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# RIO Country Report 2015: The Netherlands

Chapter:

*3. Public and private funding of R&I and expenditure*

Matthijs JANSSEN
Bram ERVEN
Pim DEN HERTOG
Koen JONKERS

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Joint
Research
Centre

**Contact information**

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: jrc-ipts-secretariat@ec.europa.eu
Tel.: +34 954488318
Fax: +34 954488300

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**Abstract**

The 2015 series of RIO Country Reports analyse and assess the policy and the national research and innovation system developments in relation to national policy priorities and the EU policy agenda with special focus on ERA and Innovation Union. The executive summaries of these reports put forward the main challenges of the research and innovation systems.

# 3. Public and private funding of R&I and expenditure

## 3.1 Introduction

Although presented as signs of progress in the Dutch NRP 2015, expenditures on Research and Development (GERD) as a share of GDP have been increasing only gradually over the past few years. The 1.97% of GDP measured in 2014 is similar to the EU28 average, but well below the national target of 2.5%. Given the high rate of GDP per capita (discussed in section 1.1), also GERD as expressed by euro per capita is above the European average.

According to Table 2, and as mentioned repeatedly throughout this country report and its predecessors, particularly concerning in the Dutch R&I profile are the R&D expenditures funded by the business sector (BERD). This amount to 1.02% of GDP in 2014, as compared to a EU28 average of 1.12% (2013). In the past Innovation Union Scoreboards, this has consistently been the main indicator where the Netherlands are underperforming. Expressed as a percentage of GERD, Dutch business-funded R&D lays around 52% versus a EU28 average of 55%. When looking at who performed R&D (rather than who funded it), Dutch businesses expenditures of 1.11% of GDP account for 56% of the total R&D expenditures versus a European average of 64% (2014). A low share of private R&D is complemented with a high share of R&D being performed by higher education institutions (HEIs). The share of 32% of GERD exceeds the European average of 23%. Finally, R&D performed by governmental research organizations has been constant over the past years (11%-11.6% of GERD). Because the most severe fiscal consolidations were implemented in 2014, it is too early to assess the effect this had on the amount and relative distribution of R&D investments. The same holds for interventions introduced with the Enterprise Policy, aimed at leveraging business R&D expenditure.

Compared to other countries, the Netherlands have been fairly successful in obtaining funding from the European Framework Programs for research and technological development (RTD). The 5113 FP7-projects that were awarded with in total €3.37bln delivered funding to no less than 8280 participants.[1] With a return of 8.3% of total funding, exceeding the initial contribution of 5%, the Netherlands have been exceptionally successful in attracting FP7-funding.Especially important for this result were the technological institutes and universities. The participation of SMEs (receiving 13% of attracted funding) was below the European average of 15%. In the first call of the Horizon2020 'SME instrument', Dutch SMEs have been underperforming with a hit rate of 4% for phase 1 projects (compared to the EU average of 6%). This number has steadily going up in later calls and phase 2, however. The hit rate in the first two calls of phase 2 was 16.5% on average; significantly higher than the EU average of 11.5%.[2] To maintain or even enhance this performance level and exploitation of the research projects receiving European funding, the cabinet introduced a 'fast track to innovation' and a SME-instrument (MIT) in 2015.[3]

In the period 2007-2013, the Netherlands received €830mln out of the €201bln of European structural funds (ERDF). As the total available amount for 2014-2020 is lower (€183bln), also funding for Dutch regions will decrease. The €500mln expected by RVO.nl would correspond with a lower relative share for the Netherlands (0.27% instead of 0.41%).[4]

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[1] Joint Research Centre – Institute for Prospective Technological Studies (2015). Internal documents.
[2] Ministry of Economic Affairs (May 2015). Positive developments in the participation of Dutch SMEs in Horizon 2020.
[3] Ministry of Economic Affairs (2014). Progress Report Enterprise Policy 2014.
[4] RVO.nl. Europees Fonds voor Regionale Ontwikkeling (EFRO). In Dutch. Accessed on 9-1-2016.

**Table 1:** Basic indicators for R&D investments

| Indicator | 2011 | 2012 | 2013 | 2014 | 2015 | EU average (2014)* |
|---|---|---|---|---|---|---|
| GERD (as % of GDP) | 1.9 | 1.94 | 1.96 | 1.97 | | 2.03 |
| GERD (Euro per capita) | 734.6 | 747.9 | 759.5 | 776.9 | | 558.4 |
| GBAORD (€m) | 4975.06 | 4676.81 | 4794.3 | 4924.47 | 4779.68 | 92828.15 |
| R&D funded by GOV (% of GDP) | 0.65 | 0.63 | 0.65 | 0.65 | | 0.66 |
| R&D funded by BES (% of GDP) | 0.97 | 1 | 1 | 1.02 | | 1.12 |
| R&D funded by PNP (% of GDP) | 0.06 | 0.06 | 0.06 | 0.06 | | 0.03 |
| R&D funded from abroad | 0.22 | 0.24 | 0.24 | 0.25 | | 0.2 |
| R&D performed by government sector (% of GDP) | 0.21 | 0.23 | 0.24 | 0.23 | | 0.25 |
| R&D performed by business sector (% of GDP) | 1.08 | 1.1 | 1.09 | 1.11 | | 1.3 |
| R&D performed by HEIs (% of GDP) | 0.62 | 0.61 | 0.63 | 0.64 | | 0.47 |

* EU28-averages of R&D funding concern 2013 figures.

## 3.2 Smart fiscal consolidation

### 3.2.1 Economic Growth, fiscal context and public R&D

Following a contraction in real GDP in 2012 and 2013, the Dutch economy returned to growth in 2014 (1.0%) and 2015 (1.9%) driven by domestic demand as a result of real wage growth and improving labour market conditions. The Commission forecasts 2.1% growth in 2016 and 2.3% in 2017[5].[6].

Public finances were strongly hit by the crisis: the headline deficit jumped to more than 5% of GDP in 2009 from the previous levels which were in balance or showed a slight surplus (Figure 2). This has been followed by gradual and continuous decreases down to 2.2% by 2015 thanks to a robust multiannual fiscal framework that uses inflation-adjusted expenditure ceilings predetermined for the entire term of office of the government, automatic stabilisers on the revenue side and independently derived macroeconomic assumptions.

[5] As a legacy of the credit-led housing boom that started in the 1990s, Dutch households remain highly indebted. The on-going deleveraging by households is likely to put a limit on the speed of economic recovery http://ec.europa.eu/europe2020/pdf/csr2015/cr2015_netherlands_en.pdf.

[6] As a legacy of the credit-led housing boom that started in the 1990s, Dutch households remain highly indebted. The on-going deleveraging by households is likely to put a limit on the speed of economic recovery http://ec.europa.eu/europe2020/pdf/csr2015/cr2015_netherlands_en.pdf.

In 2016-17 it is expected to continue to improve to 1.8% and 1.5% of GDP, respectively due mainly to the recovery of domestic demand leading to higher tax income.

The gross government debt increased gradually from the pre-crisis levels of 43-50% to around 66-68% by 2014-2015, a level from where it is expected to decrease to ca. 65% by 2017 thanks to increasing nominal GDP and to the sale of financial assets and other debt-reducing measures. The country seems to face medium and long-term fiscal sustainability risks due to ageing related costs.

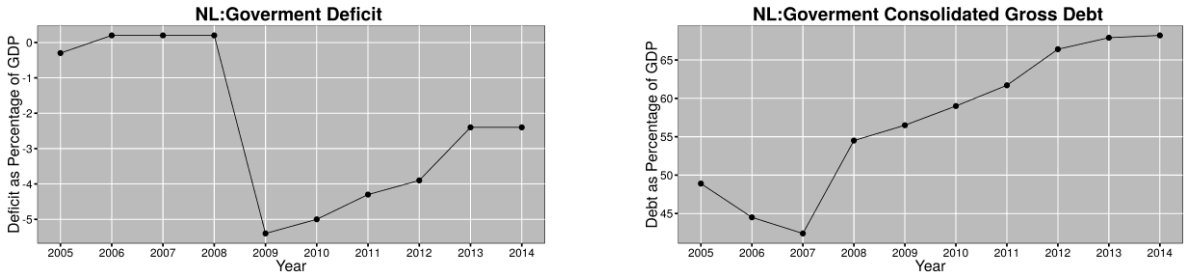


**Figure 1:** Government deficit and public debt

Data source: Eurostat

Total GERD in the Netherlands was 12,743 MEUR in 2013. There are three main sources of R&D funding: the business sector (6,0516 MEUR), the government (4,249 MEUR), and foreign funding (1,551 MEUR). Direct funding from the government goes to business enterprises (118 MEUR), the government (910 MEUR) and the higher education sector (3,250 MEUR).[7]

**Table 2:** Key Dutch Public R&D Indicators

| | 2007 | 2009 | 2013 |
|---|---|---|---|
| GBAORD, % of gov. exp. | 1.61 | 1.54 | 1.49 |
| GERD, % of GDP | 1.69 | 1.69 | 1.96 |
| out of which GERD to public, % of GDP | 0.80 | 0.89 | 0.87 |
| Funding from GOV to, % of GDP | | | |
| Business | 0.02 | 0.03 | 0.02 |
| Public (GOV+HES) | 0.60 | 0.66 | 0.63 |
| Total | 0.64 | 0.69 | 0.65 |
| EU funding, % of GDP | n.a. | n.a. | 0.03 |

Source: Eurostat

[7] National sources indicate that government funding of R&D was 4278 in 2014. Funding from Business and private non profit combined had increased more substantially to 7143 MEUR in 2014. Total GERD had increased to 13075 MEUR (http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=82042NED).

### 3.2.2 Direct Funding of R&D activities

Figure 3, below shows the historical evolution of GERD financing in current prices in the Netherlands.[8]

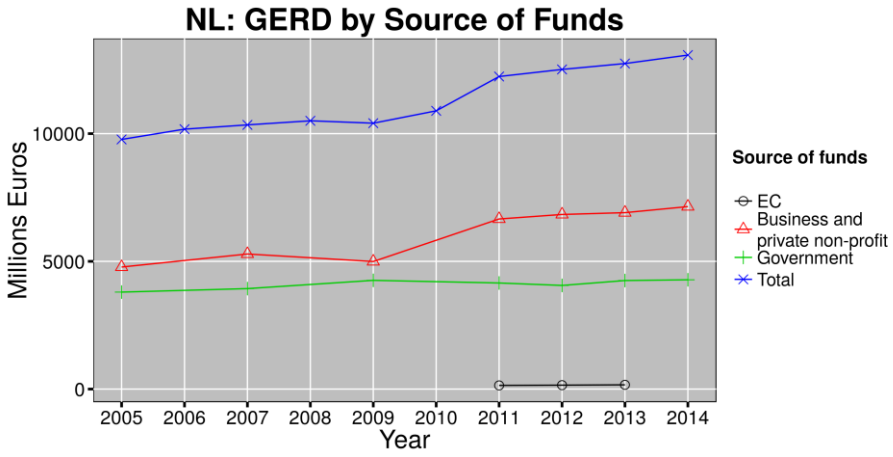


**Figure 2:** Funding of the total GERD

Data source: Eurostat

Figure 3 shows that the total R&D expenditure in Netherlands increased between 2010 and 2013 due to an increase in the R&D investments of the private sector. Direct public funding has remained almost stable, whereas the available data from Eurostat is not sufficient to assess the effect of the EC contribution.

"The jump in Business financed R&D expenditure occurring in 2011 can partially be attributed to revisions in the measurement procedure (definitions and inclusion of firms with a size of 1 – 9 employees)[9], as well as to temporary crisis measures implemented in 2010"[10]. Nevertheless, R&D intensity continued increasing and in 2013 reached 1.98% of GDP, approaching the EU28 average of 2.01%.

#### 3.2.2.1 Direct public funding from the government

The analysis of the total civil R&D appropriations in millions of euro shows an increasing trend in the period 2005-2011. The peak in 2011 can be attributed to temporary crisis related measures implemented in 2010. Only in 2012 we see a significant drop in GBAORD, which could be due to the shift from subsidies to R&D tax incentives by the Cabinet Rutte. Later this shift was followed by the introduction of some new budgets for the Ministry of ECS and in particular NWO. The drop did not continue in 2013 and 2014 but it was repeated in 2015 though at a lower rate. One also notices that the difference between the total and the civil appropriations remains approximately constant in the whole period under study: The defence R&D budget is small but stable.

[8] The sources of R&D funding according to the Frascati manual are: Government sector (GOV), Higher education sector (HES), Private non-profit sector (PNP) and Abroad (including EC). In this analysis the public sector as source of funds is given by the Government sector (GOV), whereas the public sector as a sector of performance is the aggregation of GOV and Higher education sector (HES).

[9] Eurostat indicates a break in the series in 2011.

[10] Pim den Hertog, Matthijs Jansen, RIO country report 2014 the Netherlands, draft version.

The GERD funded by government in nominal terms increases from 2005 to 2009, not always at the same rate. It drops in 2011 and 2012 (data for 2010 is not available) but increases again in 2013, following a similar pattern as the budget appropriations. The EC contribution increased from 144 to 162 million euro between 2011 and 2012.

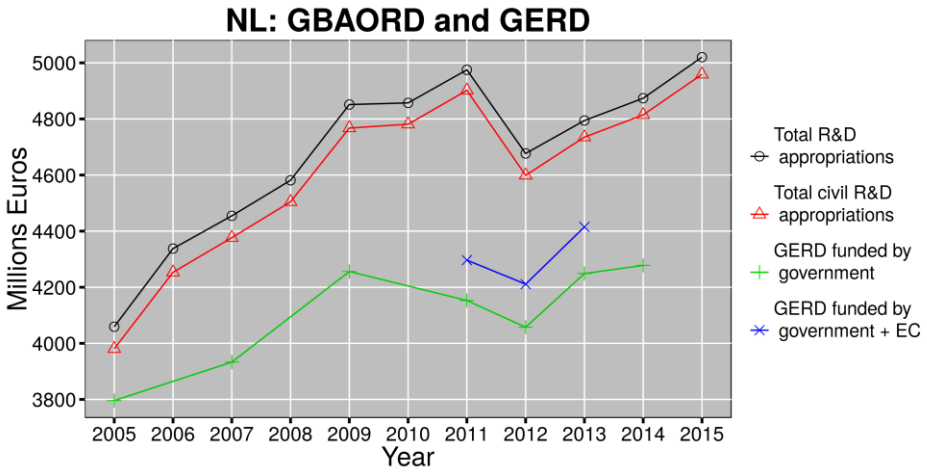


**Figure 3:** R&D appropriations and government funded GERD in millions of national currency

Data source: Eurostat

### 3.2.2.2 Direct public funding from abroad

It is clear from the figures for 2011 to 2013 that the contribution of the EC as share of GOVERD is increasing over time.

**Table 3:** Public Funding from Abroad to Dutch R&D (in millions of national currency)

| Source from abroad | 2005 | 2007 | 2009 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Total | 1173 | 1102 | 1129 | 1385.40 | 1566.91 | 1551.13 | 1632.78 |
| BES | | | | 943.53 | 1078.74 | 1033.40 | |
| EC | | | | 143.90 | 153.57 | 166.17 | |
| HES | | | | 29.85 | 37.31 | 26.48 | |
| International Organizations | | | | 268.12 | 297.29 | 325.08 | |
| Total as % GERD | 12 | 10.66 | 10.85 | 11.32 | 12.52 | 12.17 | 12.49 |
| EC as % GOVERD | | | | 3.47 | 3.78 | 3.91 | |

Table 4 shows that the overall EC contribution to the R&D funding from Abroad has increased over the years but the largest part comes from the private sector. [11]

[11] National sources indicate that in 2014 the total funding from abroad had increased to 1633 MEUR. http://www.cbs.nl/nl-NL/menu/themas/bedrijven/publicaties/artikelen/archief/2015/2015-meer-onderzoek-en-innovatie-bij-nederlandse-bedrijven.htm

The EC contribution as reported by Eurostat seems small but increasing (3.91%% of the direct public support to R&D in 2013). In reality the Netherlands receives a considerably larger amount of funding for R&D from EC sources.

The Netherlands is one of the largest net recipients of FP7 funding, having received 3.371 bn euro in funding over the FP7 period, which corresponds to 8.3% of the overall EC financial contribution to EU28 .[12] It is interesting to note that the corresponding rate for FP6 for Netherlands was 7.6% which clearly indicates that the Netherlands became more competitive over the FP7 period.

Van Steen indicates that over the last fifteen year the average annual income from FPs has increased from 165 million to 475 million euro.[13] Moreover, FP7 funding out-weights the contributions received as core R&D funding through the structural funds (around 180 million euro[14]). This amount is significant if one considers that government funding in each year between 2007 and 2014 remains below 4.5 bn euro. For 2014, Van Steen estimates the share of FP and structural funding to be [just] below 10% of the national public expenditure for R&D and innovation.

**Distribution of public funding**

Figure 5, below shows how the distribution of public funding to sectors of performance evolved over time:

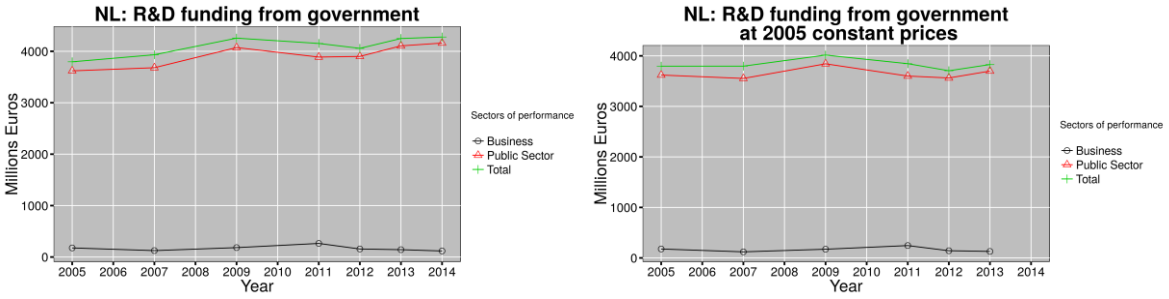


**Figure 4:** Government intramural expenditure by sectors of performance
Data source: Eurostat

Not surprisingly, the public sector (GOV + HES) is the main recipient of government funded GERD but starting up till 2011 the share of the funding going from the government to the private sector. After 2011, this share decreased again. By 2014 it was less than a third of the money invested in 2010. Public support to private R&D has increasingly been organised as a function of private R&D expenditures: tax incentives and the TKI allowance only cost the government money when private firms make R&D investments or in the case of the innovation box, make profit from them (see section 3).[15]

[12] JRC IPTS RIO elaboration of DG RTD CORDA data. It is not fully compatible with data reported at the national level.

[13] Jan van Steen, Total Investments in Research and Innovation (TWIN) 2013-2019, Facts & Figures, Rathenau Instituut

[14] JRC IPTS RIO estimate on the basis of DG REGIO data. Van Steen reports estimates of 100 million euro on R&D funding from the structural funds in 2014. Jan van Steen, Total Investments in Research and Innovation (TWIN) 2013-2019, Facts & Figures, Rathenau Instituut

[15] National statistical data indicates that in 2014, business expenditures (7.4 bn EUR) and universities (4.2 bn EUR) both increased their expenditures in R&D in comparison to 2013. Government research institutes saw their level of expenditures decline from 1.6 to 1.5 bn EUR. This is mainly, though not fully, a consequence of a reduction in government support of these institutes. Together government research institutes and universities received 4160 MEUR in government support in 2014 compared to 4105 MEUR in 2013 Direct support to business decreased somewhat in nominal values from 143 MEUR to 118 MEUR. http://www.cbs.nl/nl-NL/menu/themas/bedrijven/publicaties/artikelen/archief/2015/2015-meer-onderzoek-en-innovatie-bij-nederlandse-bedrijven.htm

### 3.2.3 Indirect funding - tax incentives and foregone tax revenues

"*In the Netherlands, R&D tax incentives are important compared to direct government funding of business enterprise expenditures on R&D (BERD). The R&D tax allowances comprised about 75-80 percent of total government support to private sector R&D"* [16]

Figure 6 and the table next to it provide an overview of the evolution of R&D tax incentives from 2005 onwards, for two of the main Dutch R&D tax incentives: the research and development promotion act (WBSO) and the RDA. There is a third form of R&D&I related tax incentives which does not feature in the national budgets, called the "innovation box". The cost to the government for this instrument in 2011 was estimated at 0.567 bn euro.[17] For 2015, 0.625 bn euro was budgeted for the innovation box.[18] (see also section 3.5.2). Assuming all this money is used, the total foregone tax revenues due to fiscal incentives is 1657 million euro. This corresponds to roughly 25% of GBAORD (see also figure 5).

The rise in 2009 can be explained by a "*change in the definition which from thereon also includes the development of (software) programmes for ICT services. The cabinet reserved around 20 million for this. In addition to this structural increase of the WBSO budget, in the spring of 2009 the cabinet approved an incidental increase of 150 million to support companies during the economic crisis. The budget after 2009 was maintained and even increased after this year.* "[19] As from 2016 the WBSO and RDA are merged together. It is important to realise that, while representing a substantial amount of foregone tax revenues, the innovation box is included in the figure nor the table (see footnote 18).

| year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WBSO + RDA | 359 | 377 | 410 | 445 | 701 | 860 | 915 | 859 | 992 | 1066 | 1040 | 1151 | 1128 | 1128 |

**Figure 5:** evolution of foregone tax revenues due to R&D tax credits (WBSO + RDA only).

[16] OECD STI Scoreboard 2013. OECD STI Outlook 2014. CPB Netherlands Bureau for Economic Policy Analysis, 2014, A Study on R&D Tax Incentives Annex: Country fiches DRAFT FINAL REPORT, European Commission, DG Taxud

[17] http://www.rathenau.nl/en/publications/publication/total-investment-in-research-and-innovation-twin-2012-2018.html

[18] The reported €625mln is an internal guideline rather than that the Innovationbox is capped at this amount. The actual amount of tax reduction provided to innovation-based profits depends on how much the instrument is used de facto, which to a large extent is influenced by how much profits companies make. This can only be determined afterwards. Over the course of 2010-2012 (latest year available), the provided tax reduction was estimated to have increased from €345.000 to €852.000 (Kamerbrief January 2015). See evaluation in section 3.5.2 for recent estimates.

[19] Agency NL, Ministry of Economic Affairs, Focus op Speur en Ontwikkelingswerk, het gebruik van de WBSO in 2009

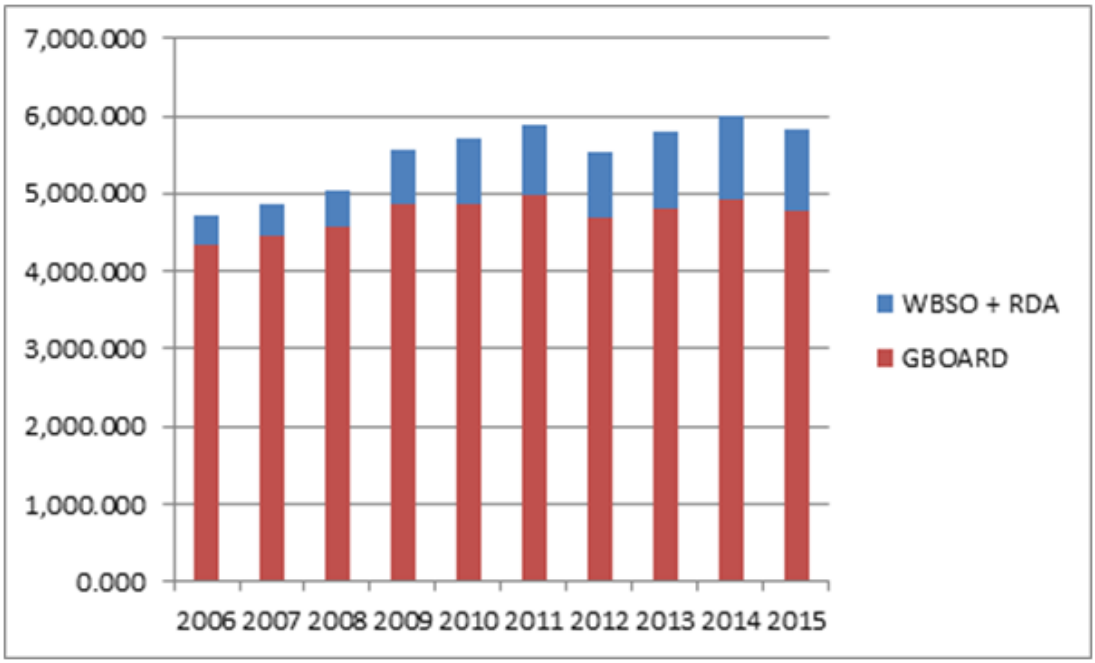


**Figure 6:** gives an idea of the evolution of the relative size direct and indirect R&D support by the Dutch government.[20]

### 3.2.4 Fiscal consolidation and R&D

In line with the European Semester's CSR, the Dutch budget deficit was effectively responded to with a €6bln consolidation program over the past two years.**Error! Bookmark not defined.** Forecasts indicated that, in combination with economic recovery, this will result in a deficit reduction from -2.3% to -1.8 to -1.2% in the period 2014-2016. By the end of that period, the structural deficit is estimated to be at -0.5%, implying that the Netherlands will comply with the Stability and Growth Pact medium-term objectives.

R&D appropriations (GBAORD) faced steady growth throughout 2005-2011, in spite of the gradual budgetary adjustments. In 2012 it faced a decrease both nominally, by around 300 MEUR (Figure 3) and as a share of GDP by ca. 0.05%. This decrease has been followed by the government funded GERD with one year time lag, i.e. in 2013, the year in which a relatively stronger fiscal adjustment has also taken place (Figure 2, left).

Figure 7, below shows the scatterplot of the structural balance and GBAORD as % GDP, first panel as well as GERD as % GDP, second panel.[21]

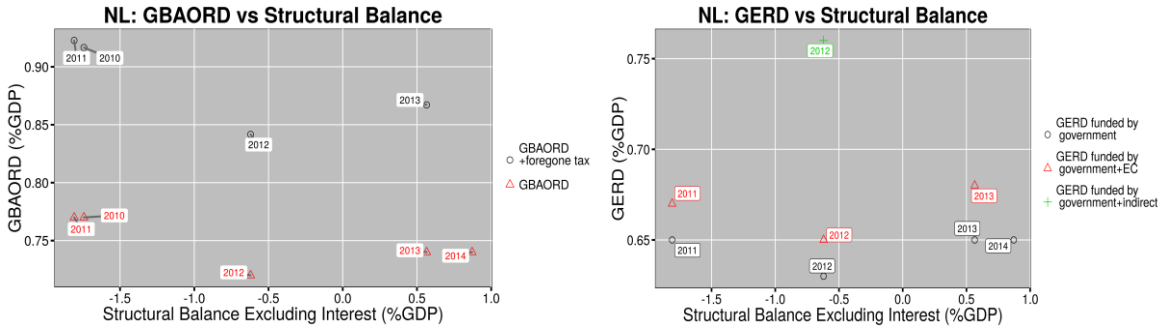


**Figure 7:** Fiscal consolidation and R&D
Data source: AMECO, Eurostat

[20] Source: for both the table and the figure, for 1998-2010 Agentschap NL and Ministry of Finance in Evaluation WBSO report, for 2011 to 2020 Rijksbegroting (national accounts) 2011-2016.

[21] Structural balance data comes from the AMECO database the other indicators were taken from Eurostat.

Based on Figure 7, fiscal consolidation had a negative impact on R&D appropriations between 2011 and 2013, translating into a loss in GBAORD of around 0.05% of GDP (i.e. the difference between 2013 and 2011 data for GBAORD including foregone tax revenues). However, in terms of expenditures (Figure 5, right) the fiscal adjustment has not come at the expense of governmental R&D investments in 2011-2014.

As briefly touched upon in section 2.3, the Dutch government has aimed to spare expenditures with direct importance for sustained economic growth. The NRP 2015 prominently states that budget cuts on education and R&I were largely omitted, although it is also admitted that in absolute terms public funding for R&I is gradually declining from 2014 onwards. This development is partially related to the fact that R&I investments were intensified after the financial and economic crises set in. Taking 2008 as a benchmark, the budgets for the coming years will still exceed the original level of public funding for R&I. The Budgets for 2015 and 2016 indicate that consolidation is especially manifested in non-R&I expenditures.

## 3.3 Funding flows

### 3.3.1 Research funders

Research funding in the Netherlands is primarily made available by the Ministry of ECS, followed at large distance by the Ministry of EA. A large part of the ECS' research budget not provided directly to HEI's, PRO's or international institutions is allocated by the Netherlands Organisation for Scientific Research (NWO), the Technology Foundation STW (an independent part of NWO), and the Royal Netherlands Academy of Arts and Sciences (KNAW). Funding flows by these organisations are reported in the subsections on project funding (NWO) and institutional funding (KNAW). RVO.nl, the agency responsible for allocating and managing funding provided by the Ministry of EA, tends to work with project funding as well.

Charitable organizations are the main source of private not-for-profit funding of public research in the Netherlands. A recent study by the AWTI shows that their contribution to the total public funding budget, estimated at 3.3% of GERD is similar to shares found in other European countries.[22] Remarkable about the Dutch case is that most funding comes from healthcare funds. 19 of them are collaborating in the Cooperative Health Funds (SGF), which is backed by 5 million donors and 800.000 volunteers. Increasingly, SGF is taking a proactive role, selecting thematic areas (based on societal needs) and aligning her funding programs with NWO and the Top Sector Life Sciences & Health.

[22] AWTI (October 2014). The role of foundations for science in the Netherlands. In Dutch.

While the annual budget available for research used to lay around €150mln, this increased to more than €190mln in 2014.[23] As the costs increased along, the research share in total funding available from SGF sticks around 40%.

### 3.3.2 Funding sources and funding flows

*Public funding flows*

In the Netherlands, public funding for R&D&I comes predominantly from the Ministry of Education, Culture and Science and the Ministry of Economic Affairs. Whereas the first one mainly focuses on fundamental research, the innovation policies of EA are more oriented towards the commercialization of new knowledge. As for the balance in funding: the total budget for fundamental research is significantly larger than the budget available for applied research and support for innovation activities by businesses. Direct R&D support by the Ministry of ECS amounted to €3471mln in 2015, compared to only €883mln by the Ministry of EA.[24] Out of these amounts, €294mln respectively €767mln is deemed innovation-relevant (i.e. a small share of ECS budget, and a large share of EA's smaller budget), indicating that the still the majority of direct R&D funding is focused on research. Also when taking direct non-R&D innovation expenditure into account (€137mln, almost entirely on EA's budget) or even indirect tax incentives for R&D&I (€1043mln of WBSO/RDA), the balance does not tip. During the coming years the ECS's budgets for direct R&D remain equal while EA's budget decreases from more than €1000mln to about €700mln in the period 2014-2019.

The table below shows a more detailed composition of Dutch public funding for R&D&I, based on the most recent available information of annual budgets. The figures at the national level are provided in the NRP 2015; they are similar to the ones discussed above but are reported using a different breakdown (not by ministry). Regional and local contribution to national policy appear to be of minor importance only, with an estimated budget of €100mln per year at the regional level and even less at the Provincial level (as noted in section 1.2.1, however, the Provinces and municipalities also develop and finance their own programs). The €100mln already include contributions by European structural funds (ERDF). As the 2014-2020 European funding program offers ample room to regional development, this amount is expected to increase.

Also European funding for R&D allocated through Horizon2020 might increase, as it has a budget that is larger than ever before (€80bln). Taking the same return percentage as observed in FP7 (counting with 7.4%) and distributing it over timetable of Horizon2020, the Rathenau Institute arrives at a total volume of €800mln of research funding per year. In FP7, more than half of money went to the higher education sector, while research institutes and enterprises divided most of the remaining part. Horizon2020 is more oriented towards commercialisation, which implies that more than half of the €800mln might become available as public funding for applied research and innovation. Relative to the annual budget by the Dutch government, i.e. the €363mln reported in Table 5, this amount is rather substantial.

[23] Rathenau Institute. Healthcare funds. In Dutch. Accessed at 26-09-2015.
[24] Rathenau Institute. Total Investments in Research and Innovation (TWIN) 2013-2019.

**Table 4:** Estimation of public funding flows (Sources: NRP, 2015; TWIN 2013-2019).

| | **Average annual budget (€mln)** | **% of table total** |
|---|---|---|
| Fundamental research | 3217 | 39% |
| Applied research | 364 | 4% |
| R&I expenditures other departments | 1335 | 16% |
| Fiscal support for R&I | 1667 | 20% |
| Regions (ERDF) | 100 | 1% |
| Provinces | 70 | 1% |
| ROM's | 120 | 1% |
| FP7* | 475 | 6% |
| Horizon2020* | 800 | 10% |

* Horizon2020 follows up on FP7: note that in reality these flows occur only partially at the same time.

*Private funding flows*

According to the most recent Eurostat-data available, private funding flows in the Netherlands are hardly increasing. In 2013 the business sector had an R&D performance of €7095mln, which amounts to €423 per inhabitant (see table below). Most of the research performed by the Dutch business enterprise sector is financed by that sector itself. A second major source of funding is FDI. Private R&D funding from abroad was reported (by Eurostat) to be almost twice as high as the government contribution. This stands in contrast with the European average ratio of 2:3. Of course it should be noted that the Dutch government does take many actions aimed at attracting R&D&I funding from abroad. See section 5.6 for a discussion of framework conditions for attracting FDI. As noted in section 3.3.1, the private non-profit sector is quite important for R&D funding as well.

**Table 5:** Total intramural R&D expenditure (business enterprise sector) by source of funds in millions €. [Eurostat: rd_e_gerdfund; last accessed on 04-04-2016]

| | **Netherlands** | | **European Union (28 countries)** | |
|---|---|---|---|---|
| | **2012** | **2013** | **2012** | **2013** |
| **All sectors** | 7,078 | 7,095 | 171,634 | 174,387 |
| **Business enterprise sector** | 5,851 (82,7%) | 5,946 (83,8%) | 171,634 | 143,887 |
| **Government sector** | 554 (7,8%) | 450 (6,3%) | 11,580 | : |
| **Higher education sector** | 10 (0,1%) | 17 (0,2%) | 47 | 66 |
| **Private non-profit sector** | 31 (0,4%) | 32 (0,5%) | 391 | 315 |
| **Abroad** | 1,029 (14,5%) | 957 (13,5%) | 18,281 | : |
| **Abroad - Business enterprise sector** | 962 (13,6%) | 898 (12,7%) | : | : |
| **Abroad - Private non-profit sector** | : | : | : | : |
| **Abroad - Government sector** | : | : | : | : |
| **Abroad - Higher education sector** | 31 (0,4%) | 22 (0,3%) | : | : |
| **Abroad - European Commission** | 35 (0,5%) | 35 (0,5%) | : | : |
| **Abroad - International Organisations** | 1 (0,0%) | 2 (0,0%) | : | : |
| **Abroad – other** | : | : | : | : |
| **Abroad - enterprises within the same group** | 688 (9,7%) | 675 (9,5%) | : | : |
| **Abroad - other business enterprise companies** | 275 (3,9%) | 223 (3,1%) | : | : |

## 3.4 Public funding for public R&I

### 3.4.1 Project vs. institutional allocation of public funding

Following up on a general agreement with the association for universities (VSNU), the Ministry of ECS made 'performance agreements' with each individual HEI for the period 2012-2015.[25] The three main targets of these agreements are: further differentiation of education; a better thematic focus and profile of research; and increased societal and economic relevance (e.g. through more knowledge valorization).

[25] Ministry of ECS (December 2014). Midterm review performance agreements HEIs.

An extra goal was to establish an education culture spurring the ambition and success of students, for which performance indicators have been developed. Part of the agreements is that 7% of the budget for education is allocated based on whether universities succeed in meeting their targets (5% for education quality and study success, 2% for improving scientific and educational profile).[26]

In 2012, before starting the experiment with performance agreements, Dutch universities and university medical centers received €3.8bln euros from the central government (CPB, 2014). Around 41% of this organizational level funding was allocated on the basis of education related criteria, while 44% was allocated on the basis of research parameters. The only clear research indicator on this account is the number of PhD theses defended. The remaining 15% was allocated to Academic Medical Centers. A CPB-study from 2014 describes the criteria used to allocate the education and research part of organizational funding.[27]

Education funding: (€1.6bln in 2012) funding allocation is based on student numbers and degrees (65%). The remaining 35% of education funding is based on university specific percentages and amounts which are set by the government.

Research funding: The part of university funding which is allocated on the basis of research parameters includes criteria for degrees (15%), PhD defenses (20% or €93.000 per defended PhD, around 5% is spend on the funding of (often inter-university) graduate schools. The remaining 60% is allocated on the basis of block funding based on historical considerations, though 2% is set directly by the government.

With respect to the figures reported in the CPB-study it should be noted that there are alternative ways to calculate the balance in allocation mechanisms, like the one proposed by Hicks (2012).[28] The last TWIN report states that project funding in the Netherlands is increasing to maximally 30% over the next years, after which it will drop back to about 28% in 2019. Differences in allocation statistics tend to be related to the choice to report only on funding for education, or also to report on funding for research. As especially the latter is done through competitive schemes, it can largely affect the observed distribution of funds.

### 3.4.2 Institutional funding

Traditionally, the Netherlands belong to the group of countries characterized by intensive use of institutional (block) funding.[29] In the past years, the government has started to make university funding based on performance contracts. This reform replaced an earlier trial of contract funding, during which performance contracts were signed with the 'university of applied science' sector. This experience suggested that the collective agreements were not sufficiently aligned to the strategic targets of the individual HEI. For some the objectives were unrealistic, for others insufficiently challenging.[30]

As noted in the section above, 7% of the core funding for universities on the budgets for 2012-2016 is now based on performance contracts. The major part (5% of total higher education budget) concerns funding conditional on the extent universities achieve their education targets with respect to education quality and output, while the other part (2%) is allocated selectively for improvement of education and scientific profiling.

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[26] Ministry of ECS and VSNU (December 2011). Hoofdlijnenakkoord OCW-VSNU. In Dutch.
[27] CPB (March 2014) Public funding of science: An international comparison.
[28] Hicks, D. (2012). Performance-based university research funding systems, Research Policy 41 (2), pp 251–261.
[29] Van Steen (2012), Modes of public funding of research and development, Towards internationally comparable indicators. OECD Science, Technology and Industry Working Papers.
[30] De Boer, HF., Jongbloed, B., Benneworth, P., Cremonini, L., Kolster, R., Kottmann, A., Lemmens Krug, K., Vossensteyn, H., 2015. Performance-based funding and performance agreements in fourteen higher education systems - Report for the Ministry of Education, Culture and Science, Enschede: CHEPS, University of Twente.

An evaluation of this mechanism, resulting from the performance agreements, is foreseen for 2016. As is the case in the Enterprise Policy, progress is monitored already during the execution of the strategy. This is done by the Review Commission Higher Education (RCHO), as well as by the HEIs themselves. A midterm review by the RCHO was offered to the Ministry of ECS in November 2014. The report concluded that all Dutch universities have been strengthening their scientific focus, through clustering, collaboration and phasing out. Also attempts to differentiate educational programs were evaluated positively. The most prominently expressed concerns pertain to the objective of increasing both the quantity and quality of graduates while the level of inflowing students is insufficient: many institutions perceive this as a trade-off ('trilemma'). The RCHO notes that progress indicators with respect to study success are not part of the performance agreements on the basis of which funding is allocated (contrary to indicators regarding education quality). The commission is optimistic about how the performance agreements can contribute to aligning national R&D policies (e.g. Top Sectors, grand challenges, human capital agendas, joint research initiatives, Horizon2020) with university strategies. In her letter to the cabinet from April 2015, the Minister of ECS repeated the positive findings in the RCHO-report.

Also in April 2015, the VSNU federation of universities presented her own progress report, showing already how many universities improved their performance by establishing excellence trajectories (e.g. University Colleges), how teacher quality has improved, and how student drop-out and study switch have been reduced.[31] Earlier, however, the VSNU also has been criticizing the fact that changes in legal and financial arrangements hamper universities to develop and realize a stabile research and education strategy. The head of the VSNU argued it would be better to turn the 7% of performance funding (which can amount to €300mln annually) back into lumpsum funding and simply let the universities make performance agreements with their own councils and boards. This allows for more room to adapt agreements and rewards to university-specific contexts.[32] The feeling that education is being steered too much from an efficiency perspective led to a nationwide discussion and student protests during the entire spring of 2015. Although the most symbolic protest had the form of students occupying a campus building of the University of Amsterdam, the movements against performance-thinking is significantly larger.[33] Students, teachers and other supporters throughout the country, sometimes united in student-right organizations or initiatives like the New University/Humanities Rally, have protested against university managers executing budget cuts (e.g. shutting down smaller studies) on the basis inadequately operationalized indicators and without consulting immediate stakeholders.[34]

Apart from research universities, the Netherlands also has a system of universities of applied science. In total these 37 universities spend around 100 million euro on research and they are funded almost entirely on the basis of education related criteria.

Separate from the funding allocation system, universities are also regularly evaluated at the level of departments/schools and programmes. This peer review based research assessment system was implemented in the late 1980. Rather than being linked to university funding, the assessment is used to support the development university (and national) strategies. According to Geuna and Piolatto[35] it does generate a competition for reputation among the university departments.

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[31] VSNU (September 2015). Annual report performance agreements 2014. In Dutch.
[32] Dekker, M. (April 2015). Universities would like to abandon performance agreements. NRC. In Dutch.
[33] Duits, L. (March 2015). 10 misapprehensions of the Maagdenhuis occupation. In Dutch.
[34] See, for instance: LSVb/ISO (April 2015). Effects of the performance agreements. In Dutch.
[35] Geuna, A., Piolatto, M., 2016, Research assessment in the UK and Italy: Costly and difficult, but probably worth it (at least for a while), Research Policy, Volume 45, Issue 1, Pages 260–271

In 2015 a decision was made to change the research output criteria and no longer include the volume of publications as a criterion in evaluations due to concerns over the adverse effects of publication pressure. See Jonkers and Zacharewicz[36] (2016) for a comparative analysis of Performance Based funding in the EU 28 Member States.

### 3.4.3 Project funding

Project funding is to a large extent being allocated by NWO. The share of funding that is provided by NWO is mostly based on program and project proposals. In 2014, NWO invested €767mln (2013: €735mln), of which €512mln euro was allocated to universities and other institutes (excluding intra-organizational allocation through NWO institutes) based on competition.[37] As also announced in the Science Vision 2025, the Ministry of ECS believed it to be time to change the organizational structure of NWO in 2015. The organization, with all its boards and directors, is regarded as being too bureaucratic and complex. Governance can be improved by transforming the organization in such a way that barriers between departments are lowered. The reorganization of NWO is also supposed to respond to criticism on the focus in current science on publications and acquisition of research funding.[38] A complete section in the new science strategy is devoted to lowering publication pressure and pressure for writing research proposals.[39] In April 2015, NWO released her strategy for the period 2015-2018.[40] The document describes how she will react to the requested changes expressed in the Science Vision. Although the contours for the reorganisation of NWO have been designed already, the transformation is expected to be completed not before 2017.[41] In an open letter to Dutch universities, a substantial number of Spinoza Prize winners (the most prestigious Dutch scientific award) expressed concerns about the intended reorganization. Since many management roles within the NWO will not or less be performed by scientists anymore in the near future, they fear that the NWOs policy will not change for the better. According to ECS, however, scientists will remain influential in the new NWO and its funding decisions. Also, a complete section in the new science strategy (Science Vision 2025) is devoted to lowering publication pressure and pressure for writing research proposals.[42]

Apart from reforming fundamental science funding, a substantial share of the budget for applied research is being allocated for research projects executed in one or multiple Top Sectors. As for the national institutes for applied research, the government declared to reduce fixed block-funding with 20% over the period 2011-2016. Instead, the institutes have to find co-funding from private parties, thereby ensuring the practical relevance of the research. Besides directly collaborating in research projects, the institutes can also participate in studies performed together with the Top consortia for Knowledge and Innovation, thus earning funding from the TKI-allowance (see section 5.7).

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[36] Jonkers, K. & Zacharewicz, T., Research Performance Based Funding Systems: a Comparative Assessment, EUR 27477 EN; doi10.2791/134058

[37] NWO (2015). Annual report 2014. In Dutch.

[38] Most visible through the publications of the movement of critical scientists 'Science in transition' and its publications. See http://www.scienceintransition.nl/english (accessed February 2015). One of the elements that Science in Transition is weary of is the publication rat race (at the expense of other tasks of the universities) and efficiency and utility thinking in science in general.

[39] Ministry of ECS (2014). 2025. Vision for Science. Choices for the future.

[40] NWO (April 2015). NWO Strategy 2015-2018.

[41] ScienceGuide (October 2015). Grand Départ NWO en route. In Dutch.

[42] Ministry of Education, Culture and Science (November 2014): Science vision 2025. In Dutch.

### 3.4.4 Other allocation mechanisms

Research is also funded through contract research set out by ministries. Every ministry makes use of several institutes for conducting research relevant to the policy domain it is responsible for. The Ministry of Economic Affairs, for instance, relies heavily on the Netherlands Organisation for Applied Scientific Research and the large technological institutes (TNO and GTIs, together now the TO2 federation), and the top technological institutes (TTIs, now transitioned into TKI's). For its agriculture branch the Wageningen University and Research Centre (WUR, including DLO) is of great importance, while contract research related to aviation engineering is conducted in yet another institute. The overview of total investments in science and technology (TWIN), below, shows how the ministries differ in their shares of institutional and project funding. Many of the research institutes have a triple helix profile, meaning they attract additional funds from universities and firms as well. For the TKI's, almost half of the research they conduct should be funded by private companies.

**Table 6:** R&D expenditure, and share of project funding. 2015 figures. (Rathenau: TWIN 2013-2019)

| **Ministry** | **Total R&D expenditure (mln €)** | **% project-based** |
|---|---|---|
| Ministry of General Affairs | 0,6 | 100,0 |
| Ministry of Foreign Affairs | 44,3 | 99,5 |
| Ministry of Security and Justice | 21,5 | 23,4 |
| Ministry of the Interior and Kingdom Relations | 19,9 | 100,0 |
| Ministry of Education, Culture and Science | 3.470,7 | 19,8 |
| Ministry of Defence | 58,4 | 41,7 |
| Ministry of Infrastructure and the Environment | 57,0 | 67,3 |
| Ministry of Economic Affairs | 882,8 | 56,6 |
| Ministry of Social Affairs and Employment | 1,3 | 100,0 |
| Ministry of Health, Welfare and Sport | 223,1 | 62,6 |
| ***Total*** | **4.779,7** | **30,6** |

## 3.5 Public funding for private R&D

### 3.5.1 Direct funding for private R&I

With the introduction of the Enterprise Policy, the government reconsidered the way in which support to research and innovation helps to support economic growth. Instead of directly subsidizing R&D&I, the ministry of EA mainly supports firms to participate in public-private research collaborations or allow them to deduct costs related to engaging in R&D (see sections 2.2).

The main public programs aimed at stimulating R&I are the TKI's for collaborative research PPS (see 4.4), the WBSO/RDA tax schemes (see 3.5.2), and several funds for ambitious SME's, some of them related to Top Sectors (e.g. MIT). All the aforementioned measures are generally believed to be functioning well. A comprehensive list of the most important interventions is included in Annex 4.

There is an overall tendency in the Netherlands to mainly finance the first parts of the knowledge chain rather than the later parts closer to the market. It is expected that knowledge spillovers are considered to be higher in the early stages of this knowledge chain. This also largely explains why funding for types of knowledge which are perceived to be closer to the marketplace, e.g. related to service innovation or social innovation, is scarce and debated.

Public private cooperation is particularly supported through the TKIs, as described in section 4.4. The Dutch government is currently experimenting with various novel ways to provide funding for R&D. The most prominent developments are reported in section 1.2. Important in the Enterprise Policy are also the measures taken to reduce administrative burdens, like for instance the new approach 'Future proof law and regulation' (see section 5.7). Due to the large number of available funding schemes it might be hard to understand the specific targeting of each individual policy measure, but the accessibility of the measures is normally ensured by central institutions or websites like RVO.nl and Ondernemerspleinen.nl. Moreover, in fall 2015, the Ministry of EA launched a National Funding Guide (Nationale Financieringswijzer). This website/app provides comprehensive information to especially SMEs looking for funding.

By law, all of the measures are evaluated once in a while. An overview of evaluations is provided in the meta-evaluation of the Innovation and Entrepreneurship Policy Mix.**Error! Bookmark not defined.** Furthermore, many of the R&D&I instruments are benchmarked internationally due to participation in international evaluation consortia like TAFTIE (European Association of leading national innovation agencies). As from 2015 onwards, the Ministry of EA is also active in the Innovaton Growth Lab (by NESTA, the Kaufman Foundation and the Argidius Foundation) for exchanging findings on policy experiments. In the context of European collaboration it is also important to note the creation of the Dutch Investment Agency (Nederlands Investerings Agentschap NIA) in the summer of 2015. In October 2015, the Minister of EA explained how the NIA has an important role in helping Dutch firms to benefit from the newly established EFSI-fund.[43]

**Public Procurement of Innovative Solutions**

The Dutch government procures around €60 billion worth of work, services and supplies every year.[44] By far the largest share of these expenditures are not made by the central government. Within the central government the ministry for Infrastructure and the Environment[45] has the largest procurement budget, followed by the ministry of Defence.

The cabinet currently aims to make 2.5% of all public procurement to be public procurement of innovations. The emphasis is on the initiating and realisation of new innovation oriented public purchase trajectories. The results of a research project show that in 9.1% of the public procurements included in the sample the government has been considering innovative solutions, in 6% procurement has been innovation oriented and in 5.3% this has led to an innovative solution.

[43] Ministry of Economic Affairs (October 2015). Establishing the Dutch Investment Agency (NIA). In Dutch.
[44] http://www.pianoo.nl/about-pianoo
[45] The ministry of Infrastructure and the Environment is not shown in the figure below, but it integrates "verkeer and waterstaat" which merged with other ministries to form I&M (I&M is the merger of Verkeer en Waterstaat and VROM)

On the basis of the sample of 81 procurements, it is not yet possible to assess whether the 2.5% target has been met, but the monitoring approach is being improved.[46]

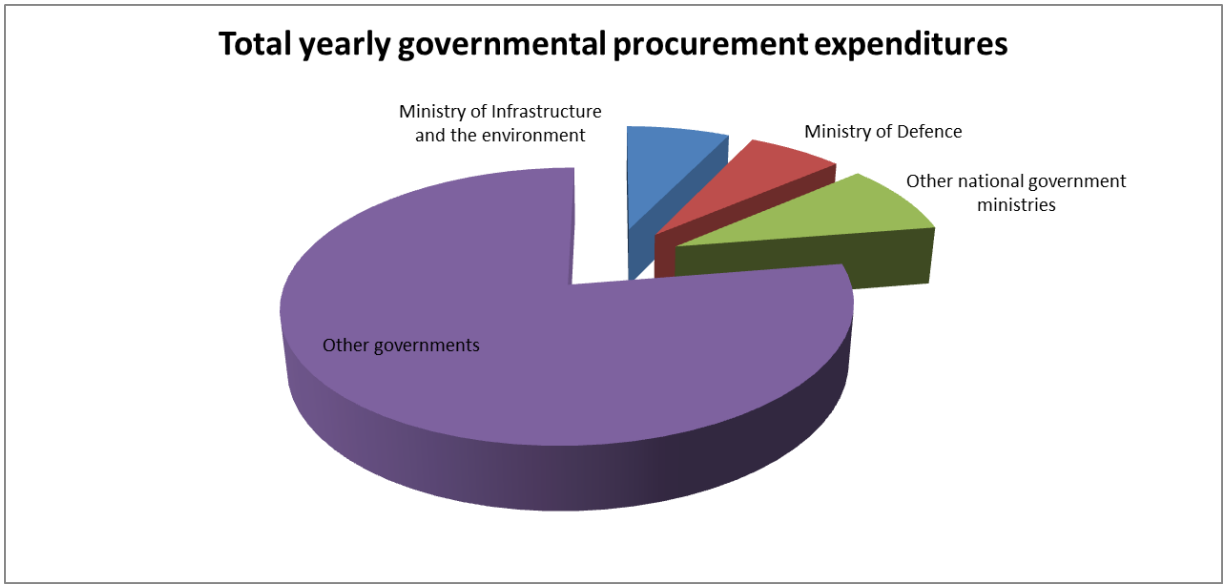


**Figure 8:** Total Yearly governmental procurement expenditures

## Legal Public Procurement framework

The Directive 2004/17/CE on public procurement has been transposed into national law in 2005 (Besluit aanbestedingsregels voor overheidsopdrachten (Bao)[47], het Besluit aanbestedingen speciale sectoren (Bass)[48]). Directive 2007/66/EG was implemented in the law implementation of legal protection directives procurement: "Wet implementatie rechtsbeschermingsrichtlijnen aanbesteden – Wira"[49]

Since April 2013 the Bao, Bass and Wira have been replaced by the procurement law 2012 for all procurement of (semi) public institutions in the Netherlands. Through this national law, the Netherlands implements the European procurement directives[50].[51]

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[46] Voortgangsreportage innovatiegericht inkopen: innovaties versterken de inkoopkracht van de overhead, bijlage bij de voortgangsreportage Bedrijvenbeleid 2013 BEDRIJVENBELEID IN VOLLE GANG http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2013/10/02/voortgangsrapportage-innovatiegericht-inkopen.html

[47] http://www.rijksoverheid.nl/documenten-en-publicaties/besluiten/2008/12/10/besluit-aanbestedingsregels-voor-overheidsopdrachten-bao-recent.html

[48] http://www.rijksoverheid.nl/documenten-en-publicaties/besluiten/2008/12/10/besluit-aanbestedingen-speciale-sectoren-bass-recent.html

[49] http://www.pianoo.nl/sites/default/files/documents/documents/wetwira28januari2010.pdf

[50] Directive 2004/18 on the co-ordination of procedures for the award of public works contracts, public supply contracts and public service contracts (Consolidated Public Sector Directive). Directive 2004/17 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors (Utilities Directive). Directive 2007/66/EC amending Directives 89/665/EEC and 92/13/EEC with regard to improving the effectiveness of review procedures concerning the award of public contracts (Public Contracts Review Procedures Directive)

[51] The Procurement law 2012 contains both rules for procurements above the European threshold amounts, as below them. A few measures from the procurement law 2012 have been further detailed in the procurement decision ("Algemene Maatregel van Bestuur – Aanbestedingsbesluit"). Part of this decision are the "Procurement Rules Works 2012", the templates "own declaration" and the "proportionality guide**".** Dutch public procurement law recognises the general principles of public procurement law (non-discrimination, transparency and proportionality). The ministry of Economic affairs has developed supplementary policy to cover the following aspects: Professionalisation procurers - Professionalisering opdrachtgevers (PIANOo); Guideline supplies and services - Richtsnoer Leveringen en Diensten; Advice complaint handling for procurement - Advies Klachtafhandeling bij aanbesteden; Procurement rules for works - Aanbestedingsreglement voor Werken, ARW 2012; System of verification/pre-qualification/procurement passport - Systeem van verificatie/prekwalificatie/aanbestedingspaspoort; VNG model general purchase conditions for supplies and services - VNG Model Algemene Inkoopvoorwaarden voor leveringen en diensten; VNG model purchase and procurement policy - VNG model inkoop- en aanbestedingsbeleid

## The PCP/PPI landscape

In the Netherlands specific attention for procurement of innovative solutions started in 2004 with the growing awareness that public procurement of innovative products and services could contribute to the solution of important societal problems and innovation policy objectives. In 2007, the government agreement explicitly stated several policies related to public procurement of innovation. The current approach to public procurement of innovation started in 2009. In a letter from the minister of economic affairs (27 406 nr 162), the definition of innovation oriented public procurement was broadened. Previously the focus was on the government as launching customer (the first purchaser of innovations). From 2009 the focus is on the complete procurement process, from strategy formation to up-scaling. The government as "lead customer" searches for innovative solutions or offers spaces to companies to come up with innovative solutions.[52]

The government wants to further strengthen the **top sectors** in which the Netherlands has a leading position worldwide. To achieve this, the government, companies, universities and research centres will work together on knowledge and innovation. The agreements on this have been set in so-called innovation contracts. For each of the 9 top sectors an innovation contract has been made.[53] Included in these innovation contracts are measures, plans and agreements to further strengthen the top sectors in the coming years. In addition ICT, nanotechnology and biobased economy are topics that concern multiple top sectors; for this action agendas have been set. Within the top sectors there is ample attention for using the procurement budget for innovation to address societal challenges. [54] The website of Pianoo [55] provides an overview of PPI and SBIR projects/targets in the top sectors.

## PCP/PPI Initiatives in the Netherlands

Inkoop Innovatie Urgent[56]

In consultation with the employer organisations, the responsible ministries (infrastructure and environment, economic affairs) have agreed to bring together trajectories that lead to sustainable innovations and the development of several public procurement instruments in the programme IIU. The programme "inkoop innovation urgent", (urgent: public procurement), established in 2012, has a promoting and exemplifying function. This program targets national, regional governments, other non-profit organisations and health care organisations. [57] It achieves results in flagship programs, which are targeted at societal challenges for which companies can offer solutions. These solutions can be procured by the government.

This projectenboek describes a number of projects (see also table 1) which are supported through IIU. The program is coordinated by a coordination group. This group consists of representatives from different governmental organisations such as the central government, municipalities, provinces and companies.

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[52] Voortgangsreportage innovatiegericht inkopen: innovaties versterken de inkoopkracht van de overhead, bijlage bij de voortgangsreportage Bedrijvenbeleid 2013 BEDRIJVENBELEID IN VOLLE GANG. http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2013/10/02/voortgangsrapportage-innovatiegericht-inkopen.html

[53] Agri&Food, Horticulture; Creative Industry; Water; high tech; Energy; Chemistry; Life Sciences en Health; Logistics

[54] See also Investeren in topsectoren

[55] http://www.pianoo.nl/sites/default/files/documents/documents/overzichtinnovatiegerichtinkopenensbirintopsectorenagendas.pdf

[56] For a detailed video-animation of the programme see: http://animation.inkoopinnovatieurgent.nl/

[57] See also: www.inkoopinnovatieurgent.nl

Like the *Small Business Innovation Research Programme (SBIR)* which is discussed later on in this section, the IIU initiative is project-based. In 2013, a total of 27 projects had been initiated to address the eight societal challenges around which Inkoop Innovatie Urgent is centered. 23 of them resulted into actual results and received permission to continue. These developments were presented in a policy letter attached to the Progress Report Enterprise Policy 2013. Inkoop Innovatie Urgent is supported by *PIANOo*. In order to link supply and demand of innovative solutions in an early stage, it developed a virtual market place (www.innovatiemarkt.nl) (Janssen & Den Hertog, forthcoming).

PIANOo

**PIANOo**, the Netherlands knowledge network for government procurers, was initiated in 2005. This network creates connections between public procurers to exchange best practices and knowledge. In order to do this, PIANOo organises meetings and seminars and deploys virtual instruments. The website http://www.innovationmarkt.nl/ now offers another platform to facilitate a strong partnership between government and the private sector: a virtual market square where governments search for companies that can offer them innovative solutions. [58] Together they should work towards a healthy entrepreneurial climate, a strong competitive position and the addressing of societal challenges.[59] [60]

SBIR[61]

The government stimulates innovations by giving R&D-commitments to SMEs (Small Business Innovation Research). This program started with a pilot by the Ministry of Economic Affairs in 2004. The programme was inspired by the US SBIR programme in which governments spent a set percentage of their annual R&D budgets in innovative SMEs. In 2013 the SBIR program is still ongoing but it has been expanded. On average 3 SBIR procurements are made each year.[62] The most important objective of SBIR is to give SMEs the opportunity to come up with innovative solutions for major societal problems and helping them to bring these solutions to the market on a contractual basis. The scheme is now broader in set up and consists of three strands. In the first the RVO (Rijksdient voor ondernemend Nederland, the successor of AgencyNL) formulates a challenge together with a ministry[63] or other governmental service. The challenge forms the basis for a public procurement procedure carried out by the RVO. The evaluation committee orders all projects and advises the actor who called for proposals. After a feasibility study there is another round of selection. In the second phase the companies engage in R&D to develop a prototype of the end product, process or service. In the third phase this prototype is prepared for market introduction. This phase is not financed by the government but the network of government actors developed for the SBIR is in a good position to include specification in its tenders that will allow it to engage in large public procurements of the product, process or service.

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[58] For example, the city of Rotterdam is looking for new ideas and techniques to create sustainable public spaces. A call on the innovation market yielded 39 companies and innovations, that are now running tests in a Rotterdam trial location

[59] www.innovatiemarkt.nl

[60] TenderNed is the Dutch government's online tendering system. All Dutch authorities are obliged to publish their national and European tenders on Tenderned's announcement platform, so businesses can access all public publications from a single webpage. Through TenderNed, all parties can digitally manage all steps throughout the entire tender process. This is determined by the contracting authority. TenderNed is a certified supplier of the European publication platform Tenders Electronic Daily (TED). TenderNed is a part of PIANOo https://www.pianoo.nl/public-procurement-in-the-netherlands

[61] A word of caution regarding SBIR: whereas the Dutch government refers to SBIR as a PCP instrument, opinions differ on whether it falls under the EU definition of PCP.

[62] Voortgangsreportage innovatiegericht inkopen: innovaties versterken de inkoopkracht van de overhead, bijlage bij de voortgangsreportage Bedrijvenbeleid 2013 BEDRIJVENBELEID IN VOLLE GANG http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2013/10/02/voortgangsrapportage-innovatiegericht-inkopen.html

[63] The SBIR program is an initiative from the ministry of economic affairs in collaboration with the ministries for Defence; Infrastructure and Environment; Education, Culture and Science; and Health, Welfare and Sports. Local governments can also participate.

In over 30% of these pre-commercial procurements the government is the expected customer.[64] The second strand is run by the research council NWO. It aims to address the "valley of death" after academic research by preparing project for investment from private sector risk capital. There are at least several examples in which there is synergy/ complementarity between strand 1 and 2: i.e. RVO coordinates a program between governmental actors and companies, while NWO coordinates a longer term SBIR R&D project on the same theme: e.g. cyber-security. The third strand is similar to the second but it is run by the public research organisation for applied research TNO. It focuses on ideas and research efforts developed by TNO and offered to companies. TNO supports companies to develop commercial applications. [65] Because it is pre-commercial procurement (R&D) these SBIR contracts do not fall under the European procurement directives. In the national programme €3m euro is available to co-finance SBIR-light of regional authorities (provinces and cities) for up to 50% of total costs (Van Putten, 2015).

Innovation procurement in Green Deals

The Green Deals are projects in which authorities make an agreement with societal stakeholders (businesses, civilians, local government, etc.) to take away bottlenecks when it comes to boosting sustainable growth.[66] The role of the government in these Deals is not financial (as in funding projects), but involves improvement of regulations, support in innovative procurement, and certification. Although, the Green Deals fall under the responsibility of the Ministry of EA, many other governments participate as well. (Janssen and Den Hertog, forthcoming). 176 Green Deals have been started between 2011 and 2014 with 1090 participants from companies and sector organisations (70%, SMEs constituted 40% of the participants), local governments (14%), NGOs (8%), research organisations (6%) and financial organisations (2%) (Van der Werff, 2015). The Green Deals programme may form part of the inspiration for the "Innovation Deals" initiative of the European Commission. Table 2 provides some examples of Green Deals.

In the TWIN 2013-2019 report it was reported that in 2012 4.5% to 6.6% of all tenders was seeking an innovative solution, compared to 3.8% to 9.1% in 2011. 3.6 to 5.2% of the tenders concerned an innovation in 2012, compared to 2.5%-6.0% in 2011.[67]

### 3.5.2 Indirect financial support for private R&I

In terms of funding, the main policy shift occurring with the launch of the Enterprise Policy concerns the increasing importance of generic policy in the form of fiscal incentives for R&D. Relevant instruments are the WBSO (tax exemption for R&D wages, 2015 budget is €794 mln), the RDA (tax exemption for R&D equipment, 2015 budget is €238mln), and the Innovationbox (tax exemption for profit derived from innovation or patenting):

The *tax credit for R&D (WBSO).* With an annual budget of approximately €800mln, the WBSO is a very substantial innovation policy instrument. It provides a tax exemption with respect to the labour costs of R&D employees. Following the evaluation in 2012, there was a budget-neutral reallocation of the funds for the WBSO in 2013, which has enhanced the facility's efficiency and effectiveness.

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[64] Voortgangsreportage innovatiegericht inkopen: innovaties versterken de inkoopkracht van de overhead, bijlage bij de voortgangsreportage Bedrijvenbeleid 2013 BEDRIJVENBELEID IN VOLLE GANG http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2013/10/02/voortgangsrapportage-innovatiegericht-inkopen.html For further information on the SBIR program see also Small Business Innovation Research (SBIR) and Boekholt, P., Evaluation SBIR in The Netherlands, The Hague 2011

[65] Boekholt, P., Evaluation SBIR in The Netherlands, The Hague 2010.

[66] For an English description: Industrial Efficiency Policy Database, NL-11: Green Deal: http://iepd.iipnetwork.org/policy/green-deal.

[67] Jan van Steen, Total Investments in Research and Innovation (TWIN) 2013-2019, Facts & Figures, Rathenau Institute

The rates for the WBSO were lowered, the salary threshold for the first bracket was raised and the ceiling was maintained at €14mln euro.

The *Research & Development Allowance (RDA)* was introduced in 2012. The aim of RDA is to make non-wage costs of investments in innovation more attractive (from a fiscal perspective). The RDA offers a higher tax relief for R&D investments in capital equipment and exploitation costs. It is complementary to the 'old' WBSO scheme offering a tax relief on R8D wages. Despite pre-launch intentions to raise the initial budget of €250mln per year with a factor of two, the budget was €302mln in 2014 and planned to decrease to €126mln by 2017. As noted in section 2.2, however, RDA will merge with WBSO from 2016 onwards.

The tax relief for innovation (the *Innovationbox*) offers firms a reduced corporate tax rate for profits derived from in-house developed intangible assets. The official annual budget of the innovation box is €625mln of foregone taxes.

According to a recent evaluation[68], the use of the Innovationbox has been growing rapidly over the past years; from €361mln to €697mln during the period 2010-2012. These figures are subjected to firms' actual profits, which is why even ex-post estimations keep changing and why the budget is exceeded (which might be even more the case in coming years). Based on 'Bang-for-the-buck' econometrics using microdata from Statistics Netherlands, the measure was found to have a positive effect on R&D spending. It is unlikely though that a euro tax relief generates more than one euro R&D investments (the BftB is estimated to be 0.54 on average). As the policy measure applies to profits based on the results of earlier R&D activities, there is no guarantee that firms will actually re-invest the tax relief they enjoy in new R&D activities. However, firms using the Innovationbox appear to be engaging in R&D structurally (especially the ones participating from the beginning). The evaluation stresses that the policy measures seems to meet its second goal, which is improving the attractiveness of the Dutch economy for such R&D intensive firms. A low tax rate helps to maintain national firms and attract foreign ones, although it is important to note that many countries offer such schemes. The Dutch version of a patent box deviates in one important aspect: besides having intellectual property, firms can also qualify for the Innovationbox by an 'R&D statement'. This statement is provided when firms register for the WBSO; the tax scheme for deducting R&D costs. The evaluation shows that a majority of Innovationbox-users uses the statement as their eligibility basis (typically those firms enjoy larger financial benefits from the WBSO than from the Innovationbox). Whether this practice can be maintained depends on the outcomes of the ongoing OECD debate on 'base erosion and tax shifting' (BEPS).

The evaluation study does not offer an overall cost-benefit analysis, but its policy recommendations have been received as a useful basis for improving the instrument.[69] The Ministry of Finance aims to do so before September 2016.

According to Table 7**:** Estimated direct and indirect public budgets for R&D&I, 2014-2020 (in €mln and as a % of GDP). Source: TWIN 2014-2020. the fiscal incentives' relative share of 24% (2014) increases to 28% from 2016 onwards. Looking only at in particular the Ministry of EA's budgets, however, the distribution between generic and specific innovation support lies at 90%-10% in 2015.[70] As can be read in the OECD STI Outlooks (e.g. the 2012 edition, p. 351), the dominant place for fiscal R&D support has been a distinctive feature of the Dutch R&I system, and this still remains the case in 2015.[71]**Error! Bookmark not defined.** In a letter to parliament in July 2015, the Ministry of

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[68] Dialogic (November 2015). Evaluation Innovationbox 2010-2012. In Dutch.

[69] Ministry of Finance (February 2016). Kamerbrief betreffende Kabinetsreactie evaluatie innovatiebox. In Dutch.

70 AWTI (October 2015) Top Sector Balance ('Balans van de Top Sectoren') 2014. (In Dutch).

71 OECD (2014). OECD Science, Technology and Industry Outlook 2014.

EA confirmed a previously announced merger of the WBSO and RDA schemes, to be implemented as of January 2016.[72]

In the meantime a discussion emerged in January 2015 on the third fiscal R&D&I scheme, the Innovationbox, and in particular on its use by various categories of firms.[73] A report ordered by the European Commission by a consortium led by the Netherland Bureau for Economic Analysis (CPB) has looked systematically at fiscal R&D schemes and a.o. made a benchmark of 83 schemes in over 30 countries.[74] The three Dutch schemes included in the benchmark WBSO, RDA and Innovation box scored a 5th, 13th and 44th place on the overall ranking. The overall ranking was based on several indicators related to scope, targeting and the responsible organization.

The annual overview of total investments in science and technology (TWIN) also presents a detailed estimation of the share of innovation expenditures in the Netherlands.[75] The report states that R&D and innovation are increasingly aligned with each other (both in the spheres of policy and practice), but that is not reflected in the planned budget adaptations. The table below provides the direct and indirect budgets for the period 2014-2020.

**Table 7:** Estimated direct and indirect public budgets for R&D&I, 2014-2020 (in €mln and as a % of GDP). Source: TWIN 2014-2020.

| | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
|---|---|---|---|---|---|---|---|
| Expenditure on R&D | 4.873,8 | 5.020,2 | 4.861,5 | 4.737,5 | 4.660,2 | 4.657,1 | 4.682,2 |
| *- out of which relevant for innovation* | 1.136,5 | 1.215,9 | 1.125,9 | 1.097,2 | 1.084,4 | 1.073,3 | 1.092,2 |
| Expenditures on innovation (not being R&D) | 139,3 | 261,2 | 181,0 | 195,5 | 197,6 | 173,4 | 161,4 |
| Fiscal instruments for R&D&I (Excl. Innovation Box) | 1.045,7 | 1.042,8 | 1.153,8 | 1.130,9 | 1.130,9 | 1.131,0 | 1.128,0 |
| Total direct and indirect R&D&I | 6.058,9 | 6.324,1 | 6.196,2 | 6.063,9 | 5.988,8 | 5.961,5 | 5.971,6 |
| As a percentage of GDP | | | | | | | |
| Expenditures on R&D&I as a % of GDP (excluding fiscal instruments) | 0,76 | 0,78 | 0,72 | 0,69 | 0,67 | 0,64 | 0,63 |
| Expenditures on R&D&I as a % of | 0,91 | 0,93 | 0,88 | 0,84 | 0,82 | 0,80 | 0,78 |

72 Ministry of Economic Affairs (July 2015). Integration of fiscal innovation schemes WBSO and RDA.
73 See letter of the secretary of state of the Ministry of Finance on the use of the Innovationbox 2010-2012, dd. 13-01-2015, kenmerk AFP/1117/U. In Dutch.
74 European Commission's DG for Taxation and Customs Union (November 2014), A Study on R&D Tax Incentives. Final report, Taxation papers, Working paper no. 52 – 2014, CPB in consortium with CAPP, CASE, CEPII, ETLA, IFO, IFS, HIS, European Union, Luxembourg.
75 Rathenau Institute (April 2015): Total Investment in Research and Innovation 2013-2019.

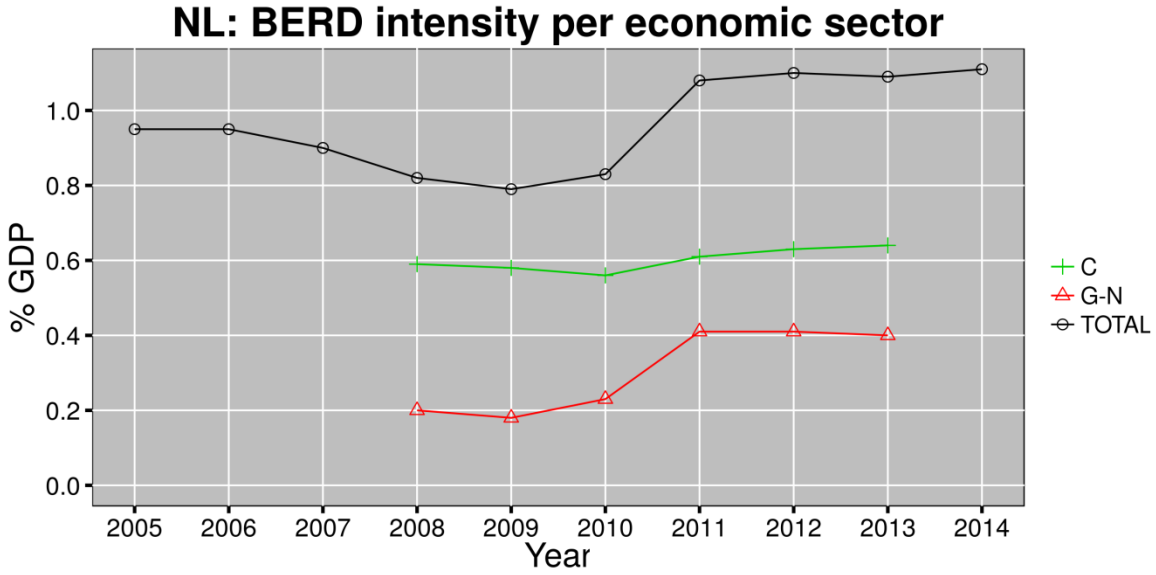
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GDP (including fiscal instruments) | | | | | | | |

## 3.6 Business R&D

### 3.6.1 The development in business R&D intensity

BERD expenditure and BERD intensity experienced a drop in the Netherlands in the wake of the crisis followed by a sharp increase in 2011. As shown in Figure 9, especially BERD in the service sector increased so that the share of the service sectors (G-N)[76] increased from 24 to 36 % of BERD between 2008 and 2013. This sudden rise may be partially due to government efforts, including R&D tax incentives and incidental additional support for business R&D by the government. Another potential and plausible reason is a revision of statistical methodology in 2011, due to which companies with less than 10 employees are included. As a result, where the reported R&D expenditure of small companies in 2010 amounted to 10% of total R&D expenditures, in 2012 this was almost 21%.[77]

The biggest funder of business R&D is business itself at 84% of BERD. Direct government support for business R&D peaked in 2010, but decreased since to 2,0% in 2014. Together with funding from abroad at 14% total non domestic business funding of BERD remains below 20% (see figure 2). What is not taken into account in Figure 10, however, is the substantial indirect support the Dutch government provides to BERD in the form of tax incentives (see public funding semester report 2015). For 2011, the OECD indicated that 75-80 % of real public support to business R&D came in the form of tax incentives. [78] The amount of foregone tax revenues are thought to have increased substantially since that year: i.e. the Eurostat figures on government support for private sector R&D are a considerable underestimation of the "real" share of BERD funded (directly or indirectly) by government.




[76] The service sectors G, Wholesale and retail trade; repair of motor vehicles and motorcycles, H Transportation and storage; I Accommodation and food service activities; J Information and communication; K Financial and insurance activities; L Real estate activities; M Professional, scientific and technical activities; N Administrative and support service activities

[77] http://dialogic.nl/documents/other/wti2_resume.pdf

[78] OECD STI Scoreboard 2013. OECD STI Outlook 2014. CPB Netherlands Bureau for Economic Policy Analysis, 2014, A Study on R&D Tax Incentives Annex: Country fiches DRAFT FINAL REPORT, European Commission, DG Taxud

**Figure 9:** BERD intensity broken down by most important macro sectors (C= manufacture, G_N=services).

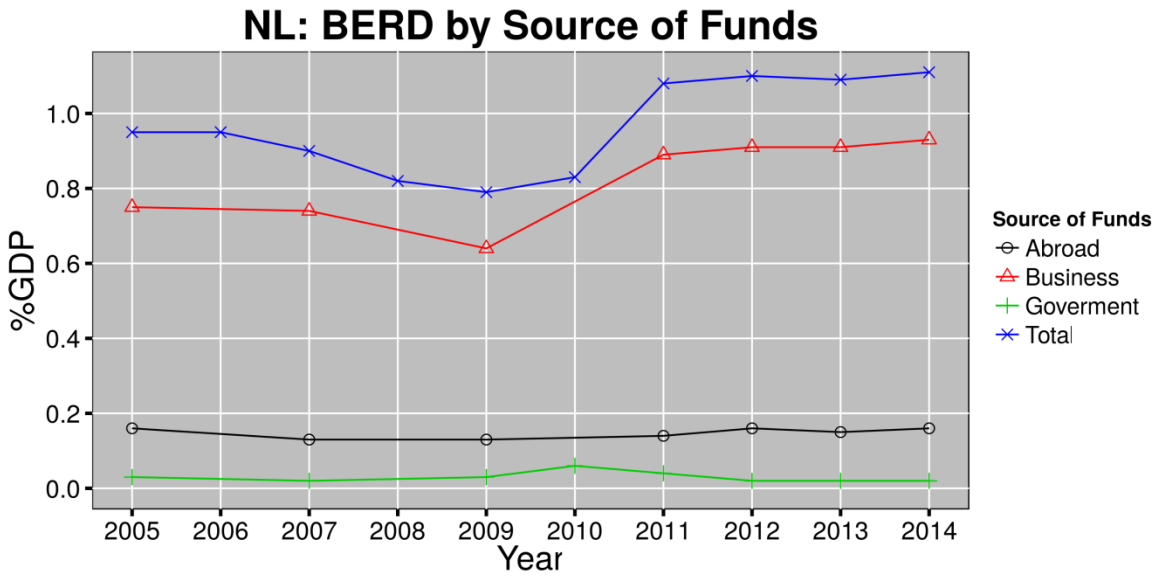



**Figure 10:** BERD by source of funds

### 3.6.2 The development in business R&D intensity by sector

As shown in Figure 9 the manufacturing sector still accounts for a larger share of BERD than the service sectors. The manufacturing sectors still account for the largest share of BERD. Absolute levels of BERD in the manufacturing sector have also increased since 2010. However the service sectors G-N have increased their levels of BERD more rapidly in this period (potentially in part due to the accounting issues raised in section 3.6.1) so that the manufacturing sector in 2013 accounted for 59% of total BERD and the sectors G-N[79] for 37% (from 22% in 2009).

C25-C30[80] account for the largest share of BERD, and in particular sectors C28: Manufacture of machinery and equipment and C26 (Manufacture of computer, electronic and optical products). Some of the larger companies included in these fields are Philips, ASML, and NXP as well as the surrounding suppliers and SME companies in the Eindhoven Brainport cluster and the Netherlands more broadly. These firms are ranked 21st, 41rd and 65th respectively on the European Industrial Innovation Scoreboard.[81] STMI electronics (ranked 26th in the scoreboard) has its administrative headquarters in the Netherlands, but appears to do relatively little R&D here. The ranking of Dutch R&D performers may change, since R&D expenditures in Philips (still over 700 million) are decreasing while they are growing rapidly in ASML. In 2014, ASML invested more in R&D than Philips according to national sources.[82]

BERD in C20 (chemical sector) decreased. In the case of the chemical sector this is perhaps surprising as the Netherlands is characterised by a strong chemical sector with

[79] The service sectors G, Wholesale and retail trade; repair of motor vehicles and motorcycles, H Transportation and storage; I Accommodation and food service activities; J Information and communication; K Financial and insurance activities; L Real estate activities; M Professional, scientific and technical activities; N Administrative and support service activities

[80] C25, Manufacture of fabricated metal products, except machinery and equipment; C26, Manufacture of computer, electronic and optical products; C27, Manufacture of electrical equipment; C28, Manufacture of machinery and equipment n.e.c.; C29 Manufacture of motor vehicles, trailers and semi-trailers; C30 Manufacture of other transport equipment

[81] http://iri.jrc.ec.europa.eu/scoreboard.html

[82] http://www.technischweekblad.nl/top-30-r-d-asml-stoot-philips-van-de-troon.366684.lynkx

large companies such as DSM and AKZO-Nobel (ranked 57th and 82nd in the European industrial R&D scoreboard respectively).

This may be due to the cyclical nature of industry in this sectorin which revenues decrease relatively rapidly in times of crisis, due to which, there can be relatively little room for investment in R&D. Also both large firms do a substantial amount of their R&D outside the Netherlands.[83]

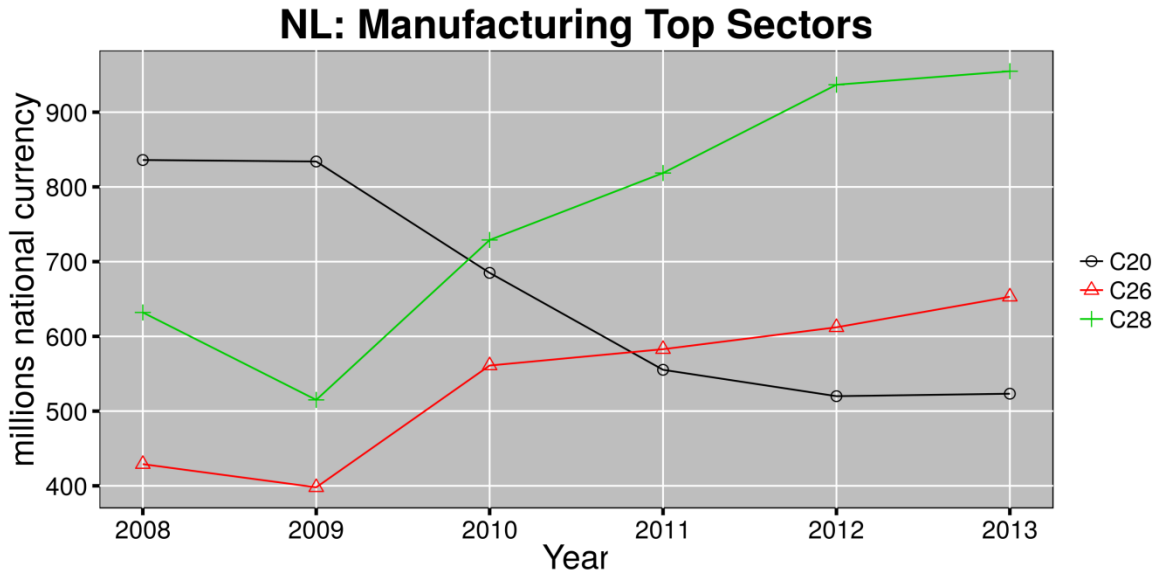



**Figure 11:** top sectors in manufacturing R&D data (C26=manufacture of computer, electronic and optical products; C20= Manufacture of chemicals and chemical products; C28=manufacture of machinery and equipment n.e.c).

There was a large increase as well in the BERD of the service sectors from 2009 to 2013. Services constitute a large share of the Dutch economy. However, firms in service sectors tend normally to invest less in formal R&D than the firms in the manufacturing sectors, though the difference between BERD in the manufacturing and service sectors is decreasing. Still, as is shown in the Figure 12, the amounts spend in BERD are substantial and increasing during the period studied. Especially the BERD in M (professional, scientific and technological activities) increased rapidly. Firms in this sector include a number of medium sized engineering consultancy firms such as Arcadis and Royal HaskoningDHV which are among the top 30 Dutch R&D performers.[84] BERD in J (information and communication) and G (Wholesale and retail trade) increased between 2008 and 2013 though the last years saw a mild decrease in BERD. This in contrast to the M sector, where BERD continued to increase in 2013 following a small decline in 2012. Wholesale and retail trade (G) is a well- developed sector in the Netherlands, with for example Ahold ranked 269 in the European Industrial R&D scoreboard.[85] The post crisis period saw a further process of concentration (Mergers and Acquisitions) in the retail sector – this year followed by a merger between large Dutch and Belgian supermarket chains (Ahold and Delhaize).

[83] https://www.technischweekblad.nl/upload/documents/tinymce/RD-Top-30-2015.pdf; http://www.technischweekblad.nl/Uploads/2014/4/Top-30-Bedrijfs-R-D-2014.pdf
[84] http://www.technischweekblad.nl/Uploads/2013/4/09-TW14-15-Tabellen.pdf
[85] http://iri.jrc.ec.europa.eu/scoreboard.html

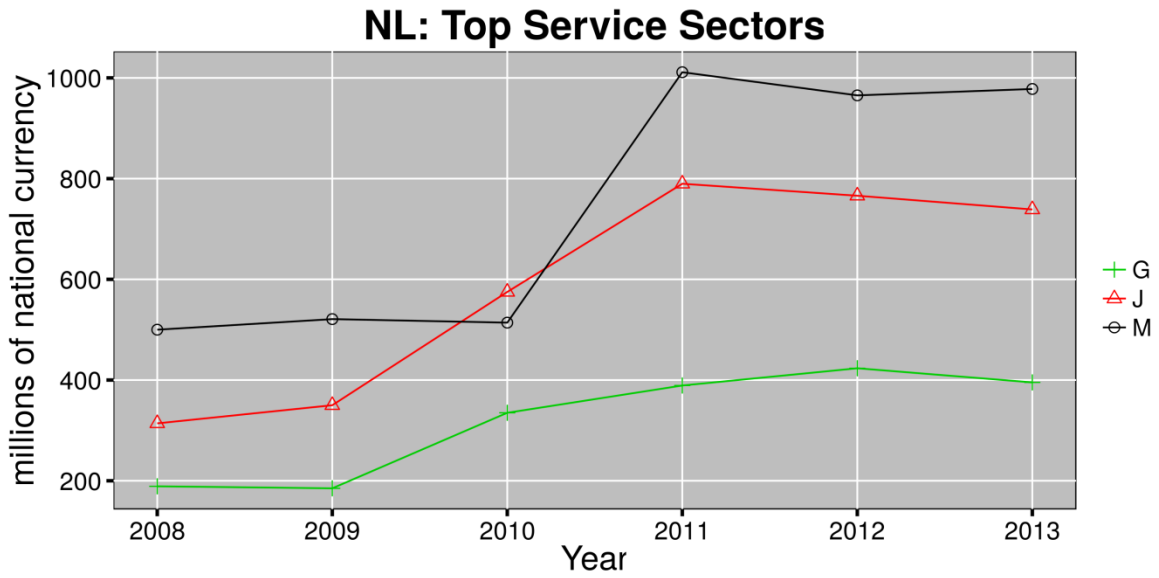



**Figure 12:** R&D expenditures in top service sectors (J=information and communication, G=wholesale and retail trade; repair of motor vehicles and motorcycles, M=professional, scientific and technical activities).

### 3.6.3 The development in business R&D intensity and value added

The manufacturing sector (see table in annex) accounts for a smaller share (12.6%) of Dutch Gross Value Added than in the EU 28 average of 15.2%. The top 6 sectors in decreasing order are 1) manufacture, 2) wholesale and retail trade; repair of vehicles and motorcycles, 3) Human health and social work activities, 4) Financial and insurance activities, 5) Public administration and defence; compulsory social security, 6) Real estate activities. As can be seen from Figure 13 the GVA levels of the manufacturing and trade sectors are comparable.

The level of Dutch Manufacturing GVA is below the EU-28 levels whereas the Trade GVA is higher. The health sector has a relatively high GVA as does the financial sector. However, Dutch banks had a difficult period following the financial crisis (the take over and split up of ABN followed by a forced nationalisation of the "Dutch" part which had been acquired by Fortis; the rescue of ING and some other banks, the loss of the AAA status and the Libor scandal by Rabobank etc). ING and the Rabobank rank 148 and 241 in the European Industrial R&D scoreboard and are therefore still among the top 15 Dutch companies on this list.

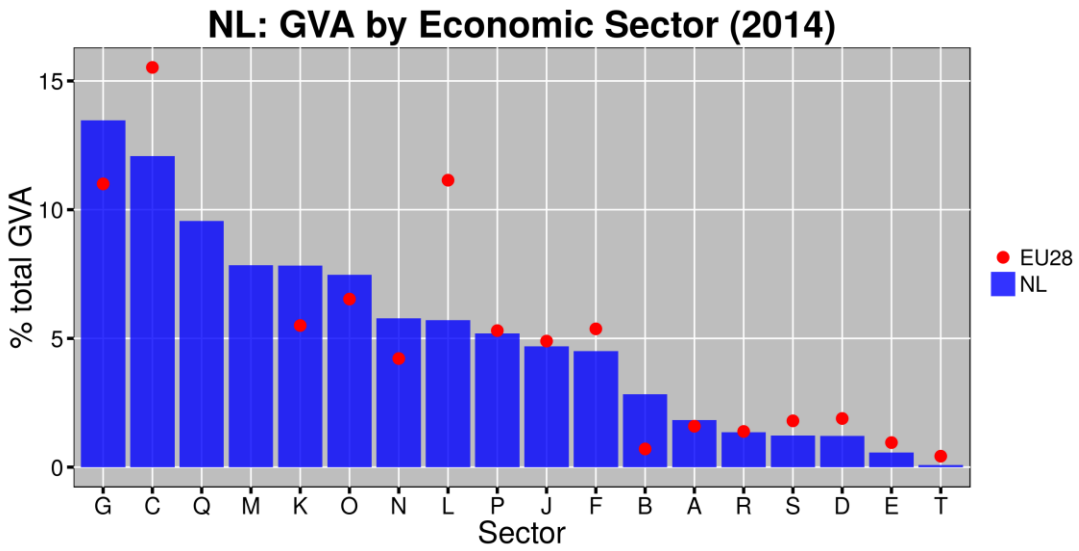



**Figure 13:** economic sectors as percentage of the total GVA.


**Figure 14:** GVA in manufacturing.

The top 6 manufacturing sectors in terms of value added are: 1) Manufacture of food products; beverages and tobacco products (C10-C12), 2) Manufacture of chemicals and chemical products (C20); 3) Manufacture of machinery and equipment n.e.c. (C28), 4) Manufacture of fabricated metal products, except machinery and equipment (C25), 5) Manufacture of furniture; other manufacturing (C31-32); 6) Repair and installation of machinery and equipment (C33).

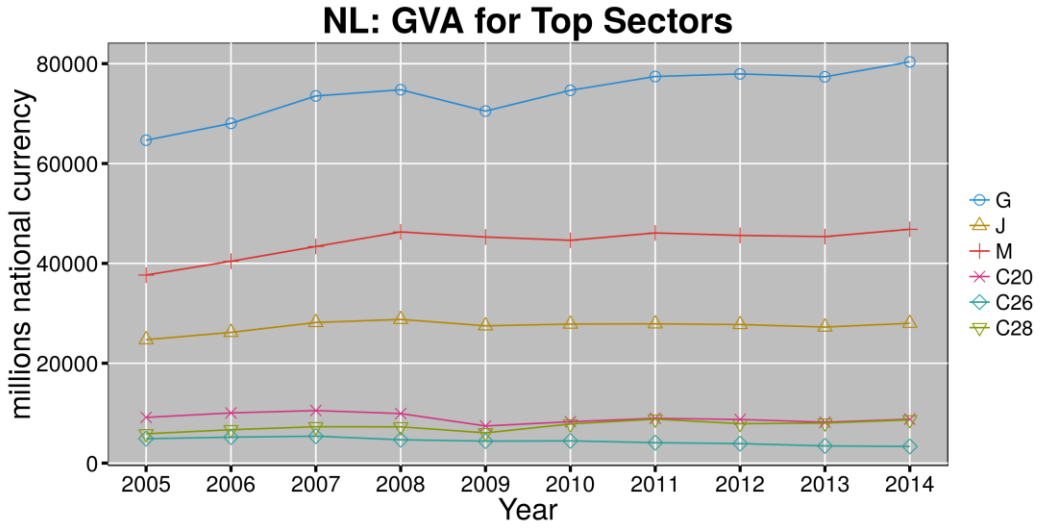
The Netherlands hosts a number of large multinational food companies a field in which it is a global leader, including some of the world's largest dairy firms, the Dutch-British Unilever, Heineken, foreign affiliates of some large American firms and, at least until recently a sizeable tobacco industry. The food sector is traditionally not characterised by high levels of R&D, which explains why while it features prominently in the GVA figure it is not represented in the figure on the Top 3 economic sectors in terms of BERD. The Chemical industry (C20) is also well represented in the Netherlands with multinationals like AkzoNobel and DSM. For both these sectors GVA is well above the EU 28 average.

This is not the case for C28: the manufacture of machinery and equipment and C26: manufacture of computer, electronic and optical products. The R&D intensity in these sectors increased substantially so that they are now the largest R&D performing manufacturing sectors in the Netherlands (the service sector M professional, scientific and technical activities had a higher BERD in 2013).

As shown in Figure 15, the service sector G (Wholesale and retail trade0 have more or less recovered to pre-crisis levels. This is not fully the case for the J (information and communication) and especially the M sector (professional, scientific and technological services). Sector M had a peak in 2008 after which it declined until 2013. It remains well above 2005 levels though. Considering the modest recovery it is striking that the R&D intensity in these sectors (see Figure 11) has increased considerably since 2010. For the manufacturing sectors analysed, C20 (Manufacture of chemicals) is around pre-crisis levels, whereas C26 (Manufacture of computers) and C28 (Manufacture of machinery and equipment) have surpassed these levels to a considerable extent.

In terms of the number of scientists and engineers we observe that the manufacturing sector saw a 38% increase in the number of scientists in engineers between 2008 and 2014. In the case of wholesale and retail trade the increase was even more pronounced with +138%, though it still employed around half of the number of scientists and engineers as the manufacturing sector. The C (manufacturing) and G (Wholesale and retail trade) sectors studied went down in total employment and both thus saw an up-skilling of their labour force. The professional, scientific and technical activities sector saw a drop in S&E employment following the crisis, but surpassed its pre-crisis levels in 2013 and 2014. This sector M (professional, scientific and technical activities) still employs 39% more S&Es than the manufacturing sector as a whole. Considering the importance of labour in total R&D costs, the uptake in the hiring in R&D staff reflects the BERD trends.

Large MNCs are important players in the Dutch economy. In terms of value added it is not so much the large number of companies with their administrative headquarters in the Netherlands (e.g. Airbus, STMI electronics), but the large firms which maintain production as well as R&D facilities in the Netherlands. The reliance on large MNCs does result in some longer term threats to the Dutch economy posed e.g. to the potential outsourcing of production and R&D to other locations in the future.



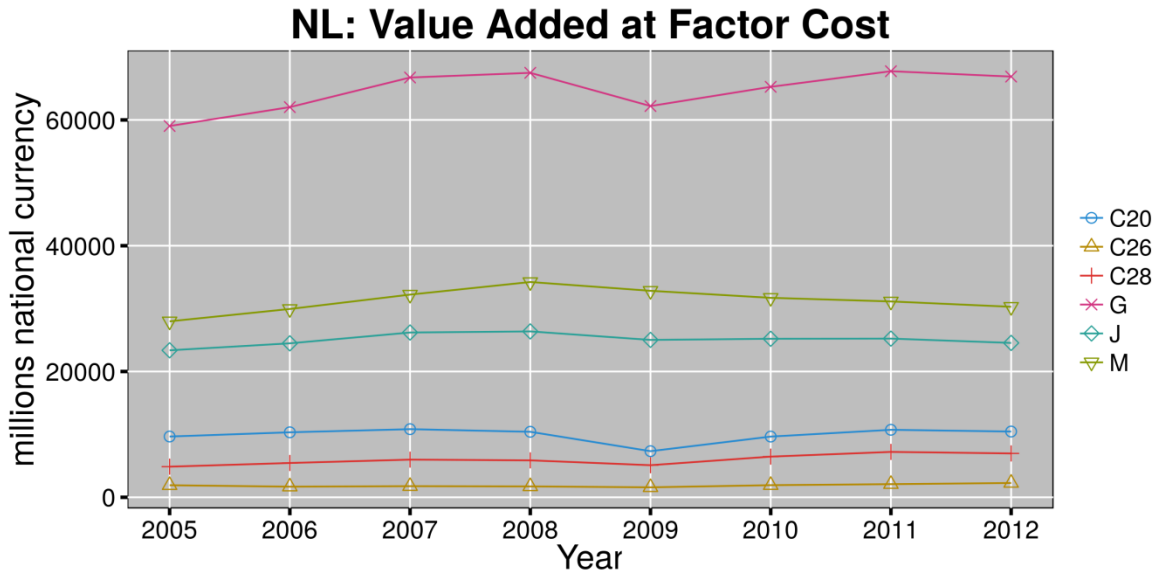



**Figure 15:** value added (GVA and at factor cost) for the leading (in terms of BERD) manufacture and service sectors (millions)

## 3.7 Assessment

Although public nor private R&D funding is known to be high in the Netherlands, the R&D system is commonly believed to be efficient when also taking into account the output that is achieved through those R&D activities. The Dutch government itself stresses the success of its R&D&I strategies by pointing at improvements on rankings like the Global Competitiveness Index (WEF) and the Innovation Union Scoreboard (EU). On both rankings the Netherlands are currently listed as 5th, as opposed to the 8th and 6th position (respectively) one year earlier. The Global Innovation Index 2015 (Cornell/WIPO) even ranks the Netherlands in 4th place, also one place higher than in 2014. Of course it is hard to assess whether these improvements really result from policy changes. Some aspects of the system are in fact being criticized for their negative consequences. This concerns for instance the reorganization as well as allocation procedures of NWO. As for the latter, the Dutch funding system is increasingly oriented towards applicability of results, which has been causing a debate with respect to whether there still is sufficient room for fundamental and 'free' (instead of thematically oriented) research.[86] Also, a recent study shows that, apart from the fact that beta sciences are receiving less funding from general university funding over time, the number of fte has increased in all disciplines in the period 1997-2014.[87] As the NWO budget has not kept up with this trend of expansion, the approval rate of proposals has been dropping. A related point of discussion is the allegedly overly strong focus on quality: although it is appreciated that the best researchers get the best chances, the percentage of research proposals actually being awarded is criticized for being on the low side while application procedures are perceived (by academics) as highly labor intensive. [88] A similar development can be found in the protests against universities being managed from a very narrow efficiency perspective.

[86] See, for instance: KNAW (August 2015). Room for unrestricted research. In Dutch

[87] Rathenau Institute (March 2016). Chinese borden - Financiële stromen en prioriteringsbeleid in het Nederlandse universitaire onderzoek.

[88] Van Calmthout (March 2015). Allocation of research funding has to change. Volkskrant. In Dutch.

When it comes to business R&D, the majority of funding in the Enterprise Policy is made available through instruments that reduce the costs of R&D (rather than directly providing subsidies). So far there is no solid evidence whether this truly results in increases in private R&D.

A recent meta-analysis of innovation and entrepreneurship interventions showed that the Dutch policy mix on this account is robust, but policy rationale and especially empirical evidence for the effectiveness and efficiency of some measures is missing.[89] An international comparison of R&D&I tax schemes, accounting for most of the innovation budget, did not point at strongly increased business expenditures.[90],[91] The fact that the government is decreasing her support for innovation implies that the absolute basis for leveraging private R&D expenditure is getting smaller. These budget cuts are paired by two notable changes in the funding system. One of them consists of intensified efforts to improve internationalization of the Dutch economy and to attract foreign funding. In fact, the Top Sector approach is to a large extent an attempt to put the strongest economic activities in the spotlights internationally. This strategy might lead to increased availability of FDI, but also aims to support commercialization of Dutch knowledge and innovation. The second notable change is the strong focus on public-private collaboration (e.g. through TKI-allowance, which has the potential of reducing two perverse incentives: not only does it reduce risks of deadweight losses of subsidies, but guiding private R&D in certain directions can also help to steer business away from environmentally unsustainable innovation towards societally desirable directions. Another concern nowadays, expressed by for instance VNO-NCW and MKB Nederland, is that the current budget cuts might damage the continuity of research and innovative activities.[92]

[89] Dialogic (May 2015). Evaluation Innovation and Entrepreneurship Policy Mix (article 12/13) 2009-2013. In Dutch.
[90] CPB (June 2015). More R&D with tax incentives? A meta-analysis.
[91] Koopmans & Donselaar (2015). A meta-analysis of the effect of R&D on productivity. ESB. In Dutch.
[92] MKB Nederland (June 2015). Budget cuts can damage industry policy. In Dutch.