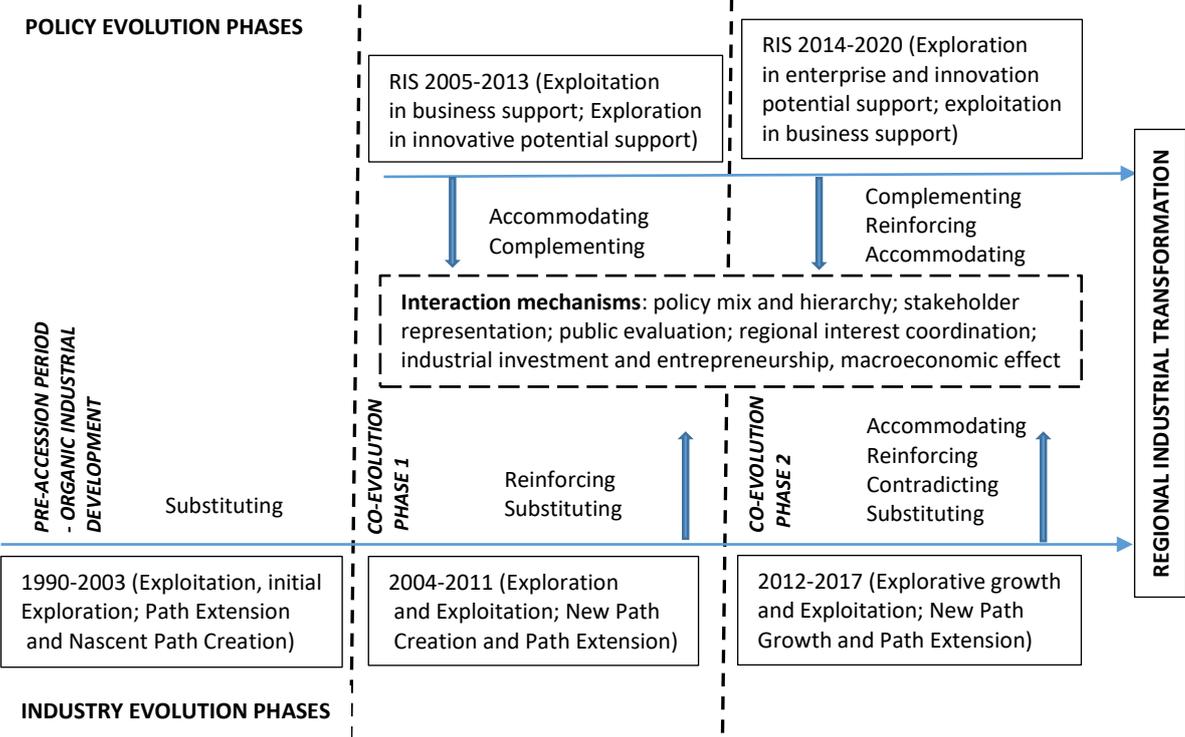
Broad consultation fora helped in shaping both general boundaries of the new, more focused regional innovation policy, as well as detailed implementation provisions, e.g., modifications to the list of beneficiaries, awarding additional points to RSS projects in the evaluation system instead of a fixed allocation ratio (MRGO, version 2016). However, all proposals to the strategy underwent not only regional, national but also a very thorough Community-level verification procedure. Developed intervention was regularly consulted with EU bodies through workshops, peer-reviews, discussions. Hence, some of planned action lines agreed among regional stakeholders and positively reviewed by national-level authorities were not accepted at the EU level, and required a substantial redesign (e.g., supporting clusters). Consequently, the main reference point for regional programming shifted to the European level. The parallel process of developing national and regional innovation policies strengthened the direct linkage between the region of Małopolska and the EU structures.

The new RIS 2014-2020 maintained a strong exploitative approach, despite introducing a focused smart specialization concept. The programming process was challenged by the need to sustain regional industrial base and local embeddedness, which led to a considerably compromised orientation towards smart specialization strategies. The new path outlined by emerging industries gained recognition among experts, yet strong voice of incumbent stakeholders tended to dominate the regional discourse. As a result, the RIS included a certain range of explorative perspective, yet it was the national level innovation policy that exhibited a more ambitiously focused approach.

**6. Innovation policies co-evolving with industry – interactions and their mechanisms**

Over the studied period, we identified distinct phases of policy and industry development, types of interaction mechanisms, as well as consequences for regional industrial transformation (path configurations) (Figure 2).

Figure 2. The co-evolution of the Małopolska innovation policies and industry



Source: own research.

In the *pre-accession period 1990-2003*, industry development was driven by the external factors of the country’s economic transformation and administrative reform. Industrial and innovation policies were absent at the regional level and industry organic development substituted for innovation policy. These processes were based on extant industrial competences and established a dominating position of large enterprises in mature industries towards exploitation and path extension. At the same time, regional internal factors of qualified human resources and R&D potential enabled the creation of local high-tech ventures and attracted first knowledge intensive FDIs.<sup>4</sup> The latter, largely internal, factors initiated exploration and nascent path creation towards knowledge-intensive industries.

*The first co-evolution phase of policy and industry* combines the years 2004-2011 for industry development and the first RIS 2005-2013 (Figure 2). The processes underlying interactions between policy and industry (interaction mechanisms) were predominantly externally-driven and limited. The major external process was initiated by Poland's accession to the EU and the introduction of the multi-scalar framework of the EU and national support policies, followed by the infusion of the Structural Funds distributed at the national and regional levels. Both regional industry and regional innovation policy agents revealed more interactions and interdependencies with national and regional cohesion policies and related measures<sup>4</sup>. The relationship of regional innovation policy objectives, measures and budgets, with national and regional policies formed an externally-driven *policy mix and hierarchy mechanism* of interaction. Regional innovation policy at the referred period represented only a limited funding available for enterprises and it was largely subordinated to other policies directed at cohesion and strengthening extant capabilities. Consequently, this interaction mechanism led to predominance of exploitative direction both in overall policy measures and in industry development.<sup>3</sup> Explorative approach could have been found in the first RIS measures to support science and R&D potential.

Another policy-related, but internally-driven mechanism was *a mechanism of regional interest coordination*. The mechanism engaged local governments and business governments (business associations, such as chambers of commerce) in a joint commission affiliated with the regional government office. The commission focused on infrastructure investment and taxation policies to enhance the regional cohesion. Repetitive, both formal and informal relationships were established, enhancing the interests of incumbent firms and exploitative direction.<sup>3</sup>

The process of setting up and implementing the RIS required an inclusion of stakeholders into the institutions setting up and monitoring the policy. This enforcement of representation has established *a stakeholder representation mechanism*, formalized as innovation council, affiliated with the office of the Małopolska government (MRGO, 2006). The mechanism was enforced by Polish regulations on the regional support (Polish Journal of Laws, 2000) and the EU fund governance, enhancing the interaction between policy and industry. However, business representation was dominated by large incumbent enterprises and lacked executive instruments, weighing direct support for enterprises towards exploitation.<sup>3,4</sup> The strong representation of academic community enhanced the investment in science and R&D, and thus enabled exploration in building innovative potential.

Indirect interactions emerged from the mechanism of public evaluation (*a public evaluation mechanism*) performed *ex ante*, and during the implementation of support programs. The evaluation research has been legally enforced in Poland since 2000 (Polish Journal of Laws, 2000), and it was also required by the EU fund's governance. The mechanism proved useful in understanding the views of entrepreneurs and industry performance. By revealing the low level R&D commercialization and innovation outcomes, it stimulated explorative ambitions of policy-makers.

The major actor in industrial development was industry itself. The influence of incumbent firms on policy can be explained as reinforcing exploitation. However, industrial investment also substituted for policy in exploring new areas of activity through FDI and nascent high tech entrepreneurship. These processes can be labelled as *a mechanism of industrial investment and entrepreneurship*. Finally, the economic crisis as an external, *macroeconomic effect mechanism*, affected primarily industry, preventing ambitious and exploration-oriented entrepreneurship but stimulating FDI in business services that sought cost savings. This external shock was moderately addressed by directing support measures to sustain the incumbent businesses.

As a result of the above industry and policy interactions, the first co-evolution phase combined exploration and exploitation efforts, and it was heading towards the RIT that integrated new path creation and path extension. Moreover, the above interaction mechanisms explain the role of policies as accommodating and complementing industrial change, rather than proactively leading this change.

*The second co-evolution phase* covers 2012-2017 in industry development, and RIS 2014-2020 in policy direction (Figure 2). The mechanisms that ignited the work on the new RIS were again externally driven (Europe 2020, EU funds, RIS3 Guide). However, unlike with the first programming period, EU level policies provided both the formal framework and detailed provisions for developing the strategy towards exploration (*the policy mix and hierarchy mechanism*).<sup>5</sup> Moreover, country-level smart specializations were more impactful in the growth of emerging industries than regional innovation policies. The policy mix and hierarchy mechanism in this co-evolution phase stimulated exploration, both in the enterprise support and in building innovative potential.

The provisions of the EU fund governance and the RIS design required a more comprehensive representation of all innovation system stakeholders, acknowledging their conflicting interests in Innovation Councils of 2015 and 2020 (*the stakeholder representation*

*mechanism*) (MRGO, 2015a, 2020).<sup>5</sup> Although industry representation has embraced predominantly extant, at least medium businesses, it has expanded to all regional specializations. Consequently, the referred mechanism stimulated policy to promote exploitation in business support, but it also targeted exploration in the support for enterprises and innovation potential (investment in science and R&D).<sup>1,2,3</sup> The support for incumbent industrial base and exploitation was additionally enhanced by *the mechanism of regional interest coordination*. Local government interest groups and related business associations emphasized decentralization of the regional growth and distribution of funding, as well as local (vs regional) industrial specializations.<sup>3,5</sup>

The turn towards strengthening the support for knowledge commercialization was additionally fueled by the policy evaluation process - *ex ante*, on-going and *ex post* (*the public evaluation mechanism*). The impact of this mechanism was much stronger than in the first co-evolution phase, since more informative, *ex-post* evaluations were possible.<sup>1,5</sup> The attempts by policy-makers and academia to focus the Małopolska RIT on limited high-tech industries were challenged by the contradicting industry. The ultimate result was the accommodation of policy and combining exploration with exploitation (support for entrepreneurial discovery and knowledge commercialization in new industries and support for extant industrial base). Moreover, the evaluation research revealed unique needs and expectations of the growing start-up community in relation to incumbent enterprises.<sup>1</sup> The established, long-term beneficiaries of public measures treated the public intervention as business contracts. High technology startups emphasized the market failures in capital provision and uncertainty that required risk-sharing.

In the second phase of co-evolution, the major driving forces of industry change stemmed from favorable macroeconomic dynamics after the crisis (*the macroeconomic mechanism*) and the related *mechanism of industrial investment and entrepreneurship* (the growth of BSS, business R&D performance, start-ups and scale-ups). Overall, industrial development 2012-2017 could be described as explorative growth combined with exploitation of extant capabilities. This industrial direction resulted in RIT that has integrated new path growth and path extension. The role of policy throughout the second co-evolution phase was predominantly complementary to industry development, with an attempt to reinforce the change, but ultimately, accommodating to industrial change.

## 7. Discussion and conclusions

### *Theoretical contribution*

Following the major aim, this research has explained the role of regional innovation policies in regional industrial transformation, using a co-evolutionary approach (Gong and Hassink, 2019; Martin and Sunley, 2015). The role of innovation policies in the Małopolska RIT can be described as predominantly complementing and accommodating to industrial change with some level of proactive promotion of new industrial opportunities (Zukauskaite et al., 2017). Overall, we observe the interactions with regional industry rather than unidirectional influence of policy.

Our theoretical contribution is the conceptualization of interaction mechanisms, i.e. the processes underlying policy-industry interactions and ultimately, explaining their co-evolution. This explanation adds to the evolutionary approach to public policies (Gong and Hassink, 2019; Uyarra, 2010). Interaction mechanisms have capacity to highlight the major development directions (exploitation or exploration) and roles of the populations studied, as well as the final outcome of the co-evolution (path configurations and RIT). *We delimited long-term interaction mechanisms of policy and industry that cut across their co-evolution phases.* These were two internal mechanisms (investment and entrepreneurship, regional interest coordination), and four external mechanisms (policy mix and hierarchy, stakeholder participation, public evaluation, and macroeconomic effect).

External mechanisms affect industry and policy either concurrently, such as the macroeconomic mechanism, or they start from one of the populations to affect the other. The latter refers to the policy mix and hierarchy mechanism of EU and national policies that require a compliance of regional-level policies and, consequently, have effects on regional businesses (Fothergill et al., 2019; Rodrik, 2014; McCann and Ortega-Argilés, 2016). The internal and external mechanisms are interdependent. Internal mechanisms for industry and policy can be seen as original and based on the local context, however, they also stem from the external processes (i.e. macroeconomic effect on investment and entrepreneurship). Within the industrial population, internally-driven mechanisms include industry investment and entrepreneurial processes, as well as collaboration in protecting joint interests that stimulates reactions of policy-makers (the regional interest coordination) (Brown and Mawson, 2019; Grillitsch, 2019; Varga et al., 2018). Within regional innovation policy, the internally-driven mechanism of regional interest coordination raises interactions among local

governments that affects enterprises and industries in particular regional locations (Aranguren et al., 2019; Estensoro and Larrea, 2016).

Moreover, this research contributes to the literature on regional industrial transformation (Oinas, Trippl, and Höyssä, 2018; Hassink, Isaksen, and Trippl, 2019; Asheim, 2019). We address the research gap of how progressive RIT is accomplished. This study proposes that one of the explanations is co-evolution of policy and industry, and interaction rather than unidirectional role of the policy. In particular, the findings reveal how interaction and learning in policy and industry enable balancing the exploitation of the extant industrial base and regional capabilities and exploration of new, knowledge-based activities to achieve growth-oriented RIT. Moreover, this research identifies mechanisms that drive policy and industry co-evolution towards different development paths.

#### *Contribution to practice*

The identified mechanisms of interaction, their outcomes and causal interdependencies can be useful for policy-makers to understand the conditions for the design and implementation of regional innovation strategies. The awareness of these internal and external processes can enhance scenario thinking about the possible roles of policy in industrial development, as well as the roles of industry in the policy pursuit.

This research also highlights the importance of joint exploitation and exploration activities to accomplish progressive RIT. In particular, it points to barriers in accomplishing exploration that stem from weak R&D commercialization and entrepreneurship (output indicators) rather than from insufficient investment in R&D and innovation potential (input indicators).

Moreover, the case study illustrates typical challenges in the design and implementation of regional industrial specialization in Poland (Gorzalak et al., 2007; Wojnicka-Sycz, 2020). The shortages, such as a lack of focus or excessive focus in the selection of promising business domains for public investment, have been addressed due to interaction and learning mechanisms. Nevertheless, the research also points to barriers in industry and policy mutual learning, such as information asymmetries, uneven power, and under- or overrepresentation of interests of particular entities.

### *Limitations and implications*

This research was based on the explorative case study in one regional context, which allows for analytical generalization only. However, the research framework (Figure 1) can be replicated in different contexts through multiple case design (Yin, 2018). Moreover, our investigations focused on the identification of co-evolution phases and underlying processes, still, these processes were not studied in-depth. Future research might explore individual mechanisms in their complexity, considering detailed causalities in the time flow. The ultimate challenge of studying the co-evolutionary processes is to directly investigate the complex phenomena over the long run. Due to exploratory and nascent stage of co-evolutionary approach to regional policies, we used secondary data analysis of documents and statistics as a primary method, supplemented by the interviews over the studied period (Wright et al., 2018). Future research might design direct and long-term observations for particular policy and industry interactions.

### **References**

- ABSL (2018). *Sektor nowoczesnych usług biznesowych w Polsce* (The sector of modern business services in Poland). Warsaw: ABSL.
- ABSL (2020). *Sektor nowoczesnych usług biznesowych w Polsce* (The sector of modern business services in Poland). Warsaw: ABSL.
- Aranguren, M. J., Magro, E., Navarro, M., & Wilson, J. R. (2019). Governance of the territorial entrepreneurial discovery process: looking under the bonnet of RIS3. *Regional Studies*, 53(4), 451-461.
- Asheim, B. T. (2019). Smart specialisation, innovation policy and regional innovation systems: what about new path development in less innovative regions?. *Innovation: The European Journal of Social Science Research*, 32(1), 8-25.
- Asheim, B. T., Isaksen, A., & Trippl, M. (2019). *Advanced introduction to regional innovation systems*. Cheltenham: Edward Elgar.
- Brown, R., & Mawson, S. (2019). Entrepreneurial ecosystems and public policy in action: a critique of the latest industrial policy blockbuster. *Cambridge Journal of Regions, Economy and Society*, 12(3), 347-368.
- Council of Ministers (2000). *Narodowa Strategia Rozwoju Regionalnego 2001-2006* (National Regional Development strategy 2001-2006), Warsaw: Council of Ministers.
- Council of Ministers (2003). *Narodowy Plan Rozwoju na lata 2004-2006* (National Development Plan for 2004-2006), Warsaw: Council of Ministers.
- Council of Ministers (2006). *Kierunki zwiększania innowacyjności gospodarki na lata 2007-2013* (Strategy for increasing the innovativeness of the economy 2007-2013), Warsaw: Council of Ministers.
- Council of Ministers (2014). *Program rozwoju przedsiębiorstw do 2020 roku* (Enterprise development plan until 2020), Warsaw: Council of Ministers.
- Danneels E., (2012). Second-order competences and Schumpeterian rents. *Strategic Entrepreneurship Journal*, 6(1), 42-58.

- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25-32.
- Estensoro, M., & Larrea, M. (2016). Overcoming policy making problems in smart specialization strategies: Engaging subregional governments. *European Planning Studies*, 24(7), 1319-1335.
- EOCIC European Observatory for Clusters and Industrial Change (2019). *European cluster and industrial transformation trends report*. Luxemburg: Publications Office of the European Commission.
- European Commission (2003), *A Strategy for full Employment and better Jobs for All*, Brussels COM (2003) 6 final.
- European Commission (2010), *Europe 2020. A strategy for smart, sustainable and inclusive growth*, Brussels COM (2010) 2020.
- Eurostat, Regions, <https://ec.europa.eu/eurostat/web/regions/data/database>; accessed Nov. 20, 2020.
- Foray, D. (2014). *Smart specialisation: Opportunities and challenges for regional innovation policy*. Routledge.
- Foray, D. (2017). The economic fundamentals of smart specialization strategies. In S. Radosevic, A. Curaj, R. Gheorghiu, L. Andreescu, & I. Wade (Eds.), *Advances in the Theory and Practice of Smart Specialization*. Academic Press, 38-50.
- Foray, D., Goddard, J., Goenaga Beldarrain, X., Landabaso, M., McCann, P., Morgan, K., Nauwelaers, C., Ortega-Argiles, R. (2012). *Guide to Research and Innovation Strategies for Smart Specialization (RIS3)*, [http://s3platform.jrc.ec.europa.eu/en/c/document\\_library/get\\_file?uuid=e50397e3-f2b1-4086-8608-7b886e69e8553](http://s3platform.jrc.ec.europa.eu/en/c/document_library/get_file?uuid=e50397e3-f2b1-4086-8608-7b886e69e8553), assessed 12 September 2020.
- Fothergill, S., Gore, T., & Wells, P. (2019). Industrial strategy and the UK regions: sectorally narrow and spatially blind. *Cambridge Journal of Regions, Economy and Society*, 12(3), 445-466.
- Frenken, K. (2007). *Applied evolutionary economics and economic geography*. Cheltenham: Edward Elgar.
- Frenken, K., & Boschma, R. A. (2007). A theoretical framework for evolutionary economic geography: industrial dynamics and urban growth as a branching process. *Journal of Economic Geography*, 7(5), 635–649.
- Frydrych Ł. (2006). Raport z badania popytu na innowacje w ramach projektu „InnoRegio Małopolska” (*Report on the study of the demand for innovation under the project "InnoRegio Małopolska"*) unpublished manuscript, Kraków: InnoRegio Małopolska.
- Fundacja GAP (2014). *Analiza weryfikacyjna obszarów inteligentnej specjalizacji regionalnej województwa małopolskiego* (Verification analysis of areas of regional smart specialization of the Małopolska region) <https://www.Malopolska.pl/publikacje/gospodarka/analiza-weryfikacyjna-obszarow-inteligentnej-specjalizacji-regionalnej-wojewodztwa-malopolskiego>
- FundEko (2012a). *Badanie stopnia wdrażania Regionalnej Strategii Innowacji Województwa Małopolskiego w ramach dedykowanego systemu monitoringu – III etap prac* (Examination of the degree of implementation of the RIS Małopolska within the framework of a dedicated monitoring system - stage III of works). [http://pliki.wrotamalopolski.pl/Raport\\_koncowy.pdf](http://pliki.wrotamalopolski.pl/Raport_koncowy.pdf)
- FundEko (2012b). *Ocena transferu wiedzy i powiązań sfery B+R oraz instytucji otoczenia biznesu z przedsiębiorstwami w województwie małopolskim w 2012 roku* (Assessment of knowledge transfer and links between the R&D sector and business environment institutions with enterprises in the Małopolska region in 2012)

- <https://www.obserwatorium.Malopolska.pl/wp-content/uploads/2016/05/Ocena-transferu-wiedzy-i-powi%C4%85za%C5%84.pdf>
- FundEko, (2015), *Ewaluacja systemu monitoringu wdrażania Regionalnej Strategii Innowacji Województwa Małopolskiego 2008-2013* (Evaluation of the monitoring system of the RIS Małopolska 2008-2013), <http://pliki.wrotamalopolski.pl/RaportEwaluacjaMonitoringu.pdf>
- FundEko (2017). *Ocena transferu wiedzy i powiązań sfery B+R oraz instytucji otoczenia biznesu z przedsiębiorstwami w województwie małopolskim w 2012 roku. Ewaluacja ex-post wdrażania Regionalnej Strategii Innowacji Województwa Małopolskiego 2008-2013 w perspektywie jej oddziaływania na regionalną innowacyjność w horyzoncie 2016 roku* (Assessment of knowledge transfer and links between the R&D sector and business environment institutions with enterprises in the Małopolska region in 2012. Ex-post evaluation of the implementation of the Małopolska Regional Innovation Strategy 2008-2013 in the perspective of its impact on regional innovation in the horizon of 2016.) [https://www.Malopolska.pl/\\_userfiles/uploads/RGX/badania%20i%20analizy/Ewaluacja\\_ex\\_post\\_RSI\\_WM\\_w\\_perspektywie\\_jej\\_dugoterm\\_inowego\\_oddziaiywania\\_na\\_regionaln\\_innowacyjno.pdf](https://www.Malopolska.pl/_userfiles/uploads/RGX/badania%20i%20analizy/Ewaluacja_ex_post_RSI_WM_w_perspektywie_jej_dugoterm_inowego_oddziaiywania_na_regionaln_innowacyjno.pdf)
- Gancarczyk, M., Najda-Janoszka, M., & Gancarczyk, J. (2020). *Regional innovation system and policy in Małopolska, Poland: An institutionalised learning*. In Gonzalez-Lopez M. & Asheim B. (Eds.), *Regions and Innovation Policies in Europe* (pp. 225-251). Cheltenham: Edward Elgar Publishing.
- Gancarczyk, M. (2017). *The process of SME growth: integrating the resource-based and transaction cost approaches*. Kraków: Jagiellonian University Press.
- Gancarczyk, M., & Gancarczyk, J. (2008). *Czynniki rozwoju przedsiębiorczości w województwie małopolskim*. Urząd Marszałkowski Województwa Małopolskiego.
- Gong, H., & Hassink, R. (2019). Co-evolution in contemporary economic geography: Towards a theoretical framework. *Regional Studies*, 53(9), 1344-1355.
- González-López, M. (2019). Understanding policy learning in regional innovation policies: lessons from the Galician case. *Innovation: The European Journal of Social Science Research*, 32(1), 104-118.
- Gorzelałak, G. (1998). *Regional and local potential for transformation in Poland*. Warsaw: European Institute for Regional and Local Development.
- Gorzelałak, G. (Ed.). (2020). *Social and Economic Development in Central and Eastern Europe: Stability and Change after 1990*. London: Routledge.
- Gorzelałak, G., Bąkowski, A., Kozak, M., Olechnicka, A., & Płoszaj, A. (2007). Regionalne strategie innowacji w Polsce. *Studia Regionalne i Lokalne*, 1, 88-111.
- Grillitsch, M. (2014). Regional transformation: institutional change and economic evolution in regions. In *ERSA conference papers* (No. ersa14p1481). European Regional Science Association.
- Grillitsch, M. (2019). Following or breaking regional development paths: on the role and capability of the innovative entrepreneur. *Regional Studies*, 53(5), 681-691.
- Grillitsch, M., Asheim, B., & Trippel, M. (2018). Unrelated knowledge combinations: The unexplored potential for regional industrial path development. *Cambridge Journal of Regions, Economy and Society*, 11(2), 257-274.
- Gross, N. (2009). A pragmatist theory of social mechanisms. *American Sociological Review*, 74(3), 358-379.
- Grupa Gomułka (2010). *Badanie stopnia osiągnięcia wartości wskaźników, w ramach systemu monitoringu wdrażania Regionalnej Strategii Innowacji Województwa Małopolskiego - II etap prac* (Research on the degree of achievement of the values of indicators as part of the

- monitoring system for the implementation of the Regional Innovation Strategy of the Małopolska Region - stage II), Krakow: MRGO.
- Hassink, R. (2010). Locked in decline? On the role of regional lock-ins in old industrial areas. In R. Boschma & R. Martin (Eds.), *Handbook of evolutionary economic geography* (pp. 450–468). Cheltenham: Edward Elgar.
- Hassink, R., Isaksen, A., & Trippel, M. (2019). Towards a comprehensive understanding of new regional industrial path development. *Regional Studies*, 53(11), 1636-1645.
- Helmke, G., & Levitsky, S. (2004). Informal institutions and comparative politics: A research agenda. *Perspectives on Politics*, 2(4), 725-740.
- HMR Consulting (2009). Program wykonawczy 2009-2011 dla RSI województwa małopolskiego (The implementation agenda for the Małopolska region RIS in 2009-2011). <https://bip.Małopolska.pl/umwm.a,84843,uchwała-nr-28708-zarządu-województwa-małopolskiego-z-dnia-10-kwietnia-2008-r-w-sprawie-powołania-mal.htm>
- Hoon, Ch. (2013). Meta-synthesis of Qualitative Case Studies: An Approach to Theory Building. *Organizational Research Methods* 16(4), 522–546.
- Hooton, C. A., & Tyler, P. (2019). Do Enterprise Zones have a role to play in delivering a place-based industrial strategy?. *Cambridge Journal of Regions, Economy and Society*, 12(3), 423-443.
- Indergaard, M. (2019). A developmental network city? Double embeddedness in New York. *Cambridge Journal of Regions, Economy and Society*, 12(3), 385-399.
- Isaksen, A., Tödting, F., & Trippel, M. (2018). Innovation policies for regional structural change: Combining actor-based and system-based strategies. In *New Avenues for regional innovation systems-Theoretical Advances, empirical cases and policy Lessons* (pp. 221-238). Springer, Cham.
- Isaksen, A., Jakobsen, S. E., Njøs, R., & Normann, R. (2019). Regional industrial restructuring resulting from individual and system agency. *Innovation: The European Journal of Social Science Research*, 32(1), 48-65.
- Kopcyński P., Mamica Ł. (2006). Raport z badania podaży innowacji w ramach projektu „Rynek innowacji w Małopolsce” (*Report on the study of the supply of innovation under the project "Innovation market in Małopolska"*), unpublished manuscript, Krakow: Małopolska Szkoła Administracji Publicznej Akademii Ekonomicznej w Krakowie.
- KPT Krakowski Park Technologiczny (2009). *Plan wspierania klastrów w województwie małopolskim* (Program for supporting cluster development in Małopolska), Krakow: KPT. <file:///C:/Users/admin/AppData/Local/Temp/487zal.pdf>
- KPT, (2010). *Foresight. Perspektywa technologiczna Kraków-Małopolska 2020* (Foresight. Technology perspective for Krakow-Małopolska 2020). <http://foresight.kpt.krakow.pl>
- MacKinnon, D., Cumbers, A., Pike, A., Birch, K., & McMaster, R. (2009). Evolution in economic geography: institutions, political economy, and adaptation. *Economic Geography*, 85(2), 129-150.
- Małopolska Regional Development Observatory (2015). *Specjalizacja lokalna w gminach i powiatach województwa małopolskiego* (Local specialization in the communes and counties of Małopolska).
- Martin, R., & Sunley, P. (2006). Path dependence and the evolution of the economic landscape. *Journal of Economic Geography*, 6(4), 395-438.
- Martin, R., & Sunley, P. (2015). Towards a developmental turn in evolutionary economic geography?. *Regional Studies*, 49(5), 712-732.
- McCann, P., & Ortega-Argilés, R. (2016). Smart specialisation, entrepreneurship and SMEs: issues and challenges for a results-oriented EU regional policy. *Small Business Economics*, 46(4), 537-552.

- Ministry of Communication (2001). *E-Polska. Plan działań na rzecz rozwoju społeczeństwa informacyjnego w Polsce na lata 2001-2006* (E-Polska. National Plan for the development of the information society for 2001-2006), Warsaw: Ministry of Communication.
- Ministry of Economy, Labor and Social Policy (2004). *Strategia zwiększenia nakładów na działalność B+R w celu osiągnięcia założeń Strategii Lizbońskiej* (Strategy for increasing R&D expenditures in order to achieve objectives of the Lisbon Strategy), Warsaw: Ministry of Economy, Labor and Social Policy.
- MRGO Małopolska Regional Government Office (2000). *Strategia rozwoju województwa małopolskiego* (Regional development strategy for Małopolska), Krakow: MRGO.
- MRGO (2005). *Program strategiczny „Regionalna Strategia Innowacji Województwa Małopolskiego 2005-2013”* (Regional Innovation Strategy of the Małopolska Region 2005-2013). Krakow: Małopolska Regional Government Office.
- MRGO (2006). *The regulation of the Małopolska Region’s Board No 75/06 of January 26, 2006.* <https://bip.malopolska.pl/umwm,a,102928,uchwala-nr-7506-zarzadu-województwa-malopolskiego-z-dnia-26-stycznia-2006-r-w-sprawie-powolania-malo.html>
- MRGO (2008). *The regulation of the Małopolska Region’s Board No 287/08 of April 10, 2008.* <https://bip.malopolska.pl/umwm,a,84843,uchwala-nr-28708-zarzadu-województwa-malopolskiego-z-dnia-10-kwietnia-2008-r-w-sprawie-powolania-mal.html>
- MRGO (2005). *Program strategiczny „Regionalna Strategia Innowacji Województwa Małopolskiego 2005-2013”* (Regional Innovation Strategy of the Małopolska Region 2005-2013). Krakow: Małopolska Regional Government Office.
- MRGO (2008). *Program strategiczny „Regionalna Strategia Innowacji Województwa Małopolskiego 2008-2013”* (Regional Innovation Strategy of the Małopolska Region 2008-2013). Krakow: Małopolska Regional Government Office.
- MRGO (2011). *Strategia rozwoju województwa małopolskiego 2011-2020* (Regional development strategy of Małopolska 2011-2020), Krakow: MRGO.
- MRGO (2012). *Program strategiczny „Regionalna Strategia Innowacji Województwa Małopolskiego 2013-2020”* (Strategic program "Regional Innovation Strategy of the Małopolska Region 2013-2020"); updates approved by the Management Board of the Małopolska Region in 2012; 2013, 2014, 2015, 2016. Krakow: Małopolska Regional Government Office.
- MRGO (2015a). *The regulation of the Małopolska Region’s Board of November 12, 2015.* <https://bip.malopolska.pl/umwm,a,1139156,uchwala-nr-151715-zarzadu-województwa-malopolskiego-z-dnia-12-listopada-2015-r-w-sprawie-powolania-m.html>
- MRGO (2015b). Uchwała nr 755/15 z 18 czerwca 2015 r. w sprawie zatwierdzenia składu osobowego Grup Roboczych ds. małopolskich inteligentnych specjalizacji (Resolution No. 755/15 of 18 June 2015 on the approval of the composition of the Working Groups for Smart Specializations in Małopolska)
- MRGO (2018). *Aktualizacja pogłębionej analizy innowacyjności gospodarki Małopolski* (The up-dated in-depth analysis of the innovativeness of the Małopolska economy). Krakow: Małopolska Regional Government Office.
- MRGO (2020). *The regulation of the Małopolska Region’s Board of September 1, 2020.* <https://www.malopolska.pl/samorzad/rady/malopolska-rada-innowacji>.
- Murmann, J. P. (2003). *Knowledge and competitive advantage: The coevolution of firms, technology, and national institutions*. Cambridge University Press.
- Murmann, J. P. (2013). The coevolution of industries and important features of their environments. *Organization Science*, 24(1), 58-78.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.

- North, D. C. (2005). *Understanding the process of economic change*. Princeton and Oxford: Princeton University Press.
- OME Observatory of the Małopolska Economy (2012). *Inwestorzy zagraniczni w Małopolsce w 2009 i 2010 roku* (Foreign investors in Małopolska in 2009 and 2010). MRGO, Krakow.
- Oinas, P., Trippel, M., & Höyssi, M. (2018). Regional industrial transformations in the interconnected global economy. *Cambridge Journal of Regions, Economy and Society*, 11(2), 227-240.
- Ostrom E., (2005). *Governing the Commons: The Evolution of Institutions for Collective Action*. In C. Menard and M.M. Shirley (Eds.), *Handbook of New Institutional Economics*. Dordrecht: Springer, 819–848.
- Pawłowski, K. (ed.) (2003). *Turning Knowledge into Capital*, WSB-NLU, Nowy Sącz.
- Polish Journal of Laws (1998). *The Act of June 5, 1998 on regional self-government*, No 91, Item 575.
- Polish Journal of Laws. (2000). *The law of May 12, 2000 on the principles of regional development support*, No 48, item 550.
- Pylak, K., & Kogler, D. F. (2021). Successful economic diversification in less developed regions: long-term trends in turbulent times. *Regional Studies*, 55(3), 465-478.
- Rodrik, D. (2014). Green industrial policy. *Oxford Review of Economic Policy*, 30(3), 469–491.
- SACADA (2018). *Analiza efektów wdrażania Małopolskiego Regionalnego Programu Operacyjnego na lata 2007-2013 w zakresie innowacji* (Analysis of the effects of implementing the Małopolska Regional Operational Program for 2007-2013 in the field of innovation), Krakow: MRGO.
- Schrock, G., & Wolf-Powers, L. (2019). Opportunities and risks of localised industrial policy: the case of “maker-entrepreneurial ecosystems” in the USA. *Cambridge Journal of Regions, Economy and Society*, 12(3), 369-384.
- Sirén, C. A., Kohtamäki, M., & Kuckertz, A. (2012). Exploration and exploitation strategies, profit performance, and the mediating role of strategic learning: Escaping the exploitation trap. *Strategic Entrepreneurship Journal*, 6(1), 18-41.
- Smętkowski, M., & Wójcik, P. (2012). Regional convergence in Central and Eastern European countries: A multidimensional approach. *European Planning Studies*, 20(6), 923-939.
- Statistics Poland, Local Data Bank (2020); <https://bdl.stat.gov.pl/BDL/dane/teryt/jednostka>; accessed Aug. 3, 2020.
- Statistics Poland, Selected Entrepreneurship Indicators (2020); <https://stat.gov.pl/en/topics/economic-activities-finances/activity-of-enterprises-activity-of-companies/selected-entrepreneurship-indicators-in-2014-2018,10,6.html>; accessed Aug. 3, 2020.
- STOS (2017). *Ocena transferu wiedzy i powiązań sfery B+R oraz instytucji otoczenia biznesu z przedsiębiorstwami w województwie małopolskim. Ewaluacja ex-post wdrażania Regionalnej Strategii Innowacji Województwa Małopolskiego 2008-2013 w perspektywie jej oddziaływania na regionalną innowacyjność w horyzoncie 2016 roku*, (Assessment of knowledge transfer and links between the R&D sphere and business environment institutions with enterprises in the Małopolskie voivodship. Ex-post evaluation of the implementation of the RIS Małopolska 2008-2013 in the perspective of its impact on regional innovation in the horizon of 2016), Krakow: Małopolska Regional Government Office, <https://www.Małopolska.pl/publikacje/gospodarka/ewaluacja-expost-rsi-wm-w-perspektywie-jej-dlugoterminowego-oddziaływania-na-regionalna-innowacyjnosc>
- Strykiewicz, T. (2009). The old and the new in the geographical pattern of the Polish transition. *Geographica*, 40(1), 5-24.

- Swianiewicz, P. (2011). Poland: Europeanization of subnational governments. In Hendriks, F., Lidström, A., & Loughlin, J. (Eds.), *The Oxford handbook of local and regional democracy in Europe*, Oxford: Oxford University Press.
- Ter Wal, A. L., & Boschma, R. (2011). Co-evolution of firms, industries and networks in space. *Regional Studies*, 45(7), 919-933.
- Uyarra, E. (2010). What is evolutionary about ‘regional systems of innovation’? Implications for regional policy. *Journal of Evolutionary Economics*, 20(1), 115-137.
- Varga, A., Sebestyén, T., Szabó, N., & Szerb, L. (2018). Estimating the economic impacts of knowledge network and entrepreneurship development in smart specialization policy. *Regional Studies*, 1-12.
- Vatn, A., (2007). *Institutions and the environment*. Cheltenham: Edward Elgar.
- Wojnicka-Sycz, E. (2020). Theory-based evaluation criteria for regional smart specializations and their application in the Podkarpackie voivodeship in Poland. *Regional Studies*, 54(11), 1612-1625.
- Wolfe, D. A. (2016). Innovation and creativity in city-regions. In R. Shearmur, D. Carrincazeux and D. Doloreux (Eds.), *Handbook on the Geographies of Innovation*. Cheltenham, UK: Elgar, pp. 174–186.
- Wright, A. L., Middleton, S., Hibbert, P., and Brazil, V. (2018). “Getting On With Field Research Using Participant Deconstruction”, *Organizational Research Methods*, DOI: 10.1177/1094428118782589, 1-21.
- WYG International IMC Consulting. Supplement (2006). *Ocena szacunkowa projektu programu operacyjnego na lata 2007-2013 województwa małopolskiego* (Ex ante evaluation of the operational program of the Małopolska region for the years 2007-2013). Warsaw.
- WYG International IMC Consulting. (2007). *Ocena szacunkowa projektu programu operacyjnego na lata 2007-2013 województwa małopolskiego* (Ex ante evaluation of the operational program of the Małopolska region for the years 2007-2013). Warsaw.
- Yin, R. K. (2018). *Case study research and applications. Design and methods*. Sage: Los Angeles.
- Zukauskaite, E., Trippl, M., & Plechero, M. (2017). Institutional thickness revisited. *Economic Geography*, 93(4), 325-345.

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<sup>1</sup> Polish Ministry for Investment and Development (2020), *Ewaluacja regionalnej pomocy inwestycyjnej w zakresie celu tematycznego 3 w obszarze wzmocnienia konkurencyjności mikroprzedsiębiorstw oraz małych i średnich przedsiębiorstw w ramach regionalnych programów operacyjnych na lata 2014-2020*, (The evaluation of the regional investment support in the area of strengthening the SME competitiveness within regional operational programs 2014-2020, research commissioned to the consortium of Evalu Sp. z o.o., STOS, Wise Europa.

<sup>2</sup> National Science Centre, Poland (2014-2017), *The process of SME growth. Combining the resource-based and transaction cost approaches*, research project no 2013/09/B/HS4/01938.

<sup>3</sup> European Social Fund, Małopolska Agency for Regional Development (2013-2014), *Strategy for the innovation network development of the ZET Transport company*, research and development project no MARR/1427/2013/DZPP.

<sup>4</sup> Polish Ministry for Science and Higher Education (2006-2008), *The evaluation of effectiveness and efficiency of the support policy for small and medium-sized enterprises (SMEs)*, research project no H02D 021 30.

<sup>5</sup> EC Erasmus+ Jean Monnet – Projects (2017-2019), *EU Regional and Innovation Policies and Peripheral Regions/EURIPER; educational and research project no 587410-EPP-1-2017-1-ES-EPPJMO-PROJECT*.

**Department of Geography and Regional Research  
University of Vienna**

Contact person: Michaela Trippl  
Universitätsstraße 7/5/A0528, 1010 Vienna, Austria  
Tel.: +43-1-4277-48720  
E-Mail: [Michaela.tripppl@univie.ac.at](mailto:Michaela.tripppl@univie.ac.at)  
<https://humangeo.univie.ac.at/>

**Department of Socioeconomics  
Vienna University of Economics and Business**

Contact person: Jürgen Essletzbichler  
Welthandelsplatz 1, 1020 Vienna, Austria  
Tel.: +43-1-31336/4206  
E-Mail: [juergen.essletzbichler@wu.ac.at](mailto:juergen.essletzbichler@wu.ac.at)  
<http://www.wu.ac.at/en/department-socioeconomics>

**Institute for Urban and Regional Research  
Austrian Academy of Sciences**

Contact person: Robert Musil  
Postgasse 7/4/2, 1010 Vienna, Austria  
Tel.: +43-1-51581-3520  
E-Mail: [robert.musil@oeaw.ac.at](mailto:robert.musil@oeaw.ac.at)  
<https://www.oeaw.ac.at/en/isr/home/>

**Department of Working Life and Innovation  
University of Agder**

Contact person: Arne Isaksen  
Jon Lilletunsvei 3/A161, Grimstad, Norway  
Tel.: +47-37-23-33-53  
E-Mail: [arne.isaksen@uia.no](mailto:arne.isaksen@uia.no)  
<https://www.uia.no/en/about-uia/faculties/school-of-business-and-law/department-of-working-life-and-innovation>

**Department of Geography  
Kiel University**

Contact person: Robert Hassink  
Hermann-Rodewald-Str. 9, 24098 Kiel, Germany  
Tel.: +49-431-880-2951  
E-Mail: [hassink@geographie.uni-kiel.de](mailto:hassink@geographie.uni-kiel.de)  
<https://www.wigeo.uni-kiel.de/en/>