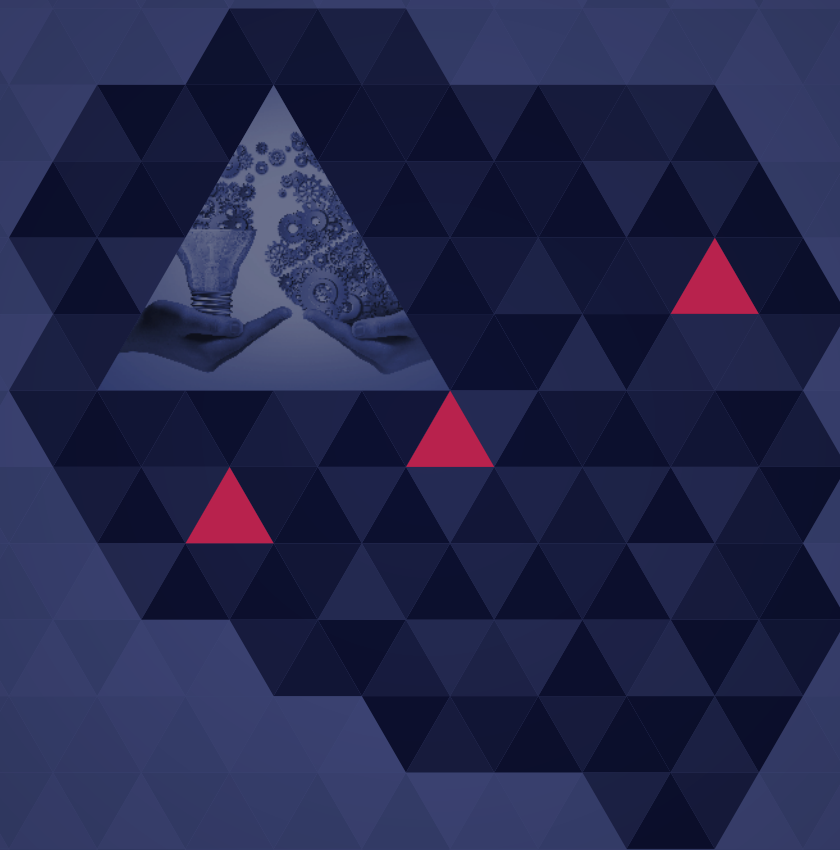


POLAND CATCHING-UP REGIONS 3

SUPPORTING REGIONAL INNOVATION
AND ENTREPRENEURSHIP
LODZKIE, PODLASKIE
AND DOLNOSLASKIE REGIONS



POLAND CATCHING-UP REGIONS



SUPPORTING REGIONAL INNOVATION
AND ENTREPRENEURSHIP
LODZKIE, PODLASKIE
AND DOLNOSLASKIE REGIONS



© 2019 International Bank for Reconstruction
and Development / The World Bank
1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this work is subject to copyright. Because The World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given.

Any queries on rights and licenses, including subsidiary rights, should be addressed to World Bank Publications, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2625; e-mail: pubrights@worldbank.org.

CONTENTS

Acknowledgements	5
Acronyms	6
Executive Summary	7
PART 1 CONTEXT AND BACKGROUND	11
PART 2 PROJECT OUTCOMES	15
Development of the analytical base for policy interventions	16
Identification and design of tailored pilot interventions	17
Dolnoslaskie	18
Podlaskie	18
Lodzkie	19
Increased awareness and knowledge sharing	20
PART 3 PROJECT ACTIVITIES AND DELIVERABLES	23
Development of the evidence base	24
Designing and developing regional pilot instruments	24
Building local competence	26
PART 4 GOOD PRACTICES IN DESIGNING REGIONAL I&E POLICY INSTRUMENTS	29
LIST OF ANNEXES	33
Notes	33

FIGURES

FIGURE 1 Emerging Practical Recommendations	16
FIGURE 2 Dimensions and Categories of the Policy Instrument Functionality	25

TABLES

TABLE 1 Summary of the 5 pilots	17
TABLE 2 Capacity Building Activities	26

ACKNOWLEDGEMENTS

This report was prepared by a core team comprised of Anwar Aridi, Lisa Cowey, Dariusz Wiatr, Jerzy Toborowicz and Wojtech Nosek, and coordinated by Paul Kriss, Marcel Ionescu-Heroiu, Grzegorz Wolszczak and Agnieszka Boratyńska.

The team would like to thank Commissioner Corina Crețu for initiating the Initiative, Minister Jerzy Kwieciński from the Poland's Ministry of Investment and Economic Development for his invaluable support, and the European Commission's team for outstanding engagement and support, especially Marc Lemaitre, Erich Unterwurzaher, Christopher Todd, Wolfgang Munch, Justyna Podralska and Andrzej Urbanik.

The team would like to thank Arup Banerji, David Sislen, Marialisa Motta, Carlos Pinerua for the advice and guidance provided throughout the elaboration of this report and Agnieszka Boratyńska for her excellent support.

The team is also indebted to all counterparts for the support offered in the elaboration of this study, the timely feedback, the excellent collaboration throughout, and their passion for developing their regions and institutions, especially: the Ministry of Economic Development: Marta Leśniak, Anita Wesołowska, Piotr Machański; from Podlaskie Marshal Office: Joanna Sarosiek, Wioletta Dąbrowska, Katarzyna Poleszczuk-Woźniowska, from Białystok Science and Technology Park: Anna Daszuta-Zalewska, from Metal Processing Cluster: Sebastian Rynkiewicz, from University of Białystok: Rector Mariusz Popławski, Maria Truskolaska, from Medical University of Białystok: Rector Marcin Moniuszko, Andrzej Małkowski, from Białystok University of Technology: Rector Lech Dzienis, Tomasz Stypułkowski; from Dolnosląskie Marshal Office: Agnieszka Czuczvara, Tomasz Krzeszowiec, Zbigniew Dynak, Agata Zemska, Justyna Lasak, Michał Frycz, from Wrocław University of Technology: Rector Cezary Madryas, Rector Andrzej Kucharski, Damian Derlukiewicz, from Wałbrzych City Council: President Roman Szelemej, Andrzej Kosiór, Martyna Dąbrowska, from Dolnoslaskie Regional Development Agency: Sławomir Hunek, Barbara Buryta, Tomasz Charkot, from Dolnoslaskie Employers' Association: Artur Mazurkiewicz, Katarzyna Kiek, Marcelina Palonek; from Łódzkie Marshal Office: Małgorzata Zakrzewska, Łukasz Siekiera, Piotr Kinas, Dorota Milska, Aleksandra Rutkowska, Monika Urbaniak, Anna Tomaszewska, from Łódź City Council: Agnieszka Chudzik, from Łódź University: Rector Antoni Różalski, Adam Kaźmierczak, from Łódź Medical University: Rector Radziśław Kordek, Bartłomiej Grobelski, Agnieszka Rzeźnik, from Łódź University of Technology: Rector Sławomir Wiak, Rector Dariusz Gawin, Grzegorz Kierner, Grzegorz Liśkiewicz, from BioNanoPark: Marta Wankiewicz, Andrzej Berut.

The report was completed in May 2019.

ACRONYMS

BLC	Business-Led Challenge
CDU	Challenge-Driven University
BUT	Bialystok University of Technology
CBI	Center for Business Innovation
CTT	Center of Technology Transfer
DARR	Dolnośląska Agencja Rozwoju Regionalnego
EC	European Commission
ECTS	European Credit Transfer Scheme
EU	European Union
I&E	Innovation and Entrepreneurship
IP	Intellectual Property (Rights)
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MS	Member State
MO	Marshal's Office
NSF	National Science Foundation
PBL	Problem Based Learning
PCI	Podkarpackie Center for Innovation
PRO	Public Research Organization
R&D	Research and Development
RDA	Regional Development Agency
ROP	Regional Operational Program
SME	Small and Medium Enterprises
SPC	Special Purpose Company
S3	Smart Specialization Strategy
SWOT	Strengths Weaknesses Opportunities Threats
TA	Technical Assistance
WB	World Bank

EXECUTIVE SUMMARY

This report outlines support provided by the World Bank to the Lodzkie, Podlaskie and Dolnoslaskie regions under Activity 6 of the Catching-up Regions 3 (CUR1) Initiative (Technology Transfer and Innovation) in the period July 2018 – June 2019. Assistance has focused on three main activities: analytical support, technical assistance (TA) and capacity building.

The in-depth analytical report provides a strong base for evidence-based policy, including a SWOT (Strengths, Weaknesses, Opportunities and Threats) and an overview of present technology transfer (TT) activities and outputs (Annex 1). Five key recommendations emerged from the report (see Figure 1) along with a specific gap analysis for each region. These were used as the starting point to design pilot actions for each region (Annex 2) using technical assistance from the World Bank team and stakeholder engagement.

The pilot design was based on the identification of one or more clearly analyzed and comprehensively diagnosed problems in each region. The main challenge for the Dolnoslaskie sub-region is the low level of innovation in local, traditional enterprises in Walbrzych, that are not successfully addressed through existing instruments (such as innovation vouchers), combined with a lack of proximity to a knowledge provider. The main challenge for the Podlaskie region is to overcome the limited technical and financial resources for TT in the Public Research Organizations (PROs) and in particular, funding of early stage promising commercialization projects. Finally, the Lodzkie region demonstrates a lower than optimum level of support for the Regional Operation Program (ROP) innovation support instruments, and a lack of commercialization competencies among the region's researchers, compared to the strength of their potential pipeline.

The preliminary approach to designing the pilots was to ensure that each one was:

- **Grounded in the analytical findings** that emerged from the data and field work, and designed to address identified gaps and potentials within the supply and demand framework;
- **Designed for piloting**—experimental in nature and intended for short-term implementation with the intention that if a pilot fails to achieve its objectives, it can be adjusted, refocused, or terminated;
- **Low cost**—so that it does not require substantial budget commitment, but leverages resources from regional and national, private and public, stakeholders;
- **Easy to implement**—by ensuring that it does not require complicated administrative procedures or institutional and governance structures; rather, it leverages the existing structures and institutions.

The subsequent design of tailored pilot interventions were built on the present strengths and opportunities and were designed to fit a modified ROP. The development process was iterative, and involved building a strong working relationship with local stakeholders, including the Marshal's Office (MO), PROs and RDAs (Regional Development Agencies).

The intervention method suggested for the Dolnoslaskie sub-region was to bring student teams and research mentors to the companies, so that they could diagnose and address innovation challenges in the field. Under this type of intervention, Walbrzych businesses would benefit from accessing local technical talent from among the regions' graduates, supervised by more experienced researchers from the university. In the longer term, this could create attractive jobs in Walbrzych enterprises, and lead to the recruitment of talent from the student teams.

The outcome of the design process in Dolnoslaskie was a proposed pilot that combines 'business-led challenges' (BLC) with 'problem-based learning' (PBL). This pilot paves the way for a European Credit Transfer Scheme (ECTS) based on BPL at the Wrocław University of Science and Technology, and the long-term possibility of a full cultural shift towards a 'challenge-led university' in the future. Local businesses do not have the local research counterpart to engage with on long-term projects—BLC could establish impetus for such engagements.

In Podlaskie, the team recommended the setup of a Partnership for University-Industry Cooperation as a joint undertaking. The main objective of this partnership is to build stronger and closer relationships, among universities, and with local firms and industries. A second recommendation was to introduce a regional proof-of-concept (PoC) program. This PoC program would provide financial support to technological projects with commercialization potential that were of high quality but were not selected for funding in national programs and which offer clear benefits to the regional innovation ecosystem.

In Lodzkie, the team recommended two pilots, focused on building the capacity to support innovative enterprises and research teams. The first pilot aims at increasing the use of the ROP funds, by introducing a more intensive outreach by the MO to local businesses, and more effective promotion of the ROP by the Center for Business Innovation (CBI), along with the creation of a database of the region's potential innovators, and the preparation of collateral material describing the key points and advantages of the Lodzkie ROP's innovation agenda. The second pilot aims to introduce a variation of the U.S. National Science Foundation Innovation Corps (NSF I-Corps) training program to build stronger commercialization competence among the research teams. Given the ubiquity of the research commercialization challenge, the objective is to scale this regional training pilot to a national-level program and position Lodzkie as a center for research commercialization training and competence.

Alongside the pilot design, the WB team provided capacity-building activities to help enhance competencies and raise the local stakeholders' awareness of good practices and experience. A series of relevant and tailored workshop activities were delivered by internationally recognized experts, designed to leverage the findings of the analytical report, and build capacity to implement the pilots and future actions. These included workshop training on state aid rules related to ancillary use of research infrastructure, an introduction to the U.S. NSF I-Corp program for researchers, and an introduction to policy design for Innovation and Entrepreneurship (I&E) instruments. A future study visit was also designed. The overall outcome of these activities was a deeper awareness about each region's challenges, wider recognition of good practices, expanded professional networks, and, in general, increased capacity at the regional level to design and implement high-quality I&E support instruments and activities.

Finally, based on the lessons from this 12-month engagement, the team distilled a list of transferable good practices that could inform policy makers and practitioners involved in similar actions. These recommendations are based on direct observations from the project and build on the good practices of designing innovation policy instruments¹. They include the importance of an explicit and realistic logical framework and Monitoring and Evaluation (M&E) indicators, clearly identified instrument objectives that are measurable, complementarity with the existing regional and national policy mix, and availability of evidence as a justification for policy intervention.

PART 1

CONTEXT AND BACKGROUND

This report outlines the support provided by the World Bank to the Dolnoslaskie, Podlaskie and Lodzkie regions under Activity 6 of the Catching-up Regions 3 (CUR3) initiative in the period July 2018 – June 2019. Activity 6, Technology Transfer and Innovation, is a continuation of the tasks performed under Activity 1 in 2016 – 2018, during the design and implementation of the Podkarpackie Center for Innovation (PCI), in the Podkarpackie region. The PCI's mission is to build bridges between the region's research and development (R&D) and knowledge providers, and local enterprises and entrepreneurs (the demand side), in a way that fosters the culture of entrepreneurship at the universities, and complements the commercialization efforts of the university centers of technology transfer (CTTs) and their special purpose companies (SPCs). Activity 1 was concluded in June 2018². Activity 6 was designed to build on the experience gained and selected good practices learned, from the 2016 – 2018 period, in three Polish regions: Lodzkie, Podlaskie and Dolnoslaskie.

Assistance under Activity 6 has focused on three main activities: analytical support, technical assistance and capacity building. Specifically, Activity 6 provided a robust analytical analysis that complements the s3 analytical methodology (see Annex 1). The team conducted an in-depth analysis of each region's performance based on quantitative statistical indicators, as well as qualitative input from interviews with stakeholders, including enterprises from each region. The analytical report identified the key gaps, and consequently, the needed public interventions, for each region.

Emerging recommendations from the analytical reports, combined with the know-how accumulated from the WB PCI engagement in Podkarpackie, and proposals submitted by each region, were used to identify potential pilot actions to improve business-science cooperation. The World Bank team developed three regional pilots that clearly address identified problems and challenges that are key for the MOS to deliver effective program implementation. These pilots were designed to be compatible with the timescale and resources of a modified Regional Operational Program (ROP). A roadmap was developed for each proposed pilot (see Annex 2).

Throughout the duration of the project, the WB team designed and delivered several capacity-building activities to reinforce the emerging pilots and their associated activities (see Annex 3). These included: structured workshops with national and international trainers to explore particular issues related to science-to-business engagement, raising awareness of good practices from other countries to encourage academic entrepreneurship, gaining skills in the design and implementing of Research and Development and Innovation (R&D&I) actions, and proposals for study tours to other EU member states to observe and learn at firsthand about selected and relevant European practices.

The WB team has used Activity 6 to distill lessons learned that can inform policy makers and practitioners involved in the design and implementation of similar actions in other Catching-up Regions.

PART 2

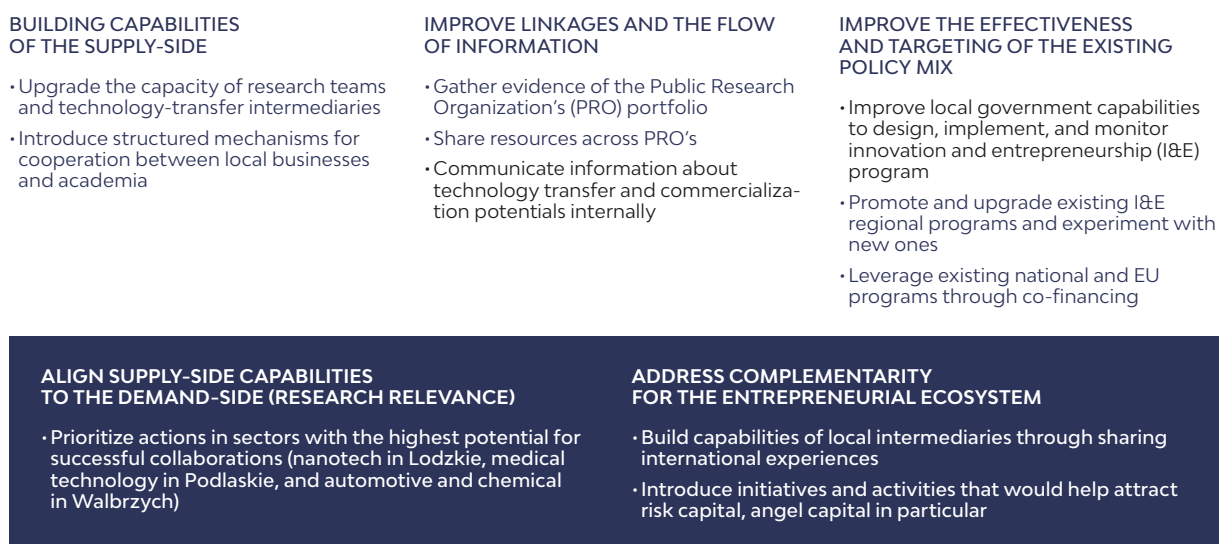
PROJECT OUTCOMES

Over the course of the 12 months, the WB team has achieved a number of outcomes as per the design of this regional engagement. Namely, these outcomes include: the development of a strong analytical base for evidence-based policymaking that highlighted particular issues for each region; clearly identified and diagnosed problems that enabled the design of tailored interventions that leveraged present strengths and opportunities and will fit to a modified ROP; and enhanced competencies and raised awareness of good practices and wider experience that will enable the local stakeholders to design and deliver impact from new interventions. These individual outcomes, and their benefit for other similar projects, are detailed below.

DEVELOPMENT OF THE ANALYTICAL BASE FOR POLICY INTERVENTIONS

A fundamental aspect of the World Bank support has been a comprehensive analytical exercise for each of the three regions (Annex 1). The ensuing report combined both qualitative and quantitative data and provided a strong base for evidence-based policymaking. In particular, the report enabled identification of the specific context and issues for each region, the potentials and competencies for increased innovation, and the gaps that might be addressed through new interventions.

FIGURE 1 Emerging Practical Recommendations



Source: World Bank

The analytical work produced several practical recommendations. These recommendations were linked to the gaps and overlaps between the demand-side and the supply-side. These gaps and overlaps identified where the target regions needed to be indirectly or directly 'anchored'. The emerging practical recommendations were clustered around the following key areas (see Figure 1):

- Build capabilities of the supply-side

- Improve linkages and flow of information
- Improve the effectiveness and targeting of the existing policy mix
- Align the supply-side capabilities to the demand-side (research relevance)
- Address complementarities for the entrepreneurial ecosystem

These recommendations formed the starting point for the design of pilot actions for each region.

IDENTIFICATION AND DESIGN OF TAILORED PILOT INTERVENTIONS

The second key outcome of this project was the design of pilot interventions for the three regions. The preliminary approach to designing the regional pilots was to ensure that each one was:

- **Grounded in the analytical findings** that emerged from the data and field work, and designed to address identified gaps and potentials within the supply and demand framework;
- **Designed for piloting**—experimental in nature and intended for short-term implementation with the intention that if a pilot fails to achieve its objectives, it can be adjusted, refocused, or terminated;
- **Low cost**—so that it does not require substantial budget commitment, but leverages resources from regional and national, private and public, stakeholders;
- **Easy to implement**—by ensuring that it does not require complicated administrative procedures, or institutional and governance structures; rather, it leverages the existing structures and institutions.

Each individual pilot was developed to address one or more clearly identified and comprehensively diagnosed problems for the region (the areas highlighted in red in Figure 1). The development process was iterative and involved building a strong working relationship with local stakeholders including the MO, PROS, RDAs, and other intermediaries. The joint development process was designed to ensure that all the proposed pilots:

- Address the diagnosed problem(s)
- Build on present strengths and opportunities
- Leverage and scale existing potentials
- Are realistic and feasible for implementation in the short term
- Draw on demonstrated international good practices
- Have the potential to deliver measurable impact through defined key performance indicators (KPIs)
- Will fit to a modified ROP
- Have the support of all the major stakeholders

The WB team developed 5 regional pilots for the 3 regions. One of these pilots, in Dolnośląskie, evolved from an initial proposal submitted by the Lower Silesia MO for a challenge driven-university (CDU). The 5 pilots are: summarized in the table below

A brief description of each of the individual, tailored pilots follows below, full details are contained in Annex 2.

TABLE 1 Summary of the 5 pilots

Region	Designed Pilots
Dolnoslaskie	Business-Led Challenges
Podlaskie	Partnership for University-Industry Cooperation Proof-of-Concept (PoC) Support Program
Lodz	Lodz Enterprise Innovation Support Poland I-Corps Program

Source: World Bank

Dolnoslaskie

The main problem identified for the Dolnoslaskie sub-region of Walbrzych was the low level of innovation in local enterprises. This problem is not being addressed through the existing traditional instruments (such as innovation vouchers), which do not help bring the knowledge base into contact with enterprises. Low take-up of existing policy instruments is partly due to the physical (geographic) distance between enterprises in Walbrzych, and the local R&D provider in Wrocław. The distance is further exacerbated by the poor fit between demand and supply sides: the traditional, non-innovative culture of the local companies, and the relatively low research component of their present innovative needs, do not make them a strong match for the research activities of the Wrocław University of Science and Technology.

Overall, the region has a pool of strong student talent, but the economic prosperity of Wrocław, compared to Walbrzych, is a cause of local 'brain drain', making it harder for the Walbrzych enterprises to attract and retain graduates from the Wrocław University. This migration of local talent to Wrocław could be reduced, if there were more opportunities for talented graduates to be working in innovative enterprises, so that they could combine job satisfaction with the lower cost of local living.

The team proposed an activity that would bring student teams and research mentors to the companies, so that they could diagnose and address innovation challenges in the field. Under this type of intervention, the Walbrzych businesses would benefit from access to local technical talent from among the regions' graduates, supervised by more experienced researchers from the university. In the longer term, this intervention could create attractive jobs in Walbrzych enterprises and lead to the recruitment of talent from the student teams. This intervention was a 'pivot' on the original proposal from the region to develop a challenge-led university.

The final design of the Dolnoslaskie pilot combines business-led challenges (BLC) with problem-based learning (PBL). This pilot paves the way for use of the European Credit Transfer Scheme, (ECTS) based at the university, and the long-term possibility of a full cultural shift towards a challenge-led university in the future.

The design process attempted to identify a way to retain the original proposed concept of a challenge-driven university, while adapting it to fit the current strengths and opportunities. This approach channeled new and emerging ways to bring innovation into the first stream mission of the university (teaching), and blend it with the second mission (research). This concept also reinforced the ongoing entrepreneurial process of discovery in local enterprises that is currently being used to deliver the Smart Specialization Strategy (S3) for the region.

The WB team ensured that a clear commitment to facilitate the changes needed to the ROP, and secure the necessary funds, was secured from the MO, and that a clear champion emerged to implement the pilot in the form of the RDA — Dolnośląska Agencja Rozwoju Regionalnego DARR). The team also ensured that commitment was secured from other key stakeholders, including the local research-rich PRO, the city, and the local Employers Association. An interactive process of development was used to build consensus that yielded a detailed concept note and roadmap, including a budget for all the partners, and an understanding from the MO of how this concept could be incorporated into the present ROP. It also included suggestions for how this concept could be further developed for the next ROP, to include knowledge-transfer partnerships and internships, based on examples showcased from other EU countries.

Podlaskie

The Podlaskie region is 'organizationally thin' meaning that there are a limited number of strong stakeholders, especially on the supply-side, where applied research capacity is limited, and scientific cooperation with other R&D actors in the country and abroad is underdeveloped. In general, PROs suffer from fragmented technical and financial resources, when it comes

to research commercialization and cooperation with companies. They also do not have enough internal capacity (expertise, money, and time) to develop prototypes, and ultimately, products that are market ready for commercialization. There are several strong research areas with commercialization potential, including medical technology and state-of-the-art equipment. However, although some R&D projects have frequently demonstrated commercial potential, they have not been very successful in the nationwide proof-of-concept competitions. Companies in the region often do not invest in innovation as part of their long-term business strategy, and thus lack the internal capacity and motivation to collaborate with the PROs beyond routine measurements and specialized tests. It is therefore important to build a critical mass of commercialization capacity through collaboration and cooperation of the region's universities with local enterprises and clusters. This effort should build on the willingness of the stakeholders to cooperate, and opportunities made possible through the increased commercial use of research infrastructure (RI) and the presence of a strong leader Bialystok University of Technology (BUT).

The WB team recommended the setup of a Partnership for University-Industry Cooperation as a joint undertaking. The main objectives of this partnership are: to build stronger and closer relationships, among universities, and with local firms and industries; and to leverage the limited human and financial resources, as well as the underused RI, through the collaboration of the universities and research organizations.

To achieve this goal, the partnership is expected to organize joint activities, which will lead to increased cooperation between universities and companies. Universities will be able to leverage their capacities to increase their economic impact in the region. The joint activities should also help increase the mutual trust between universities and companies, which the analytical report identified as one of the main obstacles for cooperation.

The WB team suggested focusing on activities that are not very costly, but that can have a significant impact, such as, speed dating/business breakfast, and a joint database of R&D equipment and expertise. Speed dating events could effectively set balanced expectations among universities and companies, and also increase mutual trust. The joint database functions as a single point of contact for companies. It contains not only lists of equipment, but also expertise, and possibly services, of the PROs in the region.

The second proposed pilot for the region will introduce a regional proof-of-concept (POC) program. The objective of the POC program is to provide financial support to technological projects with commercialization potential and of regional significance, that were not selected for funding in national programs. Selected projects would have to address one of the priority topics, as selected by the Partnership for University-Industry Cooperation, correspond with the priorities mentioned in the Regional Innovation Strategy, and reflect the needs of a regional business.

The WB team ensured that a clear commitment was secured from the MO to facilitate the changes needed to the ROP and secure the necessary funds to support the pilots. Local champions (such as BUT and its SPC) emerged as potential implementation partners, in addition to the local research players (BUT, University of Bialystok, UB Medical University of Bialystok UMB), the city, and the local cluster (metal processing). An interactive process of development was used to build a consensus that yielded a concept note and roadmap, including an indicative budget and an understanding from the MO of how this could be incorporated into the present ROP.

Lodzkie

The analytical exercise and early consultations with key regional actors identified two potential areas for effective intervention in Lodzkie: increasing the level of uptake of the existing ROP funds available for innovation support; and building stronger commercialization competencies among the region's researchers. On the demand-side, the Lodzkie enterprise base is diversified and has particular strengths in medical devices, pharmaceuticals, textiles and other light manufacturing. However, this base is not making strong use of the available

innovation support instruments, nor is it well integrated into the local PROs. Research from the PROs is strong nationally, and the CTTs have demonstrated technology transfer activity, but the level of start-up formation, risk investment activity, and the commercialization of university R&D is low, suggesting substantial underused potential.

To address these challenges two pilots were proposed. Pilot 1 — Enterprise Innovation Support — aims at increasing the use of the ROP funds, by improving existing enterprise support instruments, including their promotion and support. Pilot 2 — Poland I-Corps Program — aims to launch a structured commercialization capacity-building program for research teams, something that is currently lacking in Poland. Both pilots involve key stakeholders from the region: the Marshal's Office, PROs, and their CTTs.

The objective of the Enterprise Innovation Support pilot is to ensure a more intensive outreach by the MO to local businesses, and more effective promotion of the ROP through the Center for Business Innovation (CBI). The CBI represents a potential mechanism to stimulate demand for innovation among the region's small and medium enterprises (SMEs). Currently, CBI is focused on other objectives, and is only able to offer minimal support to help companies innovate. Training CBI personnel will improve their ability to encourage the local enterprises to consider applying for ROP funds. Other activities proposed as part of this pilot include the creation of a database of the region's potential innovators, and the preparation of collateral material describing the key points and advantages of Lodzkie ROP's innovation agenda.

The objective of the Poland I-Corps Program pilot is to improve the capacity of researchers to identify opportunities, and transfer more of their research outputs to the private sector. The pilot leverages the experience of the I-corps program of the U.S. National Science Foundation (NSF) in designing and running programs teaching researchers to launch businesses based on their inventions. The proposed intervention will lead to a first-edition implementation of this concept in Lodzkie. In the long term, the Lodzkie experience can be extended to other Polish regions. It is envisaged that the three-week program would be delivered by personnel experienced with the NSF approach, include a 'train-the-trainer' component, and initially target several (6–8) teams from all the local universities. During the program, the teams would be expected to seek feedback from potential customers and business partners, thus testing the commercial viability of their technological inventions.

Through several rounds of consultations, the World Bank team ensured that both pilots have the initial support and commitment of the key stakeholders in the region. The MO is willing to consider changes to the ROP to fine-tune the mission and concept of the CBI, as well as to identify the optimal funding formula for the I-corps-type program for Lodzkie. All three CTTs confirmed the need for, and their support of, the I-corps pilot, while stressing the importance of keeping their respective sectors engaged in designing and launching the initiative.

INCREASED AWARENESS AND KNOWLEDGE SHARING

The capacity-building activities organized by the WB team focused on building the capabilities needed to improve I&E support, and sharing relevant international experiences. The series of workshops and trainings targeted areas of competence common to all three regions. In total, four workshops were delivered, (two in Warsaw, two in Lodz) and a knowledge-exchange study tour was devised for the Dolnoslaskie counterpart. The overall outcome of these activities was deeper awareness about each region's key challenges, wider recognition of international good practices, expanded professional networks among regional and national stakeholders, and increased capacity at the regional level to design and implement I&E support instruments and activities.

PART 3

PROJECT ACTIVITIES AND DELIVERABLES

This section provides a description of project activities and associated deliverables between July 2018 and June 2019. The main activities were: an analytical analysis of all three regions with an associated report (Annex 1); the design of pilot interventions for each region, with a resulting roadmap (Annex 2); and a series of capacity-building activities (workshops and study visits) (Annex 3). These are detailed below.

DEVELOPMENT OF THE EVIDENCE BASE

The analytical exercise followed the regional innovation system framework as an analytical tool, distinguishing between the knowledge generation subsystem (PROs) and the knowledge utilization subsystem (enterprises). The objective of the exercise was to identify gaps and areas of overlap between the regional knowledge-producing actors and the enterprise sector, to enhance knowledge flow and transfer, to yield better economic outcomes.

The analysis combined quantitative and qualitative methods (mixed methods), and used existing public and primary data. After a thorough stakeholder identification process in each of the regions, the WB team conducted a bibliometric analysis of research output and collaboration by the regions' knowledge providers and analyzed their areas of relevant competence and specialization. To supplement the lack of public information on the regions' university technology transfer and contract research activities, the team designed and conducted a survey targeting all the TTCs in the three regions. The results of the survey helped establish a baseline of the current technology transfer and contract research activities in each region³. Consequently, the team analyzed the firm's innovative activities, industrial specializations, and collaborations. The quantitative desk research helped identify general regularities and patterns, as well as, the knowledge and industrial specializations in each region. The findings were then corroborated and verified (and adjusted) through a series of semi-structured interviews with the key regional stakeholders from both subsystems. These qualitative interviews provided valuable insights and, to some extent, understanding of the causal factors. The findings from the analytical exercise guided the development of the policy recommendations focused on improving technology and knowledge transfer capabilities, as well as innovation adoption (see Figure 1 above).

DESIGNING AND DEVELOPING REGIONAL PILOT INSTRUMENTS

Development of the pilots commenced when proposals and suggestions were put forward by the three regions⁴. The analytical report and early discussions highlighted that the concept of a single innovation center and the three platform interventions proposed in the Podkarpackie Center for Innovation (PCI) might not be suitable for the three regions. The WB team, therefore, elected to keep an open mind regarding the new pilots and to consider possible alternative instruments that respond to the specific regional needs. This decision was underscored by the fact that the PCI has yet to show any results or impact, due to delays in commencing its operations.

Based on the emerging findings from the analytical report, combined with a SWOT analysis, it became clear that while there were commonalities in the challenges faced by all three regions, there was also a clear case to be made for a different set of diagnosis-based interventions. This was underlined through a series of consultations with the key stakeholders in each of the regions, when the WB team pressed to explore the underlying problems and issues. The underlying objective was to ensure that the pilots respond to real problems (not symptoms) and are not ‘solutions looking for problems.’

The pilot design and development process built on the framework established by the functional and governance analysis component of the World Bank Public Expenditure Review for Science, Technology, and Innovation (PER STI)⁵. The functional and governance analysis is an in-depth assessment of the design, implementation, and governance of specific instruments, by institution and position within the policy mix (see Figure 2). The team followed this framework by addressing the different sub-components in the design process, and integrating them into the concept notes of each of the pilots. Once a problem had been identified and prioritized with the MO in each region, a concept note was developed for a pilot action (see Annex 2). Concept notes were iterative and developed through meetings and face-to-face exchanges with the MO and the main stakeholders in each region, as well as by email and remote discussions.

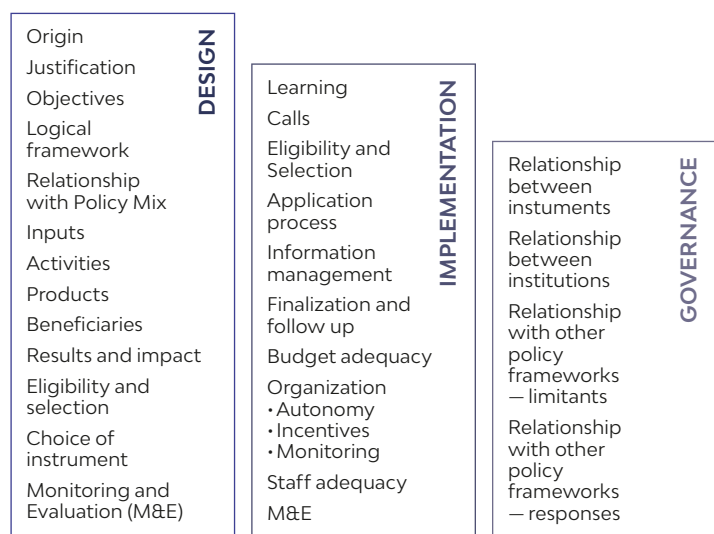
Key to this development process was a clear understanding by the WB team as to how an existing ROP could be modified to enable a new pilot action to be supported. This goal was pursued by ensuring that the proposed pilot is a close fit, with existing priorities and defined interventions. It was also important that the MO and regional stakeholders understood how they could seek approval for changes, as this was a new process for most of them; the support of the Commission at steering committee meetings was helpful in addressing this issue. It was also important for both groups to understand how to operationalize the change (if it could be a non-competitive grant, for example, or if it would have to be a fully competitive process).

The deliverables for each pilot can be found in Annex 2 in the form of a concept note. Each concept note covers the following subsections:

- Objectives
- Rationale (background and justification for the proposed approach)
- Proposed activities and associated outputs
- Key Stakeholders in the action
- Target groups
- Pilot Evaluation
- Long term planning
- Instrument and Financing structure
- Tasks and responsibilities
- Other issues to be addressed
- Risks and mitigation
- Main counterpart
- Outputs
- Indicators
- Timeline
- Beneficiaries

Where possible, a detailed budget was also incorporated that reflected the tasks and activities of each organization involved.

FIGURE 2 Dimensions and Categories of the Policy Instrument Functionality



Source: World Bank

BUILDING LOCAL COMPETENCE

The WB Team designed and implemented a series of capacity-building activities to help ensure both a good quality design of the pilots, and a solid preparation of the ground for successful implementation. These activities are summarized in the table below and in Annex 3.

TABLE 2 Capacity Building Activities

Workshop/ Date/ Location	Objective/ Goals	Description	Target audience/ Beneficiaries
State Aid and Ancillary Use of Research Infrastructure 19.11.2019 Warsaw	Improved understanding of how to make use of research infrastructure for commercial purposes in the state aid legislative framework	Presentation of the main relevant state aid issues, a practical methodology for monitoring use that complies with current law and international examples	Public Research Organizations, Centers for Technology Transfer, PARP, UOKiK, MoIED, EC
Research Commercialization Training 17.01.2019 Lodz	To introduce researchers from the PROs to the methodology and tools of the U.S. NSF I-Corps program and lay the ground for take-up and adoption via a pilot	A hands-on practical overview to the complete 'I-Corps' methodology for rapid commercialization, delivered by experienced and certified trainers	Young researchers and Centers for Technology Transfer
Design and Implementation of I&E Instruments 07.05.2019 Warsaw	Enhanced understanding of how to design I&E policy interventions and exposure to relevant international examples	An interactive introduction to the main issues inherent in designing and implementing I&E actions. A number of programs from outside Poland were introduced with direct relevance for the proposed pilot actions	Marshal Office, Regional Development Agencies, City Councils, Centers for Technology Transfer
Mini Workshop* May 2019 Łódź	Capacity building for the Business and Innovation Centers (BIC)	Interactive support to clarify the role of the BIC, adoption of an operational manual for the BIC staff in the field, and support for the MO in defining indicators to enhance the activities of the BIC	Marshal Office's Business and Innovation Centers in Lodz
Study Visit* (Czech Republic 2019)	Direct exposure to a 'Business Led Challenge' program	Meeting with the Technical University of Prague that runs the SSP Platform and Co@Fit match-making event**.	Marshal Office, Regional Development Agencies, City Council and PROs from Dolnoslaskie Region

Source: World Bank

Note: PARP – Polish Agency for Enterprise Development, UOKiK – Office of Competition and Consumer Protection, MoIED – Ministry of Investment and Economic Development, EC – European Commission

* At the time of the writing of this report, these two activities were already prepared but not yet delivered

** See <https://ssp.fit.cvut.cz/>

PART 4

**GOOD PRACTICES
IN DESIGNING REGIONAL I&E
POLICY INSTRUMENTS**

This section provides a summary of transferable lessons related to the design of regional I&E programs and policy instruments. These lessons are based on direct observations from the project and draw on good practices in the design of innovation policy instruments. The key emerging principles for effective design of regional I&E policy instruments include:

1. Availability of evidence as a justification for policy intervention
2. Early and sustainable stakeholder engagement
3. Clearly identified instrument and program objectives that are measurable
4. Complementarity with the existing regional and national policy mix
5. Explicit and realistic logical framework and M&E indicators
6. Keen consideration of the implementation capacity and costs

Availability of evidence as a justification for policy intervention

Evidence-based intervention to design policy actions is critical, particularly on the regional level, where analytical and financial resources are usually scarce. Analysis should be based on a balanced mixture of quantitative statistical data and qualitative information collected from consultations with stakeholders. Attempts to quantify the extent of the failure at hand, and the methodologies and data needed, may differ at the regional level, compared to national-level initiatives. The feasibility of collecting qualitative data from the manageable number of stakeholders and actors allows for more granularities and ‘street level truth’ to emerge. It is also important to communicate and test the perceived validity and legitimacy of both the methodology and the data collected through discussions with stakeholders. The value of the evidence is in its acceptance by the key stakeholders as a justification for policy intervention.

It is critical to identify the root cause of an identified problem, as there can be a tendency to treat symptoms rather than root causes. Once a real underlying problem has been identified, then the appropriateness of the proposed solutions should be challenged and tested. This addresses a situation where a ‘solution’ is proposed because some stakeholders have desired the associated activities for some time and have been looking for a justification to adopt the action. This tendency often manifests, when other successful initiatives have been observed elsewhere in regions showing similar symptoms. Identifying a root cause and a clear SWOT, including interactions and complementarity with the present policy mix, will help mitigate such risks and match the problem with viable solutions.

Showcasing examples from other countries that have clear commonalities with the pilot under development has strong benefits for all stakeholders. This approach enables stakeholders to talk to counterparts at a different phase in the implementation trajectory, and to consider options that have not previously occurred to them, or that have been seen as being unfeasible or high risk. Innovation policy design is by nature imitative. Policymakers tend to imitate initiatives and programs implemented elsewhere, sometimes with little consideration of their impact. This is particularly important when considering ongoing pilots for replication, as they will not have had the time to mature and demonstrate success and impact. However, it is important to experiment, take risks, and not to simply copy solutions from elsewhere.

Early and sustainable stakeholder engagement

Early, regular and meaningful stakeholder engagement with key stakeholders and actors from the public sector, academia, private sector, and intermediaries is critical for I&E policy design process. It is important to rapidly understand and set the expectations regarding the process, activities, and expected outcomes. Initially, bilateral meetings and larger group meetings enable individual interests and preferences to emerge. At later stages, more formal and established mechanisms, such as steering committees and consultative bodies, could allow for a healthy flow of information and ensure buy-in. A critical factor enabling the ultimate success of this project was the commitment of the MO in each region, and the early identification of a pilot champion. Where consensus and commitment were gained quickly by the stakeholders, the pilot development became a joint task, and the final proposal was robust. Strong involvement of key stakeholders also had a clear benefit in reducing risks that had been identified early in the design process.

Embedding emerging bottom-up ideas and nascent initiatives from stakeholders into a pilot could secure increased commitment. Stakeholders need to see a way to pilot their own ideas in a lower-risk environment (for example, an environment where they can secure resources from the new pilot), as well as the opportunity to involve new partners. Therefore, it is important to examine ideas that come from stakeholders, to assess if they align well with the proposed intervention, and to determine where a pivot of the original idea may benefit the overall initiative. Equally, it is important not to adopt ‘solutions looking for a problem’, where they do not align with the problem identified. Identifying ways to incorporate such ideas at a later phase of a successful pilot can be a way to maintain motivation among such groups. Overall, while a bottom-up approach is likely to yield ideas that fit well to the resources and culture of a region, they must also take into consideration regional and national-level planning. Involvement of a strong mix of stakeholders is therefore critical in the design phase.

Clearly Identified instrument objectives that are measurable

Once the appropriate solution has been identified and agreed upon, the objectives of the intervention need to be defined in such a way that reduce ambiguity and conflict. To accomplish this, goals must be clearly articulated; they must be realistic; and they must be observable and measurable, as opposed to abstract and generic. The instruments’ objectives need to be juxtaposed to other existing instruments to ensure complementarity and avoid overlap.

Complementarity with the existing regional and national policy mix

It is important that there is a clear complementarity between regional pilots and the existing or planned national instruments/programs. Changes taking place to relevant strategy and legislation at the national level can have a significant impact on regional planning (for example, changes and updates to a law on higher education, and the associated research agenda and IP ownership framework). For this reason, it is helpful to include representatives from the relevant ministries and national agencies in meetings and discussions, to improve the sharing of information and the complementarity of activities.

Keen consideration of the existing regional initiatives and instruments could yield better outcomes than launching new ones. Building on existing competences and scaling-up existing activities can be as effective as establishing new and complex structures (for example, a new agency or institution), which sometimes fail to yield the intended outcomes due to unforeseen problems. Alternative solutions should always be considered, particularly when the long-term objective is to ‘own’ policy making and implementation. While existing solutions may be constrained by the conditions that come with funding, it is important to think about long-term ownership and independence.

An explicit and realistic logical framework and M&E indicators

The proposed policy instrument should make clear how it will bring about sustainable change. This should include the assumptions underlying the way that inputs, activities, and outputs will lead to outcomes and impacts, and how they will affect specific stakeholders and final beneficiaries. It should also include a risk analysis with clear mitigation for identified risks.

Pilot instruments should include a clear M&E framework with appropriate key performance indicators (KPIs). This will facilitate the actual use of evaluation results for progressive learning, and for improving future policy design. It is important to note that the implementation of future versions of the same, or similar interventions, will depend heavily on the inclusion of an M&E framework in the design phases. Having an evaluation of the impact embedded in the design phase will produce important information, especially in cases where the instrument starts as a pilot.

Keen consideration of the implementation capacity and costs

The capacity to implement actions through competent and connected human resources needs to be assured alongside the pilot design. The competence of local authorities and institutions to implement a pilot can make the difference between success and failure. Delivering capacity-building and training activities as part of the pilot design process could help reduce risks and increase the potential for success of the immediate and long-term actions.

Identification of the source and size of the budget for pilots should happen very early in the process. In the Polish regions' context, if a modified ROP is to be leveraged, then it is critical to know that the proposed pilot will fit sufficiently well into the existing ROP (for example, contributing to Smart Specialization, or matching close enough to one of the existing priorities to make the change possible), and that the amount of money available is commensurate with the pilot being suggested.

When additional resources can be identified, there is a tendency to design actions to a scale and size that will fully adsorb this new funding opportunity. However, money for substantial new initiatives is not always the optimum solution to an identified problem. Some technology transfer, innovation, and entrepreneurship problems can be effectively addressed through low-budget approaches to network building, organizational bridging, and improved communication and information flow. It is also important to ensure that the competencies and skills needed to implement a pilot are available; if this is not the case, then a pilot action may fail, not because it is a poor fit to the problem, but because it could not be implemented successfully.

LIST OF ANNEXES

List of Annexes is available under the following link:

<http://documents.worldbank.org/curated/en/541491560169628135/pdf/Catching-up-Regions-Poland-Supporting-Regional-Innovation-and-Entrepreneurship-Lodzkie-Podlaskie-and-Dolnoslaskie-regions.pdf>



NOTES

1. For a detailed discussion on the design and implementation of innovation policy and business support Instruments, see “Cirera, X.; J. Frias; J. Hill and Y. Li (forthcoming). Instruments to Support Business Innovation in Low- and Middle-Income Countries. A Guide for Policy Makers and Practitioners. World Bank.”
2. See two reports capturing the design and implementation of Activity 1 here: <http://www.worldbank.org/en/country/poland/publication/catching-up-regions>
3. The survey and its results are included in the analytical report. Nevertheless, the summary excluded proprietary information collected from the TTCs, especially related to financial/budgetary information.
4. These proposals were partly inspired by the three platforms of the PCI. The concept of creating critical mass for improved technology transfer was of interest in Lodz, and a ‘proto-lab’ for students was of interest in Podlaskie. However, some proposals, such as, the challenge-driven university concept from Dolnoslaskie, were very different and required more investigation of their feasibility.
5. Correa, Paulo. 2014. Public Expenditure Reviews in Science, Technology, and Innovation: A Guidance Note. World Bank Group, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/21064> License: CC BY 3.0 IGO.

