Country Profile

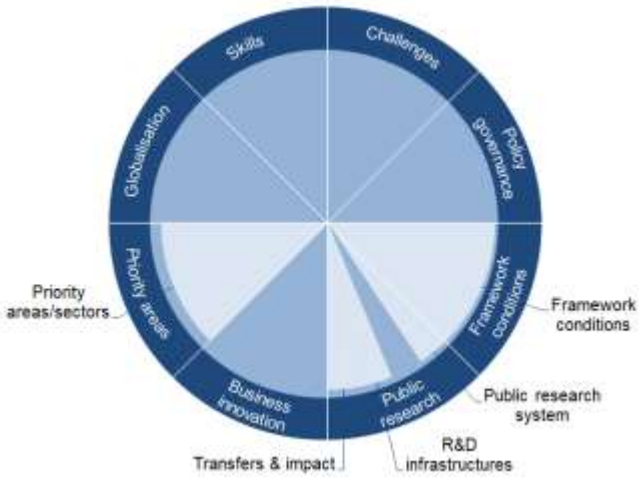
THE NETHERLANDS

In the aftermath of the global economic crisis, economic growth in the Netherlands began to pick up in 2014, with gross domestic product (GDP) recently exceeding its pre-crisis peak. However, as in many OECD countries, labour productivity growth has been weak since the beginning of the global crisis (figure 2). Strengthening investment in knowledge and innovation is a key to future productivity growth and competitiveness and is also necessary to address social challenges. The 'top sectors' approach, a form of industrial policy announced in 2011 and continued to date, focuses public resources on specific sectors and seeks to foster co-ordination of activities in these areas by businesses, knowledge institutions and government.

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

	NLD	OECD
GERD		
USD million PPP, 2014	16 291	1 181 495
As a % of total OECD, 2014	14	100
GERD intensity and growth		
As a % of GDP, 2014	2.00	2.38
(annual growth rate, 2009-14)	(+3.3)	(+2.3)
GERD publicly financed		
As a % of GDP, 2014	0.65	0.61
(annual growth rate, 2009-14)	(+1.2)	(+2.5)

Figure 1. Major STI policy priorities, 2016



Hot issues

Improving the framework conditions for innovation

The Netherlands scores high on indicators of overall framework conditions (figure 5[i,n]) and skills for innovation (figure 5[s,u,v]). Some indicators of private investment in R&D and innovation, however, are closer to the OECD median than in countries considered leading innovators (figure 5[d,h,k]). The government has set targets to reduce administrative burdens and compliance costs for enterprises and improve transparency and provision of public services. The enterprise policy "To the Top", which began in 2011, aims to assist Dutch companies to do business, invest, innovate and export (so-called 'top sectors' are clusters of enterprises and knowledge institutions where most Dutch R&D expenditure is concentrated and which are usually export intensive). Current policy seeks to limit rules and subsidies, focusing on lower taxes, fewer

and less complicated regulations, broader access to corporate finance and better utilisation of knowledge infrastructure by business. The ambition is to make the Netherlands one of the top 5 knowledge economies in the world (by 2020), increase R&D spending to 2.5% of GDP (by 2020), and establish Top Consortia for Knowledge and Innovation (TKI), to which both public and private parties contribute.

Improving transfers, returns and impact of science

The government emphasises strengthening the commercialisation of public research (Valorisation Agenda of 2009). Dutch universities and knowledge institutes have strong links with the business sector, with a high share of industry funding in public research (figure 5[o]). To foster commercialisation and technology transfer, the Valorisation Programme was introduced in 2011, with a budget of EUR 63 million (USD 76 million PPP), to support 12 consortia over six years. The Valorisation process is now part of performance agreements with universities. Collaboration to exploit scientific research is a key objective of the top sectors. A national plan for knowledge transfer is also due in 2016. Based on experience so far, and to better reflect social challenges, efforts are being made to simplify and harmonise top-sector instruments: the Top Consortia for Knowledge and Innovation (TKI) and the SME Innovation Support Top Sectors (MIT) scheme. The MIT scheme, introduced in 2013, promotes SMEs' participation in top-sector related initiatives, through collaborative R&D projects, feasibility studies, innovation vouchers, support for hiring of experts, networking and coaching. The government made USD 37 million PPP (EUR 30million) available in 2015 for the MIT scheme. The TKI allowance, with USD 103 million PPP (EUR 83 million) in 2013, promotes public-private R&D consortia in top sectors. Efforts are under way to strengthen the representation of SMEs in the top sectors. To address shortcomings in access to venture capital, the government has launched the fund-of-funds Dutch Venture Initiative/DVI-1, and in October 2015 established a business angels co-investment facility. Four other funds in the early stage venture capital market started in 2015. These interventions target all sectors, including green innovation and clean energy.

Strengthening the public research system

Public R&D expenditure is high as a share of GDP (figure 5[a]). Dutch universities are well placed in global rankings, and Dutch science has a strong global impact (figure 5[b,c]). Universities and PRIs also attract a comparatively high share of industry funding for their R&D (figure 5[o]). While project-based funding has increased in importance, most public R&D funding is disbursed as institutional block funding (figure 9), of which general university funds (GUF) represent approximately two-thirds. In November 2014 the "2025 Vision for Science" was published. This White Paper outlines the government's plans for science policy and has three key goals: achieving world-class research; maximizing research impact by developing stronger links with society and industry; and, helping researchers develop to their full potential. To achieve these goals the government intends to improve open access to research, renew research infrastructures, improve science communication, increase the number of PhD researchers in government and industry, strengthen cooperation between science and the private sector, and promote equal opportunities for women in science. Based on the Vision for Science, a National Research Agenda was published in November 2015. This Agenda seeks to establish research priorities and increase research cooperation. Starting in 2015, new schemes have sought to help universities, research institutes and business to benefit from European funds. In 2014 the Dutch government also published a Strategic Vision for the country's 6 institutes of applied research. The institutes work together in a cooperation committee (TO2) so as to align activities, better assist target groups (such as the top sectors), and learn from each other. The private contribution for research in these institutes was USD 172 million PPP (EUR 140 million) in 2014.

Strengthening public R&D capacity and infrastructures

The government has set up a Permanent Commission for Large-scale Scientific Infrastructure to implement the national roadmap for large-scale infrastructure, which is being renewed in 2016. The Commission is expected to provide effective coordination of investments and usage of large-scale infrastructures among the main stakeholders, including the institutes of applied research, which account for a large part of such facilities in the Netherlands.

Targeting priority areas/sectors

The Netherlands affords generic measures for all companies and specific measures for the top sectors. There is a coordinated approach to achieve ambitions on five main themes for the top sectors: knowledge and innovation, human capital, internationalisation, better regulation and societal implications. Nine top sectors receive preferential support: agriculture and food, horticulture and propagation materials, high-technology systems and materials, energy, logistics, creative industries, life sciences and health, chemicals and water. Knowledge institutions, companies and the government co-operate to strengthen the competitiveness of top sectors (and thereby address social challenges). While research and innovation dominate top-sector programming, there is also concerted action on STEM-educated human resources. Dedicated funding for top-sector instruments is about USD 340 million PPP (EUR 275 million) a year, but considerable amounts of public research (of which about 30% is privately financed) in universities and PRIs are being aligned with the top sectors approach, equal to about USD 1.2 billion PPP (EUR 1 billion) excluding regional and EU funding. The Netherlands Organisation for Scientific Research (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW) will dedicate a substantial part of their budgets to (fundamental) research related to the nine top sectors. Allocation of budgets will be based upon scientific quality, economic impact and the contribution to meeting grand challenges. New large public-private partnerships are also being sought in such fields as oncology and big data. Quantum research in Delft is at the forefront of recent scientific developments, with for instance important discoveries in superconductor- and semiconductor-based qubits, and the recent demonstration of teleportation between two computer chips. To help European high-tech firms gain a sizeable share of the future quantum sector, TU Delft and TNO have established a joint centre with Industrial partners (QuTech). In 2015, Intel invested USD 62 million PPP (EUR 50 million), together with USD 14 million PPP (EUR 11 million) from the Ministry of Economic Affairs, in QuTech to accelerate development of quantum computing.

Some key STI performance indicators

Figure 2. Economic performance

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

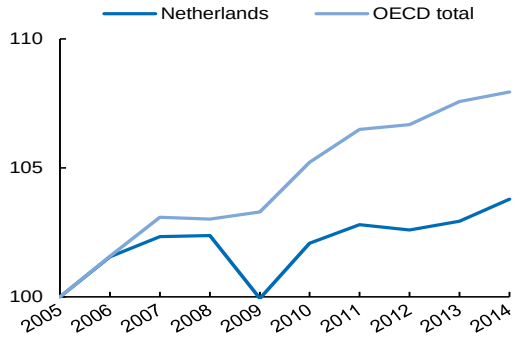


Figure 3. Environmental performance

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

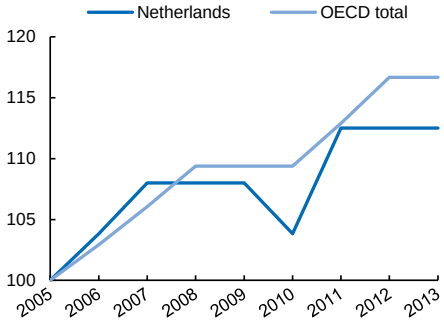
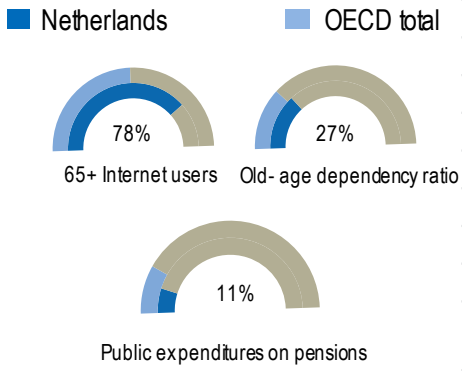


Figure 4. Ageing

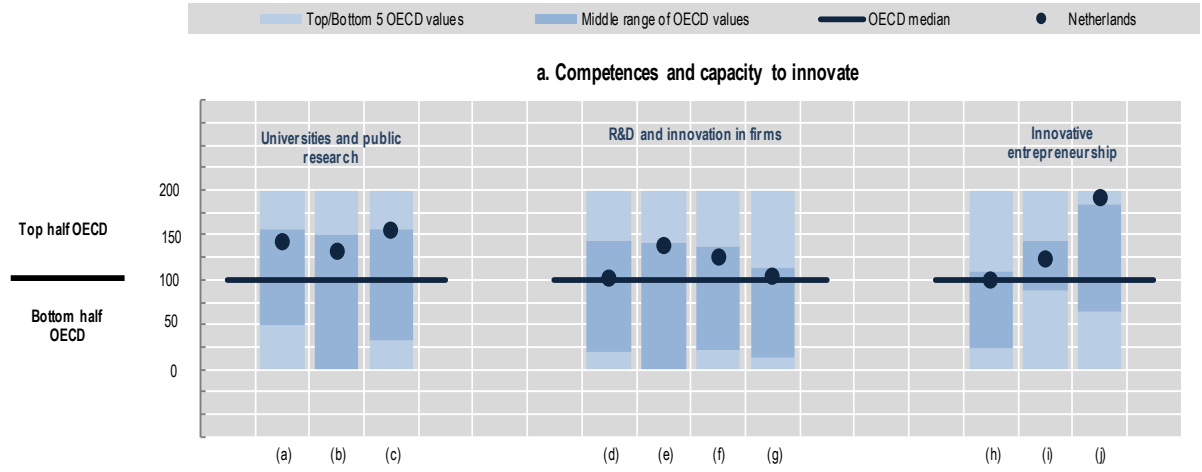
2015 or latest year available
Percentage of total



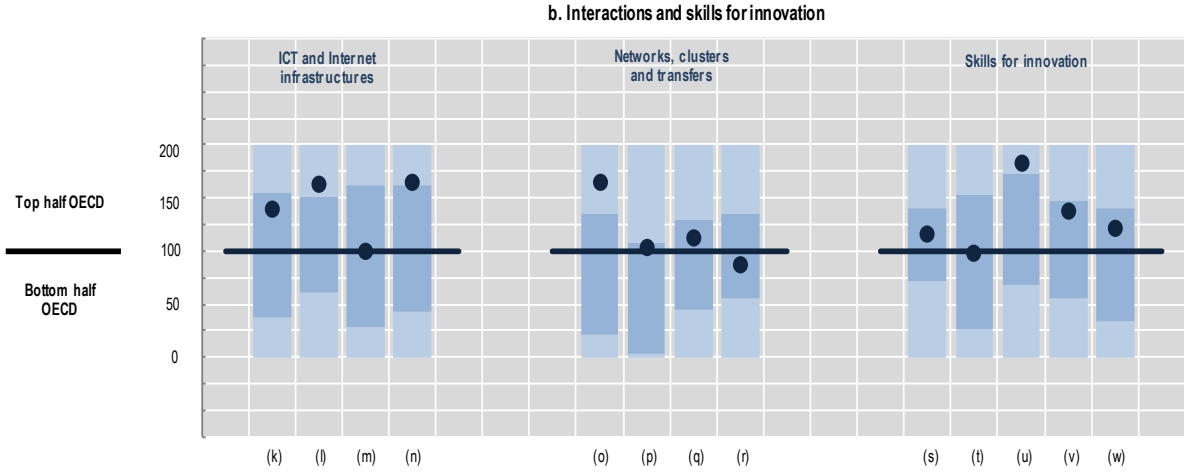
Benchmarking national STI systems

Figure 5. Science and Innovation in Netherlands

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 Dutch STI system

New challenges

Social challenges facing the Netherlands include demographic change, energy supply and climate change. These challenges are also important in shaping top-sector agendas. Innovative responses to these challenges are strengthened by participation in the EU's Horizon 2020 programme, and by funding from the Netherlands Organisation for Scientific Research (NWO), which distributes a major share of competitive research funding to Dutch universities and other knowledge institutes. In June 2015 the Cabinet informed the Dutch parliament on progress of Dutch policy towards green growth, as reflected in the document 'Taking Stock: Green Growth 2015'. The overall conclusion was that unmet opportunities exist.

STI policy governance

The Ministry of Economic Affairs (EZ) and the Ministry of Education, Culture and Science (OCW) remain the main policy actors in the broad field of knowledge and innovation. The areas where other departments are responsible, such as in health, development aid and transport, are connected to the innovation and research agenda through their participation in the top sectors, for example, in (renewable) energy, sustainable food production, health, development aid and mobility. They directly influence the thematic roadmaps of the Top consortia for Knowledge and Innovation (TKIs).

Innovation in firms

The intensity of business R&D expenditure is at the OECD median (figure 5[d]), owing in part to structural features of the Dutch economy. Yet, the Netherlands performs above the OECD median in patenting and at the OECD median in trademarks registration (figure 5[f,g]), owing to the presence of a number of large corporate R&D spenders (figure 5[e]). Support for business innovation is part of enterprise policy, with instruments available to support public-private partnerships in the top sectors and the broader population of businesses. Tax incentives are the primary means of financial support for business R&D (figure 9). The largest innovation policy instrument is the R&D payroll tax allowance (WBSO). The WBSO tax credit scheme has recently been revised and its budget increased. In 2016 the WBSO tax credit (for R&D wage costs) and the R&D Allowance (RDA), which covers other R&D costs, will be merged. The new WBSO tax credit will cover all R&D costs. Companies benefit from this tax credit via deductions from the wage tax and social-insurance contributions. These deductions can be implemented during the year the R&D takes place, and are not dependent on the profitability of companies. The merger of the WBSO and RDA also aims to reduce the administrative burden for companies that apply. In the WBSO, start-ups are eligible for higher tax credits (40%, instead of 32%, of the first USD 437 000 PPP (EUR 350 000) of all R&D costs in 2016). For large R&D companies, 16% of R&D costs are covered by the WBSO. The budget for WBSO for 2016 is USD 1.4 billion PPP (EUR 1.2 billion). 66% of the budget of the WBSO is used by SMEs (while SMEs conduct 41% of all R&D in the Netherlands).

The Netherlands ranks among the leading countries on the OECD Ease of Entrepreneurship Index (figure 5[i]). In recent years, the scarcity of bank lending, and limited venture capital (figure 5[h]), have been restricting factors. In response, a number of policy instruments contain special provisions for SMEs, including credit guarantees through the Qredits, MKB and GO facilities. The Seed Facility supports private equity firms investing in early stage start-up companies and the R&D credit helps support R&D projects.

Globalisation

The Netherlands is very open to international trade and investment. The science system, too, is highly internationalised, as reflected in the level of international co-authorship (figure 5[q]), although international

co-invention is below the OECD median. Dutch participation in European Framework Programmes is above the European average. The Ministry of Education, Culture and Science and the Ministry of Economic Affairs have developed national strategies to promote the international dimension of STI policies and programmes.

Skills for innovation

The Dutch workforce is well educated and has strong innovation-related skills overall. Education is of high quality (figure 5[u,v]), although adult tertiary education attainment and the rate of doctoral graduates in science and engineering could be improved (figure 5[t,w]). Current policy efforts focus on maintaining quality in tertiary education and responding to emerging labour market needs. The top sectors' human capital agendas encourage co-ordination to identify and prepare for emerging skill needs. In 2013, the government launched the 2020 National Technology Pact, involving major stakeholders. Co-operation between Higher Education Institutions (HEIs), vocational secondary education and the business sector is a key part of the Pact, which aims to increase the number of technically trained people. In contrast to higher education, student enrolment in technical secondary vocational education is falling, despite a relatively large number of technical vacancies. The Technology Pact will seek to address this issue, in part by focusing on traineeships and apprenticeships at secondary vocational level. The 'Strategic Agenda for Higher Education, Research and Science', to be implemented during 2015-2019, aims to improve the quality of education, strengthen applied research at universities of applied science, create regulation-free zones for innovation in education, and introduce Comenius-grants for innovation in education. The Ministry of Education, Culture and Science will increase the budget for applied research at the universities of applied science. Centres of Expertise began to be established in 2011 and are themed according to the top sectors. In these centres, employers, scientists, teachers and students cooperate to improve the quality of technical vocational education and accelerate innovation. The Dutch government has proposed to establish more of these Centres. The Network of Dutch Centres of Entrepreneurship was launched in 2015 and aims to increase the scope and quality of entrepreneurship education in the Netherlands.

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

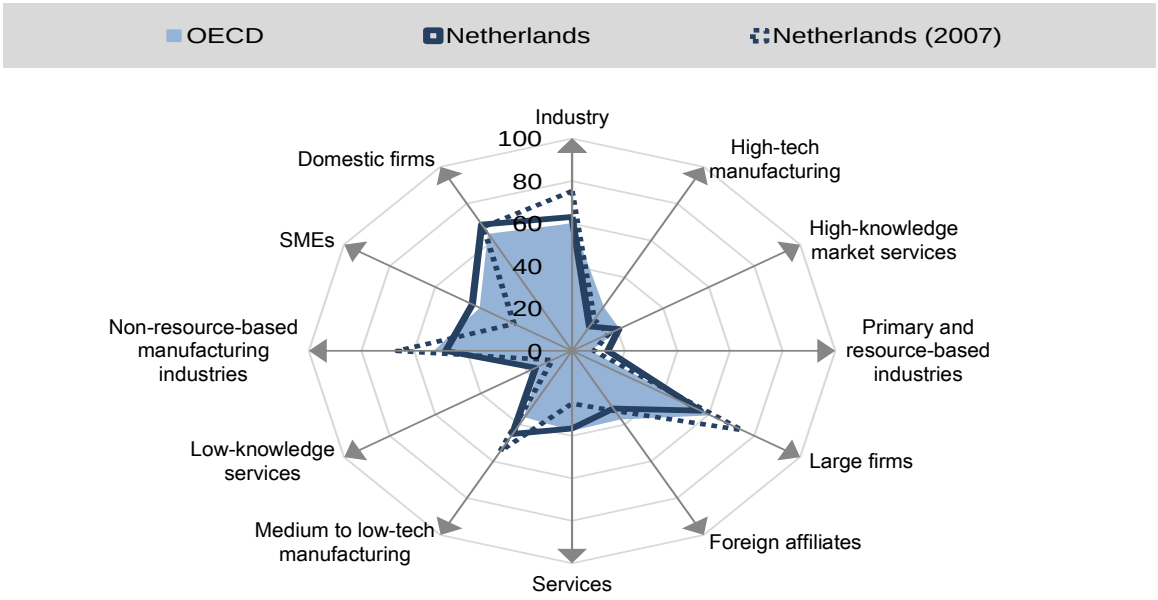
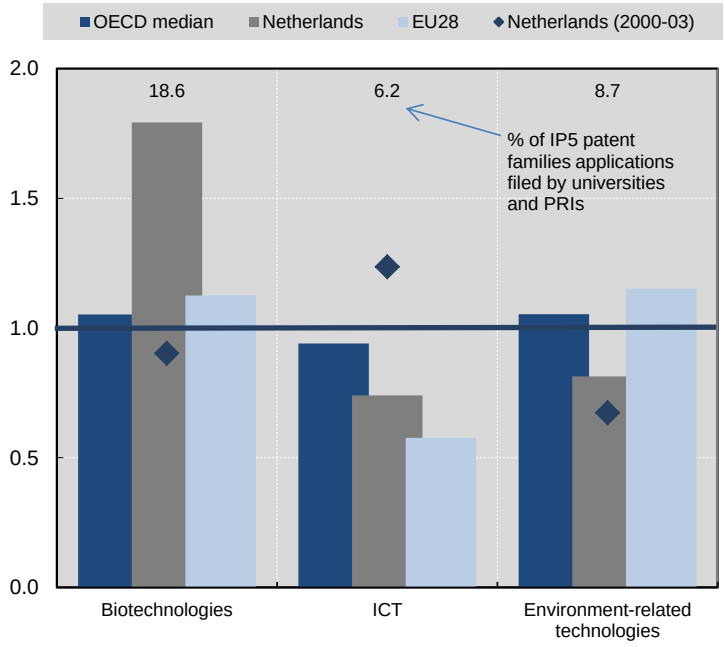


Figure 7. Revealed technology advantage in selected fields, 2011-2013

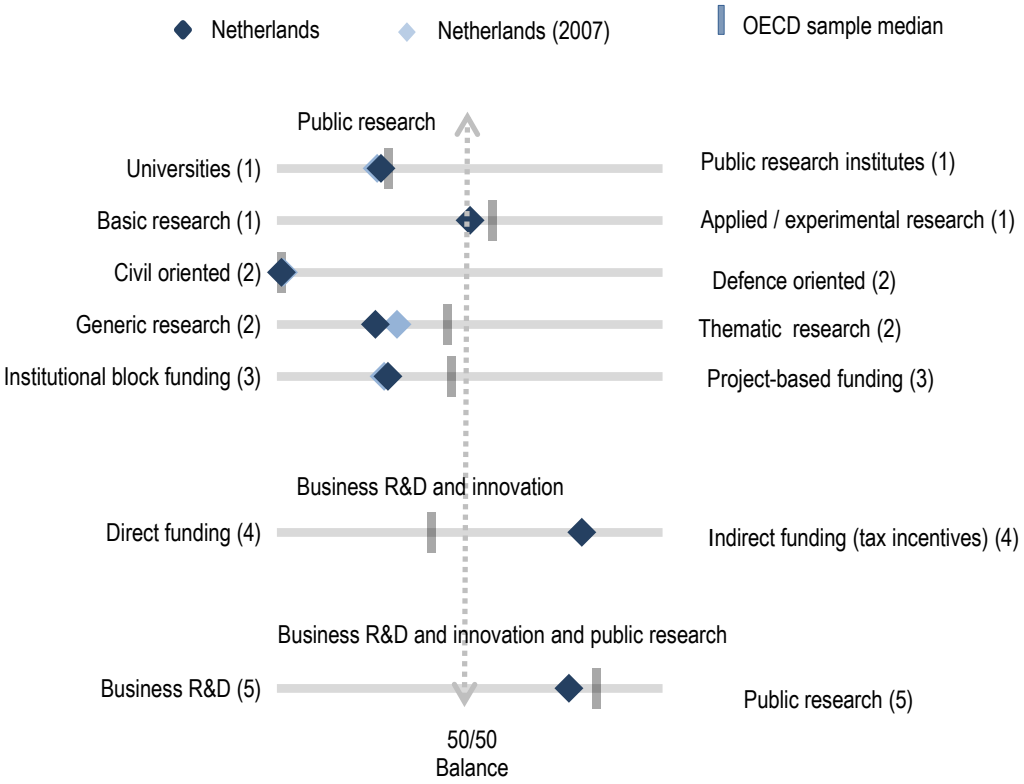
Index based on IP5 patent families applications



National STI policy mix

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

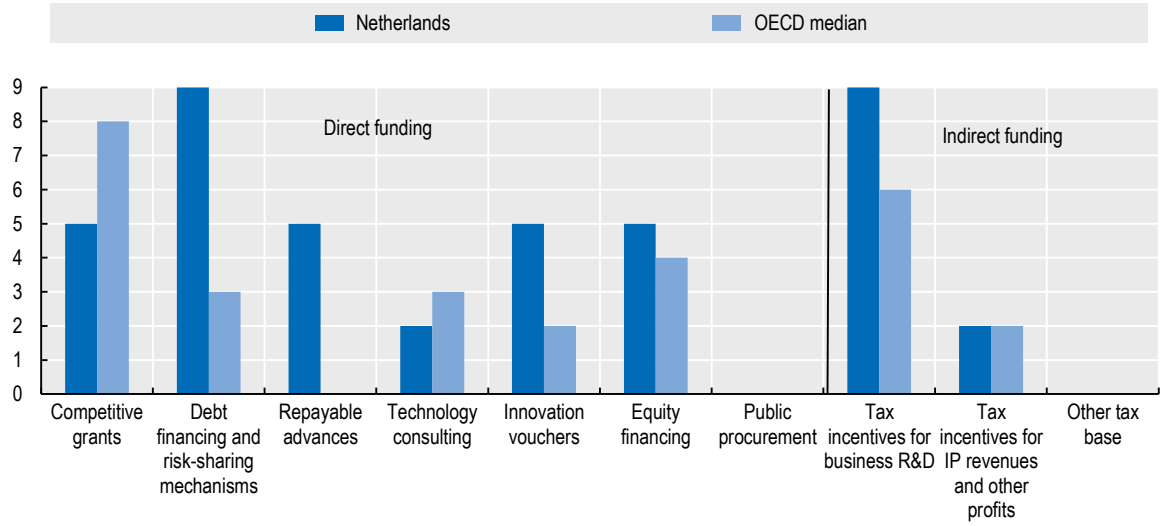
By sector, type of R&D and mode of funding



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

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

StatLink http://dx.doi.org/10.1787/888933433979

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