

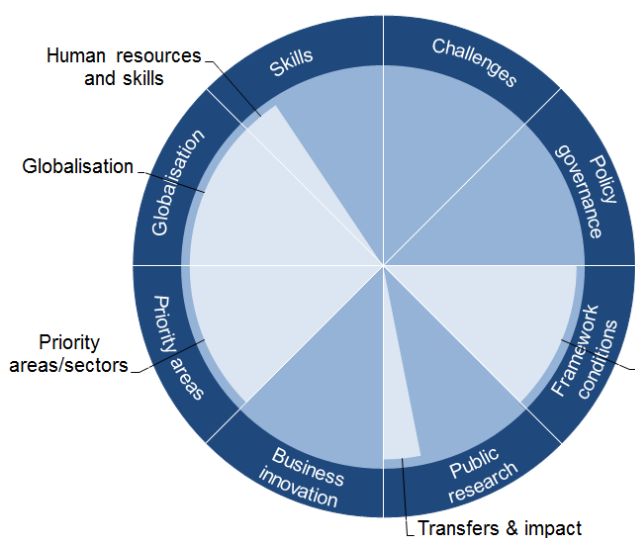
BELGIUM

Belgium is a small EU economy and is very open to international trade and FDI. Its economy is strongly service-oriented and it has a number of internationally competitive technology sectors (e.g. chemicals, life sciences and ICT). Belgium is a federal country composed of three communities (Flemish, French and German-speaking) and three regions (Brussels-Capital Region -BCR-, Flanders and Wallonia). STI competences and mandates span across all these government levels. The Federal Belgian policy focuses on thematic aspects on aerospace sector and supporting R&D efforts towards the 3% of GDP Lisbon target, e.g. by reducing costs of researcher employment through tax allowance on R&D wages. The Communities are the main source of scientific research support, and the regions are the main source of innovation and business R&D support. Presently, key STI plans include the BCR Regional Innovation Plan (2015-20) on improving innovation chain and typologies, Wallonia's new Marshall Plan 4.0 (2015-19), and Flanders' Governing Agreement (2014-19) streamlining the organisational structures. The annual policy letter series is drafted by the government of Flanders and presents an overview of recent shifts in employment, economy, science and innovation strategy.

Table 1. Gross domestic expenditure on R&D (GERD)

	CAN	OECD
GERD		
USD million PPP, 2014	12 023	1 181 495
As a % of total OECD, 2014	1.0	100
GERD intensity and growth		
As a % of GDP, 2014	2.47	2.38
(annual growth rate, 2009-10)	(+5.6)	(+2.3)
GERD publicly financed		
As a % of GDP, 2014	0.72	0.61
(annual growth rate, 2009-14)	(+6.9)	(+2.5)

Figure 1. Major STI policy priorities, 2016





Hot issues

Improving overall human resources and skills


Belgium's labour-force skills are rather strong with values around or slightly above the OECD median (6s,t,u,v,w), and a series of policies have been made to strengthen education, skills and capacity building. At the federal government level, several policy initiatives exist to increase student's participation in higher education (low tuition fees, grants, housing, etc.), to attract Belgian researchers settled abroad and to offer tax deductions to increase the employment of researchers. The last initiative raised the deduction on the withholding tax on researchers' salaries from 75% to 80% in 2013, amounting tax incentive to USD 853 million PPP (EUR 696 million) in 2013, up from USD 772 million PPP (EUR 630 million) in 2012. Brussels Capital Region (BCR) funds PhD students involved in public-private collaborative projects through the DOCTIRIS program. Flanders launched in 2012 the STEM (Science, Technology, Engineering and Mathematics) Action Plan with a science communication plan to increase the number of secondary and higher education students in STEM, and in 2015 a new round of Entrepreneurial Education Action Plan to stimulate entrepreneurship education. There are also programmes to support innovation traineeships (Innovatiestages) and long-term career path for researchers in Flemish institutes. Wallonia's Axis 1 of Marshall Plan 4.0 aims to strengthen the link between the supply of training and the employment of the future by fostering dual apprenticeships.

Improving transfers, returns and impact of science

Belgium has a sound science base and seven of the world's top 500 universities (6b). Universities and PRIs publish and patent actively (6c,p). Industry-science relations are well developed and the business sector finances a high share of public R&D (6o). Transfer of knowledge is a major concern at all government levels and is supported in forms such as patent policies, innovation funds, networks and centres. The federal government launched Belgium's own 'Patent Box' initiative, which results in a maximum 6.8% effective tax rate on patent income by an 80% tax deduction on patent incomes. BCR supports the creation of university spin-offs through financing technology transfer offices and creates strategic platforms to support the valorisation of academic research. Flanders established Flanders Make in 2014 as the 5th strategic research centre, following Imec, VIB, iMinds and Vito. PMV (Flanders Holding Company) manages the Transformation and Innovation Acceleration Fund (TINA), with a budget of USD 235 million PPP (EUR 200 million) since 2010, which provides risk capital financing for innovation projects and acts as "entrepreneur" and facilitator. Wallonia supports Knowledge Transfer Offices in universities and high schools and to foster R&D results translation. The Technological Innovation Partnership encourages collaborative research, with new mechanisms (e.g. collective research calls) to improve collaboration between SMEs and research centres.

Addressing challenges of STI globalisation and increasing international co-operation

Belgium seeks to create a favourable environment for business innovation and to attract foreign investment in R&D and innovation. It has a well-developed and productive science base and a strong international reputation in R&D in certain technological fields and in patenting (6f). Belgian STI activities are well integrated internationally (6q,r) and foreign affiliates account for more than half of BERD (7). Increasing international co-operation has been a priority of the Belgian governments. To this end, they support professional agencies, key research infrastructures, active participation in international programs, and integration of Belgian scientists in the European Research Area. BCR has set up Brussels Invest&Export to facilitate the internationalisation of local companies. Wallonia's Offices for International Investors and Flanders' Investment and Trade have a number of active offices abroad and focus also on innovation investments. As an active participant of international research infrastructures, Belgium is a founding member of CERN, ESA, ESO and ESRF. It also participates in many ESFRI research infrastructures. In 2015, Flanders FWO has concluded a number of agreements with sister organisations in four European countries to apply the lead agency principle (which means that joint research proposal has to be submitted to one



funding agency only). Wallonia launched in 2011 the Wallonia-China Innovation Platform for technology transfer to China.

Targeting priority areas/sectors

Each region has identified its own priority areas although there is some overlap. The federal level mainly targets the aerospace sector with more than USD 240 million (EUR 200 million) per year contribution to the European Space Agency. BCR focuses on certain sectorial niches and on R&D and innovation to meet societal challenges. The priority sectors identified in the Regional Innovation Plan are ICT, health care and environment. Funding schemes have been prepared along with a cluster initiative to foster a growth ecosystem and critical mass in the priority sectors. In Flanders, the Policy Note 2009-14 identifies major long-term priorities, and policy letter 2015-2016 stresses investments in employment, excellent knowledge base, services and networks. It also released in 2014 the Strategic Framework for Smart Specialisation, identifying seven strategic cluster domains. Wallonia's Marshall Plan 4.0 adopts the regional smart specialisation strategy. It builds on the core competence of the 6 sector-oriented competitiveness poles and 6 clusters created by the 2 previous Marshall Plans, and helps stimulate innovation with initiatives for green technologies, health, energy and digital economy. Wallonia also has specialised life science and sustainable development funds (WELBIO and WISD).

Improving framework conditions for innovation

The innovative entrepreneurship has been integrated in the BCR's research and innovation system. Its BRUSTART II Fund targets small innovative companies, and its new VC fund supports "pre-commercial" research. BCR's funding agency IMPULSE also provides support to young innovative companies for business planning, technical-economic monitoring, legal and financial matters, and search for partners. In Flanders, in addition to the TINA Fund, the Spinn-of SOFI Fund invests since 2015 in innovative growing spin-off companies and the ARKimedes II Fund supports start-ups and fast-growing SMEs with innovation mezzanine, seed and early-stage funding. In Wallonia, the Marshall Plan 4.0, with an overall budget of USD 3.3 billion (EUR 2.9 billion), focuses on innovation as one key axis: the Public funds (Green Impulse Fund), investment companies (Invests, Novallia) and networks (Be Angels) invest in spin-offs, start-ups and SMEs. The Creative Wallonia Action Plan launched in 2011 aims to stimulate the creative economy and to support an innovation culture throughout the economy.

Some key STI performance indicators

Figure 2. Economic performance

Labour productivity, GDP per hour worked, index
2005=100

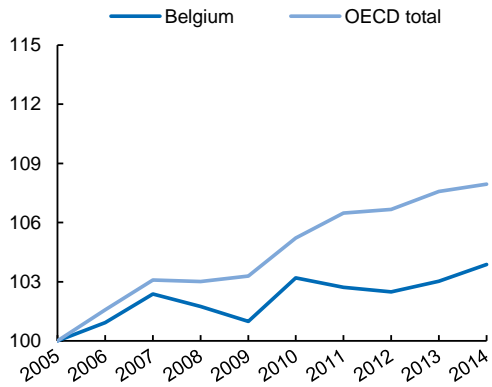


Figure 3. Environmental performance

Green productivity, GDP per unit of CO2 emitted, index
2005=100

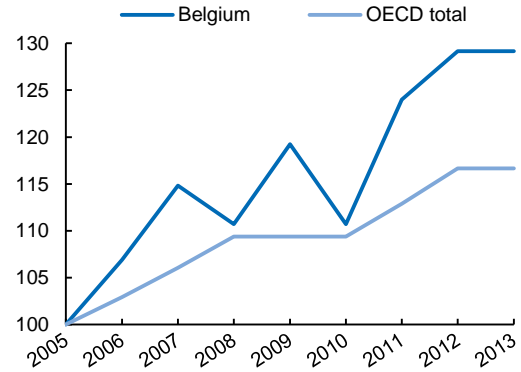
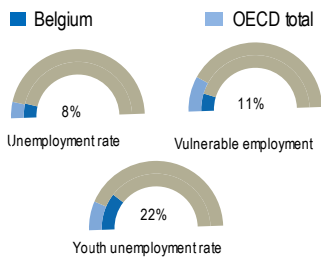


Figure 4. Unemployment

Percentages

2013 or latest year available



Benchmarking national STI systems

Figure 5. Science and Innovation in Belgium

Comparative performance of national science and innovation systems, 2016



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



Highlights of the Belgian STI system

New challenges

Many initiatives address global and societal challenges. The federal level has focused on societal challenges by launching BRAIN-be, a program funding interdisciplinary networks including green growth and biodiversity. Environment is one of the priority investment sectors in BCR's updated Regional Innovation Plan. BCR also participates in JPI Urban Europe to create attractive, sustainable and economically viable urban areas and launched Innovative Brussels Care, supporting joint project with the Flemish Region for a 'Living Lab' in the healthcare sector. Flanders' VISIE 2050 outlines the tendencies and challenges from a broad societal point of view and contains 7 transition priorities including disruption readiness and Industry 4.0, and its VRWI Foresight 2025 aims at establishing scientific, technological and innovation priorities to help address grand societal challenges such as energy, mobility, ageing population, health, environment and climate change. Wallonia launched the Marshall Plan 4.0, which reinforces the Marshall Plan 2 Green's emphasis on environmental issues and industrial ecology. In 2014, BCR, Flanders and Wallonia have all issued 3rd energy efficiency action plans, adopting new energy efficiency standards and measures.

STI policy governance


Since 2010, greater intergovernmental co-operation on R&D and innovation has been discussed among all relevant policy actors and governments. For example, Flanders merged research and innovation agencies to simplify structures and increase efficiency. The three Belgian regions (Brussels, Wallonia, Flanders) have made some progress in exchanging information on their policy priorities and programmes for R&D. Efforts have also been made to reinforce policy evaluation capacity. The new BCR regional innovation plan puts greater emphasis on active evaluation and monitoring. Capacity of its funding agency Innoviris has been reinforced in 2014 with a new dedicated unit specialised in Policy and Monitoring. Although evaluation practices still vary across the different Belgian authorities, a general trend is toward more frequent policy evaluations. The Belgian Science Policy Office (Belspo) has recently evaluated several federal scientific institutions. Flanders has evaluated a number of IWT business support schemes, FWO's application procedures for grants and various projects and institutions active in the field of science communication. Wallonia has conducted evaluations of initiatives related to Plan Marshall2 Green and a mid-term evaluation of its Creative Wallonia Plan.

Universities and public research

In addition to Belgium's strong science base, it performs well in terms of publication output and number of citations (6c). Spending on R&D is at the OECD median (6a). The Federal Government aims to increase the participation of universities and public research in international research infrastructure projects. In 2011, a protocol was signed on Academic Diplomacy with the goal of increasing the interaction between the academic world and foreign policy, particularly with reference to diplomatic events and foreign missions. Flanders' new Cluster Policy (2014-19) focusses on commercialisation of innovation and public research.

Innovation in firms

Belgium's business environment and financing for entrepreneurship are at or slightly below the OECD median (6h,j). The development of research and innovation in SMEs is a policy priority at the federal as well as the regional level. SMEs have received a wide range of support for improving their innovation capabilities (training, consultancy, funding, business angels, etc.). The federal government has increased the reduction on the advance tax payment for all research and technical staff in young innovative companies from 50% to 75%. In addition to instruments for supporting spin-offs and young innovative enterprises, BCR has developed new instruments in conjunction with EU initiatives aimed at SMEs. For example, Flanders DC, as the Flemish organisation for entrepreneurial creativity, conducts research on creativity, innovation, entrepreneurship and creative industries. In 2016, Flanders Fashion Institute and Design Flanders became



part of the organisation. This new partnership includes a focus on design and fashion. For the gaming programme, Flanders DC collaborates with a number of industry-related partners.. Wallonia has also developed several schemes to promote research and innovation in SMEs through the Walloon Small Business Act and Creative Wallonia Plan (2015-19). Innovation voucher is a common practice employed across all three regions to support SMEs.

ICT and Internet Infrastructures

While Belgium's ICT investment as a share of GDP and fixed broadband subscriptions per population are above-average compared to other OECD countries (6k,l), use of wireless infrastructures lag behind (6m). As part of Marshall Plan 4.0, Wallonia aims to boost the digital economy by fostering integration of the digital technologies in support of growth and competitiveness and by developing a digital culture within society between 2015 and 2019. To achieve this objective, Walloon authorities will i) accompany the transition towards digital technologies; ii) foster the modernising of the productive industrial apparatus; iii) support the shift towards smart cities; iv) support the connectivity within the territory; and v) encourage smart mobility. Flanders introduced Flanders' Make for Smart Manufacturing to the network of strategic research centres that exists since 1984. Flanders' Make bundles the existing Mechatronics Technology Centre (FMTC), Flanders' DRIVE (formerly innovation platform) and laboratories of five Flemish universities to support smart manufacturing and digitalisation in companies with pre-competitive research. The aim is to align technological research and innovation (mechatronics, product development and production technologies) with industry needs in view of higher added value for a competitive international manufacturing industry in Flanders.

Clusters and regional policies

Discussions were launched in all regions in 2011 on a "smart specialisation strategy" to reshape innovation policy instruments and governance. The BCR Regional Innovation Plan is aligned both with the EU's Strategy 2020 and with the region's smart specialisation strategy. Innoviris and Impulse (the Brussels Enterprise Agency) have developed a cluster policy focusing on creating a growth ecosystem in key sectors and creating critical mass. Flanders released in 2014 the Strategic Framework for Smart Specialisation, identifying seven strategic cluster domains. It also approved in 2015 a Concept Note on Cluster Policy that aims to unlock economic potential and to increase of competitiveness among Flemish companies. In the framework of the Marshall Plan 4.0, Wallonia has adopted the regional smart specialization strategy, which will guide the industrial and innovation policy in all relevant areas. Competitive poles and clusters are at the core of Wallonia's smart specialisation strategy, which focuses on innovation and creativity, greening, internationalisation, and SMEs.

Structural aspects and specialisation

Figure 6. Structural composition of BERD, 2013 or latest year available

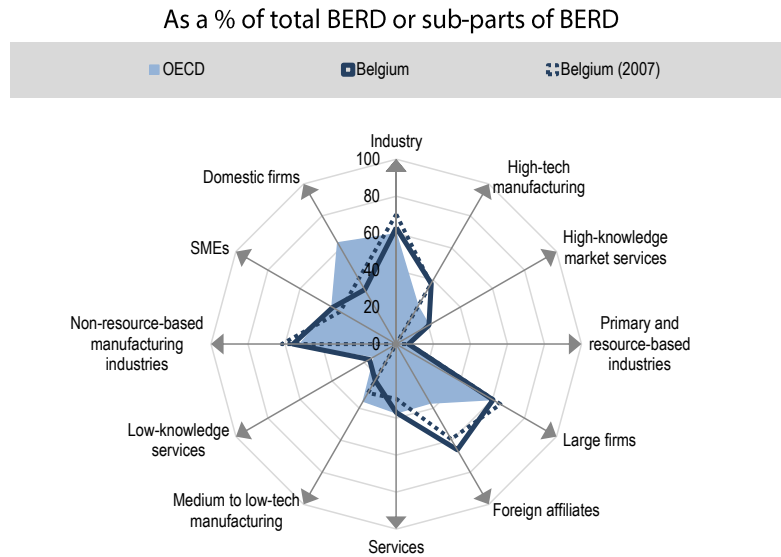
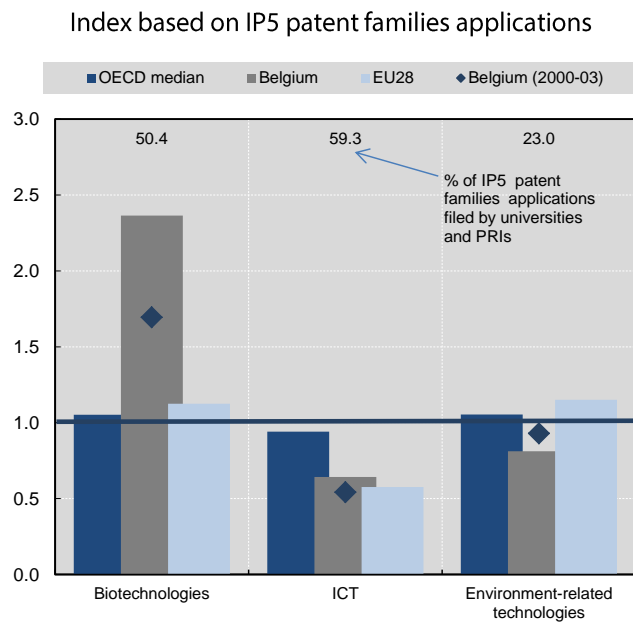
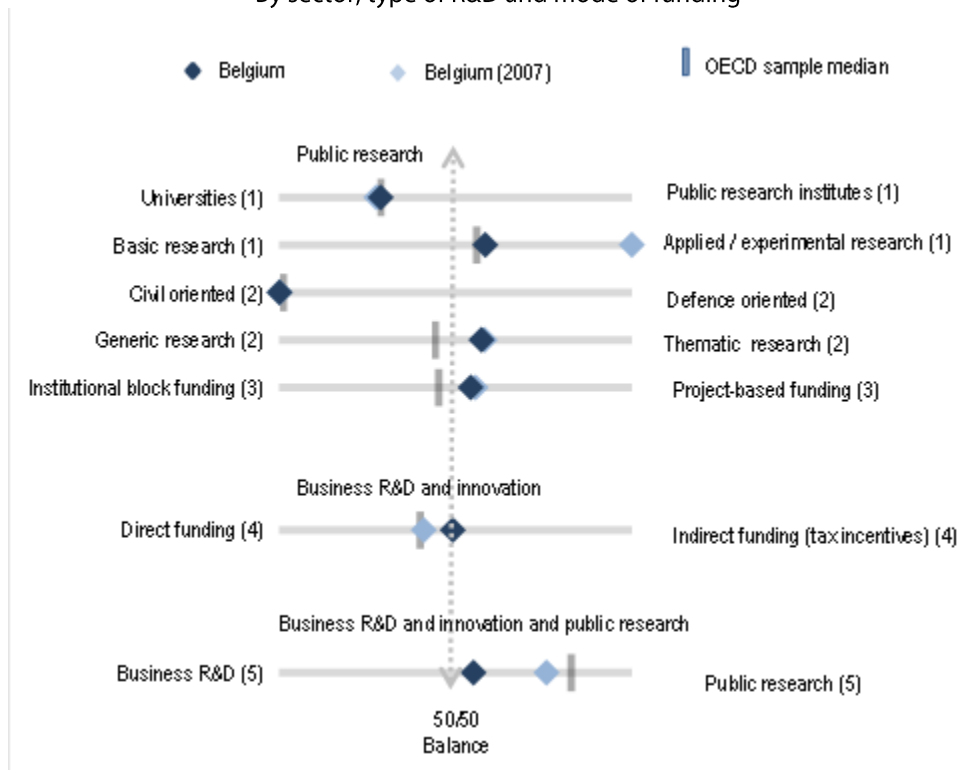


Figure 7. Revealed technology advantage in selected fields, 2011-2013



National STI policy mix

Figure 8. Allocation of public funds to R&D, 2014 or latest year available
By sector, type of R&D and mode of funding



(1). Balance as a share of both higher education (HERD) and government (GOVERD) R&D expenditure.

(2) Balance as a share of total government budget appropriations and outlays for R&D (GBAORD).

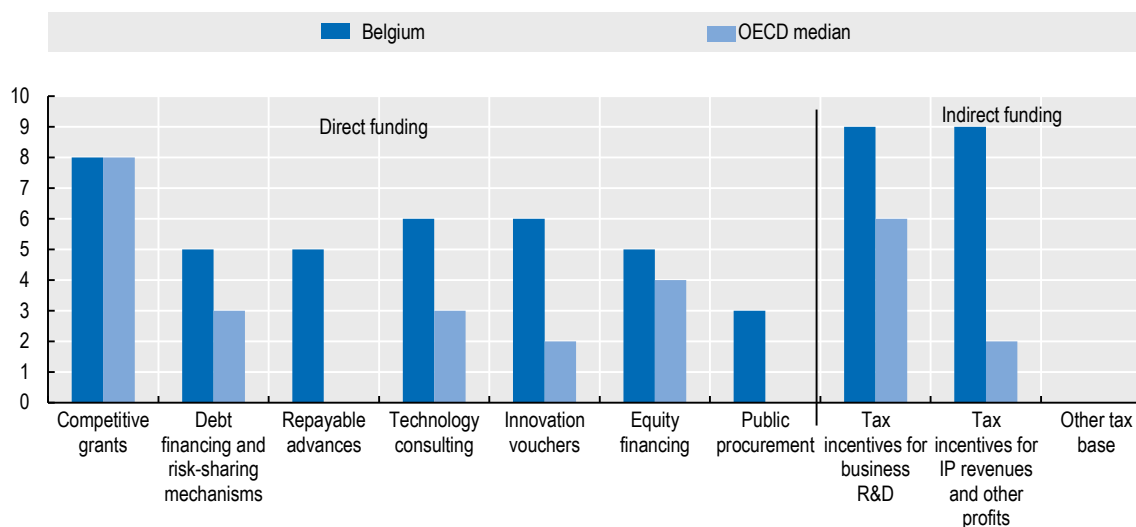
(3) Balance as a share of total funding to national performers.

(4) Balance as a share of both indirect funding (through R&D tax incentives) and direct funding (through grants, procurement, loans, etc.).

(5) Balance as a share of publicly-funded HERD and GOVERD and components of (4).

Figure 9. Most relevant policy instruments of funding for business R&D, 2016

Country self-assessment, index (9 = high and increasing relevance to 0 = not used)



Note: Policy information comes from country responses to the EC/OECD STI Policy Survey 2016 and 2014. Belgium's responses are available in the EC/OECD STI Policy Database, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/BEL...STIO_2016.

Source: See the reader's guide and methodological annex

StatLink <http://dx.doi.org/10.1787/922016061P1G044>

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