

BELGIUM

Hot STI issues

- Addressing expected shortages in human resources in S&T.
- Attracting inward foreign investment.
- Encouraging further commercialisation of R&D projects.

General features of the STI system: Belgium is a small economy, largely open to international trade and FDI, and highly exposed to external shocks. Poorly endowed in natural resources, it has highly developed transport networks and some strong manufacturing industries (chemicals), but is heavily service-oriented. The business sector accounts for 66% of GERD. Investment in R&D is moderate compared to the rest of the OECD (Panel 1^{(a)(d)}). BERD was 1.32% of GDP in 2010, similar to 2003, with R&D activities concentrated in pharmaceuticals (28%), chemicals (9%) and computer services (8%). Foreign affiliates play a key role in business R&D (54%) (Panel 2) and the research system is well integrated in international networks: 57% of total scientific articles and 43% of patents filed under the PCT are produced through international co-operation (1^{(q)(t)}). Industry and academia have good connections: the business sector finances 14% of public R&D activities (0.07% GDP) (1^(o)). Belgium has a strong RTA in bio- and nano-technologies (Panel 3) and is active in patenting (1^(f)). Framework conditions for entrepreneurship are mixed: while financing opportunities through venture capital exist (1^(h)), the tax burden and regulatory barriers impede market adjustments (1⁽ⁱ⁾). ICT infrastructures are unevenly developed: fixed broadband infrastructures are widespread but wireless access is far below the OECD median (1^(k)). Skills are modest (1^{(s)(u)(v)}): a third of the adult population holds a tertiary education degree and graduation rates for PhDs in S&E are modest.

Recent changes in STI expenditures: GERD increased by 2.9% a year in real terms between 2005 and 2010 to 1.99% of GDP (USD 8 billion). Industry remains the main funder (59%) but government funding (25%)

increased in relative terms as business investments in R&D receded. Funding from abroad (12%) is significant because of large MNEs in R&D-intensive industries and remained stable over the period.

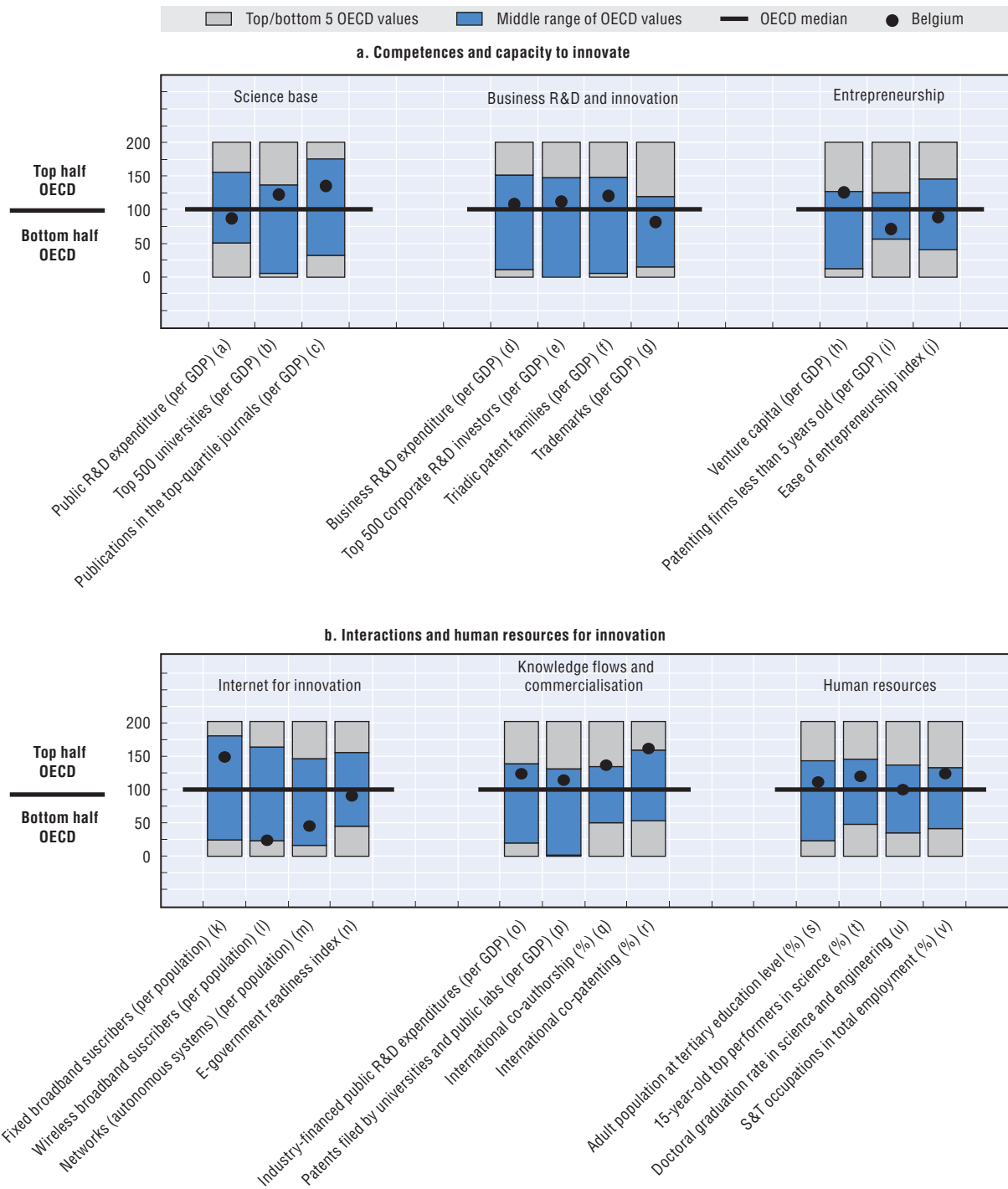
Overall STI strategy: Belgium is a federation with three regions (Brussels-Capital Region [BCR], Flanders and Wallonia) and three communities (Flemish-, French- and German-speaking). The regions' competences are strictly separated. They account respectively for 8%, 67% and 25% of total R&D. The Federal Government Agreement adopted in 2008 set the main STI policy objectives: to reduce the employment costs of researchers; to support the creation and development of SMEs; and to increase R&D intensity. All competent Belgian authorities have included the EU Strategy 2020 3% target in their STI strategies and aim to increase expenditures on R&D. Flanders in Action (2009) focuses on research talent and the commercialisation of research results in strategic fields. The Innovation Centre Flanders concept note approved in May 2011 defines a long-term vision for innovation policy based on six vertical and transversal "innovation crossroads". The Walloon Marshall Plan 2. Green (2009) seeks to strengthen human resources and to consolidate regional cluster policy for sustainable development. The Creative Wallonia plan was also launched in 2010 to make Walloon society more conducive to innovation; a strategy for an integrated research policy was approved in March 2011. The Brussels 2006-11 Regional Innovation Plan includes a focus on sector-oriented clusters, internationalisation of the innovation system, and better economic returns to innovation.

Key figures

Labour productivity, GDP per hour worked in USD, 2010	58.9	GERD, as % of GDP, 2010	1.99
(annual growth rate, 2005-10)	(+0.3)	(annual growth rate, 2005-10)	(+2.9)
Environmental productivity, GDP per unit of CO₂ emitted in USD, 2009	3.92	GERD publicly financed, as % of GDP, 2009	0.58
(annual growth rate, 2005-09)	(+3.7)	(annual growth rate, 2005-09)	(+4.7)

Figure 10.4. Science and innovation in Belgium

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



STI policy governance: In 2010, regional bodies opened discussions on interregional co-operation on R&D policy and instruments, and Wallonia opened its Competitiveness Poles to Brussels' stakeholders. In 2011, discussions were launched on a "smart specialisation strategy" to reshape innovation policy instruments and governance in all regions.

Science base: Universities perform 71% of total public R&D. Public research in Belgium is generally thematic and mainly financed on a competitive project basis (Panel 4). Although public R&D investments are small (0.65% of GDP) compared to OECD levels (1^(a)), Belgium has a few world-class universities (1^(b)) and a fairly high share of publications in top scientific journals (1^(c)).

Business R&D and innovation: In 2011 the BCR introduced a set of direct funding schemes to foster R&D and innovation actors (PhDs in enterprises, highly skilled personnel, young innovative firms). In 2009, the Flemish government set up the SME wallet to subsidise SMEs' access to training, advice or technology expertise. Since 2011 the SME wallet has covered environment and energy areas. Since 2009, Wallonia co-funds (with European structural funds) NOVALLIA, a scheme to promote innovative projects by SMEs via loans at fixed rates. At federal level, tax concessions on social contributions on R&D wages are accorded to the private and public sectors and have increased strongly over the past five years. They were estimated at USD 575 million in 2009.

Entrepreneurship: Investments in seed and early stage capital amounted to 0.07% of GDP in 2009 (1^(h)). This puts Belgium among the leading EU VC investors (with Finland, Ireland, Sweden, Switzerland and the United States). The BCR launched a new VC fund to support the "pre-commercial" phase of research. Flanders created a second ARKimedea fund to invest in start-ups and fast-growing SMEs. The Brussels region created the BRUSTART II fund for small innovative companies.

Clusters and regional policies: Regions' proactive innovation policies target leading-edge sectors. Flanders has strategic research centres and excellence centres, Wallonia has competitiveness poles, and the BCR has The Brussels Enterprises Agency Clusters. Flanders and the BCR are now also

involved in international policy debates on smart specialisation.

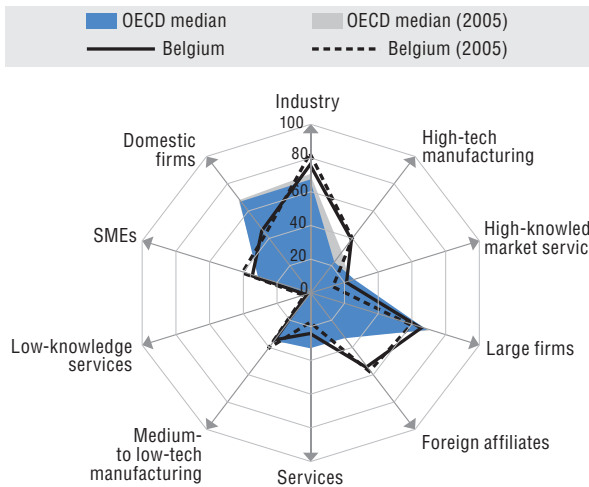
Knowledge flows and commercialisation: To accelerate knowledge transfer, the Flemish government launched in 2010 the Transformation and Innovation Acceleration Fund (TINA) with USD 233 million to support collaborative projects in industrial production. Two new knowledge centres and several centres of excellence have been set up to strengthen joint S&T capacities and co-operation. In 2011, Flanders introduced SOFI to support spin-off companies from the strategic research centres. The Technological Innovation Partnership in Wallonia (2009) and the BCR's strategic platforms (2010) also aim to encourage collaborative research. The federal government offers additional tax deductions for firms collaborating with PRIs.

Globalisation: Attracting inward FDI is a major concern of the Belgian authorities. Flanders aims to become "a strong international network area for research and innovation". In 2010 Wallonia set up offices in its science parks and abroad to provide assistance to foreign investors. Since 2011, the BCR supports international partnerships by financing staff costs, travel costs, and legal and translation services.

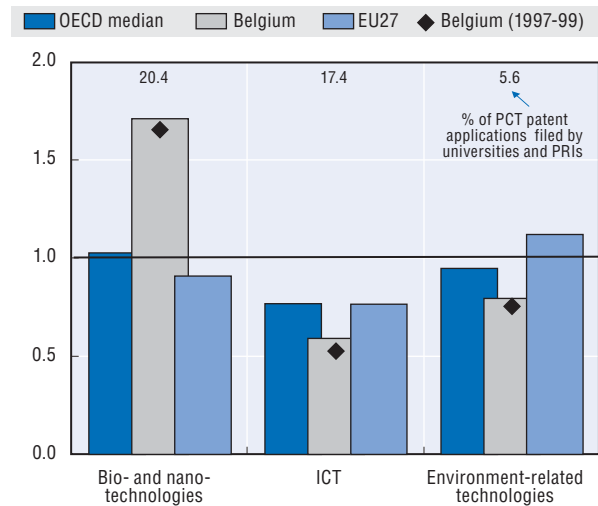
Human resources: Flanders addressed the issue of skills availability by implementing the Action Plan for Researchers 2010-11 to improve the attractiveness of research careers, and a STEM-Action Plan (2012) which, combined with a science communication plan, aims to increase the number of students in STEM in secondary and higher education.

Green innovation: The Walloon Marshall Plan 2. Green emphasises environmental issues, and in 2011 Wallonia launched a competitiveness pole for green technologies. Flanders implemented the Flemish Climate Policy Plan 2013-20 and a second Energy Efficiency Action Plan 2011-16 to adopt new energy standards, especially in construction, housing and industry, through the Flemish Energy Agency, the innovation platforms Generaties for renewable energy, Smart Grid Flanders, and a Green Guarantee for entrepreneurs.

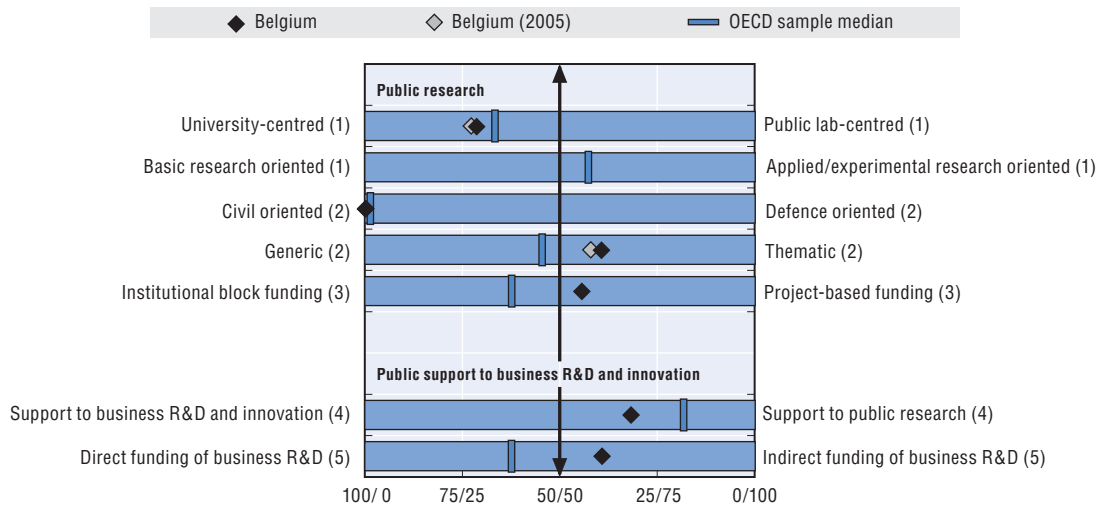
Panel 2. Structural composition of BERD, 2009
As a % of total BERD



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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