

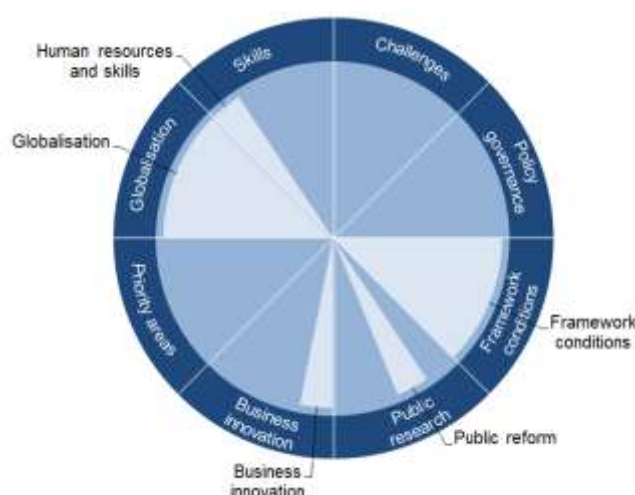
CZECH REPUBLIC

The Czech Republic is an open European economy. GDP growth increased strongly in 2015, partly due to EU-financed public investment. Exports accelerated in late 2015 and are benefitting from favourable developments in the automotive industry, an economically important sector in the country. The importance of science, research and innovation for competitiveness has grown considerably. While aspects of the Czech STI system are catching up with OECD standards, the system as a whole is still lagging. GERD increased from 1.3% of GDP in 2009 to 2% in 2014. The National Research, Development and Innovation Policy update (2016-20) (NRDIP) confirms the previously set targets for 2020 of GERD of 2.7% of GDP and public R&D expenditure of 1% of GDP.

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

	CZE	OECD
GERD		
USD million PPP, 2014	6 556	1 181 495
As a % of total OECD, 2014	0.6	100
GERD intensity and growth		
As a % of GDP, 2014	2.00	2.38
(annual growth rate, 2009-14)	(+10.0)	(+2.3)
GERD publicly financed		
As a % of GDP, 2014	0.67	0.61
(annual growth rate, 2009-14)	(+3.4)	(+2.5)

Figure 1. Major STI policy priorities, 2016



Hot issues

Improving the framework conditions for innovation

The Czech Republic's business environment is in need of improvement: while the country's ranking on the OECD's ease of entrepreneurship index has improved over time, it is still below the OECD median (figure 5^l), and venture capital is scarce (figure 5^h). Mechanisms of knowledge transfer between researchers and entrepreneurs need further development. One aim of the 2013 update of the National Research, Development and Innovation Policy (NRDIP) 2009-15 was to create better framework conditions for innovation. The Czech Government is also developing new legislation for supporting research and innovation. A major aim is to



introduce a more effective approach to applied research support at national level, including the improved commercialisation of research results and better alignment with the needs of business in a context of rapidly developing production technologies.

Reforming and improving the public research system (including university research)

The public research system has improved in recent years, but challenges remain. Public R&D expenditure as a percentage of GDP is well above the OECD median, although the number of publications in top-quartile journals is still limited (figure 5^{a,c}), as there are relatively few top universities in the Czech Republic (figure 5^b). In line with the above-mentioned NRDIP update, the Czech Republic has been also developing a new methodology for the evaluation and funding of research organisations, to be implemented from 2017 onwards. The current performance-based research funding system will be replaced by an international process of peer review. The last comprehensive evaluation of research infrastructures was performed in 2014. The findings from this evaluation led to the second update of the Roadmap of the Czech Republic for Large Infrastructures for Research, Experimental Development and Innovations, for the years 2016-2022, which was published in 2015.

Improving overall human resources, skills and capacity building

The indicators of innovation-related skills suggest a mixed picture: tertiary education expenditure is slightly below the OECD median (figure 5^s), and only 17% of the adult population possess a tertiary-level qualification, compared to 27% in the EU28 (figure 5^t). However, adults' technical problem-solving ability, the performance of 15-year-olds in science, and the share of doctoral graduates in Science and Engineering are at the OECD median (figure 5^{u,v,w}). In order to establish more favourable conditions for the development of human resources for R&D, an Action Plan for Development of Human Resources for R&D and Gender Equality in R&D will be prepared in 2017. Researchers still do not enjoy sufficient mobility, both geographically and across sectors. Although salary increases among researchers in recent years have been higher than average salary growth, the Czech labour market does not attract enough foreign researchers. Appropriate incentives and skills-building measures are needed to enhance mobility and competitiveness in global markets. The update of the NRDIP for 2016-20, and the Operational Programme Research, Development, Education 2014-20, address these issues. In this context, the Czech Republic is also currently preparing an Action Plan for International Cooperation of the Czech Republic in R&D and Internationalisation of R&D system in the Czech Republic for the years 2017-2020, which will also address human resources from the point of view of international mobility.

Encouraging business innovation and innovative entrepreneurship

The Czech economy is characterised by a relatively high dependence on foreign investments. In spite of efforts to move to a more knowledge-intensive economy, innovation performance is lagging. While BERD as a share of GDP is at the OECD median (figure 5^d), the country's innovation output is far lower (figure 5^{e,f,g}). One of the Republic's priorities is therefore to strengthen companies and to stimulate demand for innovation in general. The government will introduce a complex set of tools to support innovation, including innovation vouchers (successfully implemented at regional level), proof-of-concept funding and streamlined support for applied research projects. A new risk capital fund, the National Innovation Fund, will help to provide start-ups with seed and development finance. Co-operation between research institutions and enterprises as well as innovative entrepreneurship are two of the four pillars of the National Innovation Strategy (see STI policy governance below).





Addressing the challenges of STI globalisation and increasing international co-operation

While the Czech Republic has limited material, financial and human R&D resources, it is linked to global science and innovation networks to varying degrees. A major aim of the country is to become a highly attractive location for top-level research, technological development and innovation. With this perspective, in 2016 the Czech Republic is preparing the above-mentioned overarching Action Plan for International Cooperation for the years 2017-2020. This plan should entail, in particular, measures for the major involvement of Czech research organisations and enterprises in the Horizon 2020 EU Framework Programme and other macro-regional and/or bilateral R&D programs. The level of international co-patenting is above the OECD median, and international co-authorship below it (Figure 5^{qr}). The major national initiatives to foster internationalisation include the COST CZ, EUREKA CZ, KONTAKT II, INGO II and EUPRO II programmes, which will be implemented by 2017 and gradually replaced by the INTER-EXCELLENCE program (2016-2024). European Structural and Investment Funds that are focused, among other goals, on the deeper internationalisation of Czech R&D system will be raised through the Operational Programme Research, Development and Education (2014-20). Furthermore, Czech SMEs receive support when participating in Eurostars-2 projects (EUREKA).



Some key STI performance indicators

Figure 2. Economic performance

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

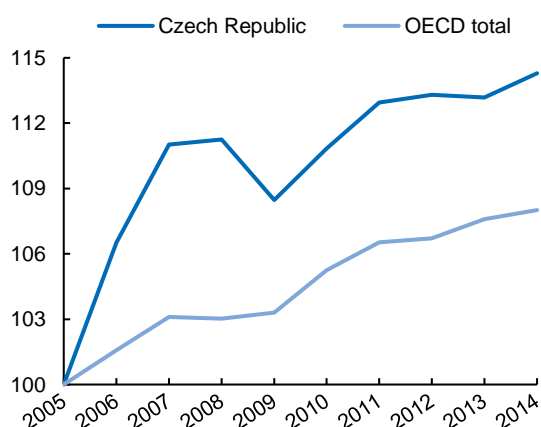


Figure 3. Environmental performance

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

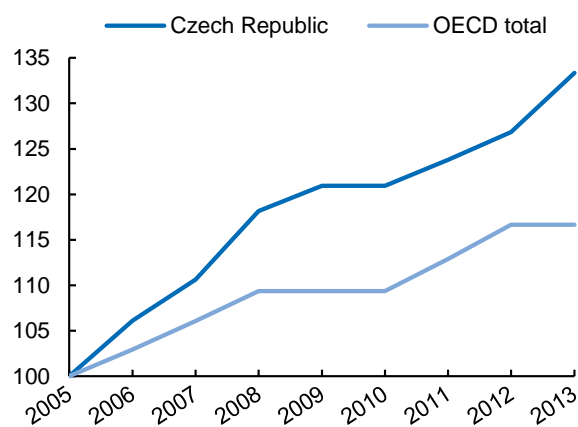
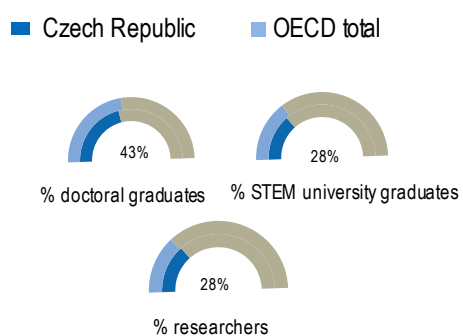


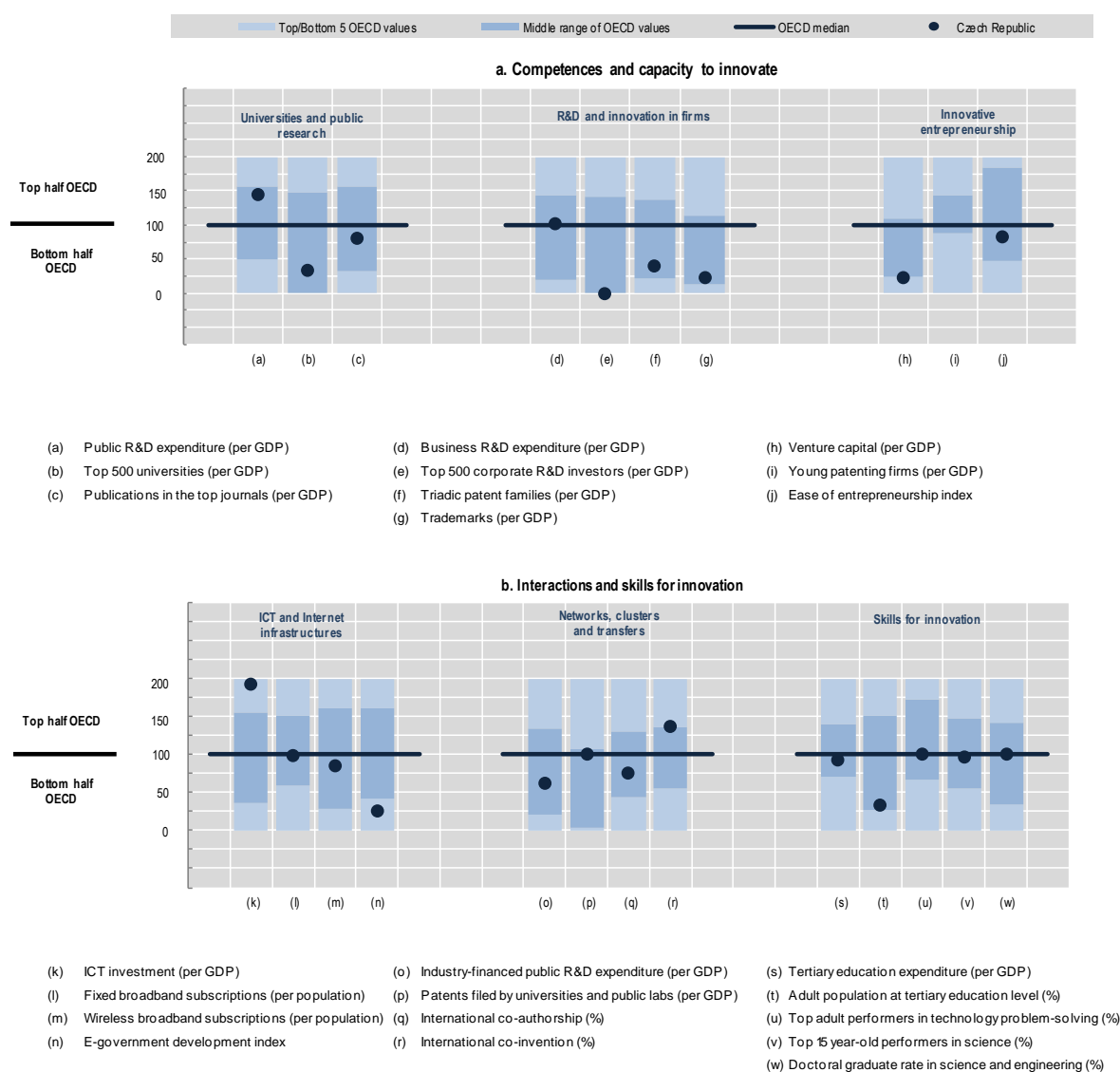
Figure 4. Women in science

2013 or latest year available, percentages



Benchmarking national STI systems

Figure 5. Science and Innovation in Czech Republic
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 Czech Republic's STI system

New challenges

New long-term national priorities were originally prepared in the Review of National Priorities for Research, Experimental Development and Innovation, which sought to identify future challenges, threats, needs and opportunities. The priorities reflected in the NRDIP, which expired in 2015, were: the development of a competitive, knowledge-based economy; the sustainability of energy, material resources and the environment; meeting social and cultural challenges; and ensuring the health and safety of the population. For the next update (2016-20), research, development and innovation will remain among the top priorities for social development.

STI policy governance

The Technology Agency of the Czech Republic (CTA) was established in 2009 to make the governance of the public support system for applied research and development more efficient by removing overlaps. The CTA administers the following programmes: ALFA (2011-19), which aims to stimulate R&D cooperation between businesses and research organisations, with a total budget of USD 575.6 million PPP (CZK 7.5 billion); BETA (2012-16), which is intended to facilitate public procurement to stimulate innovation and improve the quality of public services; GAMA (2014-19), with a budget of USD 208.7 million PPP (CZK 2.7 billion), which aims to support verification of the results of applied research and experimental development and assist their commercial use; DELTA (2014-19), which is intended to support collaboration in applied research and experimental development through joint projects between enterprises and research organisations; EPSILON (2015-25), which is intended to support applied R&D projects, where results have a high potential for quick application in new products, production processes and services; OMEGA (2012-17), which is to strengthen research activities in applied social sciences, enhance the quality of life of citizens and balance socioeconomic development; and ZETA (2012-17), which aims to increase co-operation between academia and companies. Competence Centres (Centra Kompetence 2012-19) focus on supporting the creation and operation of R&D and innovation. They also support the development of long-term collaboration between the public and private sectors. The CTA will invest a total of USD 23.7 million PPP (CZE 309 million) between 2012 and 2017.

ICT and Internet infrastructures

ICT investment per unit of GDP is particularly high in the Czech Republic, while broadband subscriptions are not more widely spread than in other OECD countries (figure 5^{k,l,m}). The ICT and Shared Services programme is a part of the Operational Programme Enterprise and Innovation for Competitiveness (2014-2020) and represents a follow-up programme of the ICT and Strategic Services programme (within the OP Enterprise and Innovation 2013-2020). The ICT and Shared Services programme offers grants to businesses specialised in ICT, software development, big data and cloud solutions to enhance the competitiveness of Czech IT firms on global markets. One objective is to boost the creation of shared services and data centres to decrease costs and raise efficiency.





Clusters and regional policies

The purpose of the Smart Specialisation Strategy (RIS3) is to effectively target funds – European, national, regional and private – on activities that strengthen research and innovation capacity and help to fully utilise knowledge potential, so as to reduce unemployment and strengthen the competitiveness of the Czech economy. The RIS3, with 14 regional strategies (annexes), has been developed and co-ordinated by the Ministry of Education, Youth and Sports since 2013. All 14 annexes were successfully approved by regional assemblies and the government in 2014. In 2015, responsibility for implementing the RIS3 was transferred to the Office of the Government. Furthermore, science and technology parks, regional innovation centres and agencies play a significant role in the regional innovation infrastructure and in the formulation, implementation and evaluation of regional strategies. The European Union and the Czech Government have invested USD 7.6 million PPP (CZK 102 million) in establishing these parks (such as the Technology and Innovation Centre of the Czech Technical University in Prague, the South Moravian Innovation Centre in Brno, the Science and Technology Park of Palacky University and the University of West Bohemia in Plzeň, and the Innovation Centre of the Technical University in Ostrava).



Structural aspects and specialisation

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

As a % of total BERD or sub-parts of BERD

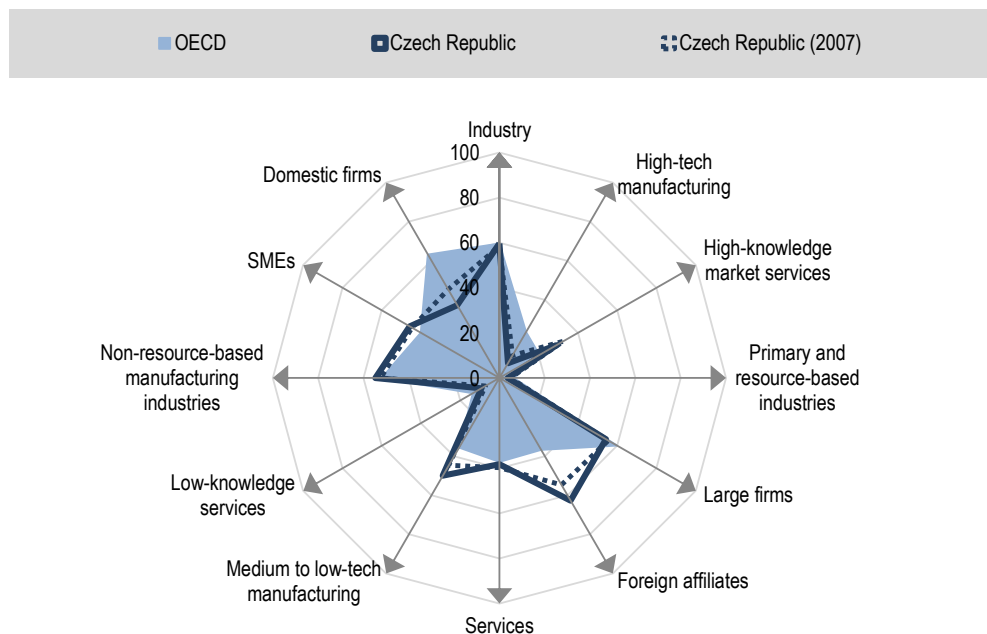
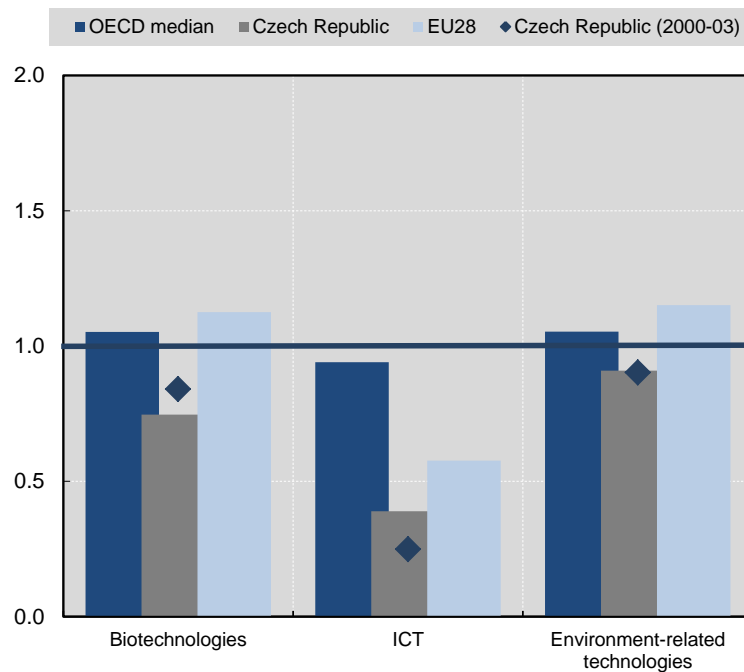


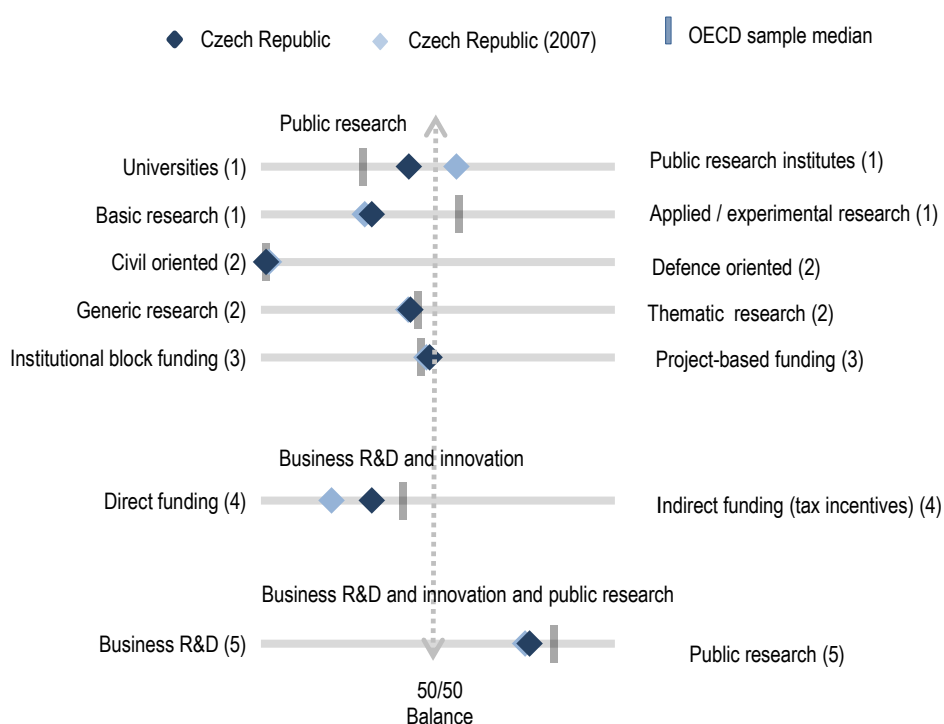
Figure 7. Revealed technology advantage in selected fields, 2011-13

Index based on IP5 patent families applications



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).

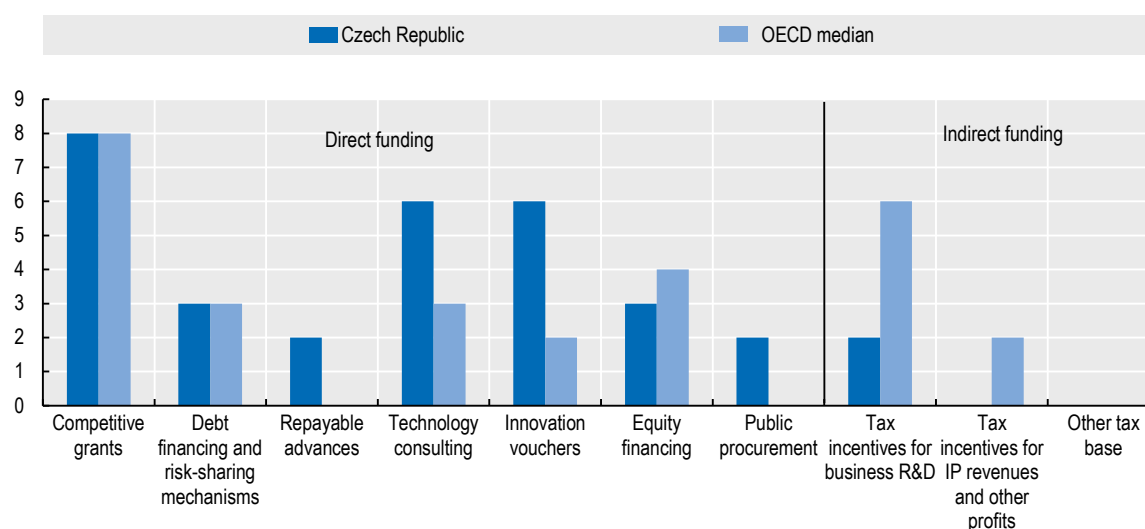
(3) Balance as a share of total funding to national performers.

(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 International Survey on STI Policies (STIP) 2016 and 2014. Czech Republic's responses are available in the EC/OECD International Database on STI Policies, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/CZE...STIO_2016.

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