

CZECH REPUBLIC

Hot STI issues

- Increasing the efficiency and flexibility of R&D institutes and simplifying R&D support.
- Increasing the quality of human resources and improving tertiary graduation rates.
- Improving international co-operation and developing global networks.
- Becoming one of the world's 20 most competitive nations and developing a knowledge economy, with a focus on innovation, infrastructure and institutions.

General features of the STI system: The Czech Republic has an open economy and a strong focus on technical and engineering industries. Its strong automotive sector spurred the economic recovery after the global crisis. Its STI system is supply-driven. In spite of efforts to move to a knowledge-intensive economy, change has been gradual. BERD has grown by 6.8% annually since 2000 (in real terms), and jumped from 0.70% of GDP in 2000 to 0.97% of GDP in 2010 (Panel 1^(d)). Links between industry and science are modest, with a small proportion of public research funded by industry (1^(o)). Integration with global networks is near the OECD median (1^(q) ^(t)). The rate of PCT patents filed by universities and public labs is low (1^(p)). In 2007-09, the Czech Republic had an RTA in environment-related technologies but performed less well in ICT and emerging technologies. Human resource indicators show some weaknesses: only 17% of the adult population is tertiary-qualified (1^(s)), although a relatively high 31% of persons employed are in S&T occupations (1^(v)). The 5.6 researchers per 1 000 employment is below the median. PISA science scores of 15-year-olds rank 16th in the OECD (1^(t)) and have deteriorated. ICT infrastructure indicators vary, with 15 fixed broadband and 55 wireless subscriptions per 100 inhabitants (1^(k) ^(l)). The relative number of autonomous networks is among the highest in the OECD (1^(m)), but the

e-government readiness index is below the median, similar to levels in Poland and the Slovak Republic (1⁽ⁿ⁾).

Recent changes in STI expenditures: GERD increased from 1.35% of GDP in 2005 to 1.56% of GDP in 2010 and the government aims to reach 2.7% of GDP by 2020. In constant prices, GERD grew strongly by 5.7% a year since 2005 and publicly-funded GERD has increased by 5% a year. In 2010, industry funded 49% of GERD, and the government funded 40%. The share of GERD financed from abroad rose from 3% in 2000 to 10% in 2010.

Overall STI strategy: The National Research Development and Innovation (RDI) Policy 2009-15 was approved in 2009, with nine key objectives. It identified four thematic areas: sustainable energy/competitive industry; molecular biology; information society; the environment. The new Strategy for International Competitiveness (2012-20) aims to place the Czech Republic among the world's 20 most competitive nations. A new national innovation strategy focuses on infrastructure, institutions and innovation (the "3i's").

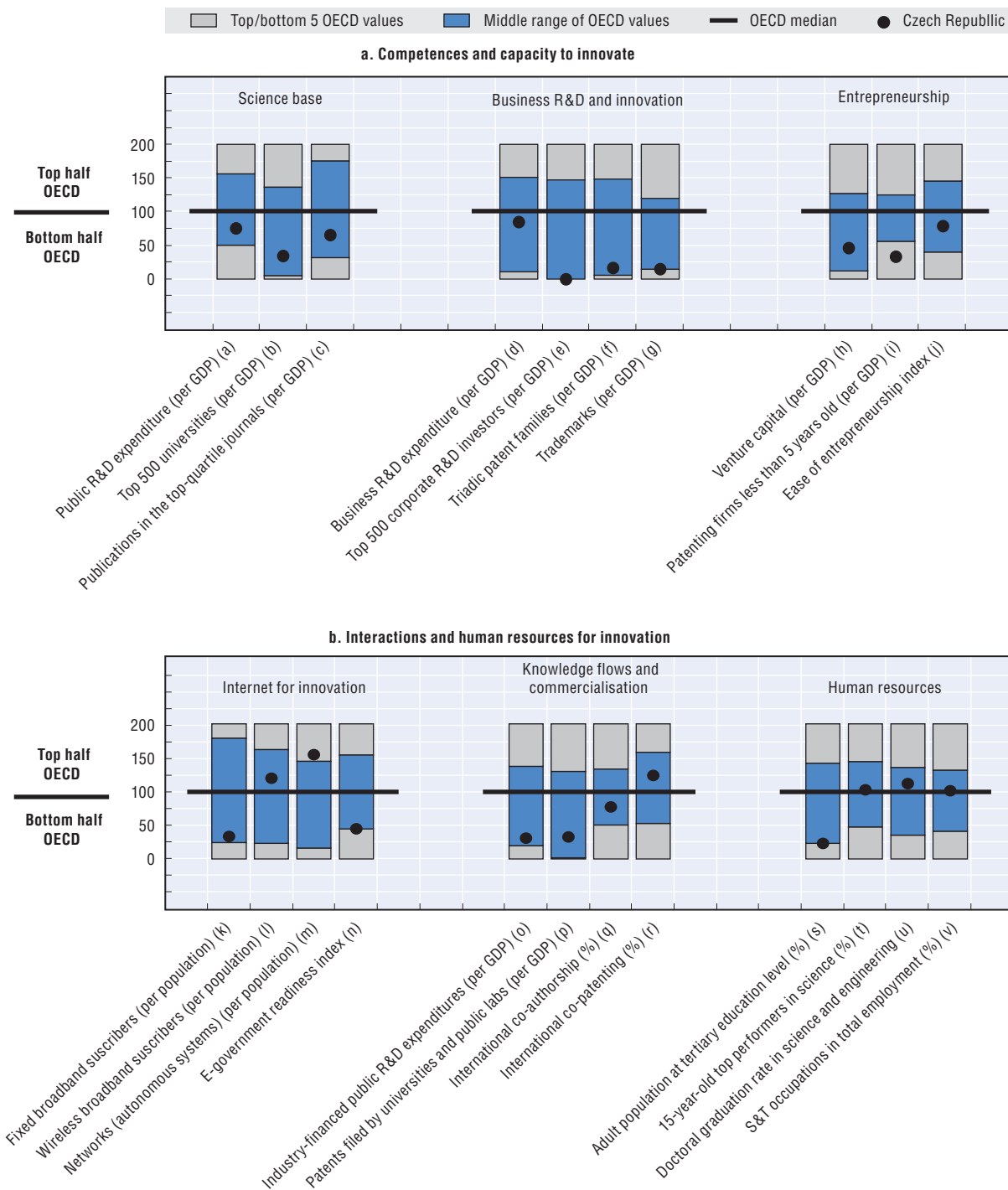
STI policy governance: STI governance has been largely unchanged since 2009. The Council for Research, Development and Innovation implements the National RDI Policy and plays an advisory role. The new Technology Agency has improved

Key figures

Labour productivity, GDP per hour worked in USD, 2010 (annual growth rate, 2005-10)	29.3 (+2.5)	GERD, as % of GDP, 2010 (annual growth rate, 2005-10)	1.56 (+5.7)
Environmental productivity, GDP per unit of CO₂ emitted in USD, 2009 (annual growth rate, 2005-09)	2.44 (+5.2)	GERD publicly financed, as % of GDP, 2010 (annual growth rate, 2005-10)	0.64 (+5.0)

Figure 10.10. **Science and innovation in the Czech Republic**

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).

budgeting, funding and RDI procurement through the BETA Programme, and co-ordinates with ministries such as the Ministry of Education, Youth and Sports (MEYS), the Ministry of Industry and Trade (MIT), the Czech Science Foundation and CzechInvest.

Science base: The Czech Republic has a comparatively weak science base, although it has a strong engineering tradition. Public R&D and publications rank below the OECD median and universities rank in the bottom five of the OECD (1^(a)(b)(c)).

Business R&D and innovation: The POTENCIAL Programme promotes technology centres and in-house R&D. The Enterprise Europe Network provides technology transfer services. A number of awards encourage innovators, such as Innovation of the Year, Czech Innovation and Best Co-operation of the Year. Czech Head, provides an annual prize for science achievements.

Entrepreneurship: Initiatives that foster entrepreneurship include START, GUARANTEE and PROGRESS that provide subsidised loans and guarantees to innovative start-ups.

ICT and scientific infrastructures: Research infrastructure is fragmented and concentrated in Prague and to a lesser extent in Brno. A lack of large research infrastructures is addressed through the European Strategy Forum on Research Infrastructures (ESFRI) and by the MEYS Operational Programme Research and Development for Innovation (USD 1.2 billion). An e-infrastructure within the GÉANT network (the CESNET – Czech NREN Operator) is under development. The ICT and Strategic Services Programme encourages innovation in ICT solutions, software, and high-technology repair and data centres.

Clusters and regional policies: The Co-operation Programme (2007-13) promotes clusters, poles of excellence and co-operative projects. In 2010, USD 42 million was invested in cluster collaboration platforms. MIT and CzechInvest oversee 30 science and technology parks which contribute to regional innovation strategies.

Knowledge flows and commercialisation: The National RDI Policy has increased the focus on

collaboration initiatives. The Technology Agency's ALPHA Programme supports co-operation between business and research with a budget of USD 417 million. MIT's TANDEM and IMPULS Programmes support industrial R&D and public-private R&D collaboration and have already allocated USD 585 million to more than 700 projects. USD 314 million has been approved to create 35 centres of competence for public-private collaboration over 2012-19. CzechInvest's PROSPERITY Programme supports technology transfer. The INNOVATION and INOVACE programmes protect IPRs, patents, designs and trademarks.

Globalisation: The Czech Republic has lagged behind other EU countries in terms of FDI. This led to a change in the *Act on Investment Incentives* in 2000. Furthermore, the National Trade Promotion Agency encourages internationalisation of Czech firms by facilitating global links. A number of CzechInvest incentives, such as tax deductions, training and requalification, promote foreign investment.

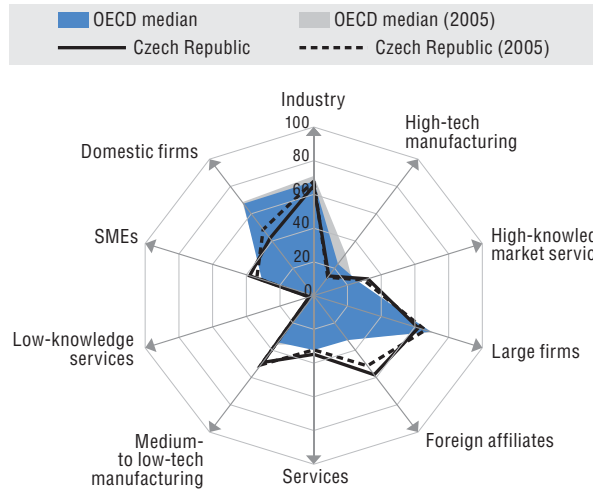
Human resources: Czech human capital is insufficient, although the number of researchers has recently increased. The Operational Programme Education for Competitiveness aims to increase academic standards, with USD 417 million budgeted for 2007-13. The Czech Little-Head and Open Science II programmes promote scientific education of school students and at universities. In 2008 a Working Group for Equal Opportunities for Women and Men was established in MEYS to achieve gender-equal education. The share of tertiary-qualified population among those 30-34 years old is forecast to increase to 34% by 2020.

Emerging technologies: New long-term national priorities are being prepared and will address key emerging technologies. Current technological projects include the Extreme Light Infrastructure and the Prague Asterix Laser System at the Institute of Physics, and the COMPASS-D Programme at the Institute of Plasma Physics. The Programme for the Support of Environmental Technologies supports eco-technologies and the ALPHA programme supports enabling technologies in a range of industries.

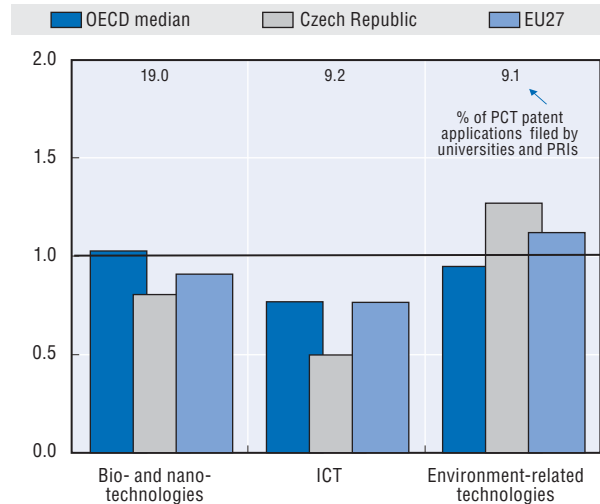
Green innovation: The Ministry of Environment has updated the Programme of Support of Environmental Technologies approved by the

government in July 2009. The update aims to increase energy efficiency and stresses the importance of renewables and eco-innovation.

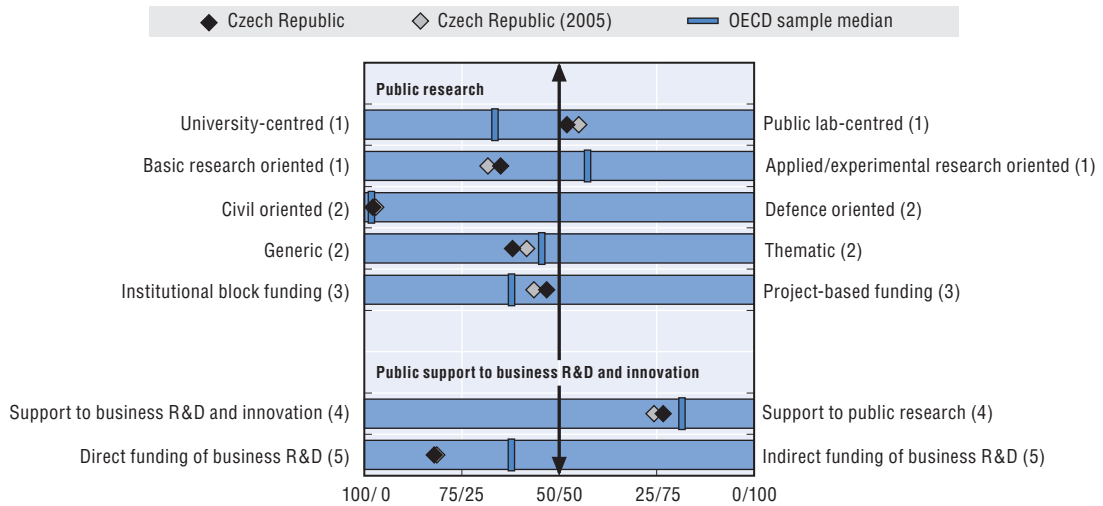
Panel 2. Structural composition of BERD, 2009
As a % of total BERD



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



- Balance as a percentage of the sum of HERD and GOVERD.
- Balance as a percentage of total GBAORD.
- Balance as a percentage of total funding to national performers.
- Balance as a percentage of the sum of HERD and GOVERD funded by government and higher education and components of (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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