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POLISH SYSTEMS OF INNOVATIONS

– trends, challenges and policies

WWZ
Wydawnictwo Naukowe
Wydziału Zarządzania
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WYDZIAŁ ZARZĄDZANIA

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Warsaw 2017

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The book documents findings of a research project financed by the Joint Research Centre (JRC) of the European Commission as the Research and Innovation Observatory (RIO) – Horizon 2020 Policy Support Facility.

ISBN 978-83-65402-59-2
e-ISBN 978-83-65402-63-9
DOI: 10.7172/ 978-83-65402-63-9.2017.wwz.5

DOM WYDAWNICZY ELIPSA

Typesetting and printed by:
Publishing House ELIPSA
ul. Inflancka 15/198, 00-189 Warszawa
tel./fax 22 635 03 01, 22 635 17 85
e-mail: elipsa@elipsa.pl, www.elipsa.pl

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Introduction

Context

Poland is an EU member state with 37.9m inhabitants as of 2016, accounting for 7.4% of the EU-28 population. Poland's GDP per capita expressed in purchasing power standards reached 68 % of the EU average in 2014. In 2014 and 2015, GDP growth in real terms was positive and amounted to 3.3% and 3.6% respectively (Eurostat, 2016).

In 2015, gross domestic expenditures on R&D (GERD) were €4,316.508m and since 2009, GERD have been constantly increasing (in 2009: €2,095.827m). The business sector was the largest R&D performer, its investment in R&D constituted 0.47% of GDP in 2015. (Eurostat, 2016). In 2014, R&D human resources amounted to 104,359 persons, full-time equivalent (FTE) with the total of 78,622 researchers included.

The number of active enterprises in Poland increased by 4% in 2014, compared to 2013 (from 1,771k in 2013 to 1,843k in 2014). As in previous years, SMEs dominated the market, and represented 99.8% of the total population of enterprises, employing 6,326.5k of employees (69.2% of all persons employed in non-financial enterprises). Microenterprises employing up to 9 persons represented almost 96% of SMEs, and the share of companies employing 10–49 persons stood at 3.2%, while firms with 50–249 employees constituted less than 1% of the total number of enterprises.

Since 2009, the number of entities with foreign capital has continued to grow. In 2009, there were 22,176 such companies, whereas in 2014: 26,464 companies (GUS, 2015g: 34). The role of foreign capital enterprises (including multinationals) in the Polish innovation system is substantial, but its relative importance has decreased compared to previous years.

Poland can be classified as a country with a relatively low labour productivity compared to other EU-28 countries. However, its productivity has reported a constant growth since 2008. According to Eurostat data, Poland's nominal labour productivity per person has increased from 61.2% of the EU average in 2008 to 74.3% in 2015. Real labour productivity per person has been growing

in Poland, its growth rate in 2015 amounted to 2.2% and was higher by 1.5% than in 2014 (Eurostat, 2016). Continuous TPF growth may suggest that Poland slowly improves its relative competitive position among other European countries.

R&I Actors – summary

Polish R&I policies are co-ordinated by the inter-ministerial Council for Innovativeness, headed by the Minister of Economic Development and with the involvement of the Minister of Science and Higher Education. The Ministry of Economic Development sets the overall directions for economic development and innovativeness of the economy and oversees its own funding agency PARP that supports non-R&D based innovations, implementation of innovations and broader R&I ecosystem services, while the Ministry of Science and Higher Education focuses on policies related to scientific organisations and oversees R&D funding agencies: NCN focused on fundamental research and NCBR, financing applied R&D projects. NCBR is the core source of R&D funding for business enterprises and a key government agency distributing ESIF for R&I purposes. Among important R&D funders, The Foundation for Polish Science is a non-governmental organisation that strongly relies on public funding and ESIF in its funding schemes.

Public sector remains an important R&D performer, with key Higher Education Institutes (HEIs) belonging to this sector alongside a large number of Public Research Organisations (PROs). Other R&D performers include non-public Higher Education Institutions and Public Research Organisations business enterprises.

R&I Challenges

Challenge 1: Increase the intensity of private R&D

Description

The numbers of private sector R&D performers in Poland have been gradually increasing in recent years, alongside the overall value of BERD and its shares in GERD and GDP. In 2014, 2,814 business enterprises reported R&D expenditures (GUS, 2015d: I-1). However, these figures are still low in comparison to other EU member states, as there are over 200,000 business enterprises in Poland (GUS, 2016c: 42), and also distant from the R&D intensity targets defined by the government for the year of 2020 (BERD as 0.85% of GDP).

Another worrying tendency is the excessive focus of policy makers on state-owned enterprises, which at present perform particularly poorly in R&I. They have substantial growth potential, but are unlikely to induce major innovative changes in the Polish economy, which is dominated by privately owned firms.

Policy response

The government expects the situation to change thanks to more R&D-friendly tax regulations, i.e. the adoption of the Act on Amendments of Some Acts with respect to the Support for Innovativeness in September 2015. The Act introduced the definition of R&D works and made them tax-deductible starting from 2016, thus establishing the basis for the inclusion of R&D expenditures in corporate financial books. It also eliminated previous, ill-conceived tax incentives for the acquisition of new technologies from external sources that were limiting the private propensity to carry out in-house R&D activities.

Moreover, active promotion of R&I support measures, offered by NCBR and PARP, raised the interests of the private sector, but many business enterprises only embark on formal R&D projects when they receive public co-funding. MNiSW prepared the White Paper on Innovations, setting ground for further legal reforms addressing the private sector innovativeness.

Assessment

The actions taken in 2016 can be expected to trigger proportional increases in BERD, but the growth will be primarily induced by the public co-funding and not necessarily sustainable. At the same time, the R&I policy mix related to business enterprises seems strongly focused on absorption of funding instead of economic or innovative impacts. NCBR's funding schemes induced in 2015 only 22.3% of private co-funding, and many companies consider large R&D projects only when supported by grants. Some ESIF support measures that were originally designed as financial instruments or demand-side measures were offered in 2016 as grants, further disincentivizing the mobilisation of private capital. Despite the introduction of R&D tax incentives, R&D reporting by companies remains problematic, and the existing tax and accounting regulations might still discourage companies from classifying certain expenditures as costs of R&D, but the problems seem to have been acknowledged by the policy makers (in particular, planning to address it through one of actions outlined in the White Paper on Innovations).

Challenge 2: Strengthen the cooperation between science and industry

Description

The weak linkages between business sector and academia continue to be a challenge for the Polish R&I system. Quantifiable outcomes of science and industry cooperation are very limited, including low counts of joint private-public co-publications and co-patents, as well as shares of enterprises declaring cooperation with scientific organisations and shares of R&D expenditures of public science (HEIs and PROs) funded by business enterprises. A recent nation-wide survey confirmed negative attitudes of private sector representatives towards the public science sector and scientists (Maison, 2016: 14). The knowledge transfer outcomes remain unsatisfactory. The number of research projects carried out by PHEIs and PROs that were contracted by the industry remains persistently low (with business funding of research performed by academia amounting to 0.02% of the GDP in 2015, one of the lowest values in EU-28).

Policy response

The current approach of the policy makers involves enforcing science-industry linkages, as many ESIF-based measures offer funding for HEIs/PROs only in collaboration with industrial partners. Multiple measures incentivize and enforce the co-operation, including R&D funding schemes (POIR 4.1.4, *SYNChem*, *STRATEGMED*, *BIOSTRATEG*, *TECHMATSTRATEG*), innovation vouchers (POIR 2.3.2), support for research infrastructures only in connection with their commercial uses (*PANDA 2* and POIR 4.2) and measures empowering researchers to work with industry (NCBR's *LIDER*, FNP's *TEAM TECH*). Approaches to defence R&D funding have also been improved, with dedicated measures attracting young researchers and Polish scientists working abroad. MNiSW amended the Act on Higher Education, simplifying the knowledge transfer pathways at universities and eliminating major bottlenecks. The Ministry plans a comprehensive reform of research institutes, and further adjustments of legal acts identified in the White Paper on Innovations.

Assessment

The understanding of the importance of effective science-industry co-operation is visible among the R&I policy makers, particularly in MNiSW. At the same time, certain policy actions remain contradictory to these directions, e.g. amendments to the Act on Research Institutes adopted by the Parliament in 2016, forging closer links between some of these institutes and sectoral ministries (while the reforms should rather strengthen their co-operation with industry), or proposals included in the draft Strategy for Responsible Development

to enforce the use of open licenses for some of the technologies developed by HEIs and PROs.

The public science system still focuses on "pure", non-applied science. NCN eliminates all project applications that could offer practical benefits for the industry, and thus fundamental R&D in Poland is not trying to address important societal or economic challenges but merely generate research findings that would be publishable in major international journals. The division between NCN and NCBR, fundamental and applied research, remains a serious chasm in the Polish R&I system, and it is not surprising that NCBR has shifted its focus towards companies in recent years, offering only a small number of measures dedicated for scientists. Nevertheless, many scientists, particularly from the younger generation, consider applied R&D and industry co-operation as viable options for their academic careers.

Challenge 3: Increase the quality of the public research base

Description

Poland scores low in the European Innovation Scoreboard, including a poor ranking position for research outputs and low shares of highly cited publications in comparison with other EU member states. Merely one third of Polish publications in 2013 were co-authored with foreign researchers (based on: Scopus database, RIO own calculations). Only two Polish universities – Jagiellonian University, Kraków and University of Warsaw – were included in the 2015 ARWU World University Ranking of 500 best universities (Shanghai Ranking, 2015).

Policy response

The policy makers demonstrated genuine interests in improving the public science organisations, albeit with mixed results. Legislative actions led to reductions in administrative burdens for HEIs, and new Act on Higher Education is being prepared with the involvement of academic stakeholders. NCN introduces new funding schemes, filling certain gaps identified in the R&I system, including funding for more smaller R&D projects by young researchers (*MINIATURA* and *SONATINA*) and networking between Polish scientists and foreign ERC grantees (*UWERTURA*). The establishment of the Office for Scientific Excellence, tasked with the support of ERC candidates, is also a commendable action. The Foundation for Polish Science launched a portfolio of well-designed support measures for top researchers at different career stages (support measures based on POIR 4.4), and NCN plans to imitate ERC's project selection modalities, thus bringing the Polish science closer to the international standards.

Assessment

Long-term plans for sectoral reforms of HEIs and PROs seem promising, prepared through inclusive stakeholder consultations, but legal changes introduced in 2016 seem to contradict these idealistic approaches. Positive initiatives related to the introduction of new R&D funding schemes, including support for smaller R&D projects, international networking, and schemes adopting standards known from ERC competitions be expected to trigger the increase in quality of the public research base.

Challenge 4: Priority setting in the R&I system

Description

R&I performers in Poland are guided by explicit signals regarding the thematic or functional preferences of R&I policy makers. In 2014, the Polish R&I governance was impaired by the lack of thematic R&I priorities, but at the end of 2015, the number of incommensurable thematic lists associated with specific funding schemes was overwhelming and sets of priorities were reciprocally inconsistent (e.g. National Research Programme with 7 broad thematic priorities for scientific research; National Smart Specialisations with 20 broad thematic concentrations related to industrial R&D; Regional Smart Specialisations, different in each of the 16 Polish regions, with varying levels of technological detail; several sectoral programmes of NCBR developed in partnerships with industry stakeholders for selected industries; themes of NCBR's strategic programmes; lists of prioritised sectors for export promotion, preferred FDIs and key innovation clusters).

Policy response

In 2016, the complexity was not reduced but further expanded: in an effort to narrow down the list of 20 national specialities defined by KIS and combine them with specialities of 16 regions, NCBR generated an even longer list of 26 RANBs (Regional Science-Research Agendas). In another attempt at prioritisation, the draft Strategy for Responsible Development listed 8 out of 20 areas previously identified as national smart specialisations and declared them as more important than others, deserving dedicated, "fast-track programmes". Moreover, the draft SOR included several other, confusing sets of priorities, identifying strategic sectors, horizontal technologies, sectors for international promotion, as well as strategic and flagship projects in some technological areas, while also declaring that the plans to continue "prioritisation of KIS and RIS". On top of this, there

are no visible KIS or RIS monitoring efforts, and the Economic Observatory established in 2015 to continuously analyse Poland's smart specialisations seems inactive.

Assessment

On the one hand, the willingness to clarify the priorities seem appropriate. On the other hand, its uncertain whether future efforts focused on narrowing-down the list of priorities would involve stakeholders and be evidence-based, preferably in accordance with the entrepreneurial discovery processes. There are risks that the prioritisation might be defined in a top-down mode, disregarding stakeholders and entrepreneurial discovery processes, redirecting R&I funding to sectors or beneficiaries identified by the government.

Methodology

The research described in this volume involves multiple methods, including source documents analysis (such as policy documents, evaluation reports, statistics and web content and other online resources) and statistical data analysis (primarily Eurostat statistics and data provided by the Central Statistical Office of Poland).

Main insights

The Polish R&I system went through major changes in 2016, and the assessment of many important initiatives seems premature.

Key developments in the R&I system in 2016 included:

- Establishment of Inter-ministerial Council for Innovativeness, focusing on R&I policies, headed by the Minister of Economic Development;
- Announcing "#StartinPoland" programme – a comprehensive framework for various support measures targeting start-ups;
- Adoption of the Plan for Responsible Development outlining directions for Poland's economic and social policies;
- Publishing of the draft Strategy for Responsible Development;
- Publishing the White Paper on Innovations which identifies 58 actions, including changes that would affect 15 existing legal acts and are expected to be adopted in 2017.

Acknowledgements

The draft document has benefited from comments and suggestions of Dr Tomasz M. Napiórkowski, Warsaw School of Economics, Dr Jan Kozłowski and Dr Marcin Kardas from the Ministry of Science and Higher Education and of Dr Katarzyna Szkuta and Krzysztof Mieszkowski from Joint Research Centre (JRC), European Commission. The contributions and comments from DG RTD and JRC are also gratefully acknowledged.

The book documents the legal, financial and institutional situation of the Polish innovation system as of December 2016.

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Innovation ecosystem

Poland is an EU member state with 37.9m inhabitants as of 2016, accounting for 7.4% of the EU-28 population. Poland's GDP per capita expressed in purchasing power standards came to 68 % of the EU average in 2014. In 2014 and 2015, GDP growth in real terms was positive and amounted to 3.3% and 3.6% respectively (Eurostat, 2016).

In 2015, gross domestic expenditures on R&D (GERD) were €4,316.508m and since 2009, have been constantly increasing (in 2009: €2,095.827m). The business sector was the largest R&D contributor, its investment in R&D constituted 0.47% of GDP in 2015. Its role has been constantly increasing since 2006, when its R&D investment amounted to 0.17% of GDP. Higher education sector's investments in R&D were 0.29% of GDP in 2015, while government spent 0.25% of GDP (Eurostat, 2016). In 2014, R&D human resources amounted to 104,359 persons, full-time equivalent (FTE) with the total of 78,622 researchers included.

Table 1: Main economic indicators

	2010	**2014**	**2015**
GDP per capita in EUR	9400	10700	11100
GDP growth rate	3.6%	3.3%	3.9%
Budget deficit as % of GDP	-7.5%	-3.4%	-2.6%
Government debt as % of GDP	53.1%	50.2%	51.1%
Unemployment rate as percentage of the labour force	9.7%	9%	7.5%
Value added of services as share of the total value added	63.79%	64.61%	NA
Value added of manufacturing as share of total value added	17.65%	18.62%	NA