POLAND

Hot STI issues

- Implementing policies for a knowledge-based economy.
- Increasing R&D expenditure and improving the effectiveness of public research through better funding and governance.
- Stimulating innovation in the business sector and entrepreneurship.
- Increasing the qualifications and effectiveness of research personnel.

General features of the STI system: The Polish economy outperformed other EU countries during the recent global financial crisis. In spite of Polish firms' improved competitiveness on export markets, the STI system is characterised by a business sector which innovates relatively little and a weak academic system. In 2010, BERD was 0.20% of GDP, among the lowest in the OECD (Panel 1[(d)]). Links between industry and science have traditionally been weak, a legacy of the state planned economy. A small proportion of public research is funded by industry (1[(o)]) and very few patents are filed by universities and PRIs (1[(p)]). The integration of Polish science in international networks is better in industry (1[(r)]) than in academia (1[(q)]). Poland enjoys an RTA in emerging technologies such as biotechnology and nanotechnology, but has performed less well in ICT technologies (Panel 3). Enhancing human capital would improve innovation capacity: just 23% of the adult population has tertiary level education and only 27% of persons employed are in S&T occupations (1[(s)(v)]). Poland has a very low 4.1 researchers per 1 000 employment. However, PISA science scores of Polish 15-year-olds are almost at the OECD median (1[(t)]). The ICT infrastructure is well developed: Poland has 14 fixed broadband and 51 wireless subscribers per 100 inhabitants (1[(l)(m)]). The e-government readiness index, however, is comparatively low (1[(n)]).

Recent changes in STI expenditures: In 2010, Poland's GERD was 0.74% of GDP. However, GERD grew by a robust 10.3% a year between 2005 and 2010. Poland's target is for GERD to reach 1.7% of GDP by 2020. In 2010, industry funded a comparatively low 24% of GERD, while government funded 61%. The share of GERD financed from abroad doubled to 12%.

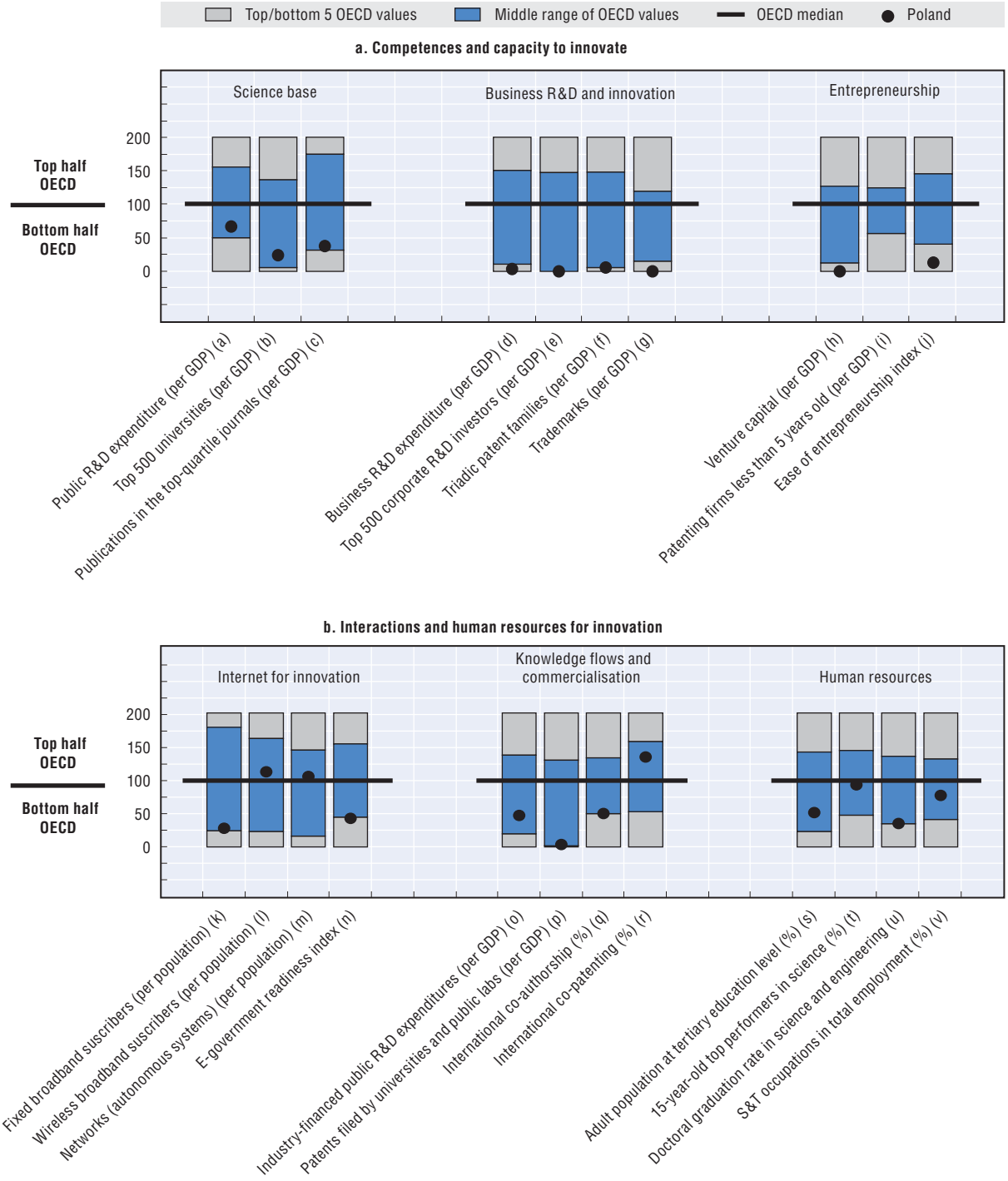
Overall STI strategy: Poland's STI strategy has recently been updated to include longer-term objectives. The more forward-looking long-term strategies, Poland 2030: The Third Wave of Modernity and the Strategy for the Innovativeness and Effectiveness of the Economy (2012-20), complement the National Reform Programme (NRP) and the Innovative Economy 2007-13. The objective of the National Cohesion Strategy (NCS) is to create favourable conditions for competitiveness. The new Science Development Programme and Entrepreneurship Development Programme promote a knowledge-based economy built on current strengths, emerging technologies and smart specialisation. The National Foresight Programme, Poland 2020, and the foresight programme InSight2030 outline potential scenarios for the next two decades.

Key figures

Labour productivity, GDP per hour worked in USD, 2010	**24.7**	**GERD, as % of GDP, 2010**	**0.74**
(annual growth rate, 2005-10)	(+2.9)	(annual growth rate, 2005-10)	(+10.3)
Environmental productivity, GDP per unit of CO_2 emitted in USD, 2009	**2.51**	**GERD publicly financed, as % of GDP, 2010**	**0.47**
(annual growth rate, 2005-09)	(+5.5)	(annual growth rate, 2005-10)	(+11.3)

Figure 10.32. **Science and innovation in Poland**

Panel 1. Comparative performance of national science and innovation systems, 2011



Note: Normalised index of performance relative to the median values in the OECD area (Index median = 100).

STI policy governance: Since 2010, changes to STI governance have been introduced to reduce fragmentation and improve co-ordination. The Ministry of Science and Higher Education (MSHE) is responsible for S&T policy design and the Ministry of Economy is in charge of innovation policy. The implementation of S&T policy is outsourced to the National R&D Centre (NCBiR), established in 2007, and the National Science Centre (NSC), created in 2010. The former was reformed in 2010 to improve public-private co-operation and increase private R&D spending. The Polish Agency for Entrepreneurship Development (PARP), supervised by the Ministry of Economy, is co-responsible for implementing innovation policy.

Science base: Despite a strong tradition in basic science, Poland's public-sector R&D spending as a share of GDP is low and rankings of universities and international publications are below the OECD median (1[(a)(b)(c)]). Part of the problem stems from fragmented sources of research funding, lack of competition and weak incentives for research excellence. Recently the science budget was increased by 29% and six new acts were passed to develop a more effective research system. At the same time, the government aims to increase the share of competitive-based research funding relative to block or statutory funding.

Business R&D and innovation: Polish firms are competitive on international markets as their strong export performance shows. However, they compete mainly on price, and few firms, particularly among SMEs, invest in R&D and innovation activities. This results in low ratios of BERD and patents to GDP (1[(d)(f)]).

Entrepreneurship: The government introduced one-stop shops to make business start-ups cheaper and faster. Although small, the Polish venture capital market is the biggest in eastern Europe. The National Capital Fund was launched in 2007 to boost growth. As part of the Technological Initiative programme, the Bank Gospodarstwa Krajowego (BGK) issues technology credits to micro firms and SMEs.

ICT and scientific infrastructures: The Research and Development of New Technologies Programme has received USD 359 million in funding for ICT infrastructure development. The Polish Roadmap for Research Infrastructure is being funded up to USD 2.1 billion. Finally, the NRP flagship initiative, Innovation Union, has been allocated USD 484 million to upgrade obsolete research infrastructures.

Clusters and regional policies: Cluster development is gaining increasing support. The Strategy for Increasing the Innovativeness of the Economy 2007-13 incorporates measures to support and develop clusters in national and regional operational programmes (OPs). Regional OPs operate in all 16 provinces (voivodships).

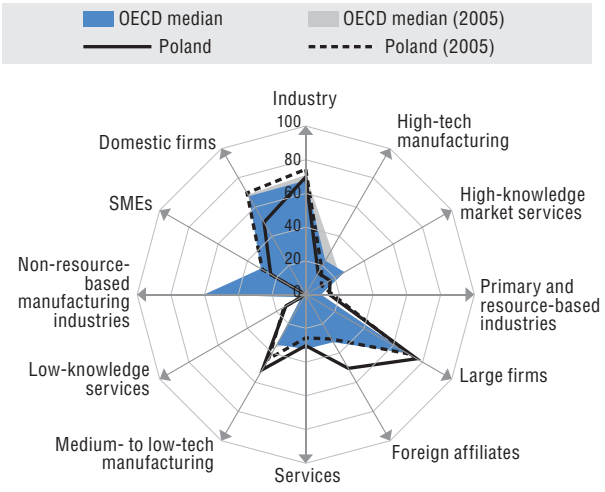
Knowledge flows and commercialisation: To facilitate knowledge flows and commercialisation, the MSHE launched a Guide for the Commercialisation of R&D for practitioners and the Patent Office assists universities. The IniTech project, Applied Research Programmes and Innovation Creator, financially supports knowledge transfer between researchers and entrepreneurs. The Innovation Voucher programme targets collaboration between SMEs and research institutions. The NCBiR also strengthens co-operation between business and technological platforms through public-private partnership.

Human resources: Human capital development is a national priority, with investment from the Human Capital Operational Programme and the NCS. In 2011, almost USD 1.4 billion was budgeted for higher education and science, and the National Qualifications Framework and National Leadership Centres (KNOW) were introduced. Mobility Plus is a competitive incentive programme for academic researchers. The Top 500 Innovators Programme funds researcher exchanges with top-ranking world research institutions.

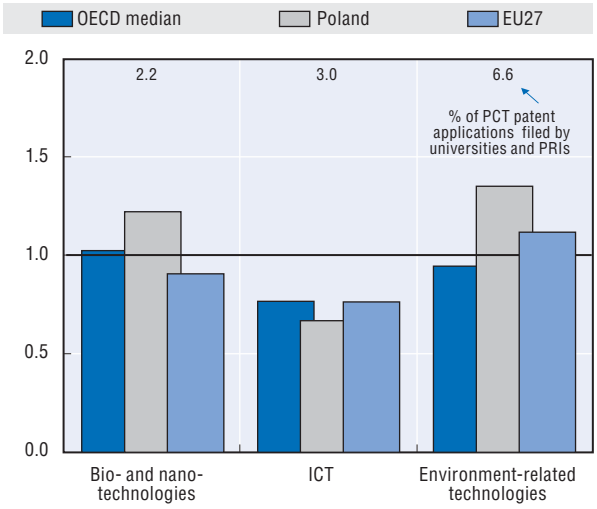
Emerging technologies: In 2011, the NCBiR introduced strategic research programmes for key technological areas for socioeconomic development. The Polish Agency for Enterprise Development funds the development and implementation of systems to support business R&D in key enabling technologies and notably the introduction of a dedicated database. The InSight2030 project identified 27 strategic key technologies for future lead markets.

Green innovation: Poland has embraced green growth in its National Reform Programme. The National Programme for Low-Emission Economy Development will be central for delivering green growth objectives. To minimise the environmental impact of government operations, the Public Procurement Office takes sustainability aspects into account in its tendering processes. The GreenEvo project supports the introduction of Polish green technologies on foreign markets.

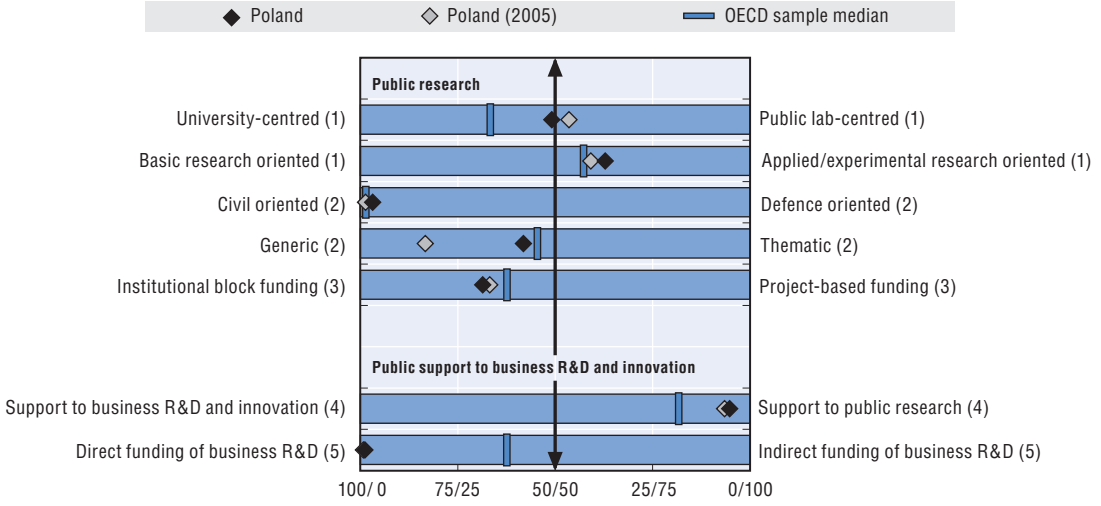
Panel 2. Structural composition of BERD, 2009
As a % of total BERD



Panel 3. Revealed technology advantage in selected fields, 2007-09
Index based on PCT patent applications



Panel 4. Overview of national innovation policy mix, 2010



1. Balance as a percentage of the sum of HERD and GOVERD.
2. Balance as a percentage of total GBAORD.
3. Balance as a percentage of total funding to national performers.
4. Balance as a percentage of the sum of HERD and GOVERD funded by government and higher education and components of (5).
5. Balance as a percentage of the sum of indirect funding of business R&D and innovation through R&D tax incentives and direct funding of BERD through grants, contracts and loans.

Source: See reader's guide and methodological annex.

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