Country Profile

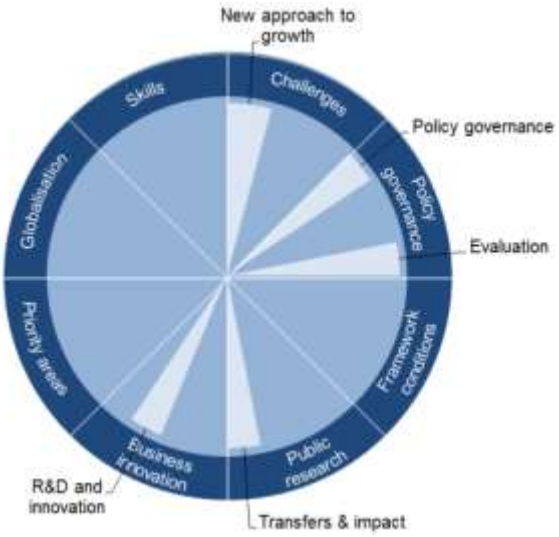
NEW ZEALAND

New Zealand recovered well from the global crisis and is currently enjoying a strong and broad economic expansion and high wellbeing (OECD, 2016). Nevertheless, as an export-oriented economy that still relies heavily on the primary sector, there is room for diversification and the government is seeking to spur further investment in high-value manufacturing and services sectors through its actions in science and innovation. Investments in knowledge have been growing substantially since the crisis – public investments in science and innovation increased by 60% since 2007-08 and are expected to expand in the coming years. Yet, investment in R&D still remains low compared to the OECD average (GERD was only 1.15% of GDP in 2013 – down from 1.25% in 2009) and is lower compared to leading small OECD economies such as Finland, Israel and Sweden. Increasing investment in R&D and complementary intangible assets such as firm-specific skills, data and new organisational processes is a key challenge given that that up to 40% of New Zealand's productivity gap (when compared with the OECD average) could be the result of low investment in knowledge-based capital (OECD, 2015). To help address this challenge, New Zealand has committed to reinforcing investments in research and innovation. Through its Budget 2016, the Government is investing NZD 410.5 million over four years in science and innovation through the Innovative New Zealand package. By 2020, the annual investment in science and innovation will have increased by 15% to NZD 1.6 billion per year. This is one of the largest single investments in science and innovation in New Zealand's history.

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

	NZL	OECD
GERD		
USD million PPP, 2013	1 903	1 181 495
As a % of total OECD, 2013	0.2	100
GERD intensity and growth		
As a % of GDP, 2013	1.15	2.38
(annual growth rate, 2009-13)	(+0.1)	(+2.3)
GERD publicly financed		
As a % of GDP, 2013	0.58	0.61
(annual growth rate, 2009-13)	(+4.5)	(+2.5)

Figure 1. Major STI policy priorities, 2016



Hot issues

Promoting structural adjustment and new approach to growth

Building a more agile science system that can have a long term impact on the economy and society is a central goal of New Zealand's policy makers and an important tool for realising a more diversified economy. A major hurdle is the low level of business R&D (discussed further below), which is held back to some extent by certain characteristics of the New Zealand economy. The Business Growth Agenda (BGA), introduced in 2012 and completely refreshed in 2015 with the *Towards 2025* report, is a central plank of the government's efforts to develop New Zealand as a hub for high-value, knowledge-intensive business. Its ultimate goal is to build a more productive and competitive economy, which is critical to creating business opportunities, more jobs and higher wages and, ultimately, the higher living standards to which New Zealanders aspire. It is supported by a variety of other major policy initiatives, including the National Statement of Science Investment (NSSI), which provides strategic orientation for 2015-2025 and aims to spur excellent science that boosts productivity and wellbeing, and National Science Challenges, which provides funding for eleven research areas of national significance where new knowledge obtained through science and research is needed to realise the benefits for New Zealand.

Supporting R&D and innovation in firms

Spurring growth in business expenditure on R&D and firms' innovation performance is a policy priority in New Zealand. The government views business R&D as a driver of a thriving independent research sector that can act as a major pillar of the New Zealand science system. However, New Zealand's small domestic market size and remote position represent a stumbling block to scaling up business ideas and integrating innovative businesses into global markets and may discourage private spending on R&D and innovation. In addition, the dominance of non R&D intensive sectors in the economy and a business landscape characterised by a lack of large firms (SMEs performed 73% of BERD in 2013) offer a structural explanation for the weak innovation activity in New Zealand' business sector. In 2014, business R&D (BERD) represented 0.54% of GDP whereas the OECD average was 1.6% (figure 5[d]). R&D performed by New Zealand business has been growing steadily, by 6.4% a year from 2010 to 2014. This positive evolution is reflected in the growing number of full time equivalent R&D personnel which increased by 14% (from 5 100 to 6 100). Nevertheless, the level remains lows and the *Towards 2025* report sets a quantitative target of doubling business sector investment in R&D to more than 1% of GDP. The government continues promoting and enhancing support to business innovation through various initiatives offered through Callaghan Innovation, the one-stop shop providing R&D grants, testing services and access to facilities, and networking services. Importantly, the *Towards 2025* report recognises the crucial role of innovation infrastructure, including New Zealand's broadband capability, in achieving business innovation goals. Embracing the digital economy offers options for New Zealand firms to overcome market size and location barriers. The new Investment Attraction Strategy to attract more R&D by multi-national companies is a complementary policy initiative.

Improving transfers, returns and impact of science

New Zealand's public science system is based on universities and sectorally focused Crown Research Institutes (CRIs). In spite of relatively modest public expenditure on R&D (figure 5[a]), the public research sector performs quite well, with five out of the world's top 500 universities and a strong ratio of scientific publications to GDP (figure 5[b,c]). However, while industry and science maintain close ties through research contracts and co-operative R&D, commercialisation of public research results could be improved (figure 5[o,p]). The government is committed to increasing the value New Zealand gains from its investments in public research, with commercialisation a major focus. One key initiative is the Pre-Seed Accelerator Fund (PSAF), which supports early-stage commercialisation activities and works to maximise the commercial benefits to New Zealand from publicly funded research as well as improving the commercial capability and skills of public research organisations. Its funding is spread across five organisations who allocate funding to specific projects.

Improving the governance of the innovation system and policy

An important goal of New Zealand policy makers in the science and innovation area is to reduce complexity and increase transparency, efficiency and effectiveness of funding and systems. The restructuring of the New Zealand government departments overseeing STI policy, and the introduction of Callaghan Innovation in 2013, were important milestones. Callaghan Innovation has implemented a Grants Enhancement programme to streamline the delivery of its R&D grants and services, and continued improvements take place through training for customer-facing staff and initiatives to improve the consistency of customer experiences. In the last two years, Callaghan Innovation's services and grants have been streamlined through changes to the Ministerial Direction, which aims to improve the fairness of the grants and ensure that they reach their intended target group of firms. The changes respond to feedback both from the government and from recipient firms. Work is also ongoing on policy evaluation mechanisms.

Some key STI performance indicators

Figure 2. Economic performance

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

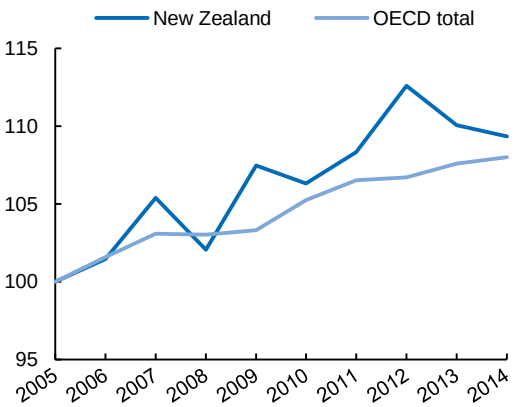


Figure 3. Environmental performance

Green productivity, GDP per unit of CO_2 emitted, index 2005=100

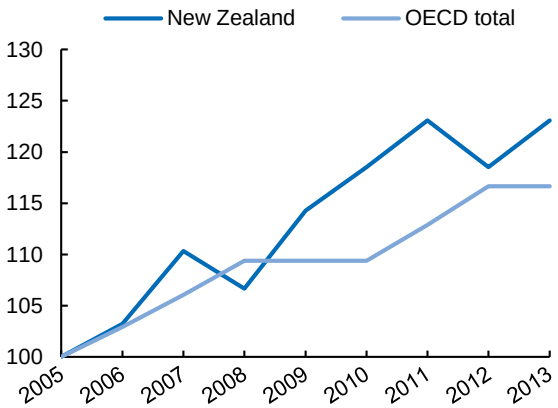
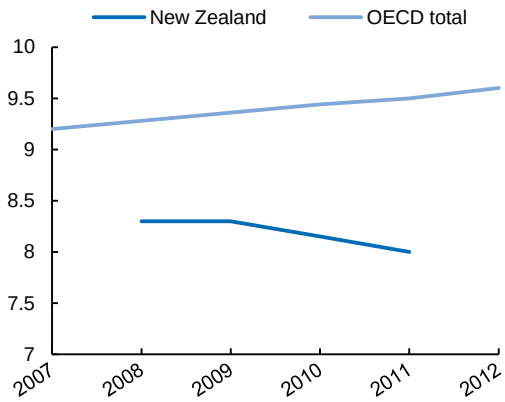


Figure 4. Income inequality

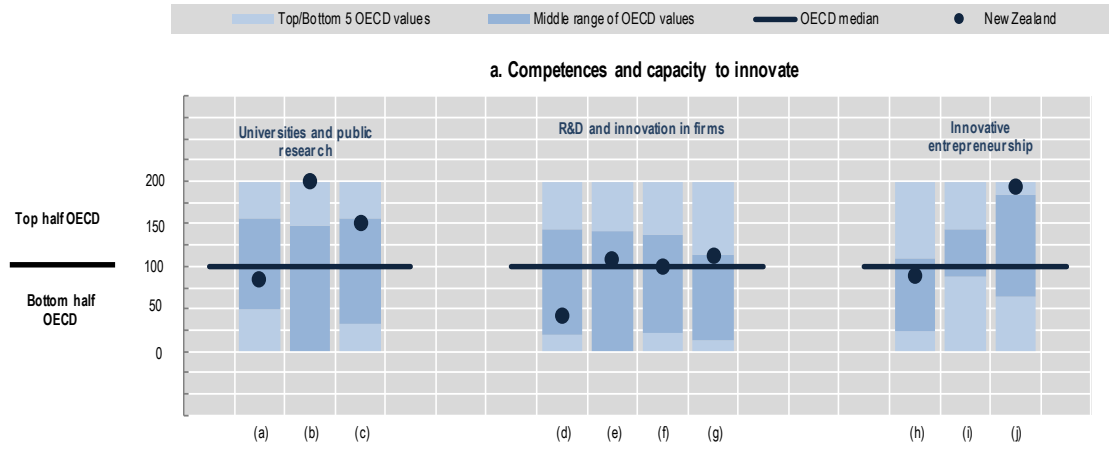
Ratio top decile/first decile of real household net disposable income



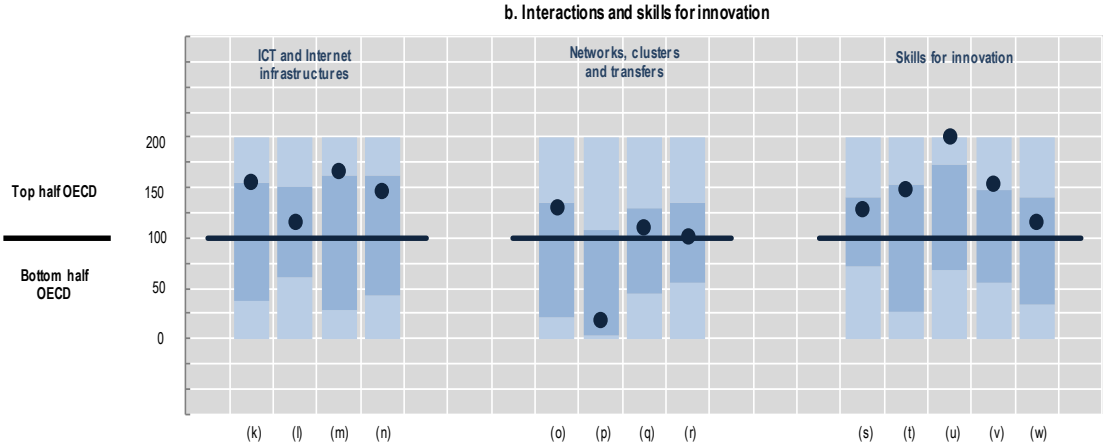
Benchmarking national STI systems

Figure 5. Science and Innovation in New Zealand

Comparative performance of national science and innovation systems, 2016



(a) Public R&D expenditure (per GDP)
(b) Top 500 universities (per GDP)
(c) Publications in the top journals (per GDP)
(d) Business R&D expenditure (per GDP)
(e) Top 500 corporate R&D investors (per GDP)
(f) Triadic patent families (per GDP)
(g) Trademarks (per GDP)
(h) Venture capital (per GDP)
(i) Young patenting firms (per GDP)
(j) Ease of entrepreneurship index



(k) ICT investment (per GDP)
(l) Fixed broadband subscriptions (per population)
(m) Wireless broadband subscriptions (per population)
(n) E-government development index
(o) Industry-financed public R&D expenditure (per GDP)
(p) Patents filed by universities and public labs (per GDP)
(q) International co-authorship (%)
(r) International co-invention (%)
(s) Tertiary education expenditure (per GDP)
(t) Adult population at tertiary education level (%)
(u) Top adult performers in technology problem-solving (%)
(v) Top 15 year-old performers in science (%)
(w) Doctoral graduate rate in science and engineering (%)

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

Highlights of the New Zealand's STI system

New challenges

New Zealand is rebuilding its evaluation system. More attention is being given to outcomes and a trend towards smaller and quicker evaluation exercises has been reinforced. Evaluation arrangements have been revised and new methods and data sources, such as public administrative data, are being introduced. Performance frameworks have been adapted to new funding mechanisms. Evaluation practices were further institutionalised with the creation in 2012 of an independent unit within the MBIE in charge of monitoring STI performance and STI evaluation. Evaluation results are primarily used to support the re-design of programme and policy instruments, and to inform the development of science and innovation priorities and strategies. Evaluation results are not currently used to justify shifts in resource allocation across PRIs or shifts in the levels of public support granted to business R&D and innovation. However, evaluation findings have had some impact in informing policy. For example, they helped to inform the reallocation of STI resources to increased bulk (non-contestable) funding for PRIs, so that these institutions were supplied with more long-term, stable funding. Changes made to Callaghan Innovation's activities in the last two years have not been formally evaluated yet, but it appears that recipients of R&D Growth Grants have increased their R&D spending by 40% on average, compared to the two years prior to receiving the grant.

Innovative entrepreneurship

New Zealand's administrative and regulatory framework is very favourable to entrepreneurship (figure 5[i]). While it has a strong angel investment market, its venture capital industry is relatively weak (figure 5[h]). The New Zealand Venture Investment Fund (NZVIF) was introduced in 2002 to help build a venture capital market. While the progress of NZVIF in catalysing venture capital markets has been promising, it was adversely affected by the global financial crisis, and the policy mix is moving towards more competitive grants and away from venture capital and equity financing tools. For example, Callaghan Innovation's Business Growth Grants provide NZD 160 million of funding per year, with no industry targeting, via three instruments: R&D Growth Grants, R&D Project Grants and R&D Student Grants. These complement the 2013 programme of repayable grants for start-ups, which offers grants of up to USD 307 000 (NZD 450 000) to assist technology start-up companies and pre-incubation grants of up to USD 24 000 (NZD 35 000) to help prospective start-ups establish the commercial viability of their innovative ideas. Other activities include the Pre-Seed Accelerator Fund and Commercialisation Partner Network that support early-stage technology commercialisation activities.

Clusters and regional policies

The government-industry Primary Growth Partnership, set up in 2012, drives the development of primary industries through market-driven science and innovation programmes along the value chain. The New Zealand Food Innovation Network supports the development of the food and beverage industry by providing S&T facilities and expertise. Other recent initiatives include the establishment of technology- and innovation-focused precincts in Auckland and Christchurch, and the Lincoln Hub, a specialist land-based innovation hub near Christchurch. The Regional Growth Programme aims at leveraging the potential of regions by identifying growth opportunities in regions. The programme is composed of two phases: the first concerns diagnostics (independent regional growth studies) and the second consists of implementation of an action plan (regional economic development plans). The MBIE recently launched an initiative to establish Regional Research Institutes around New Zealand. These industry-led centres of research will support innovation in the regions by maximising unique business, technology, and economic growth opportunities in these areas.

Globalisation

New Zealand is less integrated in global science and innovation networks than would be expected for a small, English-speaking country, as reflected in international co-authorship and co-patenting data (figure 5[q,r]). The government is committed to building international linkages and strengthening international science and innovation relationships, with initiatives to identify and capitalise on mutually beneficial research and innovation opportunities with international partners. The MBIE recently re-shaped the International Relationship Fund into a new simplified and streamlined Catalyst Fund to better support high quality international science collaborations for New Zealand. The Catalyst Fund also supports international and strategic collaboration in research, in topics of high importance for New Zealand. In 2015, Government Rules of Sourcing (good practices for procurement planning, approaching the market and contracting) were updated to *inter alia* help suppliers become more competitive in international markets. These initiatives are supported at a more general level by the government's 2014-2019 Tertiary Education Strategy, which highlights the need to build international relationships that contribute to improved competitiveness, and support business and innovation through development of relevant skills and research.

Skills for innovation

New Zealand has a sound skills base, a large pool of university graduates, good student performance in science and a fair share of doctoral graduates in science and engineering (figure 5[t,u,v,w]). The government's emphasis on increasing business R&D raises the issue of ensuring an appropriate innovation workforce. To meet the existing needs of growing high-tech industries (particularly ICT), the government is investing in engineering skills in order to lift the number of graduates by an additional 500 per year by 2017. New ICT Grad Schools have been set up in Auckland, Wellington and Christchurch to link students with industry and deliver graduates with work-relevant, business-focused skills. These graduate schools should link to local innovation precincts or technology hubs and, over time, become hubs of excellence in research into ICT. At a broader level, the initiative *A Nation of Curious Minds* was launched in July 2014 to encourage and enable better engagement with science and technology across all sectors in New Zealand. The Plan is targeted at young people and addresses science education, science communication, science literacy and the application of science-based evidence in public sector decision-making at all levels. It sets out a strategic direction for the next ten years with specific actions for the next three years. It is supplemented by initiatives such as Futureintech, run by the Institution of Professional Engineers New Zealand, which brings people who already work in technology, engineering and science-related industries into schools to share their experiences and pathways. Futureintech aims to increase the number of young New Zealanders choosing careers in technology, engineering and science.

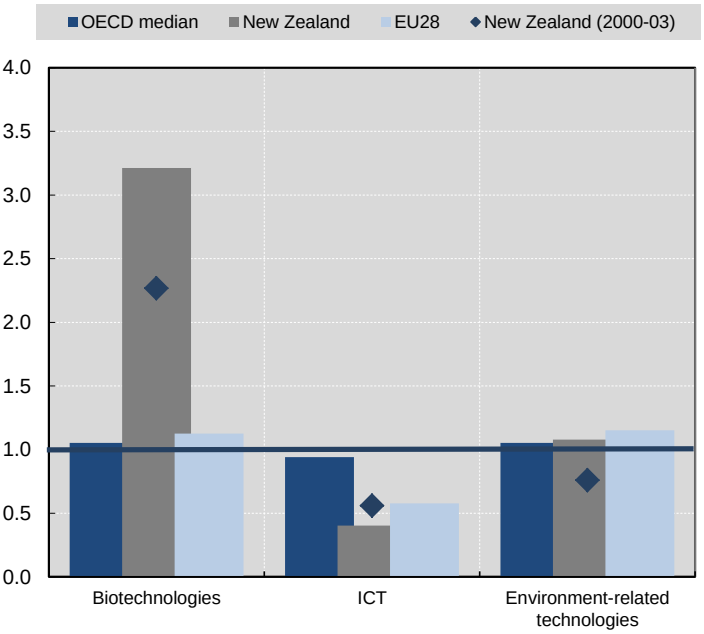
Structural aspects and specialisation

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

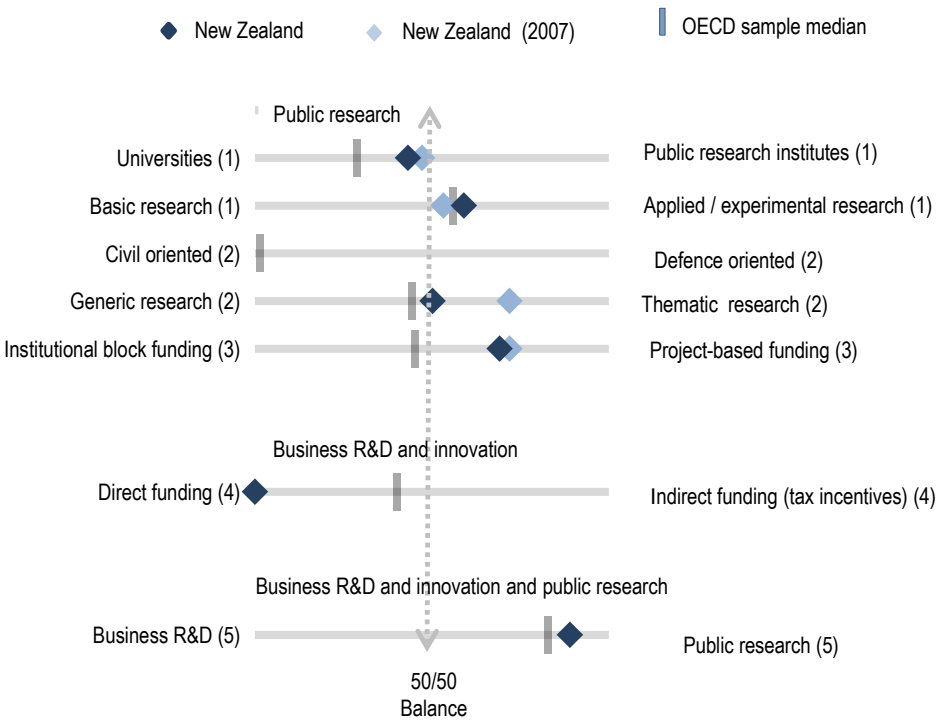
Index based on IP5 patent families applications



National STI policy mix

Figure 8. Allocation of public funds to R&D, 2014 or latest year available

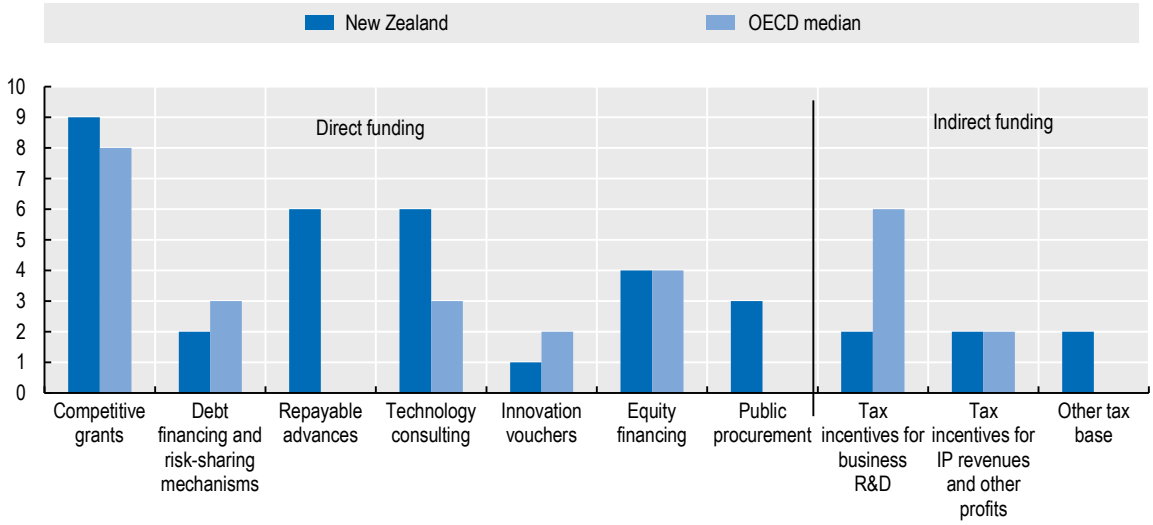
By sector, type of R&D and mode of funding



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

Source: See the reader's guide and methodological annex.

StatLink http://dx.doi.org/10.1787/888933433980

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