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THE INNOVATIVE POTENTIAL OF SCIENTIFIC AND RESEARCH UNITS IN THE PROCESS OF ENTREPRENEURIAL DISCOVERY — EXAMPLES FROM SELECTED EU REGIONS

WYKORZYSTANIE POTENCJAŁU INNOWACYJNEGO JEDNOSTEK NAUKOWO-BADAWCZYCH W PROCESIE PRZEDSIĘBIORCZEGO ODKRYWANIA — PRZYKŁADY Z WYBRANYCH REGIONÓW UE

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ABSTRACT

The entrepreneurial discovery process (EDP) is an element of the Research and Innovation Strategy for Smart Specialisation (RIS3) concept, which is the basis for activities carried out in European Union (EU) regions in the area of innovation policies. The process requires the creation of an institutional structure (cooperation network) that allows for coordinated and continuous cooperation between representatives of entities that create regional innovation systems. These include: authorities, scientific and research units, entrepreneurs and civil society. The purpose of this article is to present the role of scientific and research units in the cooperation network, as well as the possibility of using their innovation potential when conducting EDP. On the basis of market research in 10 regions, the authors identified practical examples of cooperation carried out in selected seven EU regions (partner regions participating in a project called *Beyond EDP*).

Key words: entrepreneurial discovery process, management of scientific research units, regional innovation policy, clusters, campuses

ABSTRAKT

Proces przedsiębiorczego odkrywania (PPO) jest elementem koncepcji RIS3 stanowiącej podstawę aktywności prowadzonych w regionach UE w obszarze polityk innowacyjnych. Jego przeprowadzanie wymaga utworzenia struktury instytucjonalnej (sieć współpracy) umożliwiającej skoordynowaną i ciągłą kooperację przedstawicieli podmiotów tworzących regionalne systemy innowacji. Należą do nich: organy władzy, jednostki naukowo — badawcze, przedsiębiorcy oraz społeczeństwo obywatelskie.
Celem niniejszego artykułu jest przedstawienie roli jednostek naukowo — badawczych w sieci współpracy, a także możliwości wykorzystania ich potencjału innowacyjnego podczas przeprowadzania PPO. Na podstawie badań w 10 regionach autorzy wskazali praktyczne przykłady współpracy prowadzonej w wybranych siedmiu jednostkach terytorialnych UE (regiony partnerskie biorące udział w projekcie pod nazwą — *Beyond EDP*).

Słowa kluczowe: proces przedsiębiorczego odkrywania, zarządzanie jednostkami naukowo - badawczymi, entrepreneurial discovery process, management of scientific research units

JEL: I25

Introduction

The present study encompasses both theoretical and practical dimensions. The main research method is the analysis of the literature on the subject and documents prepared on the basis of regional innovation strategies of 10 European Union's regions (unpublished). The practical part also uses the results of the analyses that were produced in the Beyond EDP project. The project, which was formally entitled 'Improve the RIS3 effectiveness through the management of the entrepreneurial discovery process (Beyond EDP)', was funded under the Interreg Europe Programme. Its implementation period was from 2016 to 2021. The project's objectives primarily focussed on: improving EDP models in partner regions and developing recommendations for other EU regions to address the identified challenges. (Beyond EDP, 2019). Partner regions included: Centre Val de

Loire (France) — project leader, Bourgogne-Franche-Comté (France), Umbria (Italy), Saxony-Anhalt (Germany), Centru (Romania), Castilla y León (Spain), Extremadura (Spain), Östergötland (Sweden), Northern Netherlands (Netherlands) and Lodzkie Region (Poland). Employees of the European Association of Development Agencies — Eurada and scientists from the Joint Research Center of the European Commission also participated in the project. The authors of this article participated in the implementation of the project as representatives of Lodzkie Region.

Innovation System and Innovation Capacity

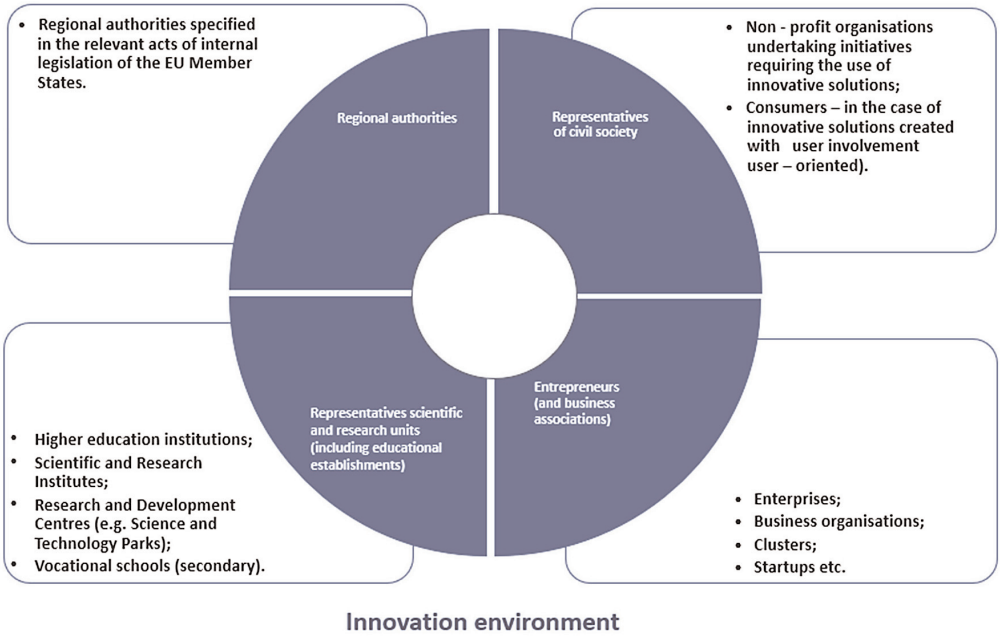
The innovation policy activities[1] of the European Union's (EU) regions are currently based on the concept of the Research and Innovation Strategy for Smart Specialisation (RIS3)[2] (Foray et al., 2012). The aim of its implementation is to increase the degree of exploitation of existing potential for achieving interregional (and even international) comparative advantage in existing and emerging economic areas (Foray, David & Hall, 2011).

Making the RIS3 concept a reality requires innovation policy interventions to be concentrated in economic areas recognised as regional smart specialisations (David et al. 2009; Kroll 2015). This is because they have a particular innovation potential based on their unique strengths (this applies in particular to their scientific potential, industry structure and the links created between stakeholders) (OECD, 2013; McCann & Ortega-Argilés, 2015; Klasik 1974). It is assumed that smart specialisations are created at the 'intersection' of technologies and economic sectors of the regions where these technologies can be used (Foray & Goenaga, 2013). Therefore, when identifying them, particular attention should be paid to the opportunities for the use of emerging general-purpose technology solutions (OECD, 2013).[3]

The knowledge necessary to raise the level of innovation in the economy (entrepreneurial knowledge)[4] is not accumulated but fragmented and dispersed among representatives of the many different specialised entities that make up the regional innovation system (Foray & Goenaga, 2013).[5] Nowakowska defines it as '(...) a system of actors, interactions and events

that, as a result of synergies, arise in a specific territory and lead to an increased capacity for the creation, absorption and diffusion of innovation in the region. (...) Its functioning is embedded in a region-specific cultural context, expressed in social relations, norms, values and interactions taking place within the community (innovation environment).' (Nowakowska, 2011). The construction and functioning principles of the regional innovation system have been the subject of continuous discussion in the literature for years (Godin and Lane 2013).[6] The quadruple helix model (Gianelle, Kyriakou, Cohen & Przeor, 2016) has been recognised as appropriate for carrying out EDPs. In addition to local government[7] it includes businesses, scientific and research units and representatives of civil society (Figure 1) (Arnkil, Järvensivu, Koski & Piirainen, 2010; Gianelle et al., 2016).[8]

Figure 1. Construction of a regional innovation system based on the quadruple helix model



Source: Based on Arnkil et al. (2010), *Exploring Quadruple Helix Outlining user-oriented innovation models*, University of Tampere; Gianelle et al (2016). *Implementing smart specialisation: A handboo*k. Brussels, Belgium: European Commission.

The RIS3 concept places entrepreneurship, broadly defined, at the centre of supporting innovation processes (which are comprised of the activities of innovative enterprises, research leaders in scientific and research units and independent inventors and innovators) (Foray & Goenaga, 2013).[9] In fact, it represents the main source of 'entrepreneurial knowledge' applicable in two areas (Gianelle et al., 2016):

(1) generating the information necessary for **government representatives** to make sound investment and strategic decisions to increase the level of innovation in the region; and
(2) providing directions for **entrepreneurs and representatives of scientific and research institutions** to develop and explore new niches and market potentials, as well as areas of scientific and technological opportunities.[10]

The use of such an approach provides an opportunity to balance initiatives, that have their origin in the regional authorities' decisions to create innovation policy instruments (the top-down approach), with 'driven' by territorial actors articulating their expectations (the bottom--up approach) (Kleibrink, Larédo & Philipp, 2017). Indeed, carrying out EDPs allows the involvement of the actors that make up the regional innovation system in the continuous construction of shared, clarified visions that lead to problem solving (and the achievement of the goals set) (bottom-up approach) (How to deal with the main challenges of the EDP. Synthesis report of the three EDP management task forces as part of Beyond EDP, 2019)[11]. This in turn is recognised as one of the key factors in building the innovation capacity of an economy (Bierut et al., 2016). Furthermore, over time it also contributes to the creation and development of collaborative networks of interactive learning and the shaping of the innovation environment (McCann & Ortega-Argilés, 2015) necessary for the emergence of innovative solutions and the commercialisation of knowledge (Trzmielak, Grzegorczyk & Gregor, 2016).

The Nature of Innovation Potential-from the Perspective of a Theoretical Approach

Innovation potential can refer to countries, regions, economic sectors, enterprises or scientific and research units. In the context of our considerations, an interesting approach is that of Za Pate (2002), which considers innovation potential as a mixture of informational, technical and technological, intellectual, spatial, financial, organisational, managerial, legal and business resources that form a unified system of idea generation and development that ensures the competitiveness of final products or technologies (Stankiewicz, 2002). It should be noted that in the literature we can also find the capability approach, which refers to the competence potential that creates innovation capabilities, for example capabilities to generate ideas for new solutions, such as technological ones. Stawasz (2015) explains capabilities for innovation in traditional and dynamic terms. The first is understood as the input to the innovation process that leads to new products and technologies. The second emphasises an organisation's ability to reconfigure its resources in the field of innovation in response to a changing innovation ecosystem. Considering the importance of competence in creating innovation potential, innovation potential should take into account the competences to create innovation, including knowledge, culture and management. Potential is the mix of resources and their availability (including both tangible and intangible assets) that can be used to create innovation (Leskovarl et al., 2013).

The importance of innovation potential, as a determinant of the wealth of nations,

is emphatically demonstrated by Kozmetzky et al. (2004). Potential is one of the three elements, along with capital and creativity (Drozdowski, Zakrzewska & Puchalska, 2010), of an economy's wealth creation. Transferring his considerations of Kozmetzky's wealth creation in the United States to the European context, we will emphasise the importance of potential for wealth creation in EU regions. According to the American entrepreneur and thinker, technology, know-how, R&D work and new technological enterprises are the new wealth of the world, economic and social. Taking the approach that innovation potential has both an economic

and a managerial dimension, we will therefore relate it to two spheres: regional policy and enterprise policy dealing with research, development and implementation of technology. In the area of regional policy, we are talking about capacity building by adapting the organisation to the changing socio-economic environment. The competitiveness of a region and the organisations within it is defined not only in terms of the level, but also the level of technological readiness for market applications, that is to say market developments, market trends and the accepted costs of applying research results on the market. Nowakowska (2020) and Sokolowicz (2015) use the term 'territorial capital', which is strongly influenced by science, R&D units and supporting institutions. Institutional support (referred to as the institutional environment) is directed towards the cooperation of R&D units and enterprises (within science parks, science and technology parks, business incubators, innovation and technology transfer centres) and is one of the key institutions of the knowledge economy (Deog-Seong & Byung-Joo, 2011).

The corporate, on the other hand, is concerned with adapting new technologies and R&D and R&D products to meet the needs of a diverse market. Socio-economic benefits are at the core of innovation policy (Tekin & Akyol, 2019). It is a consequence of the learning of scientific and research organisations, the integration of R&D processes and business (Nobelius, 2003) and adaptation to a changing environment.

The innovation potential of R&D units includes the resources identified above and the capacity to use them in the three areas of technology, know--how and new products produced on the basis of existing or new technologies (Validov et al. 2015; Trzmielak & Zehner, 2020). Utilising the R&D potential of scientific and research units in the process of entrepreneurial discovery fulfils the task of regional policy related to accumulation of knowledge, experience and skills in the process of building and utilising an organisation's innovation potential (Lundvall, 2004). The lack of such knowledge, experience and skills can lead to uncompetitive regions and organisations. As a consequence, the ability to introduce new products and technologies to the market by enterprises (Sojkin, 2012) (economic and social wealth and social wealth). The concept of innovation potential of scientific and research units in EDP will be used to describe an organisation's ability to recognise the value of the organisation's knowledge

in the region, to adapt and apply it (Ober, 2022) and to transform resources into an outcome that increases the ability to compete in the market (Stawasz, 2015).

The Role of Science and Research Units in Regional EDP Models

The identification, smart specialisation, creation and implementation of regional innovation policies using the innovation potential of R&D units, as well as the monitoring of the results achieved, require the application of an EDP (Foray & Goenaga, 2013; Gianelle et al., 2016).[12] It is defined as an inclusive and interactive bottom-up process in which participants from different backgrounds (policy, business, academia, etc.) discover and 'produce' information about potential new activities, identifying opportunities arising from this interaction, while decision-makers evaluate the information received and select opportunities for their use (Foray, 2014). The essence of EDP departure from the approach used in the past based on traditional policy intervention which involved the implementation of top-down approach, centralised for states or regions decision-making processes.[13]

Ensuring the coordination of the continuous collaboration of diverse (in terms of interests, knowledge, origin and individual predispositions) stakeholders in the field of innovation policy requires the creation of an EDP model of the region (How to deal with the main challenges of the EDP. Synthesis report of the three tasks forces on EDP Management as part as Beyond EDP project, 2019). The design and operating principles of a network of specialised bodies set up for this purpose should be defined. The communication channels for the transfer of information between EDP participants and the dissemination of information to the regional community are also essential to its design. It is necessary to create an integrated feedback mechanism between the two levels of activity: strategic and operational. This will make it possible to involve representatives of regional authorities in the group decision-making process and thus influence the increase in the degree of adaptation of innovation policy instruments to the needs of entrepreneurs (How to deal with the main

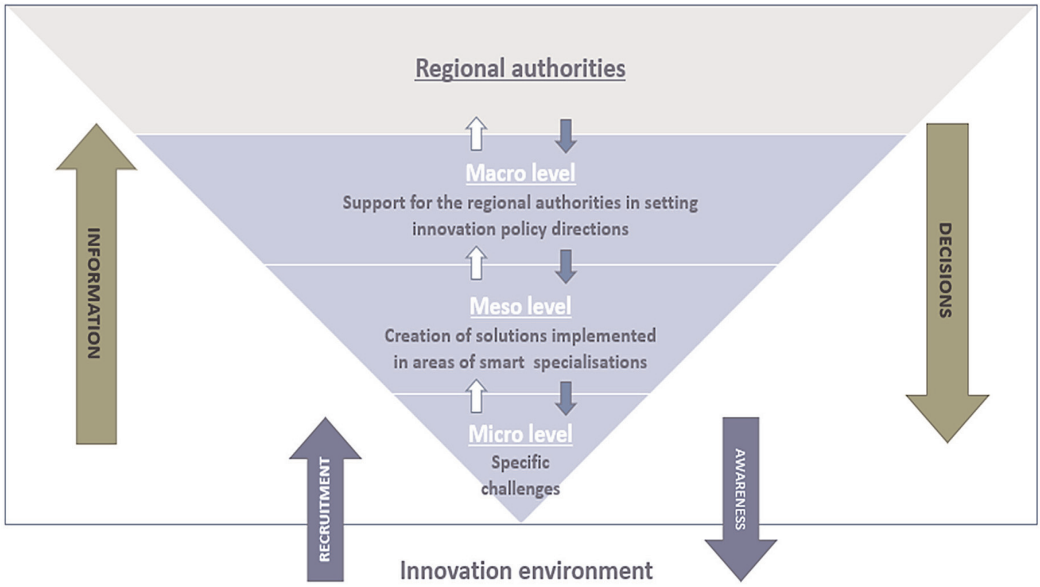
challenges of the EDP. Synthesis report of the three EDP Management Task Forces as part of Beyond EDP, 2019).

A special role in regional EDP models can be played by scientific and research units operating individually or as part of so-called intermediary bodies (clusters, science parks, regional agencies, chambers of commerce, etc.). The results of a study carried out by researchers from the European Commission — Joint Research Centre in 2021 indicate that the activity of intermediary bodies influences the possibility of achieving success factors such as the continuity of the implementation of EDPs and the creation of mechanisms and instruments used to facilitate cooperation in this regard (Perianez-Forte & Wilson, 2021). This is because the nature of their activities and the contacts they have established allow them to be positioned between the identification of individual entrepreneurs' needs (information 'sourced' from the market) and collective strategic processes. They can also support the implementation of innovation policies at the operational level (Perianez-Forte & Wilson, 2021; How to deal with the main challenges of the EDP. Synthesis report of the three EDP Management Task Forces as part of Beyond EDP, 2019).

Due to the multidimensional nature of EDP, representatives of research units can be positioned at three levels in the EDP model: macro, meso and micro. Activities at the macro level are aimed at assisting those in positions of authority to set the direction of innovation policy in relation to the economy of the region as a whole. Agreements at this level tend to be strategic in nature. Cooperation at the meso level is limited to the development of solutions that can be applied in the fields of individual smart specialisations. At the micro level, on the other hand, EDP takes place in the most direct way. This is because it focuses on finding ways to solve specific problems of a narrow group of stakeholders or individual organisations (e.g. by implementing a specific project) (How to deal with the main challenges of the EDP. Synthesis report of the three EDP Management Task Forces as part of Beyond EDP, 2019). A diagram of the cooperation network based on the three-level governance structure is shown in Figure 2. It should be seen as a model approach, as in practice both the forms and the intensity of activities carried out at the different levels reach different levels of sophistication and depend on a number of changing regional conditions. For this reason, the article does not present

comprehensive solutions for coordinated cooperation at the three levels, but rather selected examples of the participation of science and research units in the implementation of EDP. Such an approach, according to the authors, provides greater cognitive value in the field concerned.

Figure 2. Cooperation network diagram based on a three-level governance structure



Source: Based on the report — *How to deal with the main Entrepreneurial Discovery Process challenges. Synthesis report of the three taskforces on EDP Management as part as Beyond EDP project*, unpublished, 2019.

Examples of the use of the Innovation Potential of Scientific and Research Units in EDP in Selected EU Regions

Macro level

At the macro level, there are various cooperation networks in the partner regions of the 'Beyond EDP' project. These are made up of research and development units, usually represented by individuals in the most senior positions within them (e.g. rectors or relevant vice-rectors of the university). These are presented in Table 1.

Table 1. Forms of EDP cooperation operating at macro level in the partner regions of the 'Beyond EDP' project

Region	Östergötland (Sweden)	Centre Val de Loire (France)	Northern Netherlands (The Netherlands)
Name of the entity	East Sweden Business Region ESBR	Innovation Support Ecosystem Management	Regional Cooperative of Westerkwartier
Year of establishment	2011	2011	2013
Description of activity	Cooperation through the activities of the Regional Council of Eastern Sweden.	A network of public entities — Economic Developers Network of Centre-Val de Loire (RDECVL), which aims to develop a shared vision for developing the region's innovation by obtaining stakeholder commitment (representatives of 250 entities) and providing high-quality services to entrepreneurs.	A cooperative aiming to support regional and local small and medium-sized enterprises (SMEs) (around 450) to improve their competitiveness and solve common problems. This is done by encouraging the risk-taking involved in the creation and implementation of innovative solutions, as well as building a regional value chain.
Scientific and research institutions involved	Linköping University, regional science parks, clusters (Hälsans nya verktyg, Vreta Kluster and Cleantech Östergötland).	Universities of Tours and Orléans, public research organisations and institutions involved in technology transfer.	Universities (including universities of applied sciences) and various public institutions conducting research in the fields of health, wellbeing, food and landscape.
Specific solutions	Funding: The ESBR has its own budget to finance activities in target areas and to respond to general societal challenges (e.g. health care). Communication: Each ESBR partner designates a responsible contact person in each area of action.	Information sharing: RDECVL provides access to a common open database, guidance for partner activities and a regional resource repertory (an interactive portal for businesses), as well as an information and education programme to improve the advisory capacity of the ecosystem.	Approach used: A key value for the business is cooperation (including between organisations competing in the market).

Source: Based on Detterbeck (2018), Peer-review Report Bourgogne-Franche-Comté, 2018.

Meso level

In the partner regions of the Beyond EDP project, scientific research institutions are involved in the implementation of EDP at the meso level through their activities in clusters, cooperation networks and specialised Thematic Working Groups (TWGs) dedicated to the individual regional smart specialisations. In this case, they are represented by scientists who are recognised as regional experts in the selected research areas (Detterbeck, 2018). Information on exemplary forms of cooperation at this level is provided in Table 2.

Noteworthy is the distribution of roles between the different actors in the EDP model employed in the Bourgogne-Franche-Comté region of France. At this level, the clusters (certified by the competent authority of the central administration) are the most active. They are involved in supporting technology transfer and organising various events (e.g. forums, B2B meetings, technology intelligence). They also carry out research projects in cooperation with large enterprises, SMEs and research and development units.

The role of public authorities in working with clusters incorporates the following aspects:

- providing financial support (using a variety of financial instruments), and
- stimulating, coordinating and monitoring the activities of the various players.

The approach adopted makes it possible to create the conditions for increasing the level of innovation of entrepreneurs operating in the fields of all regional smart specialisations (Bourgogne-Franche-Comté peer-review report, 2018).

The MAHREG Automotive Network was established in 1999 in the German region of Saxony-Anhalt. It comprises the MAHREG Automotive and ELISA (Electro mobility, light and intelligent — an initiative for Saxony-Anhalt) clusters as well as university and non-university scientific and research institutions. As a result of the cooperation within the network, innovative technological solutions in the field of powertrain technology,

Table 2. Forms of EDP cooperation operating at meso level in the partner regions of the 'Beyond EDP' project

Region	Bourgogne-Franche--Comté(France)	Saxony-Anhalt (Germany)	Extremadura (Spain)
Name of the entity	Coordinated cluster policy	MAHREG Automotive Network	Thematic Working Groups (TWGs)
Year of establishment	Commencement of work — 2013	1999	2017
Description of activity	Organise a variety of activities to foster the acquisition and exchange of information and the promotion of technology transfer	Cooperation within the network is aimed at supporting the creation and commercialisation of innovative technological solutions in the field of propulsion technology, lightweight aluminium-based components and polymers in the field of e-mobility. These solutions are used by more than 200 delivery entrepreneurs, whose clientele encompasses all the major original equipment manufacturers of components used in building the most recognised German brands of cars, such as: Volkswagen, Daimler, BMW, Opel and Porsche."	TWGs are bodies made up of representatives of the entities belonging to the quadruple helix. Among them are regional innovation leaders in the areas of individual smart specialisations. The purpose of their cooperation is to create the conditions necessary to increase the level of innovativeness of organisations operating in these areas.
Scientific and research institutions involved	A wide range of regional research units	Scientific and research units associated in the clusters: MAHREG Automotive and ELISA (Electro mobility, light and intelligent — an initiative for Sachsen-Anhalt) as well as university and non-university scientific and research units	Scientific and research units in which research is carried out that is applicable to individual regional smart specialisations
Regional smart specialisation	All regional smart specialisations[14]	Mobility and logistics	All regional smart specialisations[15]

Source: Based on Detterbeck (2018), Peer-review Report Bourgogne-Franche-Comté, 2018.

lightweight aluminium-based components and polymers in the field of electro mobility. They are being used by more than 200 companies that supply the major original equipment manufacturers for the car brands in Germany (VW, Daimler, BMW, Opel, Porsche). Thus, there is an increase in the level of competitiveness of companies operating in the economic area of the regional smart specialisation, mobility and logistics (Detterbeck, 2018).

In order to ensure the involvement of stakeholders in a coordinated collaboration and to strengthen the relationship between them, in 2017 five TWGs were created in the Spanish region of Extremadura, dedicated to collaborating in the areas of each smart specialisation. The participants in the TWGs were selected by the General Secretariat for Science, Technology and Innovation from among representatives of the actors that make up the regional innovation system (based on the quadruple helix model) (Detterbeck, 2018).

Micro level

The involvement of science and research units in the implementation of EDP at micro level in the selected partner regions of the Beyond EDP project most often takes the form of campus-based activities. The activities of Business Advisors from the Business Innovation Centres (BICs) are also helpful for realising their potential (Detterbeck, 2018). Information on examples of cooperation at this level is provided in Table 3.

At the micro level in the German region of Saxony-Anhalt, there is the STIMULATE Research Campus, Magdeburg, coordinated by the Otto-von--Guericke University Magdeburg. Its activities are carried out within the framework of a project funded annually by the Federal Ministry of Education and Research (BMBF). The main objective of the project is to improve the quality of care and to contribute to the containment of rising health care costs for patients suffering from age-related diseases (oncology, neurology and cardiovascular diseases). Specific objectives are defined on an ongoing basis by the physicians who commission specific studies from the participating scientists. In addition to research and development, STIMULATE is active in university teaching and in the professional training of doctors and medical technicians in the field related to the project.

Table 3. Forms of EDP cooperation operating at micro level in the partner regions of the 'Beyond EDP' project

Region	Saxony-Anhalt (Germany)	Northern Netherlands (The Netherlands)	Lodzkie Region (Poland)
Name of the entity	Research Campus STIMULATE	Healthy Ageing Campus Netherlands	BIC
Year of establishment	2012	Commencement of work — 2006	2016
Description of activity	An initiative implemented as part of a project funded by the Federal Ministry of Education and Research. The main objective of the project is to improve the quality of treatment and to help contain the rising healthcare costs of patients suffering from age-related diseases (oncology, neurology and cardiovascular diseases).	The collaboration involves conducting research and commercialisation of its results in the area of healthy ageing in the broadest sense. The specificity of the campus activities lies in the application of a holistic approach (lifestyle, dietary patterns and environmental status).	Provision of support by Business Advisors from BIC according to the individual needs of entrepreneurs (e.g. by presenting the offer of regional science and research units or enabling contact with their employees)
Scientific and research institutions involved	Otto-von-Guericke University Magdeburg Other partners: Siemens Healthcare GmbH, STIMULATE Association, regional and international SMEs	University Medical Centre Groningen, University of Groningen, Hanze University of Applied Sciences	All scientific and research units located in the region
Regional smart specialisation	Health and medicine	Health, demography and welfare	All economic areas

Source: Based on Detterbeck (2018).

The partners involved in this undertaking are: Otto-von-Guericke University Magdeburg, Siemens Healthcare GmbH and the STIMULATE association, and a number of leading regional and international SMEs.

The implementation of the project will increase the level of innovation in the field of intelligent specialisation, health and medicine.[16]

Meanwhile, in 2006, the University Medical Centre in Groningen (northern Netherlands) started work on healthy ageing. The development of this work led to the creation of the Healthy Aging Campus Netherlands. It brings together all the researchers and companies of the University Medical Center Groningen, the University of Groningen, the Hanse University of Applied Sciences and various regional, national and international partners. Their collaboration aims to conduct research in the field of healthy ageing and to commercialise the results. The specificity of the campus activity lies in its holistic approach to this common societal problem. The collaboration between scientists and entrepreneurs focuses on the following factors that influence ageing: lifestyle, dietary habits and the state of the natural environment. The results of the research must be translated into the development of improved methods for the prevention and treatment of selected diseases. This in turn leads to new medical products, diagnostic technologies and nutritional products. The campus provides entrepreneurs with insight into accessible innovation chains. This allows them to gain knowledge over what has been done in the past and the problems encountered. It also helps them to find partners for cooperation. The activities of the campus lead to an increase in the level of innovation within the specialisation, health, demography and prosperity (Detterbeck, 2018).

A different approach was taken in the Lodzkie Region. In this case, the aim was to increase the level of integration of regional stakeholders and to exploit the region's business and economic potential, and accordingly, a business communication and advisory system was established in November 2016, which includes BICs. They are located in the structures of business environment institutions in selected districts of the Lodzkie Region. The task of the mobile business consultants working in them is to seek out entrepreneurs who feel the need to increase the level of innovation in their business activities and to provide them with support tailored to their individual needs. In this respect, the consultants present the offer of scientific and research institutions and business environment institutions operating in the Lodzkie Region and facilitate contacts with their representatives. They also provide information on the possibilities of

obtaining funding for the implementation of specific projects, participation in training courses or selected business events. The data on the needs of entrepreneurs collected by the counsellors during the meetings are analysed (taking into account the protection of business secrets). The averaged results of the analyses are a valuable source of information, used in the development of the region's innovation policy instruments (Detterbeck, 2018).

Summary

The implementation of the EDP as part of the RIS3 approach is essential in order to preserve the entrepreneurial knowledge dispersed among the different actors and to exploit the innovation potential, which has both an economic dimension (related to regional policy) and a managerial dimension (focussed on the organisations constituting the regional innovation systems). This requires the involvement of representatives of scientific and research organisations in the activities carried out at the appropriate level of the cooperation network (macro, meso or micro).

The examples presented show that activity in the EDP models can take different forms.

At the macro level, their representatives (often in high positions in the organisational structure) support the authorities in defining innovation policies for the whole regional economy. At the meso level, they participate in the development of solutions applicable to individual economic areas recognised as regional smart specialisations. In the case of the Beyond EDP partner regions, this is done through cooperation in clusters or specialised TWGs. At the micro level, they are involved in finding solutions to specific problems of a small group of stakeholders or individual organisations. In selected regions, this activity is carried out by campuses and business advisors from BICs. The presented results of using the potential of scientific and research units in conducting the EDP confirm the theoretical assumptions regarding the possibility of increasing the level of innovation (and competitiveness) of regional organisations by situating entrepreneurial knowledge at the centre of supporting innovation

processes. This can be seen especially in the cooperation within clusters and campuses. However, the lack of developed methods for monitoring and evaluating the implementation of EDP in selected regions is unsatisfactory. Consequently, the possibility of assessing the degree of effectiveness of the implementation of this element of the RIS3 concept is limited. The above observation leads to the conclusion that it is necessary to carry out further research on this subject.

Endnotes

[1] Based on Stawasz's (2000) view, a region is to be understood as a conventionally delimited, relatively homogeneous area that differs from others by natural (natural-geographical) or acquired (anthropological, i.e. the result of human activity) characteristics. In 2021, there were 240 regions in the EU. See Regional Innovation Scoreboard 2021, Luxembourg: Publications Office of the European Union, 2021. In Poland, the responsibility for the implementation of tasks falling within the scope of regional innovation policies (in line with the RIS3 concept) belongs to voivodeship governments.

[2] Research and Innovation Strategies for Smart Specialisation (RIS3) is the result of the work by the 'Knowledge for Growth' ('K4G') experts panel set up by Science Research Commissioner Janez Potoènik (McCann & Ortega-Argilés, 2015).

[3] It is also recommended to take into account the potential for internationalisation of the economic area considered as a regional smart specialisation (Przygodzki, 2016). This is important because of the multidimensional nature of innovation processes, which are based on linkages (relationships) that go beyond the borders of the region (Foray et al., 2012).

[4] The concept of 'entrepreneurial' knowledge includes knowledge of: science, technology and engineering, market growth potential, industry, competitors, the wider business environment, human capital and economic needs. It also includes a range of information on the inputs and service required to launch new forms of activity. Refer to Gianelle et al. (2016, p. 17).

[5] A general view has also been formulated that all agglomeration processes are partly caused by public investment decisions based on lacking knowledge. (McCann & Ortega-Argilés, 2011).

[6] See. Kochmańska (2007), Bojar and Machnik-Słomka (2014 r) and Doloreux and Parto (2005).

[7] In the case of Polish regions , the applicable provision would be the one contained in Article of the Act of June 5, 1998 on voivodeship government, Journal of Laws of 2022, item 2094. According to it, the organs of the voivodship government are: (1) provincial assembly and (2) provincial board.

[8] Depending on their positioning in the innovation process, individual actors may initiate innovative activity and disseminate its effects, as well as be its recipients (Wojtowicz & Mikos, 2012).

[9] It is recognised that without strong entrepreneurship, it will not be possible to realise the RIS3 concept, due to a lack of knowledge necessary to develop and implement regional innovation policies at a strategic level (Foray et al., 2012). The approach presented here appears to be in line with the 'role of the creative entrepreneur' formulated by Schumpeter (1994) long before the RIS3 concept was conceived.

[10] Two opportunities (external factors of development) are indicated for regional entrepreneurs to take advantage of opportunities (external factors of development) by using the RIS3 concept: (1) absorption of innovations resulting from doing business in an area of smart specialisation; and (2) participation in the implementation of projects implemented as part of the Regional Innovation Strategy and related to the development of smart specialisations (Ropęga, 2016).

[11] As a result of the EDP, a situation is created where a balance should be sought between top-down initiatives to create regional innovation policy instruments and bottom-up initiatives-'driven' by territorial actors articulating their expectations.

[12] The use of EDP will allow for qualitative research, the results of which complement the information in the area of innovation policy obtained using quantitative methods (McCann & Ortega-Argilés, 2011).

[13] This approach was considered inappropriate because the identification of regional smart specialisations was associated with existing regional biases regarding industrial priorities and technological capabilities. In addition, it excluded the entrepreneurial knowledge necessary to ensure the discovery of R&D and innovation areas in which a region can thrive (Foray & Goenaga, 2013).

[14] Regional smart specialisations of the Bourgogne-Franche-Comté region during the 'Beyond EDP' project period included: food and health, materials, biomedicine, eco-construction, mobility, energy, information and communication technology (ICT), traditional food, micro-technology and luxury products (Peer-review Report Bourgogne-Franche-Comté, 2018).

[15] Regional smart specialisations of Extremadura during the 'Beyond EDP' project period included: agri-food, clean energies, tourism healthcare and ICT (*Estrategia de Investigación e Innovación para la Especialización Inteligente de Extremadura 2014–2020*, 2014).

[16] The project is being implemented using the institution of public-private partnership.

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