

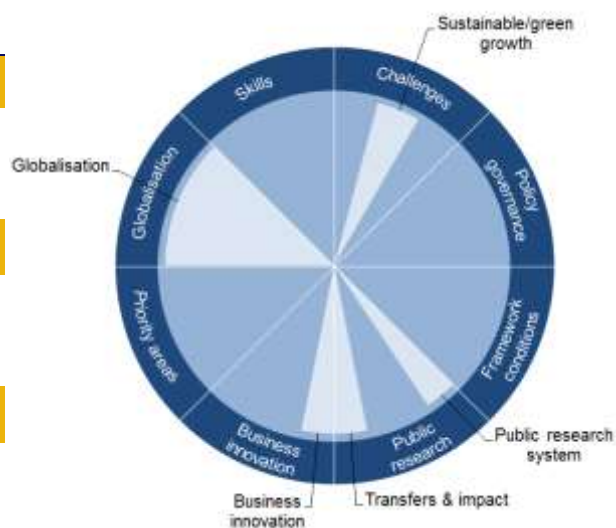
ISRAEL

The rate of GDP growth in Israel has exceeded that of most OECD countries for more than a decade, and the employment rate has continued to rise steadily. Israel also has a vibrant high-tech sector and is the world's second-most GERD-intensive country at 4.11% of GDP in 2014 (1). However productivity growth has been weak. An inefficient sheltered sector is dragging down overall economic performance. The country's technology-driven growth has not been sufficiently inclusive, as is illustrated by data on income inequality (4). To maintain and increase Israel's global leadership in the face of intensifying competition, the government approved the ministerial proposal to establish the Israel Innovation Authority. This implies a strategic change and a broad mission. The government's innovation policy aims to encourage R&D activity in industries, mainly in the manufacturing sector, to link the innovation ecosystem to the public sector and to attract new employees from under-represented groups of the population.

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

	ISR	OECD
GERD		
USD million PPP, 2014	11 377	1 181 495
As a % of total OECD, 2014	1.0	100
GERD intensity and growth		
As a % of GDP, 2014	4.11	2.38
(annual growth rate, 2009-14)	(+3.8)	(+2.3)
GERD publicly financed		
As a % of GDP, 2013	0.55	0.61
(annual growth rate, 2008-13)	(+0.8)	(+2.5)

Figure 1. Major STI policy priorities, 2016





Hot issues

Encouraging business innovation in firms and innovative entrepreneurship

Israel's STI ecosystem relies both on foreign multinationals (6) and large corporate R&D investors (5^a) as well as on start-ups (5^b). BERD and venture capital (VC) as shares of GDP are the highest in the OECD area (5^{d,h}). The government maintains several support programmes to encourage business innovation and entrepreneurship. Competitive grants and tax incentives are the two main policy instruments in support of business R&D (9). The Digital Israel initiative aims at improving the service given by the public sector through innovation, by providing R&D support to solve specified problems in public services. Although seed funding declined during the global economic crisis, the Young Companies programme helps firms up to four years old to raise private investment by supporting them with early funding and signalling business potential. However, in the ease of entrepreneurship index (6ⁱ), Israel ranks far below the OECD median, and there is a need for improvement in various aspects of the regulatory framework for business.

Strengthening the public research system

In spite of its modest public R&D expenditure, Israel hosts a number of world-class universities and produces high-impact publications (5^{a,b,c}). The six-year Higher Education Plan was introduced in 2011 with USD 1.9 billion (NIS 7.5 billion) to promote academic excellence and upgrade research and teaching infrastructures. University budgets have been increased, with a 30% rise in the budget of the Council for Higher Education; they have also become more competitive, with the doubling of the Israel Science Foundation's (ISF) competitive grants and an increased share of block funding allocated on performance criteria. Within the framework of the multi-year plan, the Israeli Centres for Research Excellence (I-CORE) programme was established. The Centres for Excellence and the programme's vision are aimed, among other goals, at strengthening the long-term position of Israel's academic research and its stature among leading researchers in Israel and abroad and at supporting and encouraging academic innovation, including multi-disciplinarity.

Improving direct and indirect knowledge transfers

The links between industry and science are modest, and the patenting activity of universities and PRIs are in a relatively good state (5^{o,p}). The OCS Magnet programme has supported knowledge transfer since 1994 through grants for new pre-competitive research consortia. The Magnet programme promotes industry-science co-operation that already exists for up to a 24-month period, and the Nofar programme aims to advance applied research in bio- and nano-technology and help to transfer it to industry.

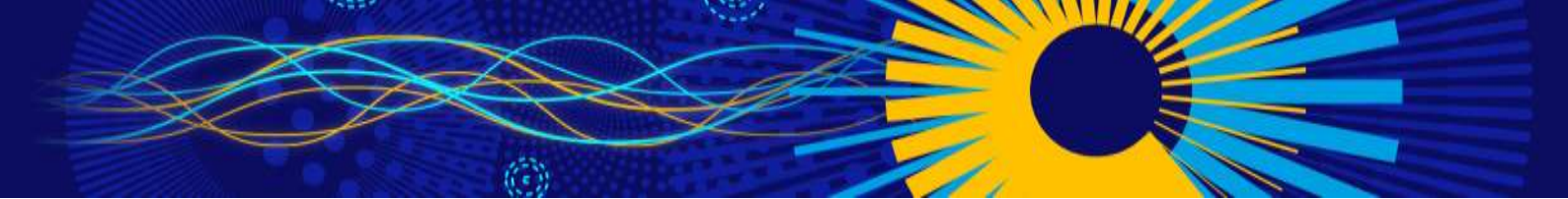
Addressing the challenges of STI globalisation and increasing international co-operation

As a small country, Israel depends on exports and international openness, but research and innovation need to be better integrated in global networks, as is illustrated by the data on international co-patenting (5^{q,r}). Israel has made international co-operation a policy priority. Competitive grants have been offered to support strategic R&D collaboration and to encourage high-technology exports to emerging markets. The share of GERD financed from abroad increased from 28% to 49% over 2007-13. Israel received USD 798 million (NIS 3.2 billion) from the EU Seventh Framework Programme (FP7), of which almost two-thirds went to universities. Israel has finalised its participation in EU Horizon 2020.

Fostering sustainable/green growth

Although Israel's performance on green productivity declined in 2012, it has risen modestly over the period 2005-13 (3). On the other hand, inclusive innovation is one of the main challenges facing Israel's STI policy. Israel also confronts challenges from water scarcity and security. The government seeks to better link the rest of the economy to its high-technology growth engine, thereby enhancing the sustainability of growth.





The Fuel Choices Initiative is a 10-year government programme dedicated to reducing the world's dependency on oil for transport and to cutting the share of crude oil in Israel's transportation sector by 30% by 2020 and 60% by 2025. The Master Water Management Plan makes policy recommendations on water management systems and tariffs. In the search for new markets, Israel launched the Grand Challenges Israel programme in 2014 to encourage innovation to global health and food security challenges in the developing world. In this programme, USD 3 million (NIS 12 million) were allocated in the form of grants to increase innovation-related exports to emerging and low-income markets.

Some key STI performance indicators

Figure 2. Economic performance

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

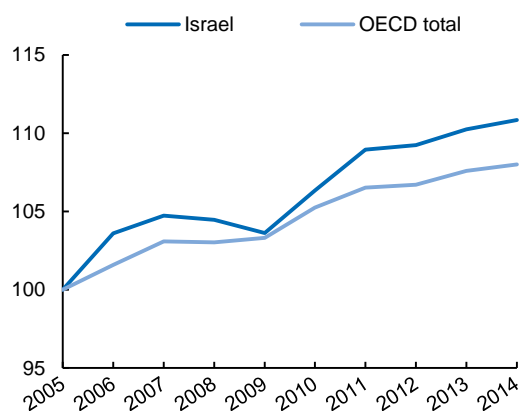


Figure 3. Environmental performance

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

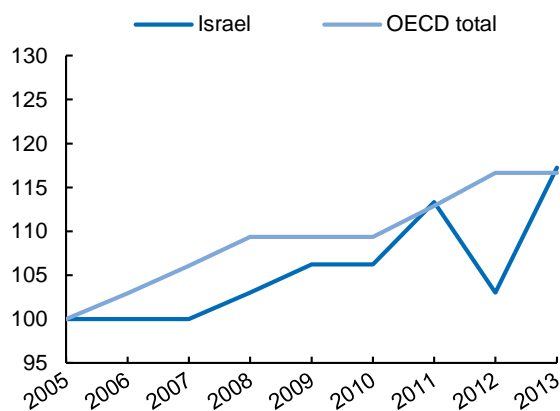
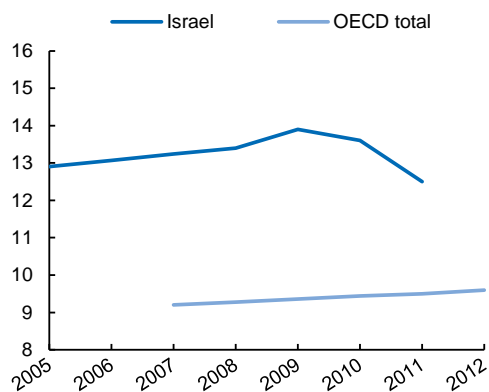


Figure 4. Income inequality

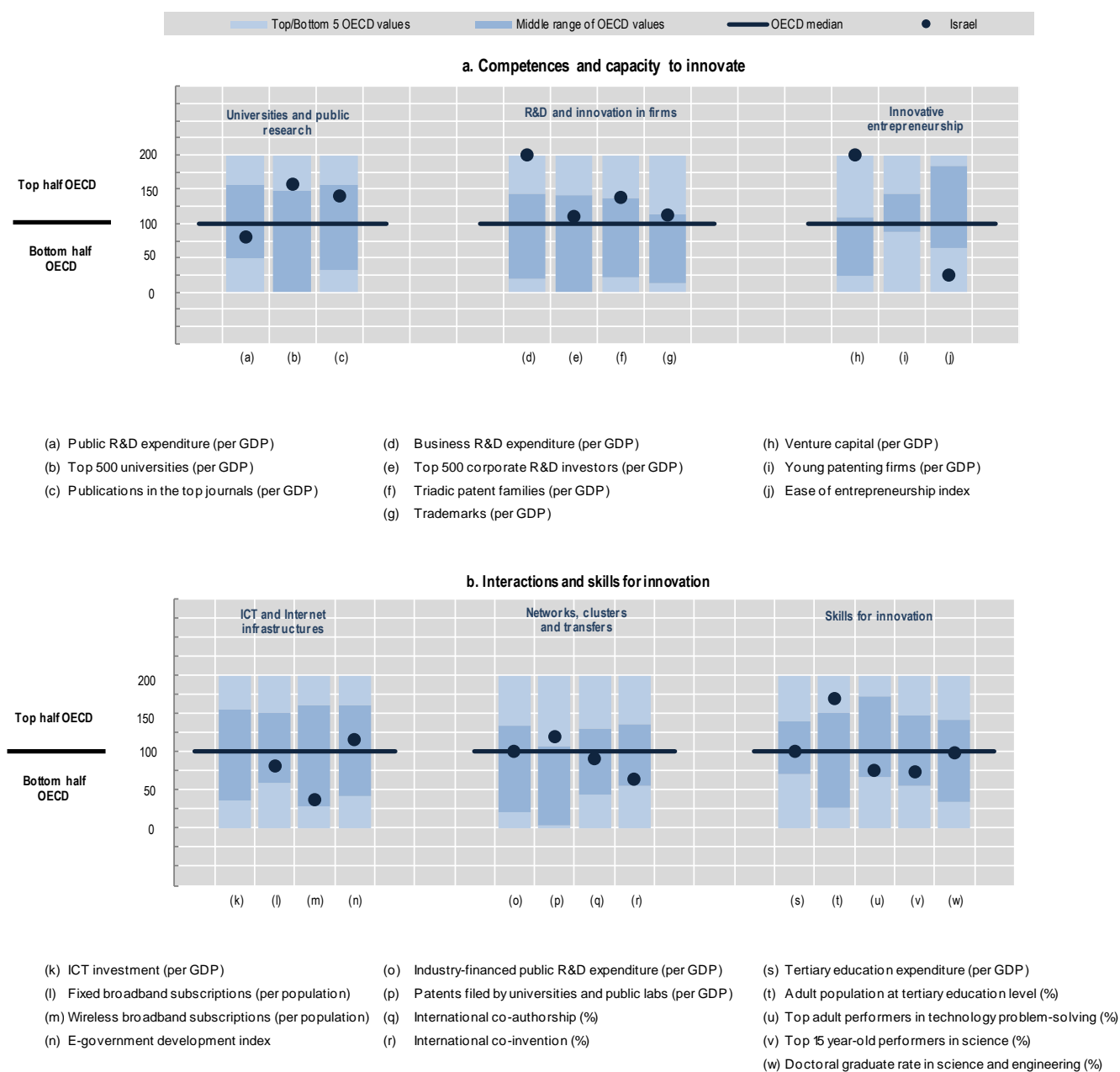
Ratio top decile/first decile of real household net disposable income



Benchmarking national STI systems

Figure 5. Science and Innovation in Israel

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 Israeli STI system

New challenges

The aforementioned Israel Innovation Authority was established at the beginning of 2016, replacing the Office of the Chief Scientist (OCS) of the Ministry of Economy and Industry. The goal is to adapt the innovation strategy of the former OCS to changing circumstances and improve the government's capabilities. Unlike the OCS, which was part of the Ministry of Economy and Industry, the Israel Innovation Authority is an independent authority. It also has the professional capabilities and flexibility to allow it to take initiatives and efficiently promote technological innovation in industry at a pace that befits the market. National reports and STI policy documents show a greater focus on biotechnology, nanotechnology and low-tech industries; a growing interest in cleantech sectors; and an ambition to establish and develop an information system in innovation.

STI policy governance

Maintaining STI leadership in the current fiscal context requires better co-ordination of government agencies and policy evaluation. The lack of a formal platform for all key players to exchange ideas about innovation strategies has been identified as a possible barrier to co-ordination. Such a platform is under development in order to involve STI policy shapers and implementers. There is also an ongoing debate about the need for a more top-down strategy. Evaluation of STI policy has received particular attention. The Strategy and Economic Research Unit (SERU) and a comprehensive evaluation methodology have supported the institutionalisation of evaluation, with a more impact-oriented approach. Major entrepreneurial programmes (e.g. Tnufa, the technological incubator and seed company programmes) have been evaluated with a view to assessing their impact on the innovation ecosystem. The cybersecurity programme (KIDMA) was evaluated after the first three years by using internal data combined with external market-related data to describe its outcomes. The first three years of the dual-purpose technology incentives programme (MEIMAD) were also evaluated to assess its contribution to the transfer of technology from the military to the civilian market.

ICT and Internet infrastructures

Although Israel's RTA in ICT as measured by patent applications is above the OECD median (7), its indicator for Internet and ICT infrastructures is relatively low (5^{1m}). The importance of the cybersecurity industry has grown immensely over the past decade. The KIDMA programme was launched in order to encourage R&D activity aimed at developing technological solutions in the field of cybersecurity. An evaluation of the programme's first phase revealed new obstacles and challenges facing the cybersecurity industry. The second phase seeks to answer these challenges through a restructured programme and a new set of support tools for the Israeli cyber industry. A national cybersecurity incubator based on a public-private partnership has been established, and a National CyberSecurity Centre of Excellence has been created together with the United States under a bilateral R&D co-operation agreement.

Clusters and smart specialisation

The Fuel Choices Initiative (formerly the Oil Substitutes Initiative) and the CyberSecurity initiative are Israel's main smart specialisation programmes. The Fuel Choices Initiative includes a one-stop shop for firms, a VC-backed programme, and assistance in establishing pilot facilities in petroleum substitutes. Its budget is USD 380 million (NIS 1.5 billion) for 2011-20. The CyberSecurity initiative comprises a few dedicated funds to encourage R&D in the field, with a budget of USD 45 million (NIS 180 million) for 2012-14. The initiative encourages the development of human capital in the cybersecurity field and is engaged in linking relevant military know-how to the industry.



Skills for innovation

The shortage of professional human resources will be a major obstacle for the Israeli STI system in the coming years, as the demand for engineers and technical professionals begins to outpace the supply. Although Israel's adults have a high educational attainment, its youth do not perform very well in science by international standards, and the rate of doctoral graduates in science and engineering is relatively modest (5^{t.v.w}). The government is addressing these challenges on all fronts: encouraging high-school students to study more maths, incentivising STEM studies in universities and attracting under-represented groups in the population to participate in the innovation ecosystem. The Higher Education Plan (2011-16) aims to improve the quality and competitiveness of the higher education system. About 1 600 new researchers will be hired in universities to replace retiring senior researchers, resulting in a net gain of about 850 academic staff over the next six years. This new policy also aims to increase participation in tertiary education, in particular by encouraging minorities to study at universities.



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

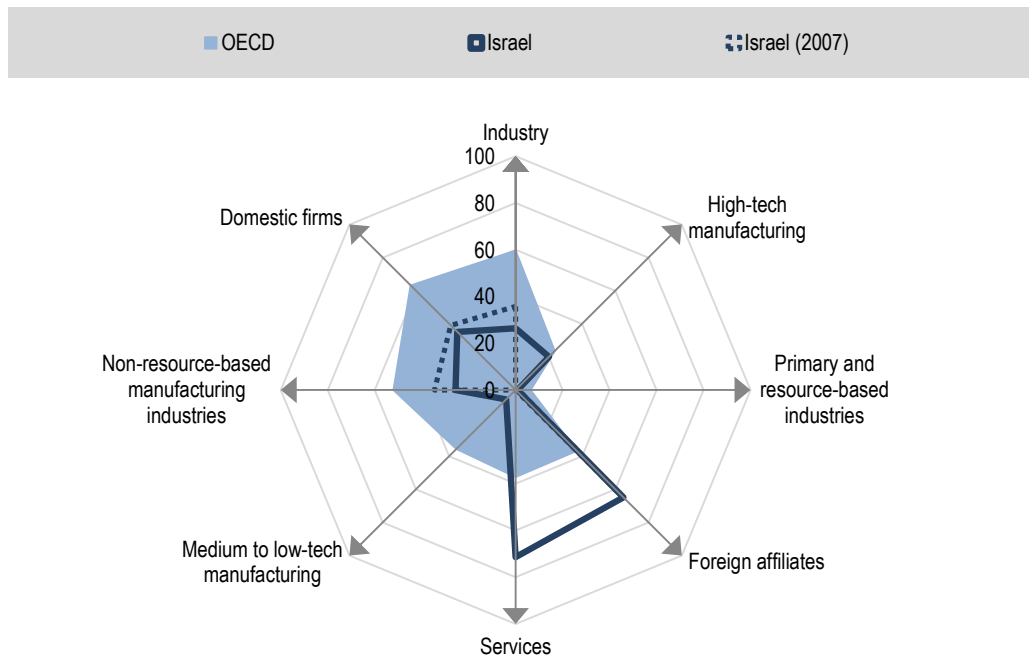
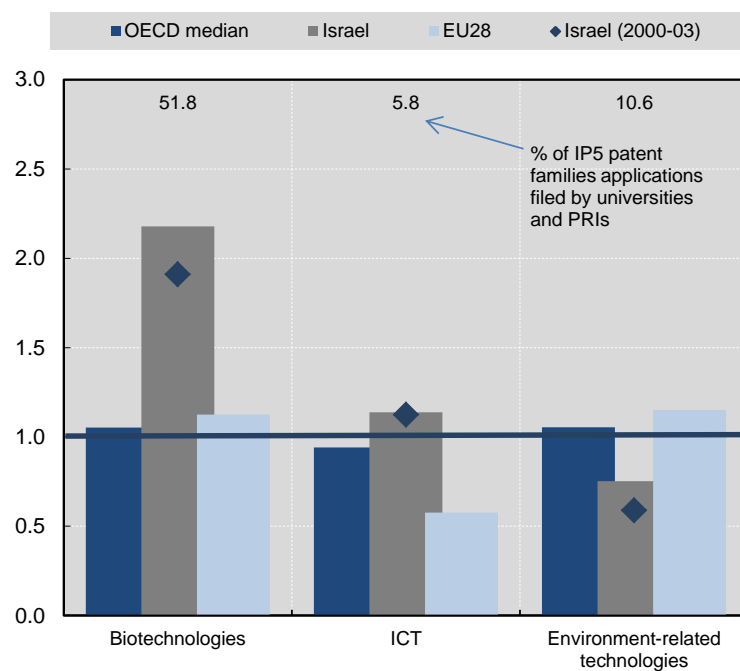


Figure 7. Revealed technology advantage in selected fields, 2011-13

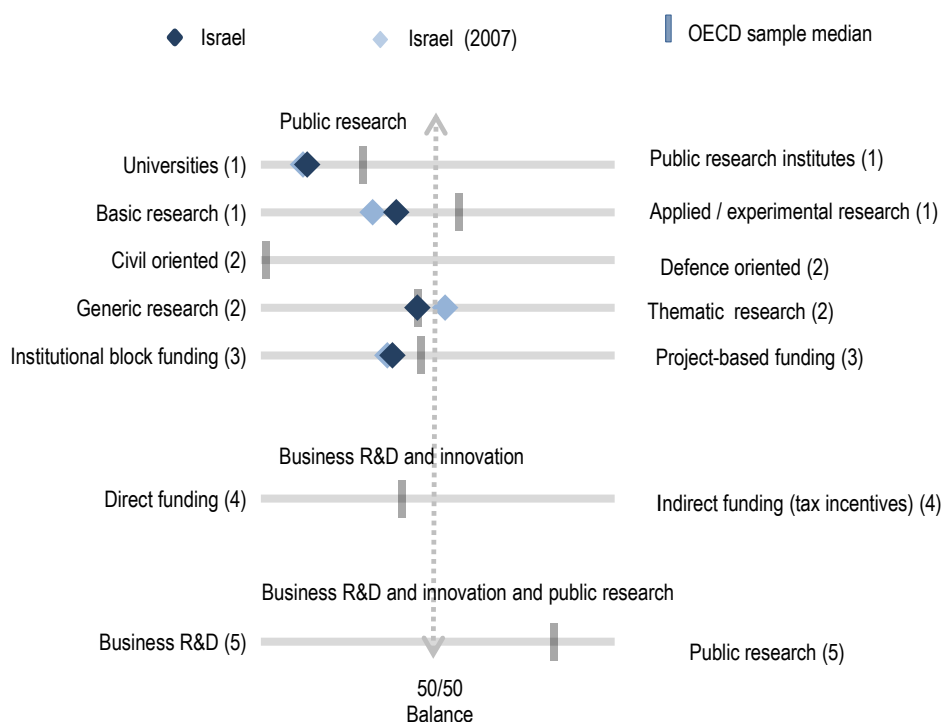
Index based on IP5 patent families applications



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).

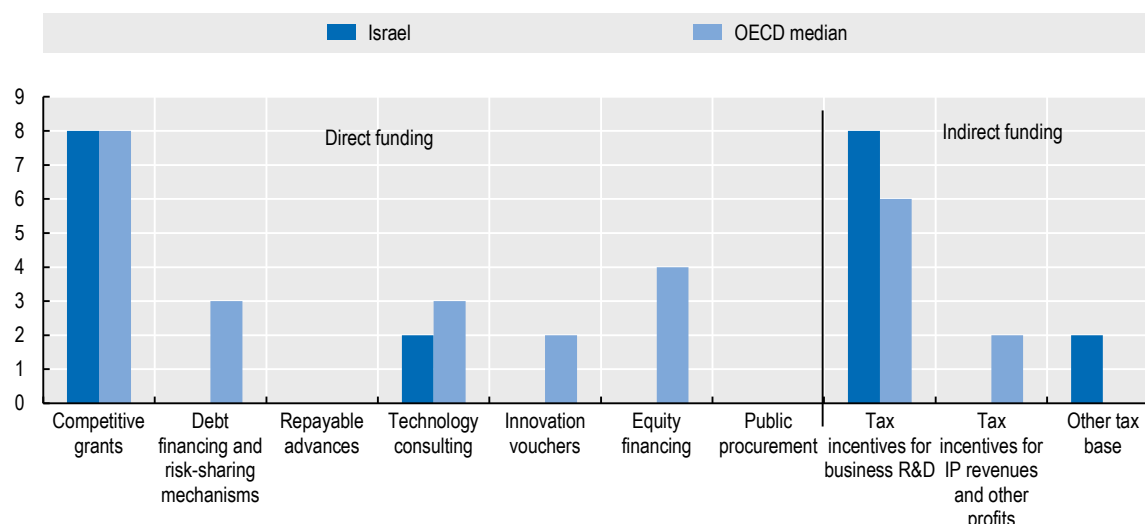
(3). Balance as a share of total funding to national performers.

(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. Israel's responses are available in the EC/OECD International Database on STI Policies, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/ISR...STIO_2016.

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