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Abstract

The report offers an analysis of the R&I system in The Netherlands for 2014, including relevant policies and funding, with particular focus on topics critical for two EU policies: the European Research Area and the Innovation Union. The report was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports, websites etc. The report identifies the structural challenges of the Dutch research and innovation system and assesses the match between the national priorities and those challenges, highlighting the latest policy developments, their dynamics and impact in the overall national context.

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Executive summary

This RIO country report provides an up to date overview of the R&I system (including funding) in the Netherlands. The report presents developments in the Dutch R&I system that are relevant to both the European Research Area and Innovation Union. The report was prepared according to a set guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports, websites, etc. The quantitative and qualitative data is, whenever possible, comparable across all EU Member State reports.

The Dutch knowledge economy is, in economic terms, among the better performing countries in the world. The share of the Netherlands in the total GDP of the EU28 is relatively high with 4.6% (2013). The GDP per capita is well above EU28 average of €27300 (2014): in 2012-2014 it grew from €38,200 to €38,900. Due to the economic crisis, GDP growth varied: in 2012 there was a drop with 1.6% (to €640.6 billion), in 2013 another drop of -0.7% (€642.9bln), but a small increase of 0.9% again in 2014 (to €655.4bln). In terms of GERD as percentage of GDP, the Netherlands performs at a level similar to the EU28 average (1.98% in 2013). This is still far below the target of 2.5%, as set by the Dutch government. The Dutch BERD is relatively low (1.1% in 2013).

According to the Innovation Union Scoreboard 2014, the Netherlands is one of the 'innovation followers', with innovation performance below those of the 'innovation leaders' but above that of the EU27 average. Whereas the relative position of the Netherlands has been increasing in the past few years, 2013 marked a decline (corresponding with a drop from place five to six). According to the IU Scoreboard 2014, the Netherlands has relative strengths in 'Open, excellent and attractive research systems' and for "Linkages and entrepreneurship". Relative weaknesses are in the category 'Economic effects' (especially knowledge-intensive services exports and sales share of new innovations). Although the current strengths are similar to the ones identified in the IU Scoreboard 2013, the weaknesses at that time were in 'Firm investments' and 'Innovators'.

Structure of the national research and innovation system and its governance

The main actors and institutions in the Dutch science, research and innovation governance system are the Ministry of Education, Culture and Science (ECS) and the Ministry of Economic Affairs (EA). The main bodies responsible for managing and implementing policies are the Netherlands Organisation for Scientific Research (NWO), the Technology Foundation STW, the Royal Netherlands Academy of Arts and Sciences (KNAW), and RVO.nl (a merger between NL Agency and the Dienst Regelingen). Additionally, the Advisory Council for Science, Technology and Innovation (AWTI) advises the government and parliament on policy relating to scientific research, technology development and innovation in both the national and international context. Finally, a Knowledge Forum has been established with the aim of strengthening interactions between senior civil servants and research institutions. In addition, The Netherlands has a large number of organisations that conduct research. A distinction can be made between: research universities (n=14), universities of professional education (n=37), research institutes (including private non-profit institutes) and companies. Secondly there are many public research institutes.

Enterprise policy: In the Ministry of EA's view, entrepreneurship is considered as crucial for wealth creation in the Netherlands. It is argued that societal and economic challenges demand for a policy that gives 'room for entrepreneurs'. Over 2011, several top teams (constituted by representatives from the industry, research institutes and government)

contributed actively to the strengthening of the new enterprise policy. The government has implemented various actions based on the advice of these top teams. In total nine top sectors were identified. These top sectors build on the unique strengths of the Dutch economy. In order to carry out basic and applied research in the top sectors, 19 consortia have been established. In these so-called *Top consortia for Knowledge and Innovation* (TKIs) many existing research initiatives are being put together. Essential is that research is conducted through public-private partnerships. In some TKIs some of the earlier Top Technological Institutes (TTIs) are integrated. Besides still supporting regular research projects of the TKIs, the government provides a top-up (through a so-named TKI-allowance) for research-oriented PPP-initiatives. In 2013, industry invested 199mln (in cash) in regular TKI-projects and another €109 for topped-up projects. Taken together with the public funding for regular and topped-up projects, the total TKI R&D-expenditures were €850mln.

One key aim of the Enterprise policy is reduction of administrative burdens. Since 1 January 2014, business can go to one place for all government matters related to doing business: '*A one-stop-shop for businesses*' (in Dutch 'het Ondernemersplein'). In this one-stop-shop for businesses, services of the Chamber of Commerce, Syntens and parts of the Netherlands Enterprise Agency (RVO.nl) will be combined. Services of new parties such as the taxation authority or municipalities will be included as well.

Higher education, (fundamental) research and science policy: In this policy domain, continuation and stability more than large scale changes is the adagio; changes – at least in budgetary terms – are limited. Probably one of the landmark changes is the gradual shift from lump sum institutional funding in higher education towards performance based or competitive funding (In the budgets for 2012-2016, 7% of the core funding for universities will be competitive funding rather than block-funding. The major part (5% of total higher education budget) will be conditional funding, while the other part (2%) will be allocated selectively for education profiling plans. This excludes the leverage effect of the competitive funding provided by NWO and EU-programs. The share of funding that is provided by NWO and KNAW, who recently in joint collaboration with Association of universities in the Netherlands (VSNU) updated the Standard Evaluation Protocol (SEP), is largely based on program and projects proposals. Most of the budget for applied research is being allocated for research projects that fit within the thematic research and innovation roadmaps drawn up by Top Sectors and TKI's. A competitive research climate also results from the fact that all vacancies in the Dutch academic world are published on the international website Academic Transfer.

To improve the connection between education and labour market (especially within the Top Sectors) several *Centres of Expertise* (higher education) and *Centres for innovative craftsmanship* (vocational education) were established. In these centres students, teachers and businesses work together. At the moment there are 25 Centres of expertise and 18 centres for innovative craftsmanship. Most of these are situated at one of 34 campuses/campus initiatives the Netherlands is hosting.

Funding trends: Dutch expenditures on Research and Development (GERD) as a share of GDP have been stable over the past two years: from 1.97% in 2012 to 1.98% in 2013. This is similar to the EU28 average of 2.02%. The R&D expenditures funded by the business sector (BERD), amounting to 0.95% of GDP in 2012, have decreased to 0.93% in 2013 (well below the EU28 average of 1.1%). Similarly, when looking at who performed R&D (rather than who funded it), Dutch businesses account for 58% of the total R&D

expenditures versus a European average of 65% (2012). In the past Innovation Union Scoreboards, this has been the main indicator where the Netherlands are underperforming.

With the introduction of the Enterprise Policy there is increasing budgetary importance of generic R&D support in the form of fiscal incentives for R&D. The Enterprise Policy aims to spur innovation by facilitating private R&D spending. In this respect, various predominantly *fiscal measures* have been adapted or newly introduced over the past year(s). The most important fiscal instruments are: the tax credit for R&D (WBSO), the tax relief for innovation-based profit (Innovationbox), and the Research & Development Allowance (RDA). The fiscal instruments are eligible to firms from any sector or size. Recognizing that especially small firms face problems with acquiring capital, there are several additional (non-fiscal) policies exclusively devoted to facilitate private R&D spending by SMEs. These include the SME Innovation support Top Sectors ([MIT](#)) and the [SME+ Innovation Fund](#) (to be continued as [Future Funds](#)) which covers [Innovation Credits](#) (also available to larger businesses), [SEED capital](#) and Fund-of-Funds, SME loan guarantee scheme ([BMKB](#)), The Netherland Investment Agency ([NLI](#)), Innovation Performance Contracts ([IPC](#)), micro-financing, and the [Growth facility](#) scheme.

Performance of the national Research and Innovation system

Looking at the performance and dynamics within the Dutch innovation system, several major challenges can be identified: the valorisation of the (excellent) knowledge it is producing, the need to improve availability of funding for innovation (especially for small firms), the lack of clarity in the innovation system (the multitude of institutes and the possible competition with private parties), addressing societal challenges and the exploitation of excellent students.

The identified challenges are being addressed in several ways. For example, Better knowledge valorisation has been a key motivation for the introduction of the Enterprise Policy. Especially the creation of Top Sectors provides a structure for intensifying the role of firms in the innovation system. Their active role in developing innovation agenda's for TKI's ensures that policy support is directed to opportunities and challenges observed by firms. In addition, several of the instruments in the Enterprise Policy aim to support innovation by providing access to funding. In order to clarify and improve the role of public research institutes for applied research, the Ministry of EA published a vision report in July 2013. The report contains five action points: elaboration of the relation with private parties; focus on multi-annual research collaboration within Top Sectors; a shift from block funding to competitive funding; more focus on quality and impact; uniform governance structures. The Ministry of EA also emphasized once again the importance of addressing societal challenges. One way to yield solutions to these problems is by focusing the activities performed within Top Sectors. The innovation agendas which were signed in 2014 have incorporated the topic of societal challenges in several ways. In addition, the Ministry of EA linked several of its policy instruments to the priorities (and European research programmes) of the Horizon 2020 framework. The structural challenge with respect to education has received ample attention in the past few years. In particular the strategic agenda on Higher education, research and science ('Quality in Diversity') from 2011 marks an important step towards improvements on this account. In fall 2014, the Ministry of ECS presented its [Science Vision 2025](#) as a basis for a new long term strategic agenda.

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1. Overview of the R&I system

1.1 The Netherlands in the European RDI landscape

The Netherlands - a unitary state - is a prosperous, densely populated country with 16.8mln inhabitants (2014) according to Eurostat, which amounts to 3.3% of the total EU28 population.¹ The Dutch knowledge economy is, in economic terms, among the better performing countries in the world. The share of the Netherlands in the total GDP of the EU28 is relatively high with 4.6% (2013). The GDP per capita is well above EU28 average. In the period 2010-2012, the PPS per inhabitant grew from €32,000 to €32,800. Due to the economic crisis, GDP growth varied: while growth was moderate (1.8%) in 2008, it deteriorated heavily in 2009 (-3.7%) and then started growing again 1.5% in 2010 and 0.9% in 2011. In 2012 there was a drop with 1.2% (to 599 billion) and in 2013 another - 0.8%. In terms of GERD as percentage of GDP, the Netherlands performs at a level similar to the EU28 average (1.98% in 2013). This is still far below the target of 2.5%, as set by the Dutch government. One reason why GERD is lacking, is that in particular the Dutch BERD is relatively low (1.1% in 2013). GBAORD in percentage of GDP, on the other hand, is well above EU28 average (0.75% in 2013). Finally, as far as data are available (i.e. until 2010), also turnover from innovation as a percentage of total turnover is relatively low in the Netherlands (10.5% versus the EU27 average of 13.4%).

According to the Innovation Union Scoreboard 2014, the Netherlands is one of the 'innovation followers', with innovation performance below those of the 'innovation leaders' but above that of the EU27 average (i.e. less than 20% above but more than 10% below that of the EU27). Within this group, the Netherlands is, however, a 'moderate grower' maintaining the level of the Innovation Union Scoreboard 2011. According to the IU Scoreboard 2014, the Netherlands has relative strengths in "Open, excellent and attractive research systems" and for "Linkages and entrepreneurship". It also appears in the top-8 innovation performers "Human resources", "Finance and support" and "Intellectual assets". While relative weaknesses in the IUS 2013 were found in "Firm investments" and "Innovators", they are now in the category "Economic effects". The Netherlands has experienced fast growth in "Non-R&D innovation expenditures", "Community trademarks", "International scientific co-publications" and "New doctorate graduates".

¹ Eurostat (February 2015). [Population \(demography, migration and projections\)](#).

1.2. Main features of the R&I system²

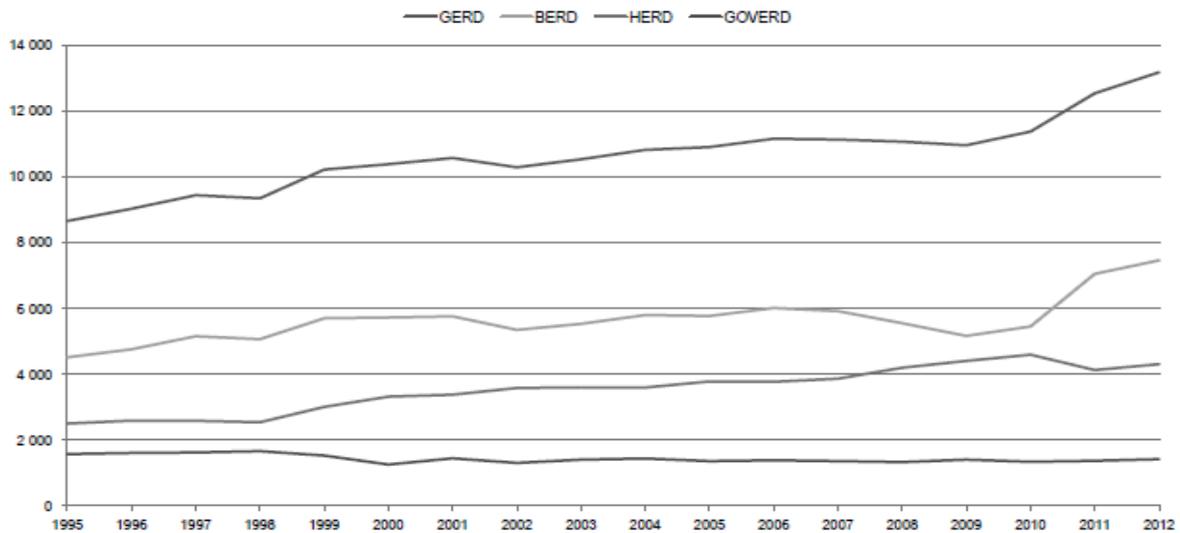
The R&I system in the Netherlands is overall highly centralised. It is mostly central government that is responsible for formulating both research and innovation strategy and policies. There are some remarkable trends however which need to be mentioned. Increasingly so central government withdraws from regional economic policies. Indicative is the decision to stop the programme originally named the Peaks in the Delta programme (since 2006) and from 2009 relabelled Strongholds in the region. This programme aimed at strengthening those regional strongholds. The programme was abolished in 2011 and the Ministry of Economic Affairs decided to limit its regional economic (including innovation) policies accordingly. Over the same period quite a number of provinces were able to sell off their stakes in regional utilities (mostly in energy) allowing them to invest more generously in (among others) innovation and more widely economic development in the region. This allowed some of the provinces such as Limburg and Gelderland to invest more in regional development and innovation, separately or as part of Research and Innovations Strategy for Smart Specialisation (see section 2.6). In the most Southern Province of Limburg this means in practice that tens of millions are invested in various regional campuses and/or clusters. Research policy is highly centralized as well, although some of the universities and public research organizations are clearly integrated in local innovation systems, examples being the Technical University Eindhoven which is, for example, part of the strong Eindhoven Brainport region or Technical University Twente which for decades already presents itself as an entrepreneurial university well embedded in regional industrial fabric.

In terms of R&D performance the balance between public and private R&D activities is quite stable over the years as can be seen from the figure below. The recent OECD Review of Innovation policy contained the development over time of GERD, BERD, HERD and GOVERD over the period 1995-2012 which nicely tells the story. It illustrates that whereas BERD and GERD have risen over the years, GOVERD is quite stable in absolute terms leading to a decreasing share in gross expenditure on R&D in the Netherlands. The most remarkable increase of BERD and decrease of HERD in 2011 is mostly a statistical artefact. Statistics Netherlands widened the definition of R&D in firms (in order to be in line with the Oslo-manual standards) and now also includes firms with fewer than 10 employees. More than 80% of the increase in BERD in 2011 is due to this change. Whereas for HERD the calculation basis for R&D spending has become more strict and therefore smaller.

² A detailed description of the Dutch research and innovation system can be found in Ministry of Education, Culture and Science (2012), [The science system in the Netherlands. An organisational overview](#). In this document the main points of the Dutch science policy are described, it describes the organisation of the science system (advisory bodies, funders, intermediary organisations and temporary task forces, research institutions etc.) and the various levels of the science system (Parliament, Cabinet and ministries). The document concludes with a number of factsheets with more detailed information on funders and performers of research in the Netherlands, with some key figures and it addresses of a number of relevant Dutch websites.

Another recent and fine overview of the relevant innovation actors is Chapter 4 in OECD (2014), OECD Reviews of Innovation Policy. Netherlands, OECD, Paris. In this chapter the business sector, higher education institutes and public research institutes are described extensively.

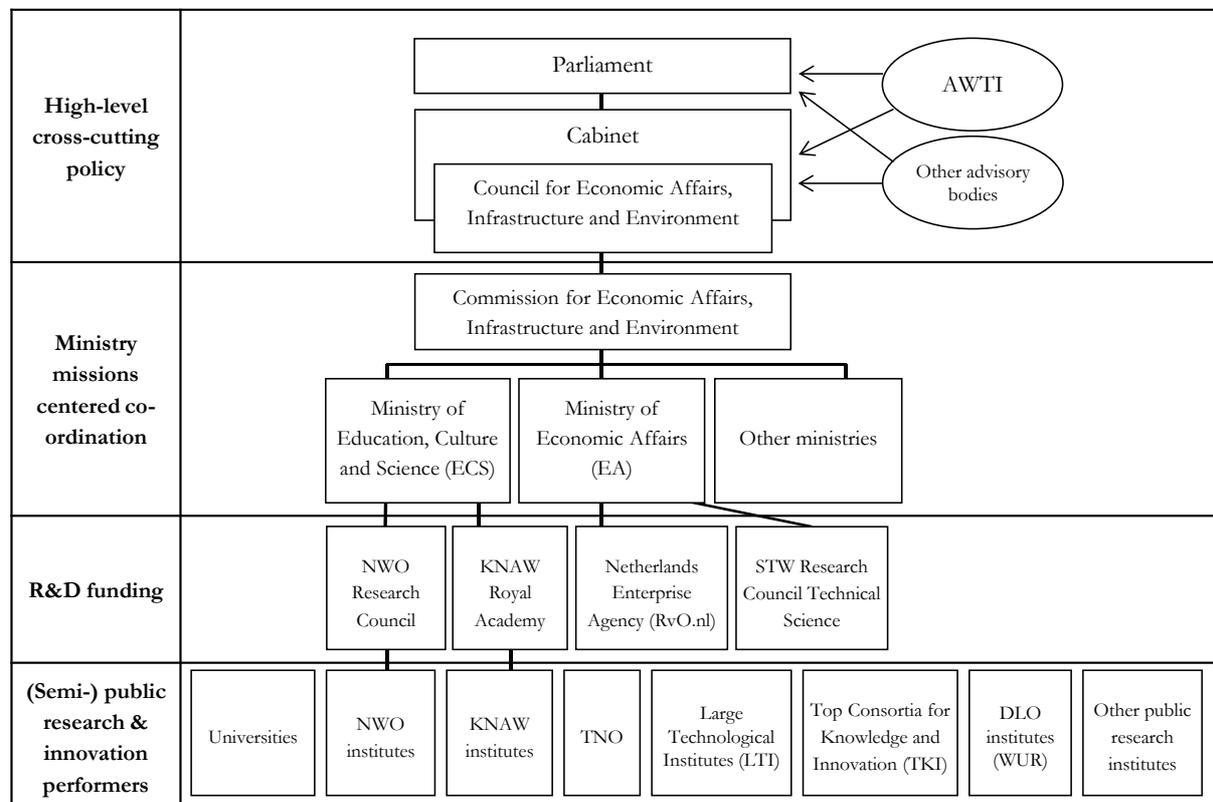
Figure 1: Business, higher education and government expenditure on R&D, USD millions, constant 2005 prices PPP (Source: OECD Reviews of Innovation Policy. Netherlands, 2014, p. 84)



1.3. Structure of the national research and innovation system and its governance

The structure of the national research and innovation system and its governance is presented in the figure below:

Figure 2: Structure of the national research and innovation system and its governance



The main actors and institutions in the Dutch science, research and innovation governance system are the Ministry of Education, Culture and Science (ECS) and the Ministry of Economic Affairs (EA). The main bodies responsible for managing and implementing policies are the Netherlands Organisation for Scientific Research (NWO), the Technology Foundation STW (an independent part of NWO), the Royal Netherlands Academy of Arts and Sciences (KNAW), and RVO.nl (an agency of EA). Additionally, the Advisory Council for Science, Technology and Innovation (AWTI, formerly AWT), an independent body, advises the government and parliament on policy relating to scientific research, technology development and innovation in both at national and an international context.

The Netherlands has a large number of organisations that conduct research. The variety of organisations includes 14 research universities (including the Open University Netherlands), 37 universities of applied sciences (specialized in technical and vocational training), a diverse set of research institutes (including PRO's, RTO's and medical hospitals) and companies. Some of the public research institutes are financed by the NWO and the KNAW: both organisations take on the role of an umbrella organisation for research institutes that carry out basic and strategic research in various disciplines. The Leading Technological Institutes (TTIs) will become part of or have already been brought into the Top Consortia for Knowledge and Innovation (TKIs). As for the private sector research community, two organizations worth mentioning are the Confederation of Dutch Industry and Employers (VNO-NCW) and MKB-Nederland. While VNO-NCW represents in particular the medium to large companies in the Netherlands, MKB-Netherlands mainly looks after the interests of SME's (just like the Chambers of Commerce). Both organisations exert influence on the policy agenda by participating in committees and discussion platforms and by publishing vision documents. VNO-NCW has been releasing strategic outlooks on topics like [entrepreneurship](#), [innovation](#) (e.g. patents), and [internationalization](#).³ It also runs a Technology Commission, in which the most R&D-intensive companies of the Netherlands discuss on innovation matters and prepare advice to the government. In total, VNO-NCW covers [160 branch organizations](#), which amounts to over 115.000 enterprises (80% of Dutch medium-sized companies).⁴

Main institutional developments in the national R&I system

The table below lists the main institutional developments in the Dutch R&I system. Most of them are discussed throughout this report. In summary, the installation of the Cabinet Rutte I (and later Rutte II) has led to a make-over of a part of the policy mix for research and innovation. Being introduced by both Ministries of Economic Affairs (EA) as well as Education, Culture and Science (ECS), the new 'Enterprise Policy'⁵ intensifies the connection between R&D, innovation and entrepreneurship on the one hand, and science and education on the other hand. Over the past five years, this resulted in the formation of Top Teams (corresponding with the Top Sectors⁶ selected by the government) and the Top consortia for Knowledge and Innovation. Since 2011, also more than 60 Centres of

³ VNO-NCW and MKB-Nederland (2014). [European Outlook – Europe: vital to Dutch companies](#).

⁴ Figures and information retrieved from VNO-NCW (February 2015). [Innovation](#) and [Industry policy](#) (both in Dutch)

⁵ The new Enterprise Policy was introduced in 2011 and the relevant document can be accessed through Ministries of Economic Affairs and Education Culture & Science (2011) [To the top: Towards a new enterprise policy](#) (in Dutch). The latest available monitor Enterprise policy published by the Ministry of Economic Affairs can be retrieved from Government of the Netherlands (2014) [Monitor Enterprise Policy 2014](#) (in Dutch)

⁶ For an overview see [Top Sectoren \(February 2015\) Enterprise policy and Dutch top sectors](#).

Expertise or Innovative Craftsmanship have been established.⁷ Recent years are marked by institutional developments in the form of mergers between agencies or other institutes, mostly for reasons of clarity and reduction of administrative costs. For instance, this includes the emergence of the Netherlands Enterprise Agency ('RvO')⁸ and the Enterprise Square ('Ondernemersplein').⁹

Apart from developments related to implementation of the new Enterprise Policy, both EA and ECS have been executing several changes by themselves as well. In the domain of economy, an ongoing development is the reorganization of the public research institutes united in the TO2-federation. For the Ministry of ECS, a trajectory of major importance is the creation of a new [National Science Agenda](#), scheduled for fall 2015.¹⁰

Main changes in 2014

- *Merger of Syntens and Chambers of Commerce into Enterprise Square ('Ondernemersplein')*
- *NL Agency merges with the agency for regulations ('Dienst regelingen') into Netherlands Enterprise Agency ('RvO')*
- *TNO and Large Technological Institutes (GTIs), together the TO2 federation, present joint strategic agenda*
- *AWT and General Energy Council fuse into AWTI (Advisory Council for Science, Technology and Innovation)*
- *Ministry of ESC presents Science Vision 2025*

Main Changes in 2013

- Top teams sign 'innovation contracts 2014-2015' with Ministry of Economic Affairs
- The MIT instrument became operational

Main changes in 2012

- Installation of Cabinet Rutte II
- Top teams established 19 Top consortia for Knowledge and Innovation (TKIs)
- Introduction of the fiscal scheme RDA

Main changes in 2011

- Introduction of the new Enterprise Policy: To the Top, including identification of 9 Top Sectors
- Formation of Top Teams, representing the Top Sectors
- Creation of first Centres of Expertise / Centres for Innovative Craftsmanship
- Ministry of ESC presents strategic agenda 'Quality in Diversity'
- Foundation of National Commission of Valorisation ('Landelijke Commissie Valorisatie', LCV)

Main Changes in 2010

- Installation of Cabinet Rutte I
- Innovation Platform presents proposal for National Valorisation Agenda
- Committee Veerman (commissioned by ESC) publishes vision on Future-proof Higher Education System
- Large technological institutes (GTIs) are transferred from Ministry of ESC to Ministry of EA

⁷ For the latest information see Top Sectoren (February 2015) [Human Capital](#) (in Dutch)

⁸ The main actor for implementing innovation schemes, see the extensive website <http://english.rvo.nl/> (last accessed February 2015)

⁹ For the central digital entry see <http://www.kvk.nl/english/> (last accessed February 2015)

¹⁰ [National Science Agenda](#) (February 2015).

2. Recent Developments in Research and Innovation Policy and systems

2.1 National economic and political context

After facing three recessions since 2008, the Dutch economy finally started to show signs of recovery in 2014.¹¹ This development, reported in the National Reform Programme (NRP, May 2014) is reflected in increases in industrial production, corporate investment, the number of temporary staffing hours, and consumer confidence. In 2013, the economy has still been contracting with 0.7%, but 2014 saw a growth of 0.8%. Current optimism stems from forecasts by the CPB Bureau for Economy Policy Analysis, which estimates a growth figure of 1.7% in 2015 and another 1.8% in 2016.¹² For 2015 and 2016, the CPB expects total export figures of +4.6% and 4.8% respectively. Also household consumption is finally starting to increase: the decline of 1.6% in 2013 was already back at an increase of 0.1% in 2014. It is expected that this will grow to +1.5% and +1.7% in 2015 and 2016. Unemployment rates lag a bit behind, as the 7.3% from 2013 went up to 7.4% in 2014. According to the CPB, unemployment will go down to 7.0% in 2016.

In September 2012, general elections were held and in November 2012 a new government coalition was established. A new government comes with a new Coalition Agreement (this time under the title 'Building bridges') in which new policies and policy directions are announced on a large variety of policy areas. In the financial and socio-economic policies of this Coalition Agreement, three pillars stand out: sustainable economic growth, healthy public finances and a balanced distribution of income. As for the innovation agenda, essential elements are the continuation of the Top Sector approach in (sector-specific) innovation policy, the continued involvement of NWO for distributing 275mln euro aimed at programmatic research in (and with) top sectors, an extra budget of 150mln euro for fundamental research (to an important degree to be used for tenders for Horizon 2020), 110mln euro for science-industry cooperation and (remarkably so, as the trend used to be in the opposite direction) the announcement that generic R&D subsidies are to be lowered in the future. Further, the National Technology Pact 2020 (signed in 2013) forms a broader agreement between industry and educational institutions (at various levels) to spur technology and technological education (see section 2.2 and 2.7 for more details).

In the area of education and sciences, a large variety of measures and initiatives has been announced or already implemented. Measures range from the professional skills of teachers, to reorganization of the student loan scheme, (limited possibility) for more strict selection of students when entering some university studies, and so on. Frequently used words are quality and excellence. The latter is in line with the 2011 *Strategic Agenda on Higher Education, Research and Science*, called 'Quality in Diversity'.¹³ In both the policy areas of education and science, there are changes as well as continuity. Stakeholders appreciate the intention to invest extra in fundamental research and the continuation of the top sector policies.¹⁴ At the same time, it is mentioned that no real (extra) investments in Higher Education are made and that all in all the available budget for innovation is

¹¹ Ministry of Economic Affairs (May 2014). [National Reform Programme 2014](#)

¹² CPB Netherlands Bureau for Economic Policy Analysis (2015). [CPBs short-term forecasts March 2015](#).

¹³ Government of the Netherlands (2012). [Strategic Agenda for Higher Education, Research and Science in the Netherlands: Quality in Diversity](#)

¹⁴ AWTI (October 2014): [Balance of Top Sectors 2014](#) (in Dutch, accessed February 2015).

decreasing.¹⁵ The publication of a new science strategy, developed by the ECS in collaboration with various stakeholders, was published in November 2014.¹⁶

Over the period 2012-2014, the government has been working on structural reforms in various domains such as the housing market, General Old-Age Pensions Act (AOW) and supplementary pensions, and various labor market reforms. The government has invested considerably in support from social partners, which resulted in the so-called Social Agreement of mid April 2013.¹⁷ This Social Agreement laid the basis for the €6 billion consolidation package that was eventually effectuated in the 2014 Budget. Part of this consolidation is a set of budget cuts with respect to research and innovation expenditures.

In the 2015 Budget, emphasis is placed on further reforms of the labor market, health care system and the energy sector. A couple of economy-related policy changes were already summarized in the NRP of April 2014 (p. 6): “The government is implementing a number of structural reforms, including the modernization of dismissal law, reducing the maximum duration of the publicly paid unemployment benefit, and raising the employee’s tax credit to increase the incentive to work. The pension system is also being reformed, and the focus on investments in innovation and research is to be continued”. The government also announced the start of a major revision of the tax system. For 2015, the ambition is to reduce taxation with (in total) €500mln. This intervention is expected to stimulate domestic consumption again, after it has been decreasing over the past years (not in the last place due to the government’s own consolidation measures). According to the NRP 2014, further reduction of administrative burdens for companies should save the public and private sector together another €2.5 billion in 2017 (compared to the annual administrative costs in 2012).

The 2015 Budget is in many respects similar to its predecessor. In the context of research and innovation, the most remarkable element is further consolidation of governmental R&I spending. The total budget available for the Enterprise Policy will decrease from €2619mln in 2014 to €2042mln in 2018.¹⁸ While the budget for TKI’s is going to increase from €25mln (2013) to €67mln (2014) to eventually €115mln (2018), and even a new measure (Future Funds) with a budget of €200mln is introduced from 2015 onwards, the financial contributions to applied research centers like TNO and the GTI’s are planned to decrease substantially. Budget cuts also affect several measures focused on (innovative) entrepreneurship, like the funding available for the SME Loan Guarantee scheme (Borgstelling MKB Kredieten; BMKB) as well as for the Chambers of Commerce. The fiscal schemes aimed at innovation (e.g. WBSO, RDA), which make up for by far the largest element in the Enterprise Policy, are planned to face a budget decrease from €1.066mln to €928mln in the period 2014-2019. New measures are discussed in more detail in the next section (2.2), while funding trends are elaborated on in section 2.5.

¹⁵ For a critical reflection on the Top Sector approach, see for instance: WRR (2013). [The Netherlands’ earning capacity: Towards a learning economy](#) (last accessed February 2015).

¹⁶ Ministry of Education, Culture and Science (2014): [Science vision 2025](#) (in Dutch).

¹⁷ Some also criticized the Social Agreement because none of the 63 smaller and bigger measures it includes cover secondary and tertiary education, R&D or innovation.

¹⁸ See the [Ministry of Economic Affairs Budget 2015](#), p. 22/23 (accessed February 2015).

2.2 National R&I strategies and policies

Both research and innovation feature prominently in the Ministry of EA's Enterprise Policy, which was introduced in the strategy documents "To the top: Towards a new enterprise policy' (February 2011)¹⁹ and "To the top: Enterprise policy in action(s)" (September 2011).²⁰ It includes both the plans regarding generic and more specific innovation policies, although the latter (most often referred to as the Top Sector approach or policy) received most attention in the public and policy debate in the last few years. In EA's view, entrepreneurship is considered as crucial for wealth creation in the Netherlands. It is argued that societal and economic challenges demand for a policy that gives 'room for entrepreneurs'. Indeed, entrepreneurs - rather than the government - seize economic opportunities and create economic growth, jobs and wealth. A key principle of the Enterprise Policy is that the government should not steer with rules and subsidies. Instead, it should ensure that companies have sufficient room to do business, to invest, to innovate and to export. As shown by the solid financial base underlying its policies, the government is heavily committed to supporting public-private collaboration between entrepreneurs, researchers and government in the top sectors.

Key elements in the current enterprise/innovation policy are:

- less subsidies in exchange for more R&D tax incentives;
- less and simpler rules;
- broader access to corporate finance (credit facilities);
- better utilisation of the public knowledge infrastructure by businesses - especially in the 'Top Sectors';
- better alignment of fiscal policy, education policy, foreign policy and diplomacy with the needs of businesses - especially in the 'top sectors'.

The formal longer-term policy ambition is:

- The Netherlands in the top 5 of knowledge economies in the world (in 2020);
- Increase of Dutch R&D-expenditures to 2.5% of GDP (in 2020);
- Creation of Top consortia for Knowledge and Innovation (TKIs) in which public and private parties participate for more than €500m, of which at least 40% is funded by the business sector (in 2015).

The basic rationale for the enterprise/innovation policy is that globalization and societal challenges (e.g. ageing, food security, scarcity of raw materials, reduction of biodiversity and climate change) not only create threats but also (economic) opportunities that can be seized by companies. This requires an excellent public knowledge infrastructure that is better aligned with the needs of the business sector. The business sector, in turn, should invest more in R&D and innovation. Furthermore, strong regional clusters are important because they contribute to the attractiveness of the Netherlands as a location for (foreign) knowledge-intensive companies. Therefore, the national and regional governments should collaborate more intensively. In the national R&I strategy, regional governments are invited

¹⁹ Ministries of Economic Affairs and Education Culture & Science (2011) [To the top: Towards a new enterprise policy](#)

²⁰ Ministry of Economic Affairs (February 2015) [To the top: Enterprise policy in action\(s\)](#)

to align their policy agenda (and budgets) with the priorities in national policy. Also the European level is considered as important, not only in terms of the internal market and a level playing field, but also in terms of aligning 'top sectors' in the Dutch economy with EU programmes for R&I (Horizon 2020).

Top teams and top sectors

At the request of the Cabinet, several top teams were established over the course of 2011. These *top teams*, contributing actively to the strengthening of the new enterprise policy, are constituted by representatives from industry, research institutes and government. The government has implemented various actions based on the advice of the top teams. In total nine top sectors were identified, i.e. Agro-food; Horticulture and propagating stock; High-tech materials and systems; Energy; Logistics; Creative industry; Life sciences; Chemicals; and Water. The top sectors build on the unique strengths of the Dutch economy. They are characterized by strong market and export positions, a good knowledge base, public-private collaborations and a potential to contribute to innovative solutions for societal challenges. According to CPB figures published in the Top Sector Monitor (October 2014), the top sectors accounted for 36% of the production and 25% of added value in the Dutch Economy in 2012. Also, 40% of the exports of goods stems from top sector firms, and no less than 87% of R&D expenditure.

In March 2012, the then minister of Economic Affairs (Verhagen) informed parliament on how the top sector policies are progressing and especially the contribution from industry (or private parties) and government.²¹ In this letter the minister indicated that he needed to be able to sign the (non-binding) *Innovation Contracts* with the representatives of the top sectors in order to secure their commitment. The budgets for the Top Sector Policy, stemming from public funds as well as from private contributions, are used for refocusing existing measures and for introducing new instruments. With respect to the latter, the government has asked top teams to make proposals on how the top sectors could benefit best from the available budgets. In October 2013, the top sectors, research institutes and the government signed the new Knowledge and Innovation contract for the next two years. The *Innovation Contract 2014-2015* specifies for each top sector which ambitions are set, and which action will be taken to meet the desired goals. The total budget amounts to €4bln (including €210mln and €275mln by NWO in 2014 and 2015, respectively). Each year, at least €100mln is made available for public-private collaborations.

Compared to its predecessors (notably the innovation programmes geared to specific strongholds in the Dutch economy), the Top Sector Policy is more formalized and especially more integrated. The broad scope of the strategy is reflected in the following description of the Top Sector Policy (retrieved from the NRP, 2013, p. 16): "The principal aim of the top sectors approach – in terms of innovation and research – is to promote closer cooperation between knowledge institutes, businesses and public authorities in the programming of fundamental and applied research, with special attention to the challenges facing society in the near future, including issues relating to sustainability. This will increase the applicability of scientific research for both commercial and social purposes and thus increase the return on the public funds devoted to research. That effect will be enhanced by the fact that the top sector approach incorporates elements of foreign policy, education

²¹ Ministry of Economic Affairs (February 2015) – [Reaction on requests for permanent commission regarding innovation contracts and human capital agenda's](#) (in Dutch).

policy and policies to reduce the administrative burden”. Importantly, rather than focusing on collaborative R&D programmes, the new strategy consists of customized policy packages for each of the nine top sectors. The customization also entails that barriers in terms of research, financing, regulation, trade promotion etc. are taken into account. Another feature is that the top sectors themselves are heavily involved in shaping the policies (i.e. they are to a large degree demand-steered by industry) and have to contribute considerably to the specific plans. A third feature, again showing the broadening of innovation policy, is that a clear link is made to human capital formation. For example, all top sectors were asked to develop a human capital agenda. Finally, there is a clear link with the regional dimension. Since regional-economic policy is no longer a priority at the central government level, many regional development policies are developed at the regional and local levels themselves. Increasingly, these are aligned with the Top Sector Policy. In this context the EA asked Netherlands Environmental Assessment Agency (PBL) and Statistics Netherlands (CBS) to literally map the top sectors.²² The resulting maps link top sectors to typical regional notions such as Mainports (Logistics), Greenports (Horticulture and propagating stock), Brainport (High-tech materials and systems) and various other regional ‘valleys’.

The current government, elected in September 2012, chose to continue the Enterprise Policy and its Top Sector approach. In December 2012 the minister of Economic Affairs informed parliament about the agreements made with the 19 *Top consortia for Knowledge and Innovation (TKIs)*, the coordinating and programming vehicles for carrying out basic and applied research in the nine top sectors, following a bottom-up process with parties from the government, science and business communities to draw up thematic research and innovation roadmaps. From this it was visible that industry is willing to invest €319m (in cash) in these TKIs on the basis of which the government will provide a top-up (through a so-named TKI-allowance), which amounted to a total budget of €82m in 2013.²³ The most recent state of affairs is described in the Monitor Enterprise Policy which was published in October 2014 (see section 2.7). How exactly TKIs contribute to knowledge transfer is the topic of section 4.4.

Overall the top sector policies are broadly supported, although not entirely undisputed. There are for example various economists who dispute the idea of sectors as unit of analysis (which is not exactly correct as most top sectors are in fact clusters), the government’s lacking ability to really choose a stronghold (a quarter of Dutch firms belongs to at least one of the top sectors), or the idea that government can pick winners in the first place. The policies were also criticized in the major business newspaper for its high transaction costs. Furthermore, various institutes and councils have called for societal challenges to be taken onboard. Such critiques have recently been expressed by notably the Scientific Council for Government Policy (WRR), PBL, AWTI, and The Confederation of Netherlands Industry and Employers (VNO-NCW). Partially in reaction to these comments, the ministries of Economic Affairs and Education, Culture and Science released a brochure, named ‘Global Challenges, Dutch Solutions’, in which they clarify the link between societal

²² PBL Netherlands Environmental Assessment Agency & CBS (February 2015) – [Ratio of special-economic Top Sector policy](#).

²³ Ministry of Economic Affairs (February 2015) [Information about agreements in Topconsortia for Knowledge and Innovation](#) (in Dutch)..

problems and the Top Sector Policy.²⁴ This link is twofold: EA states that the R&D&I it is supporting will generate innovations with relevance for societal problems, and secondly, it stresses that by making participation in the Horizon2020 program part of the Top Sector policy, also the grand challenges have become part of Dutch R&D&I dynamics.

Although Top Sectors feature prominently in the Enterprise Policy, it should be noted that their financial basis is actually relatively modest. In 2015, almost 90% of the Ministries of EA's total budget for innovation is allocated via generic policy (notably: WBSO, RDA, Innovation Funds SME+).²⁵ The Top Sectors do in fact not have a budget of their own: apart from the fact that some research funding is reoriented, the Top Sectors are only supported through the TKI-allowance and the MIT instrument. Moreover, these measures are just one part of the 10% of budget available for thematic policies. Other measures in this category include funding for Eurostars, JTI's and EUREKA-clusters. According to recent EUROSTAT figures, total R&D appropriations for specific socio-economic objectives amounted to 0.73% of Dutch GDP in 2014.

In addition to the 9 top sectors with their respective top teams, 3 *cross-over domains* have been formulated. The following domains are recognized as promising areas for research and innovation:

- *ICT*. Public-private partnerships form the basis for removing barriers related to use of ICT by particularly SMEs. Existing efforts focus on topics like precision-agriculture, education (open courses), e-health (telemedicine) and smart mobility. In line with the approach followed by the top sectors, a roadmap was formulated in 2012 (following up on the Digital Implementation Agenda from 2011). A central role is assigned to ten 'breakthrough projects' that go beyond the individual top sectors. The developments for this cross-over domain are reported in the policy letter 'Benefitting from the economic opportunities of ICT' (July 2013);
- *Nanotechnology*. Like the roadmap for ICT, the roadmap for nanotechnology was developed by the top sector HTSM but affects many more sectors. The main focus here lies on multi-purpose technologies such as sensors;
- *BioBased Economy*. The topic of bio-based economy was initially embraced by the top sector Chemicals, but the corresponding Innovation Contract 'Green Growth, from biomass to business' is presented by five other top sectors as well. Projects to reap the benefits of transforming biomass into valuable resources and materials are coordinated by a TKI devoted to Bio-Based Economy. Parallel to this development, the Dutch cabinet explained its ambitions regarding green growth in March 2013.

²⁴ Ministries of Economic Affairs and Education Culture & Science (February 2014) [Global Challenges Dutch Solutions](#).

²⁵ Ministry of Economic Affairs (2014) [Monitor Enterprise Policy 2014](#)

Recent developments

Detailed descriptions of individual policy measures aimed at supporting innovation are provided in section 4 of this report. Here, we mention which developments have recently taken place.

- Although there are relatively many entrepreneurs in the Dutch economy, growth figures in these firms are lagging behind the European averages. In response to this observation, the government (mainly Ministry of EA) presented a programme called '*Ambitious entrepreneurship: an agenda for start-ups and growth*' in March 2014.²⁶ This agenda describes how the ecosystem for entrepreneurship is improved by providing firms access to each other, to finance, to innovation and knowledge, and to actors in other countries. Also growth-conducive fiscal conditions and legislation are taken into account. Many of the described interventions are existing measures, but there are also novel initiatives like the *Lead Partnership* (connecting start-ups, government and large firms) and *NLevator* (a platform aimed at creating a network of growth firms).
- As a part of the growth agenda, and motivated by studies concerning the (insufficient) capital availability for Dutch SMEs, the EA developed an *Additional Action plan SME funding*.²⁷ The plan includes various actions aimed at extending existing measures like the recently established *Netherlands Investment Institute (NLI)*; the ceiling for project funding has been raised) and the Dutch Microfinance Institution *Qredits*. The total package of interventions has the potential of creating €2.5 billion of extra funding.
- One major element of the action plan is the transformed continuation of the *SME Innovation Funds* (Innovatiefonds MKB+). In September 2014, the EA provided details of the *Future Fund (Toekomstfonds)* it is establishing.²⁸ The fund contains €200mln of starting capital for innovative start-ups, part of which is taken from gas revenue windfalls. This capital will partially be invested in fundamental and applied research, for instance in the form of research facilities and high-risk public-private consortia.
- Half of the budget allocated to the Future Fund was made available still in 2014. Within the structure of the original programme SME Innovation Funds, the national government as well as regional development funds created the *Dutch Venture Initiative (DVI)* already in summer 2013. Together with capital of the European Investment Funds (EIF), the DVI initiative helped the government to set up innovation funds jointly possessing over €400mln of venture capital. The venture capital is being invested according to a revolving structure, implying that successful start-ups will have to return all the credit they initially borrowed. Because of the

²⁶ Government of the Netherlands (2014) [Letter on policy for ambitious entrepreneurs](#) (in Dutch).

²⁷ Government of the Netherlands (February 2015) [Substantially more support for entrepreneurs looking for financial aid](#) (in Dutch)

²⁸ Government of the Netherlands (2014) [Future fund](#) (in Dutch)

success so far, the government is now willing to continue by introducing DVI II and providing it with €100mln worth of venture capital.

- Yet another new support measure for SMEs is the *Early-stage-funds* (Regeling Vroegefasefinanciering, VFF), which was piloted in the northern Dutch provinces during the second half of 2014. The VFF is aimed to help SMEs, innovative start-ups (< 6 year old) or academic spin-offs. In July 2014, the EA announced to make another €50mln available for the national implementation of this measure in the period till 2018 (amounting to €10mln per year on average).²⁹ Originally launched as a temporal intervention, the VFF will also be made permanent from 2018 onwards. The annual budget is planned to increase to €12,5mln.
- Apart from directly providing capital, the government is also enabling alternative forms of funding through credit guarantee schemes like *Qredits*. The newly established *Subordinated Debt Funds* (Achtergestelde Leningenfondsen, AGL) is supporting private investors to strengthen the equity position of particularly SMEs. The EZ guarantees €500mln of subordinated debt. Furthermore, through the measure for 'Chain funding' (Ketenfinanciering), the EA contributes €5mln to guarantee SME suppliers they will receive payments in time.
- In December 2014, an initiative has been set up to make loans available for SMEs. The 'SME Impulse Fund' is meant to help SMEs grow and provides loans of up to €1mln. At this point, one pension fund has invested in the project.³⁰ The Ministry of EA, nor any other part of the Dutch government, is not actively involved, but does embrace the initiative.
- Finally, another part of the Additional Action plan SME funding consists of €5mln for improving entrepreneurship and innovation capabilities of SMEs by providing them coaching.
- In March 2014, the government opened the renewed *SME Innovation support for Top Sectors (MIT)*. The measure supports participation of SMEs in all nine top sectors. While the budget in 2013 was only €15mln, this has been doubled in 2014 and topped up with another €1mln by the provinces of Northern-Brabant and Limburg (total: €32mln).³¹ The finance for doubling the original budget stems from funding originally available for the TKI-surcharge, which is sometimes criticized for being attractive mainly for large incumbents.
- From 2015 onwards, entrepreneurship is going to be supported by a 'Special Envoy'.³² This ambassador for SMEs and start-ups will, amongst others, try to strengthen the international position of Dutch SMEs. By pointing at the excellent ecosystem for entrepreneurs, the envoy also has the task of attracting (innovative) firms to The Netherlands.

²⁹ Government of the Netherlands (February 2015) [Better chances of growth for enterprises of the future](#) (in Dutch).

³⁰ MKB Impuls Fonds (February 2015) [MKB Impulse Fund fills a gap](#) (in Dutch).

³¹ RVO (February 2015) [MKB Innovation Stimulus Top Sectors \(MIT\)](#) (in Dutch)

³² Government of the Netherlands (February 2015) [Prinsjesdag 2014: fortify economic growth](#) (in Dutch)

- In order to attract *innovative starters from outside of the European Union*, regulations for establishing a business have been relaxed.³³ This start-up measure allows immigrants to develop a business plan and attract starting capital if they have the potential of contributing to the Dutch economy. After actually establishing a company, entrepreneurs can request a residence permit for two years.
- Since January 2014, business can go to one place for all government matters related to doing business: '*Enterprise Square*' (in Dutch 'het Ondernemersplein').³⁴ In this one-stop-shop for businesses, services of the Chamber of Commerce, Syntens and parts of the former NL Agency have been combined. In time, services of new parties, such as the taxation authority or municipalities will be included as well. For financial issues, firms can now go to the Chamber of Commerce's central *Finance Desk* ('financieringsdesk').
- One of the government's advisory bodies, The Advisory Council for Science and Technology Policy (AWT), was transformed to *The Advisory Council for Science, Technology and Innovation* (AWTI) in September 2014. Besides now including innovation explicitly in its name, the subject of energy-innovation was added to the responsibility of AWTI while the General Energy Council is stopped. The subject of energy infrastructure went to the Council for the Environment and Infrastructure (RLI).
- A little change in the tax reduction schemes for innovation, as announced in the EA's Budget 2015, is that the public institutions will no longer be able to make use of the *tax credit for R&D (WBSO)* when performing contract research. The scheme is particularly aimed at supporting private R&D, which is why the government will no longer provide tax exemptions to public institutes who participate in research projects (of course, various knowledge transfer measures remain available).³⁵
- For 2015, the Ministry of EA also planned to start investigating whether the innovation-specific tax schemes *WBSO* (covering salary costs) can be merged with the *RDA* (covering other costs, like prototypes or research equipment).

Besides the Ministry of EA, also other ministries are relevant for spurring innovation in enterprises. In November 2019, the Ministry of Infrastructure and Environment announced the launch of a Dutch 'Climate Coalition'. A large number of Dutch firms, governments and organizations have the joint aim to support innovations that lead to climate neutrality. Among the participants are Philips and DSM and many of the larger municipalities in the Netherlands.³⁶

Higher education, (fundamental) research and science policy

³³ Government of the Netherlands (February 2015) [Regulations for innovative starters from outside EU](#) (in Dutch)

³⁴ [Ondernemersplein](#) (February 2015) (in Dutch)

³⁵ <http://www.rvo.nl/actueel/nieuws/wijzigingen-de-wbso-en-rda-voor-2015>

³⁶ Ministry of Infrastructure and Environment (Nov. 2014) – [Launch of Dutch Coalition against Climate Change](#) (in Dutch)

In the policy domain of education, research and science, continuation and stability more than large scale changes is the adagio. At least in budgetary terms, changes have remained limited over the past years. The government has decided to proceed with the *Strategic Agenda on Higher Education, Research and Science 2011: Quality in Diversity*, with its long-term perspective on higher education, research and science.³⁷ The main elements of this strategy are (see pages 66-68):

- Need for an overall quality improvement of the system as a whole. Most notably a reduction in the number of studies and tracks. Higher education institutes will be asked to specialize more, focus on their strengths and reduce the studies in which they perform poor.
- Need to challenge excellent students more on the one hand and prevent students leaving without completing their studies on the other hand.
- A better mix of education and research and the attention needed for teaching (the level of which in Professional Higher Education is too low and in academia research is seen as the priority activity over teaching).
- Introduction of performance based funding of higher education institutes.

Probably one of the landmark changes is the last mentioned gradual shift from lump sum institutional funding in higher education towards performance based or competitive funding. This was well summarized in the National Reform Programme 2013 report.³⁸ Herein it is stated that “In response to the recommendations of the Veerman Committee for Future-Proof Higher Education in 2010³⁹ and the ensuing strategic agenda in 2011⁴⁰ and framework agreements, by the end of 2012 performance agreements had been concluded with practically every university and institution of professional education to improve the quality of education, to increase the completion rate among students, to promote institutional profiling and greater differentiation of teaching programmes and to strengthen valorisation. Financial consequences are attached to the performance agreements and actually meeting the performance targets. The funding model has been adjusted accordingly, with more than 7% of the funding of education based on the criterion ‘quality and profile’. The system of performance-related agreements will be evaluated in four years’ time.” (National Reform Programma 2013 Report, p. 26).⁴¹ According to the NRP it is foreseen that if this new way of financing works well for the period 2013-2016, the share of funding higher education institutions receive through competitive mechanisms will increase to 20% in the next planning period 2017-2020.

The 2013 and 2014 National Reform Programmes also sketch how the higher education, research and science policy has developed since the new government took office in September 2012, including how it contributes to the European Research Area. The Coalition Agreement provides that €275mln will remain available via the Netherlands Organisation

³⁷ See Ministry of Education, Culture and Science (2011): Strategic Agenda for Higher Education, Research and Science in the Netherlands: [Quality in Diversity](#).

³⁸ See footnote 11.

³⁹ Commissie Veerman (2010), [Differentiëren in drievoud, omwille van kwaliteit en verscheidenheid in het hoger onderwijs. Advies van de commissie Toekomstbestendig Hoger Onderwijs Stelsel, Den Haag](#).

⁴⁰ See footnote 37

⁴¹ For the original text see Ministry of Education, Culture and Science (2011): Strategic Agenda for Higher Education, Research and Science in the Netherlands: [Quality in Diversity](#), pp. 68-70.

for Scientific Research (NWO) for programme-related research for the top sectors. A further €150mln will be provided to strengthen fundamental research (€50mln of which will come from a realignment of priorities). A substantial portion of this sum will be used to facilitate participation in the European research programme, 'Horizon 2020'. Of the increased amount announced in the coalition agreement, the government will invest €100mln a year in research via the NWO. This increased spending will start at €25mln in 2014, rising to €75mln in 2015, 2016 and 2017 and reaching €100mln from 2018. In addition, the government will devote a lump sum of €50mln from the additional annual funds for the Top Consortia for Knowledge and Innovation to further stimulate public-private partnerships in the area of fundamental research via the NWO. The sum will be spent in installments of €25mln in 2014, €15mln in 2015 and €10mln in 2016. In this way, the government will provide a firm boost for fundamental research, both independent research and the research carried out in the joint programmes with the top sectors.

Dutch research policy will also contribute to the development of the European Research Area (ERA), the planned open European area where researchers, knowledge and technology can circulate freely. In its Communication on the ERA, the European Commission requested member states to undertake a number of actions, many of which are already addressed by Dutch policy. For example, the Netherlands already has competitive research financing, as requested by the Commission, through the funding provided through the NWO (which, as previously mentioned, will be increased further), and has had a system of international visitations for years. Other examples are the fact that all vacancies in the Dutch academic world are published on the international website Academic Transfer and a large number of Dutch universities have requested the "HR Excellence in Research" logo from the European Commission, to identify them as institutions that provide a good and stimulating working environment. With respect to the ERA-priority of 'Gender equality', the ministries of ECS and EA promote gender diversity in the senior ranks of companies, organisations and institutions through the Talent to the Top Foundation. As for the priority of 'Joint programming' a substantial share of the funding available for fundamental scientific research will be used for participation in European collaborative projects (according to the Budget 2015, the annual budget for 'Innovating Internationally' will increase from €4mln in 2014, to €40mln in 2018 and 2019).⁴² Given the autonomy of the research institutions in the Netherlands, the government will take further steps to develop the ERA in consultation and collaboration with the institutions (and, where relevant, the private sector)."⁴³

Recent developments

As the Dutch R&D&I policy aims to have an integrated scope, some of the relevant development in the domain of science and education have already been discussed in the section on enterprise policy (e.g. those related to international research activities). Other development lay closer to the topic of this section.

- Before the establishment of the triple helix *Top consortia for Knowledge and Innovation (TKIs)*, a large share of public research was performed in Technological Top Institutes (TTIs; see also figure in section 1.3. Details on funding are not public). Despite being successful in bringing about strong research results, the TTIs were found to be insufficiently embedded in the general knowledge infrastructure in the

⁴² Ministry of Economic Affairs (2014). Budget 2015, p. 53

⁴³ More details are included in the ERA Communication Fiche of July 23rd 2013.

Dutch innovation system. Over the past years, support for TTIs has made place for support for TKIs. In order to perform this transition, and to build on the strengths of the TTIs, four ministries decided to provide a one-time financial injection of €64mln in April 2014.⁴⁴ By the end of 2015, the EA also indicated it will be simplifying the measure in order to increase participation.

- In the first half of 2014, 15 out of 19 the TKIs received in total €72.8mln worth of surcharge, while the other 4 TKIs did not submit any eligible projects or programmes. A new call was opened until 15th of September 2014.⁴⁵ By merging three TKIs into one consortium for Chemistry, the number of TKIs will lie at 17 from 2015 onwards. The TKI-allowance policy will be simplified by, for instance, ensuring that no other regulation for public-private partnerships (PPP) is required than imposed by the EC's state aid framework for innovation, by providing a subsidy for TKIs to organize themselves better, and by attempting to reduce administrative burdens when multiple sources of public funding are used for the same PPP research project.
- By the end of 2014, the Dutch government was still making plans on how to reshape its (substantial) infrastructure for applied research. The current system includes TNO and the large technological institutes MARIN, NLR, ECN and Deltares. In 2012, these institutes (together with DLO) had 8500 employees and a total turnover amounting to 1157mln euro.⁴⁶ Out of this budget, 414mln was a subsidy from the state for knowledge development. Typical for the setup of the Dutch innovation system, the largest institute (TNO) was at first under the responsibility of the Minister of ECS, but at the beginning of Rutte I government (2010), transferred to the Ministry of Economic Affairs. Whereas the first steered at a distance, the latter steers more directly and for example has demanded the institutes be involved in the whole top sector approach. A key aspect of the *Innovation Contract '14-'15* is that the research agendas of applied research centers will be aligned with the TKI's as well as with EU-programmes like Horizon2020.
- A document that gives an insight in the way the Ministry of Economic Affairs deals with the applied science institutes is the so-called 'Vision on applied research' of July 2013⁴⁷. In this document it is explained that the government wants to increase efficacy and efficiency in how the institutes operate and how they are governed.
- The Ministry of ECS announced in its Budget 2015 that it will increase the capital available for *matching research funds* from the European Commission's research framework Horizon2020. Several of these funds require the Dutch government to contribute a part as well. Given the success of Dutch researchers in attracting

⁴⁴ Government of the Netherlands (2014) [Next step public-private collaboration including transition](#). (in Dutch)

⁴⁵ RVO (February 2015) [70 million for knowledge and innovation](#) (in Dutch).

⁴⁶ Government of the Netherlands (2013) [Vision on applied research](#) (in Dutch).

⁴⁷ See footnote 46.

European research funds from F7 (€3,4bln), the available matching budget is going to be raised with €50mln.⁴⁸

- In November 2014, the Ministry of ECS presented its Science Vision 2025.⁴⁹ The three main ambitions of the vision are: Dutch science of worldwide significance, science with maximum impact, and Dutch science as a breeding ground for talent. As for the first ambition, the ministry of ECS announced a National Science Agenda that will be developed together with a large variety of stakeholders.. The main purpose of the National Science Agenda is to achieve closer cooperation between various relevant parties. Its development is being coordinated by the NWO, which will have a prominent role in its execution. Since NWO will become responsible for a larger set of tasks, its organizational structure will change (although exactly how is still intensely debated). In addition, the Vision document announces a national strategy for investments in large research infrastructures and the creation of a permanent committee for large scale research infrastructure (as opposed to the tradition of ad hoc committees). This committee will take on a broad view and coordinate the investments made in research infrastructure of universities, applied research organization and also governmental agencies such as the Royal Netherlands Meteorological Institute. Furthermore, the Vision document repeats the earlier expressed intention (2013) to make 60% of all research publications open access in 2018 and 100% of all research publications in 2024. While a large share of the document's content has been received positively, critics note the lack of extra investments in fundamental research, which is deemed essential by some stakeholders. Concerns have also been raised with regard to the new, possibly cumbersome organizational structure of the NWO, and the lack of scientists in its management. A reduced influence of actual scientists is foreseen, yet shunned by parties within the scientific community. The vision has also led to positive response: the VSNU (Association of universities in the Netherlands) and KNAW fully agree with the ambitions of the vision, although they are critical of the available means to reach them, especially the available funding. Frontier science is not addressed directly in the strategy itself (but will most likely be part of the national strategy to be formulated), although one of the three chapters in the strategy document is devoted to breeding talent (rather than indicating the fields of frontier science where the Netherlands can contribute). In this chapter central themes are challenging and rewarding talent in education and valorization (next to excellence in research), attracting and keeping scientific talent, more differentiated PhD trajectories, benefitting more from female scientific talent, and reducing publication pressure and pressure from writing research proposals.
- One notable (financial) reform in the context of education concerns a considerable revision of the Dutch study grant system by the Ministry of Education, Culture and

⁴⁸ Government of the Netherlands (February 2015). [€50 million for Dutch knowledge institutes when retrieving European research fund](#) (in Dutch)

⁴⁹ Ministry of Education, Culture and Science (November 2014): [Science vision 2025](#) (in Dutch).

Science. Students in the near future will no longer have a basic study grant anymore. Instead, the decision was taken and finally agreed upon by both chambers of parliament in January 2015 to switch as of September 2015 to an (extended) loan system. By offering study loans under favourable conditions, the government will be able to reduce its spending substantially. These contested plans have been under discussion for several years, but were finally accepted by parliament in January 2015. The budget that is freed up through this considerable change will amount up to a maximum of €1 billion and will (according to the ministry) be invested in raising quality of higher education, e.g. by more intense training of students, more contact hours, extra budget for excellent scientist providing education.⁵⁰ It is announced that universities, universities of applied sciences and students will be involved in how the freed up money is spend.

- Building upon the action plan ‘Make it in the Netherlands!’ of November 2013 (see section 2.7), the ministry of ECS also announced more attention for international talent. In its Budget 2015, it is stated that inward and outward flow of talented students will be supported through exploration of new collaborations, the ‘international classroom’, and scholarship-programmes.
- Another attempt to focus more on talent and excellence is captured by revisions in the new Standard Evaluation Protocol (also described in section 2.7). Also, contribution to societal challenges has become a key criterion for achieving research funding.

To conclude: traditionally research and innovation policies in the Netherlands are developed in a two-track mode as described above, that is, through Enterprise policy as formulated by the Ministry of EA and through science policy as formulated by the Ministry of ECS. In both domains public action is designed strategically and coherently, but in their own idiosyncratic ways. Typically, the Ministry of ECS has a more long-term hands-off approach, whereas the ministry of EA has a more hands-on approach and tends to steer more directly and interact and cooperate intensively with the relevant actors. Policy turbulence is typically higher in the domain of economy. The two tracks are defined and managed separately, although there are many examples where the two meet and policy action is coordinated between the two. Typical examples include the Top sector approach that is initiated from the Innovation-side but where for example NWO is intensively involved. Similarly, a large initiative such as the national Technology Pact (to be discussed in subsection 2.7 and 3.3.2) including the establishment of Centres for Innovative Craftsmanship and Centres for Expertise in an initiative where the two ministries collaborate and coordinate activities. Finally, many of the innovation schemes as initiated and managed by the Ministry of EA involve the participation of Higher Education Institutions. Higher education policies are typically integrated in science policy, but the remainder of the education pillar is mostly seen as a separate policy field (although there are again places where policy actions meet). The European dimension and link to H2020 challenges is present, but more on a case by case basis than in a systematic way.

⁵⁰ Government of the Netherlands (February 2015) [Changes student financial aid](#) (in Dutch)

2.3 National Reform Programmes 2013 and 2014

At the end of April 2013, the Dutch government submitted its National Reform Programme (NRP) 2013 to Parliament and the European Commission. It explains how The Netherlands are planning to address the five priorities stated in the EU-wide priorities for growth, as proposed by the European Semester and adopted by the European Council early 2013 (see also section 2.4). Based on the European Council's Country Specific Recommendations, as well as on the developments taking place over 2013, the Dutch NRP of April 2014 contains several updates. Below we briefly indicate along what lines the Dutch government works, starting from the ES's five priorities, and what R&I component are to be found in the respective NRPs.

Pursuing differentiated, growth friendly fiscal consolidation. With respect to this priority, NRP 2013 (p.4) states that: "The Netherlands attaches great importance to sound public finances. The government has opted to restore government finances by making savings of 16 billion euro, on top of the measures already agreed by the previous government. The government is designing the spending cuts in a manner that is conducive to growth and friendly to the environment. The austerity measures will not affect investments in education, research and innovation. A number of tax exemptions will also be phased out". In 2014, the last austerity measures (including the €6 billion consolidation package) have been implemented. Although no extra consolidation is planned, the actual effects of the effectuated measures still remain to be seen.

Restoring normal lending to the economy. To promote a healthy financial sector and restore normal lending to the economy a number of changes to mostly existing financing schemes are made. In NRP 2013 it is stated that "The Government supports lending to business with guarantees, such as the Business Loan Guarantee scheme (Garantie Ondernemingsfinanciering) and the SME Loan Guarantee scheme (Borgstelling MKB Kredieten). The Business Loan Guarantee scheme will become permanent, with an annual ceiling of 400mln euro, which will help companies to meet their funding requirements (p.4)". As discussed in section 2.2, a wide range of extra funding measures was introduced in the Additional Action plan SME Funding of July 2014. The most recent initiatives include, amongst others, the Future Funds (Toekomstfonds) and the upgrade of existing funding and credit guarantee schemes like the Dutch Venture Initiative. The NRP 2014 (p.6) also mentions the following actions: "The government has particular attention for the sectors hit hardest by the crisis and is taking targeted measures, for example by expanding options for arbitrary depreciation, maintaining the lower VAT rate for construction and expanding opportunities for start-ups and innovative enterprises to take advantage of supporting financing instruments".

Promoting growth and competitiveness. The Dutch government works on this priority along various routes, including measures in the area of research and innovation (see below) and structural reforms in areas such as the labor market and the housing market. In fact, apart from describing how policies address the goals of the EU Horizon2020 Strategy, the NRP 2014 is entirely structured around the four clear lines of reforms suggested by the European Council's Country Specific Recommendations (see section 2.4).

Tackling unemployment and the social consequences of the crisis. Relevant for addressing this priority is the Social Agreement the government signed with the social partners in April 2013. This agreement "provides the basis for fighting unemployment. The government is working to improve the position of flexible staff, and has set up dedicated programmes to

do so, including the Youth Unemployment Action Plan and the sector plans” (NRP 2014, p. 6).

Modernising public administration. This priority is reflected in policies aimed at decentralizing a large number of the government’s tasks and a structural reduction of the administrative burden for companies, professionals and citizens by 2.5 billion euro in 2017. Also the creation of the Enterprise Square (Ondernemersplein) is mentioned as a step forward.

The NRPs also summarizes the actions Dutch government is taking to spur research and innovation. It is stated that “government will promote private spending on R&D and fundamental research and annual public funding for research and innovation will increase by more than 0.7 billion euro to around 6.5 billion euro in the period 2008-2016. However, up to 2016, spending will be 0.7 billion euro lower than in the peak years of 2010-2012 as a result of the expiry of temporary crisis measures.” (NRP 2013, p. 16). In the NRP of 2014, the R&I relevant instruments and achievements are discussed by referring to the governments Enterprise Policy (including the top sectors) and the Strategic Agenda for Higher Education, Research and Science, both of which are described in section 2.2.

2.4 Policy developments related to Council Country Specific Recommendations

The five priorities proposed by the European Semester in March 2013 formed the basis for the European Council’s Country Specific Recommendations from July 2013 (see figure below). For the Netherlands, the Council reacted on both the NRP 2013 and 2013 Stability Programme Report of the Netherlands and recommended the following: to intensify efforts on structural reforms such as stepping up efforts to gradually reform the housing market, to adjust the second pension pillar, to implement the planned reform of the long-term care system and take further actions to enhance participation in the labour market. The number one recommendation, though, was to “reinforce and implement the budgetary strategy, supported by sufficiently specified measures, for the year 2014 and beyond to ensure a timely correction of the excessive deficit by 2014 in a sustainable manner and achieve the structural adjustment effort specified in the Council recommendations under the EDP” (CSR 2013, p. 4). It was also recommended to “protect expenditure in areas directly relevant for growth such as education, innovation and research”.

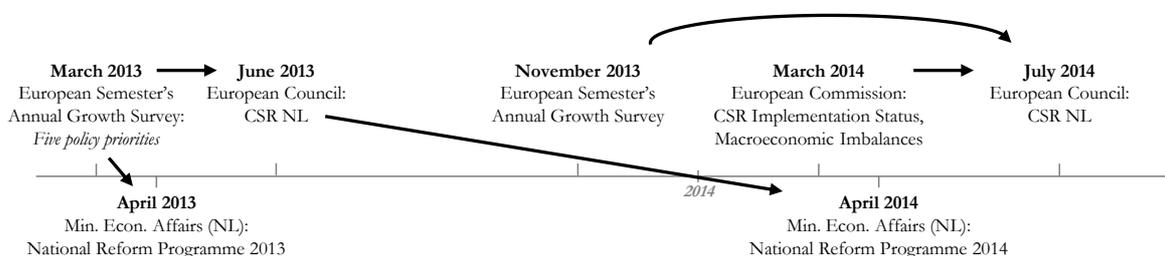


Figure 3: The European Semester’s annual cycle of economic and budgetary policy coordination

The NRP of April 2014 describes in detail what actions have been taken to address the country specific recommendations. Only few of them are of relevance for the Dutch R&I system. Responding to the Council’s recommendations, the NRP of 2014 considers the following measures to be most relevant for improving research and innovation in the

Netherlands (p. 85): government co-financing for Horizon 2020, TKI allowance, MIT scheme in cooperation with the regions, Tax facilities for R&D (WBSO, RDA, Innovation Box), and Financing instruments.

In July 2014, the Council reassessed developments in the Dutch economy. The Council's latest recommendations are based on, amongst others, results from the EC's Macroeconomic Imbalance Procedure (MIP) published in March 2014.⁵¹ According to this in-depth economic check, specific attention should still be paid to macroeconomic developments regarding private sector debt and on-going deleveraging, as well as to remaining inefficiencies in the housing market. While the economic expectations are generally thought to be prosperous, the CSR 2014 include a warning against over-consolidation: "In order to enhance the growth potential of the Netherlands, it is of paramount importance that the required consolidation safeguards growth-enhancing expenditure, such as innovation and research, including fundamental research, education and training. Based on its assessment of the Stability Programme and the Commission forecast, [...], the Council is of the opinion that the Netherlands has brought its general government deficit sustainably below 3 % of GDP in 2013, but is at risk of significantly deviating from the requirements [...] as from 2014" (CSR 2014, p. 3).

Besides the European Commission and the European Council, also the OECD has proposed several policy suggestions in its assessment of April/September 2014.⁵² Contrary to the CSR, the OECD report is particularly oriented towards innovation policy. A major recommendation on this account is (again) that the Netherlands should by all means keep investing sufficiently in research and education. Increasing pressure to engage in valorisation and to make funds more competitive are encouraged, but also form a threat for sound (fundamental) research and the diffusion of knowledge and skills. Furthermore, The Top Sector approach could be enhanced by ensuring a strong representation of smaller and entrepreneurial companies, by extending coverage to other sectors, or by identifying new areas of strength. Other suggestions are to strengthen business capabilities of firms not belonging to the small set of Dutch world-class innovators, and to further improve market regulations (e.g. regarding licensing and permits).

2.5 Funding trends

2.5.1 Funding flows

Dutch expenditures on Research and Development (GERD) as a share of GDP have been increasing over the past few years. The jump 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), as well as to temporary crisis measures implemented in 2010. Over the past years, the Dutch GERD converged to the EU28 average of about 2%. The GERD as expressed by euro per capita is far above the European average, and still on the rise.

The R&D expenditures funded by the business sector (BERD), amounting to 0.93% of GDP in 2013, is well below the EU28 average. Similarly, when looking at who performed R&D (rather than who funded it), Dutch businesses account for 58% of the total R&D

⁵¹ EC Economic and Financial Affairs (March 2014), Macroeconomic Imbalances NL 2014. Occasional Papers 185.

⁵² OECD Reviews of Innovation Policy (2014), [Netherlands. Overall assessment and recommendations](#).

expenditures versus a European average of 65%. In the past Innovation Union Scoreboards, this has been the main indicator where the Netherlands are underperforming. A low share of private R&D is complemented with a high share of R&D being performed by higher education institutions. Despite its recent decreases, the share of 32% of GERD (in 2012) is still exceeding the European average of 23.7%. Finally, R&D performed by the public sector has been constant over the past years.

Table 1 Basic indicators for R&D investments

	2009	2010	2011	2012	2013	EU28 (2013)
GDP growth rate	-3.3	1.1	1.7	-1.6	-0.7	0.1
GERD (% of GDP)	1.69	1.72	1.89(b)	1.97	1.98(p)	2.02
GERD (euro per capita)	631.3	657.1	728,9	753.5(p)	759.4(p)	539.2
GBAORD - Total R&D appropriations (€million)	4857.2	4975.1	4676.8	4,815.05 2	4794.3	90 094.205
R&D funded by Business Enterprise Sector (% of GDP)	0.82	n/a	0.94(b)	0.95	0.93	1.1% (2012)
R&D funded by Private non-profit	0.05	n/a	0.06 (b)	0.08	0.08(p)	0.03% (2012)
R&D funded from abroad	0.18		0.21 (b)	0.24	0.28(p)	0.2% (2012)
R&D related FDI (total intra-mural R&D expenditure, industry and construction only)			1,339.5			
R&D performed by HEIs (% of GERD)	40%	40%	33% (b)	33% (p)	32%	23.7%
R&D performed by Government Sector (% of GERD)	13%	12%	11%	11%	11%	12.6%
R&D performed by Business Enterprise Sector (% of GERD)	47%	48%	56%	57%	58%	65.2%
Share of competitive vs. institutional public funding for R&D (% of GBAORD)	29.2%	30/84%	30.37%	29.16%	28.92% (2014: 30.71%)	N/A
Employment in high- and medium-high-technology manufacturing sectors as share of total employment	2.7%	2.5%	2.5%	2.7%	2.7%	5.6%
Employment in knowledge-intensive service sectors as share of total employment	45.5%	45.6%	45.6%	45.3%	46.7%	39.2%
Turnover from Innovation as % of total turnover	8.9	10.5	n/a	n/a	n/a	13.4% (EU-27, 2010)

Source: Eurostat

Compared to other countries, the Netherlands have been fairly successful in obtaining funding from the European Framework Programmes for research and technological development (RTD). The 5100 FP7-projects that were awarded with in total €3.37bln delivered funding to no less than 8270 participants.⁵³ According to the Ministry of EA,

⁵³ Source: RIO elaboration on DG Regio data. The reported figures are low in comparison to data reported elsewhere, such as in last year's country report. One of the explanations for this difference is the definition adopted. The data presented here refers to Core RTD, whereas the information provided elsewhere adopts a broader definition of RTDI and linked activities. In addition, the data reported here refers to ERDF funding only and does not include cohesion funds

about half of this funding went to Top Sectors.⁵⁴ With a return of 7.4% of total RTD funding, exceeding the initial contribution of 5%, the Netherlands have been exceptionally successful in attracting FP7-funding.⁵⁵ Especially important for this result were the technological institutes and universities. The participation of SMEs (receiving 13% of attracted funding) was below the average of 15%. Also in the first call of the Horizon2020 'SME instrument', Dutch SMEs have been underperforming: the hit rate of 3.7% for phase 1 projects is below the average of 5.8%. In contrast to the share of FP7 funding that flew to the Netherlands, the RTD funding stemming from EC structural funds is substantially lower. For the period 2007-2012, only €180mln was assigned to R&D in the Netherlands. This amounts to 0.6% of the core RTD funding allocated for this period.⁵³

Yet another source of international funding for R&D is FDI devoted to such purposes. Thanks to efforts by the Netherlands Foreign Investment Agency (NFIA), 193 projects were attracted in 2013.⁵⁴ These projects corresponded to foreign investment of €1.7bln, and an all-time record of 8500 jobs. NFIA focuses its activities specifically on Top Sectors, which were selected based on their international reputation in the first place. Given the relatively high R&D intensity in the top sectors, a substantial share of FDI concerns R&D expenditures. When looking at total FDI, the drop from €14bln (2011) to €9bln (2012) marks a substantial decrease.⁵⁶

For several of the indicators in the table above, the Dutch government has defined target levels. The national investment target for R&D expenditures (GERD) is 2.5% of GDP in 2020.⁵⁷ One reason for setting this target below the 3% which is pursued by the EU as a whole is the sector composition of the Dutch economy. A relatively small high-tech and industry sector is complemented with a large service sector, in which R&D investments are either lower, or less well administered and thus less visible in statistical indicators. In the Monitor Enterprise Policy 2014⁵⁸ the latest figure on GERD is included. Figures for 2011 and 2012 have been adapted in 2014 by Statistics Netherlands due to a revision of the National Accounts and a considerable higher GDP. This resulted in a lower R&D intensity figure for 2011 and 2012. GERD for 2011 and 2012 after this correction is now 1,89% of GDP and 1,97% of GDP respectively, ending in a provisionally estimated 1.98% for 2013. Although this relative halt is mainly due to a statistical correction, it is clear that the 2,5% goal is still tough to accomplish. In the same document the Ministry of EA points at the R&D figures which are corrected for sector structure (which were incidentally published in OECD Outlook 2013) and which shows that the Netherlands here scores much closer to the 3% GDP target.

2.5.2 Project vs. institutional allocation of public funding

As noted in the table above, the GBAORD share allocated in the form of project funding lays around 30% in The Netherlands. Compared to the proportions in other countries for which EUROSTAT data is available, 30% is more or less on the average.

⁵⁴ Ministry of Economic Affairs (2013). [Progress report Enterprise Policy 2013: Enterprise Policy at full speed](#)

⁵⁵ Minister of Economic Affairs (2014). [Beantwoording kamervragen over Europese Subsidies](#) (in Dutch).

⁵⁶ OECD StatExtracts (December 2014). '[Globalisation: Activity of Multinationals](#)'.

⁵⁷ Government of the Netherlands (2013) [Progress Report Enterprise Policy 2013](#) (in Dutch)

⁵⁸ See Ministry of Economic Affairs (2014) [Monitor Enterprise Policy 2014](#).

Aimed at disentangling the research funding profile of the Netherlands, the CPB Netherlands Bureau for Economic Policy Analysis published in March 2014 the report: 'Public funding of science: An international comparison'.⁵⁹ The table below shows how the distribution of public science funding in the Netherlands compares to the composition of several other countries. Almost half of the Dutch science funding is allocated in the form of institutional fixed or 'block' funding. On top of this, another 28% is provided on an ex-ante project base. This share concerns project funding, usually obtained through a competition mechanism, and thus differs from the share that is performance-based institutional funding.⁶⁰ In the Netherlands, 11% out of the 23% of ex-post funding (i.e. 2.4% of total public science funding) is based on research-only performance indicators; the remaining ex-post funding is also based on education indicators like bachelor/master degrees and PhD defenses. The reward for delivering a PhD has long time been set at €90000 (amounting to an annual budget of €96mln), but because it provides perverse incentives it will decline with 5% from 2015 onwards.⁶¹

The Dutch overall share on ex-post funding is fairly high in comparison to the average 13% of countries looked at in the CPB study. The report also remarks that 22% of total Dutch R&D funds is directly provided to public research organizations (PROs), whereas 17% is allocated through public research councils. This latter channel mostly concerns funding for research projects that are assessed on the basis of quality of research proposals. In the Netherlands, this is done primarily by NWO and the KNAW. In section 2.7, we briefly describe their new evaluation protocol for assigning funding.

Table 2: Distribution of public science funding flows (CPB, 2014. Sources: Eurostat, Van Steen, 2012).

	Project allocation		Institutional allocation	Main funding scheme (> 50% of funding)
	Ex-post funding	Ex-ante funding	Fixed funding	
	% of total public R&D funds that is allocated on an ex-post performance base	% of total public R&D funds that is allocated on an ex-ante project base	% of total public R&D funds that is allocated on a permanent basis	
Netherlands	23%	28%	49%	Mixed
Flanders	22%	61%	17%	Ex-ante
Germany	11%	30%	59%	Fixed
Switzerland	9%	25%	66%	Fixed
Denmark	1%	31%	68%	Fixed
UK	27%	64%	9%	Ex-ante
US	0%	100%	0%	Ex-ante

Traditionally, the Netherlands belong to the group of countries characterized by their high dependency on institutional (block) funding.⁶² In the past years, the government has started to make university funding more performance-based. In the budgets for 2012-2016, 7%

⁵⁹ CPB (2014) [Public funding of science: An international comparison](#).

⁶⁰ Project funding is allocated through the research councils NWO and KNAW, who receive their resources from the Ministry of ECS. Apart from allocated funding directly to researchers or projects, NWO also funds other institutions that are in charge of organizing research projects. An example here is The Netherlands Organisation for Health Research and Development (ZonMw), which is funding health research programmes. The NWO and KNAW funding for these institutes is institutionally allocated rather than project-based.

⁶¹ Ministry of Education, Culture and Science (2014): [Science vision 2025](#) (in Dutch).

⁶² Van Steen (2012). Modes of public funding of research and development, Towards internationally comparable indicators. OECD Science, Technology and Industry Working Papers.

of the core funding for universities is competitive rather than block-funding. The major part (5% of total higher education budget) concerns conditional funding, while the other part (2%) is allocated selectively for education profiling plans. If the planned evaluation at the end of the period is positive about this change it is most likely that the share of competitive funding will increase further. However, decision-making on this is expected to take place in 2015/2016.

The share of funding that is provided by NWO is largely based on program and project proposals. In 2012, NWO invested €756mln (2013: €735mln), of which 637mln euro was allocated to universities and other institutes (excluding intra-organizational allocation through NWO institutes) based on competition⁶³. The KNAW mainly uses its funding to finance its own research institutes. Currently, the number of KNAW research institutes lies at 17. The prices KNAW awards to outstanding researchers have (by definition) a competitive nature.

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 2.2 and 4.4).

Finally, research is also funded through contract research set out by ministries. Every ministry has its own 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 (TNO), the large technological institutes (GTI's), and the top technological institutes (TTIs, now transitioning 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 aerospace 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.

⁶³ NWO (2013) [Annual Report 2012](#) and [Annual Report 2013](#). For 2013, the distribution is not mentioned.

Table 3: R&D expenditure, and share of project funding. 2015 figures. (Rathenau Institute: TWIN 2012-2018)

Ministry	Total R&D expenditure (mln €)	% project-based
Ministry of General Affairs	0,6	100,0
Ministry of Foreign Affairs	37,6	99,4
Ministry of Security and Justice	24,2	23,8
Ministry of the Interior and Kingdom Relations	18,5	100,0
Ministry of Education, Culture and Science	3.172,8	16,0
Ministry of Defence	59,9	56,8
Ministry of Infrastructure and the Environment	51,3	22,7
Ministry of Economic Affairs	795,8	51,1
Ministry of Social Affairs and Employment	1,4	100,0
Ministry of Health, Welfare and Sport	133,9	57,8
Total	4.296,1	25,6

Currently, an active debate is being held with regard to the implementation of competitive institutional funding at universities and higher education in the Netherlands. On the one hand, the ministry of ECS is arguing that competitive funding creates educational institutions with a distinct profile and a focus on their own strengths, leading to a higher quality of research and education. However, critics are noting that performance agreements create perverse incentives to pay attention solely to achieving targets, while losing focus of the actual quality of education. In addition, performance agreements are criticized for increasing bureaucracy, as well as that they might be used by management as an excuse for implementing unpopular policies. In addition, the minister of ECS already noted that universities might not be able to meet their targets, due to a change in cabinet and budget cuts.

The Science Vision 2025 (recently published by the ministry of ECS, see 2.2) initiated a lively discussion as well, concerning the new planned role of the NWO. According to ECS, scientists will remain influential in the new NWO and its funding decisions. However, in an open letter to Dutch universities, a substantial number of Spinoza Prize winners (the most prestigious Dutch scientific award) express their concerns. Since many management roles within the NWO will not be performed by scientists anymore in the near future, they fear that the NWOs policy will not change for the better. As mentioned in section 2.2 already, the new science strategy seems to be sensitive to critical voices about the focus in current science on publications and acquisition of research funding.⁶⁴ A complete section in the new science strategy is devoted to lowering publication pressure and pressure for writing research proposals.⁶⁵ It is indicative that there at least is an awareness of the downside of competition and competitive funding.

⁶⁴ 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.

⁶⁵ See footnote section 3.6.

2.5.3 R&I funding

In the Netherlands, funding for R&D and R&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. This is shown by the table below, based on Rathenau's TWIN report 2012-2018.⁶⁶ For 2015, the balance is €2997mln for fundamental research, versus €359mln and €1725mln for applied research and fiscal incentives for business R&D (respectively). In other words, around 40% of the relevant budgets concerns the valorization part of the innovation chain. This figure would change if we also take into account the R&I expenditures of other departments (€1215 in 2015), for instance through innovative procurement (see section 4.7). Since these would concern valorization rather than fundamental research, the balance would shift to a 50/50 distribution. Having said this, 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 softer types of knowledge which are perceived to be closer to the marketplace is scarce and debated.

Table 4: Resources for research and innovation for the period 2012-2017. In millions of euros.

	2012	2013	2014	2015	2016	2017
Fundamental research	2,970	2,989	3,017	2,997	2,980	2,979
Applied research	483	437	389	359	339	336
Expenditure on innovation and research by other departments	1,453	1,481	1,375	1,215	1,084	1,016
Fiscal incentives for R&D (including Innovationbox)	1,494	1,701	1,694	1,725	1,621	1,606
Total	6,400	6,608	6,475	6,295	6,024	5,936

Source: National Reform Programme 2014 (based on Rathenau's TWIN 2014). Recent budget changes have not been incorporated. The budget for Innovationbox was estimated at €625mln per year.

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 ministries of EA and ECS only support firms to participate in public-private research collaborations (see sections 2.2 and 4.4). In terms of funding, the main policy shift 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 salary, 2015 budget is €802mln), the RDA (tax exemption for R&D material, 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 €800mln, the WBSO is a very substantial innovation policy instrument. It provides a tax exemption with respect to the labour costs of researching employees. Following the evaluation in

⁶⁶ Source: [NRP 2014](#) / [Rathenau's Total Investment in Research and Innovation \(TWIN\) 2012-2018](#).

2012, there was a budget-neutral reallocation of the funds for the WBSO in 2013, which has enhanced the facility's efficiency and effectiveness. 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 R&D wage costs. 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 is now decreasing to €126mln by 2017. As noted in section 2.2, RDA will possibly merge with WBSO.
- The tax relief for innovation (the *Innovation box*) offers firms a reduced corporate tax rate for profits derived from in-house developed intangible assets. The budget of the innovation box is not public, but its use has been growing rapidly over the past years; from €345mln to €601mln to €852mln during the period 2010-2012 (thereby overtaking the budget of the WBSO). The Innovation box will be evaluated in 2015.

According to Table 4, the fiscal incentives' relative share of 23% (2012) increased to 27% from 2015 onwards. Looking only at in particular the Ministry of EA's budget (2015), however, the distribution between generic and specific innovation support lies at 89%-11%.⁶⁷ As can be read in the OECD STI Outlooks (e.g. the 2012 edition, p. 351), the dominant place for fiscal R&D support is a distinctive feature of the Dutch R&I system. In the 2015 Budget of the Ministry of EA published in September 2014, it was announced that a merger of the WBSO and RDA schemes will be considered. 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.⁶⁸ Most likely the coming months a discussion on fiscal R&D schemes and probably more widely the use of more generic fiscal schemes supporting entrepreneurship in general will emerge. Just recently 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.⁶⁹ The three Dutch schemes included in the benchmark WBSO, RDA and Innovationbox scored a 5th, 13th and 44th place.

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.⁷⁰ The report states that R&D and innovation are increasingly aligned with each other (both in the

⁶⁷ Ministry of Economic Affairs (2014) [Monitor Enterprise Policy 2014](#).

⁶⁸ See letter of the secretary of state of the Ministry of Finance on the use of the Innovation box 2010-2012, dd. 13-01-2015, kenmerk AFP/1117/U (in Dutch).

⁶⁹ See European Commission's DG for Taxation and Customs Union (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.

⁷⁰ Rathenau Instituut (2014) – Total investments in Science and Technology (TWIN) 2012-2018.

spheres of policy and practice), but that is not reflected in the planned budget adaptations. For 2014, innovation covers only 32% of the total R&D&I budgets. The table below provides the direct and indirect budgets for the period 2012-2018.

Table 5: Estimated direct and indirect budgets for the period 2012-2018 (in millions of euro and as a % of GDP)

	2012	2013	2014	2015	2016	2017	2018
Expenditure on R&D	4.676,80	4.607,50	4.533,80	4.296,10	4.175,60	4.135,10	4.110,70
- out of which relevant for innovation	752	710,9	759,5	653,5	571,7	541,3	525,2
Expenditures on innovation (not being R&D)	229,5	299,7	247,8	224,4	177,4	145,4	137,6
Fiscal instruments for R&D&I (Excl. Innovation Box)	869,1	1.075,60	1.068,60	1.099,70	995,6	980,6	980,6
Total direct and indirect R&D&I	5.775,40	5.982,80	5.850,30	5.620,20	5.348,70	5.261,10	5.228,90
- out of which direct expenditures on innovation	981,4	1.010,60	1.007,30	877,9	749,2	686,7	662,8
As a percentage of GDP							
Expenditures on R&D as a % of GDP (excluding fiscal instruments)	0,78	0,76	0,74	0,7	0,67	0,66	0,65
Expenditures on R&D as a % of GDP (including fiscal instruments)	0,96	0,99	0,96	0,91	0,86	0,84	0,82

The table below shows the development of venture capital investments in the Netherlands. The total amount of investments is highly fluctuant: especially the decrease from €2.1 billion in 2011 to €1.3 billion in 2012 is remarkable. Almost two thirds of Dutch VC investments in 2011 and 2012 concern buyouts, whereas this percentage was 77% for the EU15 average. Phrased differently, early-stage venture capital investments are relatively large in the Netherlands. In order to support innovative entrepreneurship, the government has developed a range of instruments addressing various stages in the trajectory from startup to growth. While recent changes on this account have already been discussed in section 2.2 (e.g. the transition from SME Innovation Funding to Future Funds), a comprehensive overview of funding instruments is provided in section 4.5/4.6.

Table 6: Venture capital investments by detailed stage of development (in mlns of euros)

Type of investment	2007	2008	2009	2010	2011	2012
Seed stage	14,134	8,995	4,828	1,025	9,204	2,241
Start-up stage	138,255	150,278	111,189	108,590	112,679	81,571
Later stage venture	154,988	83,078	58,800	56,230	63,642	79,461
Buyouts	2.336,551	958,733	240,868	708,819	1.455,074	886,588
Total venture capital investments	2.842,799	1.763,203	805,422	1.326,492	2.101,128	1.320,375

Source: Eurostat (Retrieved: December 2013).

2.6 Smart Specialisation (RIS3)

In the Netherlands a Research and Innovations Strategy for Smart Specialisation (RIS3) has been developed for four separate regions Noord-Nederland, Oost-Nederland, Zuid-Nederland and West-Nederland. (North, East, South, West) The RIS3 of each region is discussed separately in this chapter and is based on the ERAC Infopaper⁷¹. The RIS3 were sent as a part of the ERDF program to the European Commission. As far as known, the ERDF of Oost-Nederland is the only one which already has been accepted.

Noord-Nederland

The RIS3 Noord-Netherland does not specifically address sectors, clusters or campuses. In the strategy four societal challenges are distinguished, these are: 1) health and demographics, (2) food security, sustainable agriculture and bio-based economy, (3) reliable, clean and efficient energy and (4) clean and reliable water supply. The challenges are linked to several strong regional clusters. These clusters are active in the field of energy, water, agribusiness, healthy ageing and sensors. The RIS3 is the leading document for the Northern innovation policy and is currently further developed by the Taskforce RIS3.

Oost-Nederland

The region Oost-Nederland has identified four focal points: Agro & Food, Health, High Tech Systems and Materials (HTSM) and Energy- and Environmental Technology and the Biobased Economy (EET). The centre of the Agro & Food sector can be found in the Food Valley around Wageningen. This small geographic area is hosting leading institutes and a large number of firms active in the Agro & Food sector. For the Health sector three relevant areas are identified: Health Valley Nijmegen, Health region Zwolle and the Center for Medical Imaging in Enschede.

The HTSM sector can be distinguished in five campuses: Kennispark Twente, Mercator Science Park, Noviotech Campus, Polymer Science Park and the Thales High Tech Campus. The most important campus is Kennispark Twente. The EET sector does not have any clusters and can be found throughout the whole region. In Oost-Nederland the RIS3 is not an important part of the policy agenda for the responsible governments. Each of the provinces in the regions (Gelderland and Overijssel) has his own economic agenda; the RIS3 is only used for European projects. The RIS3 does include however measures to stimulate private investments such as fiscal measures, regional development agencies and innovation contracts.

Zuid-Nederland

The region Zuid-Nederland has identified four local clusters and three cross-border clusters (the region refers to them as 'national' and 'international'). The local clusters that can be distinguished are Life Sciences & Health, Biobased, Logistics and Maintenance. The cross-border clusters are High Tech Systems and Materials (HTSM), Chemical industry and Agrofood & Horticulture and Starting Materials (AHS). The HTSM cluster can be found in the Eindhoven area, while the Chemical industry is present around Chemelot (Limburg area) and in West-Brabant and Zeeland. The AHS cluster is strong in Oost-Brabant and Noord-Limburg. Several campuses can be distinguished within these cluster such as the High Tech Campus in Eindhoven and the Chemelot campus in Sittard-Geleen. The RIS3 originated

⁷¹ Van den Broeck (2014) ERAC Infopaper April 2014

from the Brainport 2020 agenda, which is the leading regional innovation agenda for Zuid-Nederland. A new research program, OPZuid, has made available €321mIn for supporting SMEs in the region in the following years. The program, receiving funding from the European Union, the Dutch government and the provinces of Brabant, Zeeland and Limburg, aims to strengthen the region by fostering innovation in the main competence areas.⁷²

West-Nederland

The Research and Innovation Strategy of the region West-Nederland is based on the Economic priority areas. These priority areas are Agri & Food, Chemistry, Creative Industry, Sustainable Energy, High Tech, Logistics, Life Sciences & health, Horticulture & Propagation Materials and Water and Climate. In each priority area two themes are important: knowledge valorization and sustainability. Furthermore, spillovers between the different Economic priority areas are also deemed relevant. Similar to Oost-Nederland, the RIS3 is not an important part of the policy agenda for the responsible governments in West-Nederland. They already have multiple innovation agenda's such as Zuidvleugel Agenda en de Kennis- en Innovatie agenda Metropoolregio Amsterdam.

Monitoring

The four regions agreed to perform a nationwide monitor of the RIS3. The monitor is done by the National Statistics Office (NSO) of the Netherlands. The RIS3 monitor is incorporated as a part of the Economic priority area monitor which is performed every two years.

2.7 Evaluations, consultations, foresight exercises

As can be read in the NRP 2014, "The Ministry of Economic Affairs has established an extensive monitoring system to evaluate the effectiveness of the enterprise policy and progress towards its goals" (p. 37). The pressure to arrange this appropriately has been driven up by several reports published in the past few years. Particularly important was a 2011 report by the Court of Audit, named '*Innovation Policy*', in which it was stated that there was no comprehensive overview of the policy instruments supporting innovation.⁷³ As a result, there was neither a basis for assessing the impact of R&D&I-policy. In a report published in 2012, and updated in 2013, the Court of Audit presented a critical view on the way policy effectiveness (in general) is currently being measured in The Netherlands.⁷⁴

In a reaction to these types of criticism, the government undertook several steps. One of them was setting up a website where all policy instruments with relevance for innovation are presented together. This website, www.volginnovatie.nl ("follow innovation") allows visitors to get insight in the diversity of instruments available and the corresponding budgets. Moreover, the government also asked an expert committee to develop a new standard for evaluating the impact of innovation policy instruments. The main task of this commission Theeuwes (a panel of experts consisting of scientists, the Netherlands Bureau for Economic Policy Analysis, the General Court, the Statistics Netherlands, the former NL

⁷² Omroep Brabant (February 2015) [321 million for innovation in South-Netherlands](#) (in Dutch)

⁷³ Court of Audit (2011). [Innovation Policy](#)

⁷⁴ Court of Audit (2012), [Evaluation of policy effectiveness in central government](#)

See also: [2013 update](#).

Agency and the EA Ministry itself) was to systematically analyse possible ways of evaluating the direct impact (output) of several of the Ministry of Economic Affairs' policy measures. The question is what proportion of the observed output is attributable to application of the policy instrument. Evaluation of the effectiveness at output level can be seen as the first step in evaluating the effects on outcome level (social and economic impact). The report: *'Dare to measure'* (November 2012)⁷⁵, presents a series of recommendations on how the effect of policy can be made more visible, and some proposals for the evaluation of policy designs. The report thereby set a new standard for the evaluation of policy instruments. One of the first reports to follow this new standard was the *evaluation of the Innovation Credit 2006-2011* (July 2013)⁷⁶.

Taking into account the recommendations by the commission Theeuwes, the Dutch government has developed an extensive evaluation system for tracking the effectiveness of its Enterprise Policy from the first moment on. This system includes, amongst others the yearly publication of monitors in which a variety of statistical indicators are reported. These are the *Monitor Top Sectors* (by Statistics Netherlands)⁷⁷ and the *Monitor Enterprise Policy* (by EA)⁷⁸. The latest versions have been published in October 2014. The monitors are also complemented with a *Progress Report* ('Voortgangsrapportages') the EA releases almost simultaneously. The first progress report, from September 2013, described how most of the announced instruments had been implemented and what actions were planned for focusing more on societal challenges, entrepreneurs and simplification of instruments.⁷⁹ In the Progress Report of October 2014, called 'Jointly towards growth: Enterprise Policy on track', the latest state of affairs and updates are listed (see section 2.2 for discussion of policy developments).

Besides reporting the usage of the Enterprise Policy's instruments, the Monitor and Progress Report also describe developments with respect to the economic and innovative performance of firms in the top sectors. Specific for the top sector part of the Enterprise Policy is also the website www.TopSectoren.nl, which collects relevant information and recent studies (e.g. surveys amongst top sector and non-top sector firms).

Still ongoing is a meta-evaluation of in total 65 mostly financial instruments that are part of policy articles 12 (innovation) and 13 (entrepreneurship/ entrepreneurial climate) on the budget of the Ministry of EA. This is a mandatory meta-evaluation performed by Dialogic that is used for reflecting on the current policy mix and to start a discussion on whether changes in the policy mix are needed. The background report is ready in draft and will form the basis for a synthesis document to be written by the Ministry of EA. Both will be discussed with stakeholders and send to parliament in spring 2015.

The *overall evaluation of the Top Sector Policy* is planned for 2015, and will have to fulfil maximally the evaluation criteria set by the Commission Theeuwes. Apart from recent efforts to monitor and evaluate enterprise policy, it is common practice for the Dutch government to evaluate the state of affairs in a certain policy domain about every 5 years. In the end of 2014 and beginning of 2015, the Ministry of Economic Affairs will be

⁷⁵ Impact Evaluation Working Group (2012) [Dare to Measure: Evaluation designs for industrial policy in The Netherlands](#)

⁷⁶ APE (2013) [Evaluation of the Innovation Credit 2006-2011](#).

⁷⁷ CBS (2014) [Monitor Top Sectors 2014](#)

⁷⁸ Ministry of Economic Affairs (2014) [Monitor Enterprise Policy 2014](#)

⁷⁹ Ministry of Economic Affairs (2013) [Progress report Enterprise Policy 2013: Enterprise Policy at full speed](#)

performing an *integral policy screening* of its instruments aimed at supporting innovation and entrepreneurship.

Just like in the case of innovation, also developments in the field of education and science are being monitored permanently. In reports called '*Trends in Focus*' ('Trends in Beeld'), the ECS Ministry presents statistics on quality and performance. Until 2013, this monitoring exercise had the form of annual reports. This approach has recently been replaced for an online version, which is continuously being updated with new data and factsheets (see www.trendsinbeeld.minocw.nl). Similarly, the Ministry of ECS also monitors relevant developments by collecting Science, Technology and Innovation Indicators published by sources like Eurostat, OECD, etcetera. Besides containing several background studies, the online portal set up for this purpose (www.wti2.nl) allows for benchmarking Dutch indicators against the performance of a wide range of reference countries. Finally, the Rathenau Institute for research and dialogue on STI-subjects annually presents an overview of Total Investment in Research and Innovation (TWIN).⁸⁰

Looking at systems for evaluating science on a structural basis, the new *Standard Evaluation Protocol 2015-2021* was published in March 2014 by the VSNU (Association of universities in the Netherlands), NWO and the KNAW.⁸¹ As the protocol states in its introduction: "The Standard Evaluation Protocol (SEP) describes the methods used to assess research conducted at Dutch universities and NWO and Academy institutes every six years, as well as the aims of such assessments" (p. 4). In the latest version, specific attention is paid to the integrity of scientific research. Another change is that productivity is no longer a criterion; the main categories for research assessment are now research quality, relevance to society and viability. The quality of Dutch education is being assessed by the ECS' Education Inspectorate. The inspectorate is responsible for inspection and review of schools and educational institutions. Each year, it publishes its findings in 'The State of Education in the Netherlands'. The latest one, reflecting upon the years 2012/2013, dates from September 2014.⁸²

A thorough screening somewhat similar to the one announced for innovation and entrepreneurship has recently been performed for the Dutch science system. An interdepartmental working group, led by the Ministry of Finance, conducted the *Interdepartmental Policy Study ('IBO Wetenschappelijk onderzoek')* that was published in May 2014. Main objective of the IBO was to determine whether the science system is future proof, and on what accounts policy changes are required. In order to make such recommendations, the science system has been assessed on four goals: creating possibilities for performing curiosity-driven research, yielding economic output, yielding societal output, and possibilities to perform education-oriented research. The overall conclusion was that the well-performing system could be improved further by introducing several policy adjustments. Suggestions on this account include:

- Altering allocation of 'first flow of funds' (the lump sum financial contribution universities receive from the state in order to perform their education obligations),

⁸⁰ For the latest report: Rathenau Institute (2014): [Total Investment in Research and Innovation 2012-2018](#).

⁸¹ VSNU/NWO/KNAW (2014) [Standard Evaluation Protocol \(SEP\): Protocol for research assessments in the Netherlands](#).

⁸² Ministry of Education Culture & Science's Education Inspectorate (2014) [The state of education in the Netherlands](#).

for instance by distributing funding according to student numbers or research facility costs;

- Modification of 'second flow of funds', which encompasses research grants from NWO and the KNAW. This line of funding can be oriented better towards policy priorities, for instance by supporting collaboration, aligning research agendas, reducing 'application pressure' by formulating more specific research calls and restricting the number of applications per researcher, focusing on societal challenges, or by increasing accessibility of large research and data facilities;
- Also the governance of the science system could be improved; e.g. by introducing more transparency in decision-making or by distributing responsibilities of research institutes better.
- The last policy option mentioned in the IBO suggests that the link between science and education should be strengthened. Possibilities to do so include better valuation of teaching skills and more emphasis on teaching quality in research visitations.

The afore-mentioned Progress Report Enterprise Policy is not only a backward-looking monitoring exercise. The document also serves to sketch which adaptations or new ambitions the EA has adopted. In 2014, the EA announced its main ideas already in May by releasing a presentation with plans for the near future.⁸³ Building upon recommendations by the AWTI and Scientific Council for Government Policy (WRR), the EA decided to continue elements that are successful (or require continuity) while modifying some other aspects. The adjustments, which have been elaborated in the Progress Report 2014, include:

- Connecting the Top Sector Policy to societal challenges and regional activities
- Involving a higher variety of parties
- An attractive and simplified set of instruments (e.g. modification of MIT and TKI policy; new funding measures like the Early Phase Funding instrument)
- Ensuring higher participation of SMEs in the Top Sector Policy

With respect to the top sectors, the EA has asked the AWTI to advise annually on how to give direction to this element of the Enterprise Policy. After providing a number of suggestions in September 2013 (to which the EA responded in its 2013 Progress Report), the AWTI published a new '*Balance of Top Sectors*' in October 2014.⁸⁴ In summary, the report states that the Top Sector policy truly led to new dynamics in the Dutch economy. This can be seen in new interactions and better organization within the top sectors, resulting in widely supported research agendas and alignment between private and public research activities (e.g. through the Innovation Contracts). The AWTI also argues for three ways to improve the strategy: clarification of the vision behind the top sector approach (some complain that most support goes to established parties, and also the shift from innovation-for-growth to innovation-for-solving-societal-challenges is not understood by everyone), reduction of extensive governance requirements currently placed on a few actors within each top sector, and better involvement of important parties who have so far

⁸³ Ministry of Economic Affairs (May 2014) On course and Adjust ('[Koersvast en bijsturen](#)): Top Sectors Agenda 2014. (in Dutch).

⁸⁴ AWTI (October 2014) Top Sector Balance ('[Balans van de Top Sectoren](#)') 2014. (in Dutch).

remained unconnected to the ‘golden triangle’ underlying top sector dynamics (e.g. majority of SMEs, applied universities, regional governments).

In section 2.2, we already mentioned how the EA has established a *Future Funds (Toekomstfonds)* during the summer of 2014. Given its similarity to instruments the Dutch governments deployed previously, in which natural gas revenues were also invested in knowledge and innovation, the Court of Audit published a report in which it sketched three scenarios.⁸⁵ According to this foresight study, the Netherlands could add its future natural gas revenues to its general budget (avoiding financial shortfalls in the near future), spend them through an allocation fund (which used to be the case in times of the FES fund used for investments), or place them in a State capital fund (which would ultimately replace declining gas revenues for income on the accumulated capital).

Another foresight study is the ‘*Smart Industry*’ report (April 2014), which clarifies how the fourth industrial revolution is of relevance for companies, knowledge institutions, and government in the Netherlands.⁸⁶ Smart Industry is an initiative by TNO (institute for applied research), the Ministry of Economic Affairs, the Chambers of Commerce, as well as VNO-NCW and FME (major employer associations). The motivation to unite frontrunners is that the Dutch business community is believed to be in an excellent position to gain a strong position in trends like the Internet-of-Things. The report also explains how Smart Industry relates to the top sectors: “Smart Industry should be a cross-cutting theme within the top sector policy in which a broad coalition of companies, knowledge institutions and government should be involved. The approach will be formalised in an agenda for the coming period that will be formulated as a part of the top sector policy. This agenda includes research, valorisation, and implementation of research in business as well as the development of enabling conditions (e.g. privacy, safety and standardization) for an optimal development of a Dutch Smart Industry.”

Striving for environmental friendly sustainable growth, the topic of energy receives considerable attention in the Dutch R&I strategy. In September 2013, the Social and Economic Council of the Netherlands (SER) published the ‘*Energy Agreement of Sustainable Growth*’.⁸⁷ This document “gives voice to the willingness of many parties to work on making our society and our economy sustainable. A sustainable energy supply is an indispensable component of that process. The agreement unites divergent interests and brings together more than forty organisations – including central, regional and local government, employers’ associations and unions, nature conservation and environmental organisations, and other civil-society organisations and financial institutions.” Extensive negotiations between a high variety of stakeholders (including the government) resulted in an agreement of actions and goals for a total of twelve domains. A first and largely optimistic progress report was released in June 2014.⁸⁸ In fall 2014, however, several politicians expressed their concerns regarding the goal of having 14% sustainable energy by 2023.

⁸⁵ Court of Audit (2014) [Use of natural gas revenues: facts, figures and scenarios](#).

⁸⁶ Smart Industry (2014) [Smart Industry: Dutch industry fit for the future](#).

⁸⁷ Social and Economic Council of the Netherlands (2013) [Energy Agreement of Sustainable Growth](#).

⁸⁸ Social and Economic Council of the Netherlands (2014) [Energy Agreement of Sustainable Growth: Implementation of the Agreement](#).

Science and education

Over the past years, various reports expressed a call for more attention to retaining international students. Particularly notable is the action plan ‘Make it in The Netherlands!’, which the Social and Economic Council of the Netherlands (SER) presented to the Ministry of ECS in April 2013.⁸⁹ The report provides suggestions for how to persuade foreign students to study (and afterwards remain) in The Netherlands. With its programme for 2013-2016, the SER aims to formulate an answer to employment and labor market problems of the near future. Reasoning from this perspective, the actions are based on possibilities to attract those students that will be needed most by the Dutch economy.

Another document emphasizing the urge to face rapidly-approaching labour market issues is the ‘*National Technology Pact 2020*’. In May 2013, a variety of public authorities, employers, employees, educational institutions, students and top sectors signed an agreement uniting ambitions with respect to educating more engineers.⁹⁰ Three action lines have been introduced: persuading students to choose for technological education, increasing the number of technologically educated students who actually work (and continue learning) in an engineering profession, and finally: ensuring that engineers who might lose their job maintain active in the technology sector. In the National Technology Pact Progress Report of May 2014, it is stated that it remains all the more important that stakeholders commit themselves to the actions set out in the pact. Although many plans have been implemented, and interest for technological studies seems to be rising, there are still strong signals that a shortage of engineers will keep being a threat for the Dutch economy.

The Scientific Council for Government Policy (WRR) brought a different line of recommendations on science and education forward. Its report ‘*The Netherlands’ earning capacity*’ (February 2014) provided a critical reflection on the Dutch economic policy of recent years.⁹¹ Rather than focusing on macroeconomic issues like national debt and inflation, the government is advised to pay more attention to how the Netherlands will be earning its money in the longer term. Both the fact that the crisis is slowing down and the fact that monetary policy is only partially in hands of national governments led the WRR to argue that the Netherlands have to “invest in good training, good people, and resilient institutions”. This approach is thought to be essential for the Dutch economy to stay responsive (i.e. adaptive to changing circumstances), and to be able to cope with challenges like a shrinking labor force and fragmented value chains. The WRR suggests that apart from investing in knowledge creation, also knowledge circulation should be promoted. Of key importance in this respect is “mobilising and applying ideas and technologies found in other enterprises, sectors or countries. That would require the Netherlands to develop more absorptive capacity: in other words, it must be able to pick up on new and current ideas developed elsewhere, take them on board, and use them adeptly. Knowledge circulation also supports a learning economy, which would make strict demands on how Dutch research and educational institutions and enterprises are organised. It would also require the necessary regulatory institutions to be appropriately structured.” (summary, p. 2/3). The report presents five tasks to achieve this: (1) creating more

⁸⁹ SER (2013) [Make it in The Netherlands! Programme 2013-2016](#)

⁹⁰ For an English summary, see: <http://techniekpact.nl/wp-content/uploads/2014/03/Dutch-Technology-Pact-Summary.pdf>

⁹¹ WRR (2014) [The Netherlands’ earning capacity’](#)

differentiation between research institutions, (2) developing research and education institutions into regional expertise centres that have lasting ties with the community around them, (3) reconsidering the far-reaching distinction made in Dutch education between skills training and cognitive training, (4) effectuating a major quality improvement in education, and (5) encouraging life-long learning amongst professionals.

3. National progress towards realisation of ERA

3.1 ERA priority 2: Optimal transnational co-operation and competition

The Dutch government supports international research co-operation in a number of ways. The Ministry of EA encourages both public and private parties to participate in Joint Technology Initiatives (JTIs), notably ECSEL (previously ENIAC and ARTEMIS). The budget for international innovation also involves participation in EUREKA-clusters. Note that this concerns co-funding schemes. The budget available for JTI and EUREKA together is €33mln in 2015, increasing to €40mln as of 2017 (more or less evenly spread over both initiatives).⁹² Another €11mln (2015) to €18mln is available as co-funding for the European Eurostars-program. The Dutch government also supports participation in international organisations like ESA, ESO, CERN, EMBL and EMBC. Of major importance for international research collaboration is also the creation of (and access to) large-scale research facilities. In 2014 it was announced that the Dutch government is investing €140mln in joint research facilities for European space travel, as well as an additional €13mln annually from 2018 onwards.⁹³

Also the NWO and KNAW instruments are of importance for joint research activities such as developing research agendas. As they are in charge of allocating most of the competitively assigned research funding, their participation in platforms like Science Europe and the Global Research Council ensures that research is being aligned with international research efforts.⁹⁴ Important for research programming in the Netherlands is also the Science Vision 2025, released in 2014, which takes joint research agendas into account as well.⁹⁵

The research funding available in the Netherlands is increasingly designated to topics also having priority in other countries. By linking up with the Horizon2020 program, the R&I policy automatically addresses challenges and developments taking place at the European level. As of 2015, €50mln euro is made available annually for both fundamental and applied research institutions that are applying for Horizon 2020 funding.⁹⁶ Also within the individual Top Sectors, public and private stakeholders (including the TKIs) representing a certain knowledge domain ensure they coordinate their research efforts with other countries. This thereby impacts the total amount of expenditure devoted to international cooperative research, as the parties involved in the TKIs are also eligible to instruments like the TKI-allowance and the remainder of TTI-funding (fading out over the coming years). Finally, the themes focused on by NWO are also chosen with internationally important research areas in mind.⁹⁴ Again, these are predominantly societally important themes like healthcare and energy.

As for (ex-post) evaluation procedures for international research collaboration; this is a standard procedure in most of the NWO and KNAW instruments. All funding provided by

⁹² Ministry of Economic Affairs (October 2014) – [Response to questions on EA's Budget 2015](#) (in Dutch).

⁹³ Ministry of Economic Affairs (February 2015). [Netherlands Invests €140 million in European Space Programme](#)

⁹⁴ NWO (February 2015). [Ambition; International collaboration](#)

⁹⁵ Ministry of Education, Culture and Science (November 2014): [Science vision 2025](#) (in Dutch).

⁹⁶ Government of the Netherlands (February 2015). [€50 million for Dutch knowledge institutes when retrieving European research fund](#) (in Dutch)

these research councils is subject to international peer review assessment. NWO and KNAW also have several collaboration agreements for supporting visits, joint workshops and research projects, but without predefined priorities.

All of the mentioned interventions have relevance for alignment between national and international (European) research initiatives. The NWO and KNAW are most important when it comes to embedding international research priorities in a national competitive scheme. Procedures regarding definition of priorities, selection decisions, reporting requirements, eligibility criteria, definition of eligible costs, intellectual property rights, standards for proposal evaluation, funding rates, etcetera can be found on their respective websites.

3.2 ERA priority 3: An open labour market for researchers. Facilitating mobility, supporting training and ensuring attractive careers

3.2.1 Introduction

In the Netherlands, individual institutions have a large amount of autonomy concerning staffing issues. Despite the fact that measures for active recruitment of researchers are scarce, the Dutch labour market is open to international R&D personnel (including academics). For instance, NWO mobility grants encourages the international mobility of researchers, and all vacancies in the Dutch academic world are published on the international website Academic Transfer. Improvement of doctoral education is still in progress, and also the HR Strategy for Researchers (incorporating the Charter & Code) is increasingly present.

The Netherlands holds almost 70000 doctorate holders. 20% of this population is no longer active in research, leaving approximately 55000 active researchers with a PhD, who represent almost 1% of the Dutch working population. While this has been different during the financial crisis, supply and demand in the Dutch labour market for researchers appears to be relatively balanced. In 2012, 95% of all researchers was employed, whereas only 3% was unemployed involuntarily.⁹⁷ Moreover, in December 2014 a new collective bargaining agreement for university employees was announced, which includes agreements for improving the labor market perspective of doctorate holders.⁹⁸ In 2012 there were about 185000 professionally employed researchers in the Netherlands; 134123 of them were active for private companies, 13861 for public research institutes, and 37300 for higher education institutions. Relative to the total working population, the 185000 represent slightly over 2,5% of 7,215,000 professionals.⁹⁹ Eurostat data on human resources in science and technology (HRST) indicate that the number of scientists and engineers in the Netherlands has been increasing significantly over the past few years: from 548,000 in 2010 to 748,000 in 2013 (these data do involve a couple of breaks in time series, however).¹⁰⁰ Furthermore, Eurostat data on job vacancy statistics for researchers in professional, scientific and technical activities (NACE M) amount to 11,000, compared to a total of 471,000 of occupied jobs in this particular sector (2013 figures).

⁹⁷ Dutch Bureau of Statistics / CBS (February 2015). [Careers of doctorate holders in the Netherlands](#)

⁹⁸ VSNU (February 2015). [Collective Bargaining Agreement Dutch Universities](#) (in Dutch).

⁹⁹ Dutch Bureau of Statistics / CBS (February 2015). Statline data: Research & Development.

¹⁰⁰ Eurostat: Employed HRST by category, age and occupation. Accessed at 25-02-2015.

3.2.2 Open, transparent and merit-based recruitment of researchers

As individual institutions have a high level of staffing autonomy, procedures regarding employee recruitment vary. Various universities apply the recruitment code of the Dutch Association for Personnel Management & Organisation Development (NVP). In addition, the growing number of universities that has obtained or is applying for the 'HR Excellence in Research'-status (see paragraph 3.2.6) is an indication that the recruitment of researchers in the Netherlands is relatively transparent and merit-based. Indeed, many vacancies at universities that are currently active appear to fulfil most criteria for Transparent, Open and Merit-based recruitment. The only criteria that seem to be missing frequently are those concerning info and the composition of selection panels. In addition, the existence of AcademicTransfer (see paragraph 3.2.4) helps with providing applications with a transparent and complete picture of available research vacancies.

Inflow of foreign researchers (as well as students) is explicitly being supported in the Netherlands, for instance through the [Knowledge Migration Program](#) (providing working permit and immigration possibility)¹⁰¹ and through the 30% tax ruling (giving immigrants with a specific expertise a 30% tax-exemption).¹⁰² According to the Science Vision 2025, the attractiveness of the Dutch research system will also be promoted by bringing researchers on international (trade) missions.¹⁰³ In July 2014, the Ministry of ECS informed parliament about her studies and efforts on attracting highly qualified immigrants. A report by the European Migration Network (EMN) noted the uniqueness of the Dutch approach when it comes to differentiating salaries according to the age of knowledge migrants: this is supposed to attract also younger generations (and maintain them by offering salary development opportunities).¹⁰⁴ However, in general the Netherlands only have an average performance when it comes to attracting highly educated knowledge workers. The Netherlands rank 12th on the Global Talent Competitiveness Index published in January 2015.¹⁰⁵ The weak performance is confirmed in a study by the Dutch Research and Documentation Centre (WODC), stating that the policy for highly educated employees only served to maintain knowledge immigrants already present in The Netherlands.¹⁰⁶ The status and results of interventions aimed at attracting foreign talent are being registered in the 'Monitor knowledge migrants' of the IND Information and Analysis Centre. It concluded in an evaluation that on an annual basis 6000 knowledge migrants are being attracted via the knowledge migration program mentioned above. The evaluation found that stakeholders and participants appreciate the program, but would welcome more flexibility. The fact companies need to be registered as a referent (which costs €5000) was mentioned as a discouraging factor (especially for SMEs), and also the fact that not all information is available in English is experienced as a barrier.

¹⁰¹ Immigration and Naturalisation Service (February 2015). [Highly skilled migrants](#)

¹⁰² Exact conditions are provided on the [website](#) of the Tax and Customs Administration Office: Tax and Customs Administration Office (February 2015). [Expertise requirement](#).

¹⁰³ Ministry of Education, Culture and Science (November 2014): [Science vision 2025](#) (in Dutch).

¹⁰⁴ European Migration Network (EMN), 2013. [Synthesis report and policy and best practices in the Netherlands](#)

¹⁰⁵ Nuffic (February 2015) [INSEAD: Netherlands good at attracting talent](#) (in Dutch)

¹⁰⁶ WODC (February 2015). [Wanted: foreign toptalent: Evaluation of the Regulation High Educated](#) (in Dutch)

3.2.3 Access to and portability of grants

The portability of grants is relatively well arranged in the Netherlands, as the international mobility of researchers is encouraged via a range of grants and fellowships designed to promote international cooperation between Dutch researchers and researchers of different nationalities. For instance, the grants of the NWO (Dutch Organisation for Scientific Research), such as the NWO-Talent Scheme (“vernieuwingsimpuls”), are transferable to a new institute if a grant laureate decides to continue his or her research in a different European country. Particularly noteworthy in this respect is NWO’s participation in the ‘Money follows researcher’-scheme, which allows researchers to bring their funding when moving from one European knowledge institution to another.¹⁰⁷ The MfR-scheme only holds for a selection of grants.

With regard to the access to grants: the NWO’s grants aimed at international cooperation allow researchers in foreign institutions to apply for grants, under the condition that they have cooperation with a research team in the Netherlands.¹⁰⁸

3.2.4 EURAXESS

The so-called bridgehead organisation responsible for coordinating the EURAXESS national network and the Dutch EURAXESS portal is Nuffic, the Netherlands Organisation for International Cooperation in Higher Education.¹⁰⁹ At present, four service centres exist (at the University of Tilburg, Eindhoven, Maastricht and Groningen), as well as one local contact point (Erasmus University of Rotterdam). The network is expected to grow after 2014, since multiple universities are showing interest in joining the network. In addition to regular EURAXESS initiatives, all vacancies in the Dutch academic world are published on one international website, called AcademicTransfer (dot com).

3.2.5 Doctoral training

In the Netherlands, a large number of PhD programmes is part of a national graduate school.¹¹⁰ These inter-university organisations offer professional courses to doctoral candidates, facilitate knowledge exchange and provide external supervisors to mediate any problems during the PhD programme. Not all fields of science have a national umbrella organisation. In this case, the organisation of the PhD programme is fully in the hands of a university-specific graduate school.

The primary responsibility for the design and quality of (inter-university) graduate schools lies with the individual institutions.¹¹¹ Universities that choose to offer a graduate school are also responsible for the funding. The interest for (participation in) inter-university graduate schools is currently rising, as noted in the Interdepartmental Policy Study and the Science Vision 2025 that followed (see section 2.7).

¹⁰⁷ NWO (February 2015). [Money follows researcher \(MfR-scheme\)](#)

¹⁰⁸ www.nwo.nl, in Dutch

¹⁰⁹ <http://www.euraxessmanual.com/>

¹¹⁰ [Promovendi Netwerk Nederland](#)

¹¹¹ Kamerbrief: Onderzoekscholen: financiering en positionering in perspectief (juli 2013)

Most of the Principles for Innovative Doctoral Training appear to be present in the PhD tracks available at Dutch research universities. Moreover, a next wave of top research schools will be funded, also linked to the Top Sectors and other implemented linked policies. However, not a single Dutch university appears to have explicitly stated (publicly) that it is actively following the Principles when setting up and running doctoral training programs.

3.2.6 HR strategy for researchers incorporating the Charter and Code

In 2013, two institutions were allowed to use the ‘HR Excellence in Research’ logo; Radboud University and the Wageningen University and Research Centre (WUR).¹¹² In 2014, this number has already grown to seven (out of 14 established universities), indicating that Dutch research institutions are indeed actively pursuing this status (and succeeding in it). Tilburg University, Delft University of Technology, Erasmus University of Rotterdam, University of Amsterdam and Utrecht University have joined Radboud University and the WUR.

3.2.7 Education and training systems

In the Netherlands, several initiatives exist aimed at 1) realizing a sufficient supply of graduates in fields such as science, technology, engineering and mathematics, and 2) ensuring these graduates also have both the skills and mindset needed to succeed in their later career.

In 2013, a broad agreement was signed between industry and education institutions at various levels, in order to spur technological education; the ‘National Technology Pact 2020’, as referred to in previous chapters (see 2.1 and 2.7). The agreement has three main pillars: persuading students to choose for a technological education, increasing the number of technologically educated students who actually work in their field and lastly, ensuring that engineers who lose their job maintain active in the technology sector. One example of a project developed under the Technology Pact 2020 is the STEM (science, technology, engineering and mathematics) Teacher Academy¹¹³, which started in 2014. The main goal of the Teacher Academy is the development of internships for teachers in their designated fields, which should lead to inspiring teachers with more knowledge and practical experience, as well as stronger cooperation between education and business.

Another type of competences receiving special attention in education are the so-called 21st century skills: these include ICT literacy, critical thinking, problem solving, creativity, teamwork, and intercultural and communication skills. The platform ‘Knowledge Net’ (www.kennisnet.nl) lists which parties are active in this field.¹¹⁴ Apart from an announcement that the Ministry of ECS is exploring the option of launching a dedicated platform, Knowledge Net mentions activities by the councils of primary and higher education, by elementary schools, and by the University of Twente. Again, most of these efforts are still in an exploratory phase.

¹¹² EURAXESS (February 2015). [HRS4R Acknowledged Institutions](#)

¹¹³ STEM via Jet-Net (February 2015). [STEM Teacher Academy](#)

¹¹⁴ Kennisnet (February 2015). [21st century skills in the Netherlands](#) (in Dutch)

In order to stimulate excellence in education, the Sirius Program was established. Among other things, the Sirius Program has funded 20 different extracurricular excellence programs for bachelor students with €49mln. Programs on master level have started in 2010, with a budget of €12mln.¹¹⁵ Finally, the ‘Entrepreneurship and Education’ (O&O in Dutch) is an initiative which provides subsidies for both integrating entrepreneurship in education and stimulating entrepreneurial behavior in students. This led to 28 different projects, such as several centers of entrepreneurship at research universities.¹¹⁶

Finally, there also efforts to strengthen innovation skills in the Dutch economy. These do not only include the Technology Pact, but also the Human capital agendas proposed by the Top Sectors.¹¹⁷ Each Top Sector has developed a plan for better connecting education and labor market. Part of the Top Sector approach is that the public private partnerships united in Top Sectors invest in *Centres of Expertise* (higher education) and *Centres for innovative craftsmanship* (vocational education). See section 4.4 for more details on these centres.

As for entrepreneurship education: this is subject of the Ministry of EA and ECS’s ‘Action programme Education and Entrepreneurship’.¹¹⁸ The programme sets out to embed entrepreneurial skills and attitude in education, which may ultimately lead more students to start their own business. Seven action lines have been defined, including managing the Education Network Entrepreneurship, support for six Centres of Entrepreneurship, facilitating courses for teachers, certification, running the Scholarship Program on Entrepreneurship (SPOE), awareness creation, and research and monitoring of effects.

3.3 ERA priority 5: Optimal circulation and access to scientific knowledge

3.3.1 e-Infrastructures and researchers electronic identity

The harmonization of access and usage policies for research and education-related public e-infrastructures in the Netherlands is organized and stimulated by SURF.¹¹⁹ SURF is the collaborative organisation for ICT in Dutch higher education and research. It facilitates collaboration between ICT professionals, within networks and collaborative knowledge-sharing projects in the area of ICT innovation, thus ensuring access to innovative internet and ICT facilities. An example of such an innovation is the participation of all Dutch higher education and research institutions in [Eduroam](#), which is host network allowing students and staff members to access the wifi-connections of institutes other than their own. Since 2011, SURF also supports, develops and operates the national ICT infrastructure (e-infrastructure) for higher education and research ([SURFnet](#)). Other services include [SURFmarket](#) (aimed at providing students, lecturers and researchers with ICT products and services) and [SURFsara](#) (“supporting research by developing and offering advanced and sustainable ICT infrastructure, services and expertise”, including computing services and cloud services). The funding for SURF, €108mln in 2013 (out of which €34,7 by Min. of

¹¹⁵ Sirius Programma (February 2015). [The Sirius Program](#)

¹¹⁶ Sirius Programma (February 2015). [The Sirius Program](#)

¹¹⁷ Top Sectoren (February 2015). [Human Capital](#) (in Dutch)

¹¹⁸ Netherlands Enterprise Agency (February 2015). [Action Program Education and Entrepreneurship](#) (in Dutch)

¹¹⁹ SURF (February 2015). [About SURF](#)

ECS)¹²⁰, is made available in accordance with the government's response to the advice by ICTRegie on ICT research infrastructures.

No information on measures with regard to the support of a federated electronic identity is available at present. Universities and higher education institutions are all still using separate, non-linked accounts. While challenges such as personal data security and digital identity tracking are high on the Dutch societal agenda, no specific steps have been taken with regard to the digital identify of researchers.

3.3.2. Open Access to publications and data

Since 2005, all Dutch universities, the Netherlands Association of Universities of Applied Sciences (previously Council for Higher Education), KNAW, KB and SURF have signed the Berlin Declaration. In a parliamentary document published in January 2014, the Dutch State Secretary for Education, Culture and Science stated that access to the results of publicly funded research should always be free of charge, in addition to stating his intention to roll out open access in the near future.¹²¹ Moreover, ECS's Science Vision 2025 (see 2.2) describes the ambition of the Netherlands for all research publications to be open access in 2024. Since 2010, the NWO has been stimulating open access via, inter alia, the Incentive Fund Open Access, which provides funding to researchers who publish their research in an open access journal.¹²² Moreover, the KNAW stated in March 2011 that all KNAW-published research should be open access within 18 months after publication.¹²³

Narcis, the organisation that organizes central access of Dutch scientific information, currently provides access to approximately 780000 publications; 330000 of these are open access.¹²⁴ Six Dutch universities can partially be categorized as "Gold", while four universities have "fully Gold" policies. One university can be categorized as "Green". According to a 2011 study, the other three universities appeared to be doing next to nothing with regard to open access.¹²⁵ According to a '[State-of-art analysis of OA strategies to scientific data](#)' (ScienceMetrix, 2014), commissioned by the European Commission, the Netherlands are amongst the countries with the largest numbers of open data strategies and datasets. Apart from scientific data, the government also provides access to other types of data via her [Dutch National Open Data platform](#).

¹²⁰ SURF (February 2015). [Annual report SURF 2013](#)

¹²¹ Government of the Netherlands (2014). [About digitalisation in Higher Education](#) (in Dutch)

¹²² NOW (2010). [Report about NOW Symposium 12 October 2010](#)

¹²³ KNAW (February 2015). [KNAW gives impulse to free accessibility of scientific information](#) (in Dutch)

¹²⁴ [Open Access News](#) (February 2015). Retrieved from www.openaccess.nl

¹²⁵ UKB (2011). [Assessing Open Access policy per institution](#) (in Dutch).

4. Innovation Union

4.1 Framework conditions

An R&I-conducive environment hinges on two elements: provision of incentives for experimentation, and removal of barriers that might herein occur.

Legislation is of major importance when creating an innovation-supportive environment. The Patent Act (Rijksoctrooiwet; see section 4.3) is for evident reasons of relevance here, but also approaches like the Green Deal program. 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.¹²⁶ 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. In fact, also in a broader context it is increasingly acknowledged that all authorities exert influence on R&I dynamics, not just in laws explicitly devoted to this topic. The Ministry of EA has recently been stressing the importance of creating innovation-conducive framework conditions by reforming regulation with respect to, for instance, cabs or housing (thereby referring to the governmental ambition of participating in trends like the rise of innovative business models based on the idea of the sharing economy).¹²⁷ The Ministry of Infrastructure and the Environment is supporting experimentation by creating ‘regulation-free zones’, for instance when it comes to test driverless cars.¹²⁸

One of the central pillars in the Enterprise Policy is simplification of administrative processes. In the Coalition Agreement, it is agreed that the administrative burden for enterprises, citizens and professionals will have to be reduced with €2.5 billion. This goal has to be realized through a range of interventions presented in a [policy letter](#) (*Goed Geregeld*) by the ministers of Economic Affairs and the Interior Ministry. Selected measures include: prevention of unnecessary rules, duplication in data collection, harmonization and standardization of administrative procedures, focused use of ICT and digital services and better communication. A special initiative is the *Proof of Good Service* (*Bewijs van Goede Dienst, BvGD*), which is a certificate for helping municipalities to improve their services. Another action is the *program ‘Better and more concrete: good rules and focused service’*, in which local governments commit themselves to reducing administrative burdens.

In addition to reducing the administrative burden in general, the Dutch government also has been undertaking efforts to make individual policy measures more accessible. An example is the intention to simplify the TKI allowance and MIT-measure, which is supposed to attract more SMEs. Finally, since January 2014, SMEs can benefit from the availability of a one-stop-shop for businesses, rather than facing two separate institutions for

¹²⁶ For an English description: Industrial Efficiency Policy Database, NL-11: [Green Deal](#). Accessed on 25-02-2015.

¹²⁷ Maarten Camps (2015) – [Sturen op de toekomst](#). ESB.

¹²⁸ Ministry of Infrastructure and the Environment (Jan. 2015) – [The Netherlands as testing area for driverless cars](#).

administrative and advisory issues (for the merger of Syntens and the Chambers of Commerce, see section 2.2).

Acknowledging the importance of ICT and digitalization for innovation, the government is increasingly concerned with the topic of cybersecurity as well. This development is being boosted by a statement of the General Intelligence and Security Service (AIVD), arguing that the Dutch business model (as a whole) is being threatened by cybercrime.¹²⁹ In particular firms in the top sectors high-tech, energy and chemicals are often found to be victim of such attacks. Determined to avert this threat, the government announced to strengthen its cybersecurity measures in 2015. Amongst others, this includes the introduction of a certificate for safe internet for SMEs, as well as extension of the knowledge base on cybersecurity.

Relatively few policies aim to support R&I by targeting the demand for new knowledge. Apart from the Green Deals, one could think of the Interdepartmental Programme for Biobased Economy¹³⁰ (also striving for sustainable economy) and policies for innovative public procurement (see section 4.7). These interventions are relatively unconnected to traditional supply side policies; there is no overall design in which both types of policies clearly complement each other. Generally, the idea is that demand side policies create awareness for a particular desirable development, and that parties involved find their own ways of getting value out of being involved in contributing to this development. Of course, they can rely on the supply side policies that are applicable to their situation.

4.2 Science-based entrepreneurship

Science-based entrepreneurship in the Netherlands is being supported through several measures.

In order to bring university knowledge to the market, consortia of academics and entrepreneurs can apply for the [Technology Foundation STW's Valorisation Grant](#) ('Take-off', as of 2014). This grant is designed to take start-ups like university spin-offs through different growth phases. The €19mln of subsidies that was awarded to projects in the period 2004-2011 led to 47 successful start-ups, together having an annual turnover of €16,8mln. Apart from receiving funding from NWO (annually: €44mln) and the Ministry of Economic Affairs (€22mln), STW budgets also originate from co-funding by partners in research projects (€8mln) and in-kind contributions (€10mln).¹³¹

In the period 2005-2008, science-based entrepreneurship also used to be boosted via a Technostarter programme called '*Subsidy scheme Knowledge Exploitation*' (SKE). Many of the 18 locally oriented SKE-initiatives for technostarters have been continued as *Valorisation Programme* projects. The Valorisation Program subsidizes 50% of the costs of partnerships focused at knowledge valorization. In practice these are mainly incubation programmes aiming to facilitate knowledge transfer and the creation of university spin-offs. An example is Brightmove in the South-East of the Netherlands (follow up of the Incubator3+ programme), which brings together investors, universities, businesses and government. Other examples are programmes like Startlife (providing microcredits to

¹²⁹ AIVD (2014). [The Netherlands as a testing environment for self-driving cars](#). (in Dutch).

¹³⁰ NSOB (2014) – [An evaluation of the Interdepartmental Programme BioBased Economy](#).

¹³¹ See: <http://www.stw.nl/en/content/organization>. Accessed on 25-02-2015.

student starters, as well as pre-seed funds and proof of concept funds for technostarters) and Technojump (Technosprong; platform in the South-Holland province which is uniting stakeholders and providing funding as well).¹³² Another part of the Technostarter programme that is still being continued is the *Business angel program* (BAP). This instrument is designed to bring entrepreneurs and business angels in contact with each other, for instance via the [Business Angel Network](#) (BAN).

Policy measures explicitly focused on creation and development of innovative enterprises also include funding instruments like *SEED Capital* (Technostarter as well), the *Early-stage-funds* (VFF), the *SME loan guarantee scheme* (BMKB), *Microfinance*, and the *Growth facility scheme*. These are all described in detail in section 4.5.

4.3 Knowledge markets

IPR are seen as important to the Dutch economy and to the overall innovation performance of the Netherlands. One of the key indicators used in the annual Budget of the Ministry of Economic Affairs are IPR related. More specifically the Dutch performance on both patent applications (filed PCT patents) and trademarks applied for at the Office for Harmonisation in the Internal Market (OHIM) are carefully monitored. Over the period 2010-2012 the Dutch position on the first was quite stable (5th among EU-27 in 2012) and on the second slipping somewhat (9th position among EU-27 in 2012).

The main Dutch system for the protection of IPR is the Patent Act (“Rijksoctrooiwet” in Dutch). In essence, the Patent Act is similar to the European Patent Convention, as it provides innovators of a new technology, design, etc, with a temporal monopoly on their invention. At the same time, it functions as a way for inventors to decrease information asymmetry between the patent holder and venture capitalists. The Patent Act protects intellectual property for a maximum of 20 years. In a 2012 evaluation¹³³, it was deemed to have clear added value on the European Patent Convention, due to it being a system with substantial freedom of choice and a good mix between speed, costs and legal certainty. The conclusion also noted that the Netherlands contribute effectively to international IP platforms, and that the executing agency is successful in creating awareness about the possibilities of protecting IPR. The Netherlands Enterprise Agency (RVO) supports entrepreneurs with all (practical) aspects of patent applications and IPR in general.

In the past years, the Dutch government has created several policy instruments to stimulate the development of knowledge markets for patents and licensing. One main instrument is the Innovationbox (until 2010: Patent box); a fiscal system which allows profit from patents and R&D to benefit from a lower effective tax rate of 5%. Just like the other fiscal support measures for innovation (WBSO, RDA), to which the Innovationbox is an extension, the scheme is financed by the Ministry of Finance. A difference is that there is no predetermined budget for the Innovationbox, meaning it cannot be exhausted. Current debates about (possibly state-supported) tax evasion led to questions about the

¹³² Examples taken from RVO.nl: <http://www.rvo.nl/subsidies-regelingen/projecten-valorisatieprogramma>. Accessed at 25-02-2015.

¹³³ Ecorys (2012) – [Evaluation of intellectual property policy](#) (in Dutch).

effectiveness of the Innovationbox, as it might be used by multinationals that are actually performing their activities (including R&D) elsewhere.¹³⁴

According to a recent study, commissioned by the Ministry of ECS, a large share of university patents ultimately find their way to commercial applications.¹³⁵ Using data from research by, amongst others, the [Netherlands Patent Office](#), the KNAW shows that two thirds of Dutch university patents are sold or licensed to commercial enterprises. According to the Dutch law, ownership of results of scientific research lies with the knowledge institutions and not with the researchers (Rijksocrooiwet 1995, article 12 & 7). This only applies, however, when work is the result of a carefully framed project commissioned by the employer. In many situations in scientific research this is not the case, so copyright belongs to the researcher. In the Collective Labour Agreement of Dutch universities detailed provisions are included on the obligation of employees to report findings and to provide the employer cooperation to enable them to apply for a patent or other application. Almost all institutions also have internal regulations that stipulate how to deal with intellectual property.

4.4 Knowledge transfer and open innovation

Improving circulation and exploitation of scientific knowledge by supporting triple helix collaboration is one of the main pillars of the Enterprise Policy. The top sector approach is concentrated on nine priority areas characterized by scientific excellence and high export opportunities. Although selection of these priority areas resulted from a top-down process, actual design of sector-specific instruments is based on a bottom-up approach. For each top sector, a '*top team*' of entrepreneurs and researchers has been formed in 2011. These multi-institutional top teams are requested to optimize the scientific and commercial performance of their sector, in which knowledge transfer plays an essential role. Although the innovation voucher scheme is no longer continued, several instruments for knowledge transfer and collaborative efforts are made available to the top sectors.

In an interactive policy process, the government, the business sector and knowledge institutes in the top sectors jointly identified the problems and opportunities for each sector. The top teams presented their first *policy agendas* (2012/2013) in 2011. These so-called *Innovation Contracts*, which are updated bi-annually, contain integrated sector-specific roadmaps regarding domains like education policy, research policy, foreign policy, and environment policy. The latest Innovation Contract dates from 2nd of October 2013, when it was signed by the top sectors, knowledge institutions and the Dutch cabinet. In the *Innovation Contract 2014/2015*, these stakeholders promised an annual research investment of almost €2 billion euro (out of which about €970mln by the top sectors, and €1,06 billion public investments). In the Innovation Contracts, it is agreed how the available resources will be used in each Top Sector to build on existing scientific excellence and to meet the need for innovative solutions to societal problems. In this vein, alignment with the societal challenges formulated in European research programs and Horizon 2020 is emphasized in the latest contracts, amongst others by specifying the broader relevance of each research topic mentioned in the Innovation Contracts. Furthermore, participation in

¹³⁴ Minister of Finance (Nov. 2014) – [Response to questions about the Innovationbox](#) (in Dutch).

¹³⁵ KNAW (2014). [Benutting van octrooien op resultaten van wetenschappelijk onderzoek](#) (in Dutch).

European programs is supported with a total (cofounding) budget of €36mln for the years 2014-2017.

In the course of 2012, the parties collaborating in the top sectors established 19 *Top Consortia for Knowledge and Innovation (TKIs)*, which have started to implement the research agendas that are part of the Innovation Contracts (17 TKIs from 2015 onwards). Enterprises can participate in incidental or multi-annual research projects by investing resources. For each euro an enterprise contributes to a TKI, the government adds another 25%. This TKI-allowance, which is intended to spur private financing for TKI projects, had a total budget of 83mln euro in 2013.¹³⁶ Note that firms do not receive subsidy for their own research activities, but contribute to the joint research being performed in the TKIs themselves. The research within this TKIs is funded both through the TKI-allowance (inviting firms to contribute to applied research) as well as through other measures (e.g. the NWO grants aimed at fundamental research). Moreover, there is a difference between the sum of funds the TKIs collect using all those measures (for 2013: €200mln private plus €371mln public) and the amount of money they are actually spending on performing research projects.

Given the ambition to connect to European research programmes, as expressed in the Innovation Contract 2014/2015, part of the available funds is available to co-finance EU projects. In order to enhance the participation of SMEs in TKIs, firms can enjoy a special TKI-allowance of 40% for the first 20,000 euro they contribute. From 2014 onwards, SMEs also have the possibility to contribute this first 20,000 euro in kind rather than pecuniary. Moreover, each TKI has a contact point devoted to SMEs. These contact points help small and medium enterprises with identifying appropriate research programs and innovation activities. By relying on acquired experiences, both within the TKIs as well as in earlier platforms for public-private partnerships¹³⁷, it is planned for 2015 to make the criteria for TKI-allowance more demand driven and flexible with respect to how to use the investments. In 2014, a total of 1900 firms participated in the TKI's collaborative research projects, out of which 1400 SMEs. Thanks to the MIT-measure, 700 SMEs actually provided financial contributions. Their private funding of €60mln was complemented with the EA's MIT-budget of €30mln.

To improve the connection between education and labour market (especially within the Top Sectors) several *Centres of Expertise* (higher education) and *Centres for innovative craftsmanship* (vocational education) were established. In these centres students, teachers and businesses work together. At the moment there are 24 Centres of expertise¹³⁸ and 18 centres for innovative craftsmanship¹³⁹ (October 2014). To a large extent, these centres are located at one of the campuses in the Netherlands. According to an indexation of September 2013, there were 34 *campus initiatives*; 8 of them being in the idea phase, 10 of them recently started, 9 being in a phase of growth and 7 begin mature.

The RAAK Programme is a competitive funding scheme for research in applied universities. It consists of four programs: for the promotion of collaboration between polytechnics and SMEs, for collaboration between polytechnics and regional public bodies; RAAK PRO for

¹³⁶ For the TKIs related to the topic of energy, like the TKI for 'Biobased Economy', additional funding was available from innovation resources specifically related to energy (e.g. the measure 'SDE+').

¹³⁷ The most notable example of such platforms are the Technological Top Institutes (TTI).

¹³⁸ <http://www.centresofexpertise.nl/>

¹³⁹ <http://www.centravoorinnovatiefvakmanschap.nl/>

collaboration between polytechnics research organisations and companies; and RAAK international for collaboration between Polytechnics, their regional network and foreign organisations. Recently, budget cuts to this programme were prevented, and in 2014 the budget (now being allocated through NWO) actually increased with €13mln up to €30mln. This is partially due to an additional investment in practice-oriented research, amounting to €3mln in 2014 and €7mln in 2015.

Finally, Technology Foundation STW runs several programmes focused at knowledge transfer between the technical sciences and users of research results. The Foundation funds top scientific and technical (collaborative) research through a range of grants. On average, STW runs about 600 projects simultaneously. These projects result annually in 85 PhD theses, 600 publications and 10 patents.¹⁴⁰

When it comes to incentives for researches share their knowledge, there is increasingly support for including social impact in the evaluation criteria of scientific personnel. The Standard Evaluation Protocol (SEP), which describes the methods used by the VSNU, NWO and KNAW to periodically evaluate research conducted at Dutch universities and NWO and Academy institutes, does not use to contain assessment criteria on knowledge transfer. However, NWO promotes knowledge transfer to individual academics by including it as a selection criterion for funding proposals.¹⁴¹ Every proposal is (partly) evaluated based on the potential contribution to society and other scientific disciplines, as well as the specific expected gain for external parties who might benefit from the knowledge that would be created. Moreover, researchers are asked to come up with a concrete action plan to ensure knowledge transfer indeed takes place. As such, academics have an incentive to come up with proposals that score highly on the (potential) transfer of knowledge. Recently, a joint project called Evaluating Research in Context ([ERIC](#)) was performed by the Royal Netherlands Academy of Arts and Sciences (KNAW), the Association of Universities in the Netherlands (VSNU), the Netherlands Organization for Scientific Research (NWO) and the Netherlands Association of Universities of Applied Sciences (HBO-raad), and the Rathenau Institute.¹⁴² ERiC developed a methodology to assess the societal relevance of academic relevance, which should make it possible to reward researchers for engaging in knowledge transfer.

4.5 Innovation framework for SMEs

Recognizing that especially small, young firms face problems with acquiring capital, there are multiple additional (non-fiscal) policies exclusively devoted to *facilitate private R&D spending by SMEs*: The *Action plan SME funding*, submitted in July 2014, expands on several existing policies. In total, SMEs receive 65% of all innovation policy spending.¹⁴³

- *SME Innovation support Top Sectors (MKB Innovatiestimulerend Top Sectoren, MIT)*. One of the most important developments in 2013 was the launch of the MIT-measure. Purpose of the MIT-measure is to involve SMEs in the top sector

¹⁴⁰ www.stw.nl/en

¹⁴¹ NWO (2014). Call for proposals. *Investeren in N.W.O.-groot*.

¹⁴² <http://www.rathenau.nl/en/publications/publication/evaluation-of-research-in-context-a-quick-scan-of-an-emerging-field.html>

¹⁴³ Dutch ministry of EA (2014). *Monitor Company Policy* (in Dutch).

approach. To this end, a menu of partial subsidy instruments is available, ranging from collaborative business-to-business R&D projects, feasibility studies, knowledge vouchers, hiring highly qualified staff, networking activities and innovation brokers. The top sectors themselves advise the Ministry of EA which instruments are best suited to the needs of SME's in their sector and thus how to divide the available budgets of 2mln euro per top sector (including the crossovers of BioBased Economy and ICT). Given the success of the measure in 2013, the total budget for 2014 was increased to over €30mln.

- The *SME+ Innovation Fund (Innovatiefonds MKB+)*, which will continue as part of the new *Future Fund* in 2015 (see section 2.2), offers revolving funds for a period of four years (2012-2015) in order to increase the availability of venture capital for entrepreneurs. The aim of the Future Fund will be to on the one hand stimulate fundamental and applied research, while on the other hand finance innovative and fast-growing SMEs. The SME+ Innovation Fund currently includes several financial instruments for innovation and funding fast growing innovation companies. It consists of three main pillars:
 - *Innovation Credit*. The Innovation Credit supports development projects with high risks. Companies using the Innovation Credit pay back the loan if their project is successful, otherwise the loan can be converted to a grant. In 2013 the threshold for the Innovation Credit has been lowered to improve access to the scheme for small companies. Moreover, as from 2013 and until (at maximum) the end of 2014, the credit percentage of 35% will be raised till 50%.
 - *SEED Capital*. This scheme focuses on high technology or creative entrepreneurs. It provides public venture capital investment funds. The scheme improves the return-to-risk ratio for investors. In 2010, the Dutch government participated in 29 funds, together making available €40mln worth of risk capital.
 - *Dutch Venture Initiative (DVI)*. In 2013, this financial instrument with a budget of €150mln was launched in collaboration with the European Investment Fund (contributing one third of the funding). This most recent pillar with 'later stage venture capital' funds focuses explicitly on high-growth innovative enterprises. In 2014, the Dutch government decided on an additional injection of 100mln euro via the *Action Plan SME funding*, for the purpose of stimulating early phase investments by business angels and private equity parties.
- *SME loan guarantee scheme (Borgstelling MKB, BMKB)*. By stimulating banks to provide loans, this scheme allows SMEs to borrow more than would be possible with their own collateral. Until the end of 2014, the BMKB will be broadened by increasing the guaranty from 45% to 67.5%, with a maximum of €200,000 per firm.

- *Dutch Investment Agency (Nederlandse Investeringsinstelling, NII)*. In September 2013, the Minister of Economic Affairs [presented](#) his plans to improve the availability of funding for enterprises. Based on an analysis captured in the [report](#) 'Corporate funding', the minister decided to create a Dutch Investment Agency in cooperation with pension funds, insurers and banks. "By combining knowledge and expertise, and promoting standardization and economies of scale, it will act as an intermediary that matches supply of long-term finance with demand. The aim is to widen financing opportunities for profitable investments and encourage developments that market failure would otherwise prevent. The NII will concentrate on social challenges in the Netherlands in such areas as health care, energy, infrastructure, school buildings, housing and sustainability, and regional initiatives. Following consultation, a project planner will be appointed in the near future to set up an institution that can stand on its own feet in a couple of years."¹⁴⁴
- *Innovation Performance Contract (IPC)*. The IPC was a subsidy (€7.75mln in 2013) for multi-annual research projects between SMEs within a similar region, value chain, or (sub)sector. Although the IPC started as a generic measure, it was included in the Top Sector approach by adding the criterion of 'relevance for top sectors' in 2012. Almost half of the IPC-participants in 2013 belonged to a top sector (mostly HTSM and the Creative Industries). 2013 was the last active year for IPC: at present, existing projects will be finalized. Reserved budgets are now used for the MIT-measure. It is announced that a generic IPC-instrument with a budget of €3mln per year will be available in both 2015 and 2016.¹⁴⁵
- *Microfinancing*. Since 2009 the Ministry of EA has been supporting the availability of microfinancing, as executed by the non-profit Qredits Microfinance Institution. In the *Additional Action plan SME funding*, EA announced that Qredit now offers credit of up to €250,000, instead €150,000 as was previously the case. Other microfinance-related initiatives due to the Action plan include 400mln euro made available for financing alternative funding initiatives, 100mln for the Dutch Venture Initiatieve, as well as 25mln for early chase financing and 5mln for early stage capital funds. Finally, Qredits has expanded its services to coaching, mentoring and helping with credit requests previously denied by banks.
- *Growth facility scheme (Regeling Groeifaciliteit)*. This concerns another instrument for helping SMEs to access venture capital. Under the scheme, financiers who provide venture capital to SMEs receive a guarantee: if the bank or venture capital company incurs a loss on the investment, 50% can be reclaimed from the Ministry of Economic Affairs. The guarantee applies to, for instance, losses incurred on the sale of shares, the writing off of a loan, or bankruptcy. The term of the guarantee is a maximum of 12 years. No substantial recent changes apply to this instrument; in

¹⁴⁴ Budget Memorandum 2014, p. 4.

¹⁴⁵ Ministry of Economic Affairs (09-03-2015). [Kamerbrief over uitwerking amendement Van Veen/Vos](#). In Dutch.

a 2012 evaluation, the Growth facility scheme was evaluated predominantly positively.¹⁴⁶

- Subordinate Debt Fund (AGL fonds). In the *Additional Action plan SME funding*, the minister of EA stated his intention to support other parties in the development of a subordinate debt fund, as advised by the NII. The rationale behind such a fund is that it would help SMEs in attracting loan capital. The Subordinate Debt Fund is currently being investigated by Economic Affairs, in cooperation with the NII.

Table 7: Overview of policy measures for SME innovation.¹⁴⁷

Policy measures	Available budget (x €1 mln)
SME+ Innovation Fund*	
Innovation Credit	76.5 in 2015
SEED Capital	17.1 in 2015
Dutch Venture Initiative	21.6 in 2015
Funding policies	
SME Innovation support Top Sectors (MIT)*	28,0 in 2015
Eurostars	11,2 in 2015
Guarantee policies	
BMKB*	706,0 (yearly loan guarantee budget) 71,0 (cash budget 2015)
Growth facility scheme	85 (yearly loan guarantee budget) 71,0 (cash budget 2015)
Business loan guarantee scheme (GO) - see 4.6	400 (yearly loan guarantee budget)
Additional Action plan SME funding*	
Subordinate Debt Fund (AGL fonds)*	500.0 (from unused loan guarantee budget 2014-2015) and 12.0 (cash budget)
Loan guarantees: alternative funding initiatives	400.00 (from unused loan guarantee budget 2014-2015)
Loan guarantees: expansion Qredits	100.0 (from unused loan guarantee budget 2014-2015)
Dutch Venture Initiative +	100.0 (added to EA budget in 2014)
Structural early phase finance	12.5 per year from 2018 onwards
Supporting measures SBR+: improvement of credit information	5 multiannual in total
Supporting measures skills: improvement knowledge and know-how SMEs	5 multiannual in total
Supporting measures streamlining: better presentation and organization of instruments	3 multiannual in total
Supporting measures reverse factoring: program for inclusion SMEs	3 multiannual in total

* Measures with an asterisk were aimed specifically for SMEs

¹⁴⁶ Carnegie Consult (2012). Policy Evaluation Growth Facility Scheme (in Dutch)

¹⁴⁷ Ministry of Economic Affairs (October 2014) – [Response to questions on EA's Budget 2015](#) (in Dutch).

Apart from EZ's policy measures, the SME impulse funds, an initiative from pension funding companies, is making loans of up to €1mln available for SMEs with growth plans.¹⁴⁸ As noted in section 2.2, the new SME Impulse Fund is not a policy initiative.

The list of interventions provided so far indicates that SMEs have many places to go to for obtaining funding. While the available set of instruments might at some points be unclear to SMEs, at least they can benefit from other efforts to reduce bureaucratic complexity and administrative burdens (see section 4.1). SMEs also receive special attention in knowledge transfer programmes aimed at involving them in the activities of innovation/knowledge clusters; apart from the general TKI-allowance especially the SME-specific *MIT-instrument* is of relevance here (see section 4.4). In order to participate in European programmes, SMEs can also turn to RVO.nl's Team IRIS (formerly known as EG-Liaison). This is the Dutch National Contact Point for Horizon2020.

Finally, although not explicitly oriented towards small or medium-sized enterprises, also the large fiscal schemes in the Netherlands are popular amongst SMEs (see section 2.5.3 for a description of those schemes). All the fiscal instruments are eligible to innovative firms from any sector or size. Approximately two-thirds of the budget appropriated to the above-mentioned tax facilities is used by SMEs (over 95% of the users are SME's).¹⁴⁹

4.6 Venture capital markets

In addition to the instruments aimed at facilitating private R&D by predominantly SMEs, there is one instrument that focuses on large and medium-sized companies in the Netherlands. The *Business loan guarantee scheme (Garantie Ondernemingsfinanciering, GO)* allows them to borrow substantial amounts of money. Capital providers, since 2013 also including non-banking organizations, receive a 50% guarantee from the government. The term of the guarantee is a maximum of 8 years. The amount involved used to be between €1.5mln and €50mln, but has recently been increased to €150mln.

Another generic development in the field of financing research and innovation is the coalition's intention to support alternative forms of funding (e.g. credit unions, crowd funding, SME obligations) via promotion, reduction of legislative barriers and incorporation in existing measures.¹⁵⁰ In addition, a co-financing facility is in the works in cooperation with the EIF, aimed at professional business angels. €45mln will be provided by the Dutch government, while another €45mln will come from business angels, according to the *Additional Action Plan SME funding*. The purpose of this facility is to stimulate investments from venture capital. In the Netherlands, there are no special tax facilities for venture capitalists or business angels.

4.7 Innovative public procurement

Apart from instruments focused on providing access to finance, policy measures with a demand-side perspective are increasingly present in the Dutch innovation policy. First of

¹⁴⁸ <http://www.mkbimpulsfonds.nl/nieuw-mkb-impulsfonds-vult-gat-de-markt/>

¹⁴⁹ Ministry of Economic Affairs (2014). Progress rapport Enterprise Policy 2014 (in Dutch).

¹⁵⁰ Ministry of Economic Affairs (2014). Progress rapport Enterprise Policy 2014 (in Dutch).

all, the program *Innovative Procurement Urgent* (*Inkoop Innovatie Urgent*) aims to increase governmental expenditure on innovative solutions. The initiative is initiated by the Ministry of EA, but tries to engage other departments as well. Ultimate goal is to devote a minimum share of the governmental budgets (2.5%) to innovative solutions. Like in the existing *Small Business Innovation Research Programme* (*SBIR*), the 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 (see section 2.4). Inkoop Innovatie Urgent is supported by *PIANOo*, an expertise center for innovative procurement. In order to link supply and demand of innovative solutions in an early stage, it developed a virtual market place (www.innovatiemarkt.nl). At present, both Inkoop Innovatie Urgent and SBIR are still active programs. According to a check in April 2014, 3.6% of the number of public procurements concerned innovative procurement. In 2.7% of the cases, this also led to an actual innovative solution. The total number of 7 SBIR trajectories in 2014 was significantly higher than the 3 SBIRs from the previous year.

5. Performance of the National Research and Innovation System

5.1 Performance of the National Research and Innovation system

According to the Innovation Union Scoreboard (IUS) 2013, the average innovation performance of the Netherlands corresponds with a leading position in the group of innovation followers. In the IUS 2014 this place was lost to Luxemburg, positioning the Netherlands at the sixth place. Especially the excellent research system and its linkages with private businesses are contributing to this above-average-EU position. Somewhat weaker, on the other hand, is the business expenditure on R&D (see section 2.5). Further increase on this account is required for the Netherlands to join the select group of innovation leaders.

On average in 2012, the Netherlands produced 28.25 publications per 10,000 inhabitants, well above the EU-28 average (13.8). They are also internationally orientated with 53.98% of publications internationally co-published. In 2012 the Netherlands had about 1457 international scientific co-publications per million population, which is between the performance of Finland (1490) and Luxembourg (1669). In the period 2002-2012, 15.6% of the Dutch scientific publications were in the top 10% most cited publications worldwide in comparison with 11% of top scientific publications produced in the EU28 (ScienceMetrix, 2014).¹⁵¹ The share of public-private co-publications in the Netherlands is 3.9% in the period 2008-2013 against 2.8% for the EU28.¹⁵²

¹⁵¹ These publication data are based on Elsevier's Scopus database. ScienceMetrix, Analysis and Regular Update of Bibliometric Indicators, study conducted for DG RTD. They represent an update of the data displayed in the table below. See also http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=other-studies.

¹⁵² SciVal 2014, Scopus based publication indicators derived from Elsevier's SciVal platform, www.scival.com last accessed December 2014.

Table 8 Assessment of the Performance of the National Research and Innovation System

1. ENABLERS	Year	NL	EU
Human resources			
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	2011	1.90	1.70
Percentage population aged 30-34 having completed tertiary education	2012	42.30	35.80
Open, excellent and attractive research systems			
International scientific co-publications per million population	2012	1,456.75	343.15
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	2009	15.63	10.95
Finance and support			
R&D expenditure in the public sector as % of GDP	2012	0.93	0.75
Venture capital (early stage, expansion and replacement) as % of GDP	2012	0.09	0.08
2. FIRM ACTIVITIES			
R&D expenditure in the business sector as % of GDP	2012	1.22	1.31
Linkages and entrepreneurship			
Public-private co-publications per million population	2011	128.22	52.84
Intellectual assets			
PCT patent applications per billion GDP (in PPSE)	2010	5.45	3.92
PCT patent applications in societal challenges per billion GDP (in PPSE) (climate change mitigation; health)	2010	1.37	0.85
3. OUTPUTS			
Economic effects			
Contribution of medium and high-tech product exports to trade balance	2012	0.88	1.27
Knowledge-intensive services exports as % total service exports	2011	28.77	45.26
License and patent revenues from abroad as % of GDP	2012	0.65	0.59

Source: European Commission, IUS Database (2014).

A closer look at the indicators underlying the composite index reveals that performance in the category ‘enablers for innovation’ is well above the average of the EU27. This holds for the strength of human resources and the access to finance and support, but especially for the presence of an open, excellent and attractive research system. Outstanding is the number of international scientific co-publications: 1457 in the Netherlands versus a EU27 average of 343 (IUS2014). Also the percentage of scientific publications that is part of the top 10% most cited publications is above average (15.6% versus 11.0%).

In the category ‘firm activities’, the picture is somewhat more mixed. Notably the R&D investments of the business sector are lagging behind. Recent increases in BERD would not have been sufficient for a higher place in the overall ranking. Nevertheless, we observe that non-R&D investments have shown the fastest growth of all Member States (arriving just above the EU27 average). An explanation provided earlier is that this is due to the sector composition of the Netherlands, in which the tertiary sector is relatively well-presented (see section 2.5.1). It should be noted, however, that the IUS 2013 and 2014

recorded a rapid decrease of exports by knowledge-intensive services see 'Outputs'). As for the indicators on intellectual assets, the Dutch R&I system appears to be performing rather well. While statistics on applications to national patent offices are not always comparable across countries, they can provide some indication of technological development activities that are not captured by EPO/PCT data. In the Netherlands, almost 35 thousand patent applications were made at the EPO in the period 2000-2010 and a similar number took the PCT route. The National Patent Office received over 66 thousand applications in this period (these three figures are based on fractional counting).¹⁵³

The main reason that overall performance in the Output-category 'economic effects' used to be regarded as strong, was found in the license and patent revenues from abroad. Until 2011, the Netherlands used to be exceptionally strong on this account: the recorded 3.7% was well above the average of 0.58%. 2012 marks a sudden drop to 0.65%, which is only just above the EU average.

5.2 Structural challenges of the national R&I system

Looking at the performance and dynamics within the Dutch innovation system, several major challenges can be identified. The challenges below (summarized in

Table 9) are the most prominent ones, but in its assessment of the Dutch innovation policy (September 2014) the OECD also mentions weaknesses and threats like lagging productivity in some sectors, the frequent number of changes in innovation policy, limited public recognition of the benefits of science, technology; and entrepreneurship, and failures regarding the use of human capital and abilities to diversify into sectors of growing global importance.¹⁵⁴

First, like many other (European) countries, the Netherlands are struggling with the challenge to valorise the excellent knowledge it is producing. The indicators in the Innovation Union Scoreboard point at the contrast between the quality of the research system, resulting in relatively many (top) publications and doctorate graduates, versus a modest performance on the account of economic output. A common explanation is found in the business expenditures on R&D, which lags behind EU averages. In comparison, Dutch firms are less inclined to invest heavily in R&D. The necessity to improve the role of firms in diffusing and applying public knowledge is one of the drivers behind the innovation policy of the Ministry of EA.

Another urgent challenge is the need to improve availability of funding for innovation. In current times, firms experience difficulties with obtaining access to finance. Venture capital investments might be above the European average, but especially for small firms it remains difficult to fund their innovative activities. As for this specific group, the AWTI expressed his concerns regarding the accessibility of existing policy instruments. It also stated that SMEs are still poorly connected to the initiatives that are central in the Enterprise Policy.¹⁵⁵

¹⁵³ KU Leuven, Bocconi University, "Patents and Licensing study" for DG RTD – data release Summer 2014.

¹⁵⁴ OECD (September 2014) - [Reviews of Innovation Policy: Netherlands 2014](#). See especially table on p. 25.

¹⁵⁵ See section 2.6 for report of the AWTI.

With respect to various actors making up the Dutch innovation system, there is a risk that (small) firms are overwhelmed by the multitude of institutes that are of potential interest. The AWTI is concerned that a lack of clarity in the innovation system prevents fruitful interactions to emerge. Moreover, coordinating a large number of institutions brings costly governance structures. A particular issue which is currently at stake, is the question how to proceed with the six institutes for applied research (TNO, DLO, NLR, ECN, Deltares and Marin). From a market failure perspective, especially the possible competition with private parties deserves attention. Furthermore, with the introduction of the Top Sectors, the position of these institutes has to be reconsidered in order to improve the effectiveness and efficiency of the innovation system as a whole.¹⁵⁶ In order to be more efficient, the Minister of EA asked TNO and the applied research centers, together referred to as “TO2”, to develop their strategic agendas together. Apart from being linked to the TKI’s, the institutes within TO2 should also be aligned to each other. In 2014 the TO2 federation did already publish her integrated strategic agenda for 2015-2018, and this intensified collaboration is expected to continue in a similar approach for the period 2018-2022.¹⁵⁷

Apart from spurring economic progress, policy makers also face the objective to address societal challenges. On its own, the government cannot solve problems in domains like health or sustainability. Therefore, it sees it as its responsibility to support other parts of the innovation system in achieving innovative solutions. How this support can best be organized remains a puzzle. Various institutes and councils have called for societal challenges to be taken on board. Such critiques have recently been expressed by notably the Scientific Council for Government Policy (WRR), PBL, AWTI, and The Confederation of Netherlands Industry and Employers (VNO-NCW). By adhering to specific rather than generic innovation policy, notably in the form of Top Sectors, the cross-sectoral nature of many societal challenges is hard to address.

Finally, the presence of good education is essential for the future success of an innovation system. The IUS 2014 indicator for Dutch population aged 30-34 with a tertiary education shows a strong performance in comparison to the EU average, but the main concern on this account is the level of education. Due to the crisis, the government planned substantial budget cuts for educational institutions, which were only partially adopted in the end. Nevertheless, the common fear is that the search for more efficiency will go at the cost of quality. Additionally, it has been stated that excellent talent is not exploited adequately: educational institutions are urged to find methods for better challenging excellent students. A last challenge in the domain of education is found in the lack of science and engineering students. The attractiveness of beta-studies appears to be insufficient. With respect to good education it is worthwhile to note that from September 1st 2015, the basic grant for students in higher education will be replaced by a loan option. The supplementary grant and public transport card continue to exist. The Dutch government invests the money from the basis grant directly into the enhancement of the quality of higher education. This amount increases to a maximum of €1 billion. Examples of investments include intensive support for students; increase of contact hours; rewards for good scientist who also teach. Students, universities and colleges are given a major say in the destination of the money for higher education.

¹⁵⁶ Wetgevingsoverleg Ondernemerschap van 17 december 2012.

¹⁵⁷ Minister of Economic Affairs (july 2014) – [Reaction to strategic agenda TO2 federation](#) (in Dutch).

Table 9: Structural challenges and status of policy solutions

Challenges	Policy measures/actions addressing the challenge	Assessment in terms of appropriateness, efficiency and effectiveness
1. Better utilisation of the public knowledge infrastructure by firms	Knowledge transfer elements within Enterprise Policy	Top Sectors and TKI's are designed for improving valorisation. Bottom-up approach ensures involvement of businesses.
2. Improve availability of funding (esp. for SMEs)	Modification of existing and introduction of new funding measures. Removing administrative barriers.	Policy development addresses both the lack of funding and poor accessibility. Policy development addresses both the lack of funding and poor accessibility. Transparency and access for SMEs improved by merger of relevant agencies.
3. Reorganization of institutes for applied research (technological and scientific).	Five action points, formulated in 'Vision on applied research' (July 2013)	Some actions are still in phase of vision formulation, others are just implemented.
4. How to deal with (cross-sectoral) societal challenges?	Challenges are put on the agendas of Top Sectors, ambition to create linkages between them, and participation in Horizon2020.	No indications for efficiency or effectiveness yet.
5. Quality improvement of the overall higher education system	Strategic agenda on Higher education, research and science (Quality in Diversity, 2011), Science vision 2025 (nov. 2014).	Comments by stakeholders are mixed.

5.3 Meeting structural challenges

As the Ministries of EA and ECS develop their policies by organizing social debates and by consulting stakeholders, they are open to solutions for addressing structural challenges. In fact, the Top Sector policy is characterized by an unprecedented tendency to continuously experiment in public-private settings. This marks a significant change from the policy style in which one single strategy formed the basis for a static policy mix. The current approach build on several cornerstones as well, but these allow for adaptations in the design.

Generally, most of the efforts to address structural challenges have been implemented only recently, or are still under construction. This implies that so far there is no evidence regarding the effectiveness of the interventions.

Table 9, in the previous section, already summarized how the identified challenges are being addressed. We describe these policy measures in more detail below.

Stimulating closer links between enterprises, knowledge institutes and government has been a key motivation for the introduction of the Enterprise Policy. As the name suggests, this strategic program for innovation draws heavily on supporting businesses. Especially the creation of Top Sectors provides a structure for intensifying the role of firms in the innovation system. Their active role in developing innovation agenda's for TKI's ensures that policy support is directed to opportunities and challenges observed by firms. A detailed discussion of knowledge transfer activities is provided in section 4.4.

Several of the instruments in the Enterprise Policy aim to support innovation by providing access to funding. In terms of budgets, the tax exemption scheme WBSO is the largest instrument. Despite having ample opportunities for making use of the WBSO, SMEs are also targeted with other measures. As indicated in section 2.4, these include (amongst others), the MIT, Innovation fund MKB+ (including Innovation Credit, SEED Capital, Funds-of-funds), SME loan guarantee scheme, and IPCs. Actual use of the various instruments is supported with efforts to lower administrative barriers. A striking example in this respect is the merger of Syntens and the Chambers of Commerce as of January 2014. This should make it easier for SMEs to find their way to support.

In order to clarify and improve the role of public institutes of applied research, the Ministry of EA published a vision report in July 2013 (see section 2.2).¹⁵⁸ The report contains five action points: elaboration of the relation with private parties; focus on multi-annual research collaboration within Top Sectors; a shift from block funding to competitive funding; more focus on quality and impact; uniform governance structures. Several of these actions have already been initiated, since parts of the Top Sector policy have been developed in further detail after the report was published. Also the decreasing share of block-funding has already been budgeted. The institutes themselves will present their thoughts on how their activities relate to research efforts by market parties, whereas the Ministry of EA will explore how the institutes can be organized in a uniform way.

As for the societal challenges, the ministries of Economic Affairs and Education, Culture and Science released a brochure, named 'Global Challenges, Dutch Solutions', in which they clarify the link between societal problems and the Top Sector Policy.¹⁵⁹ This link is twofold: the ministries state that the R&D&I they are supporting will generate innovations with relevance for societal problems; and secondly, they stress that by making participation in the Horizon2020 program part of the Top Sector policy, also Europe's Grand Challenges have become part of Dutch R&D&I dynamics.

The structural challenge with respect to education has received ample attention in the past few years. In particular the earlier mentioned strategic agenda on Higher education, research and science ('Quality in Diversity') from 2011 and the Science Vision 2025 (November 2014) mark important steps towards improvements on this account. Currently, the long term National Science Agenda is being shaped through stakeholder consultations (see section 1.3).

¹⁵⁸ <http://www.rijksoverheid.nl/documenten-en-publicaties/notas/2013/07/05/visie-op-het-toegepaste-onderzoek.html>

¹⁵⁹ Ministries of Economic Affairs and Education Culture & Science (January 2014) [Global Challenges Dutch Solutions](#).

Annex 1 – References

- AIVD (2014) Niet alleen reageren, maar anticiperen op digitale dreiging. (in Dutch).
- APE (2013) Evaluation of the Innovation Credit 2006-2011.
- AWTI (October 2014) Top Sector Balance ('Balans van de Top Sectoren') 2014. (in Dutch).
- AWTI (October 2014): Balance of Top Sectors 2014 (in Dutch, accessed February 2015).
- Carnegie Consult (2012). Policy Evaluation Growth Facility Scheme (in Dutch)
- CBS (2014) Monitor Top Sectors 2014
- Court of Audit (2011). Innovation Policy
- Court of Audit (2012). Evaluation of policy effectiveness in central government . See also: 2013 update.
- Court of Audit (2014). Use of natural gas revenues: facts, figures and scenarios.
- CPB (2014) Public funding of science: An international comparison.
- Dutch Bureau of Statistics / CBS (February 2015). Careers of doctorate holders in the Netherlands
- Dutch ministry of EA (2014). Monitor Company Policy (in Dutch).
- EC Economic and Financial Affairs (March 2014). Macroeconomic Imbalances NL 2014. Occasional Papers 185.
- Ecorys (2012) – Evaluation of intellectual property policy (in Dutch).
- EURAXESS (February 2015). HRS4R Acknowledged Institutions
- European Migration Network (EMN). 2013. Synthesis report and policy and best practices in the Netherlands
- Eurostat: Employed HRST by category, age and occupation. Accessed at 25-05-2015.
- Government of the Netherlands (2012) Strategic Agenda for Higher Education, Research and Science in the Netherlands: Quality in Diversity
- Government of the Netherlands (2013) Progress Report Enterprise Policy 2013 (in Dutch)
- Government of the Netherlands (2013) Vision on applied research (in Dutch).
- Government of the Netherlands (2014) Future fund (in Dutch)
- Government of the Netherlands (2014) Letter on policy for ambitious entrepreneurs (in Dutch).
- Government of the Netherlands (2014) Next step public-private collaboration including transition. (in Dutch)
- Government of the Netherlands (2014). About digitalisation in Higher Education (in Dutch)

Government of the Netherlands (February 2015) Regulations for innovative starters from outside EU (in Dutch)

Government of the Netherlands (February 2015) Better chances of growth for enterprises of the future (in Dutch).

Government of the Netherlands (February 2015) Changes student financial aid (in Dutch)

Government of the Netherlands (February 2015) Prinsjesdag 2014: fortify economic growth (in Dutch)

Government of the Netherlands (February 2015) Substantially more support for entrepreneurs looking for financial aid (in Dutch)

Government of the Netherlands (February 2015). €50 million for Dutch knowledge institutes when retrieving European research fund (in Dutch)

Immigration and Naturalisation Service (February 2015). Highly skilled migrants

Impact Evaluation Working Group (2012) Dare to Measure: Evaluation designs for industrial policy in The Netherlands

Kennisnet (February 2015). 21st century skills in the Netherlands (in Dutch)

KNAW (2014). Benutting van octrooien op resultaten van wetenschappelijk onderzoek (in Dutch).

KNAW (February 2015). KNAW gives impulse to free accessibility of scientific information (in Dutch)

KU Leuven, Bocconi University, "Patents and Licensing study" for DG RTD – data release Summer 2014.

Maarten Camps (2015) – Sturen op de toekomst. ESB.

Minister of Economic Affairs (2014) - Beantwoording kamervragen over Europese Subsidies (in Dutch).

Minister of Economic Affairs (July 2014) – Reaction to strategic agenda TO2 federation (in Dutch).

Minister of Finance (Nov. 2014) – Response to questions about the Innovationbox (in Dutch).

Ministries of Economic Affairs and Education Culture & Science (2011) To the top: Towards a new enterprise policy

Ministries of Economic Affairs and Education Culture & Science (January 2014) Global Challenges Dutch Solutions.

Ministry of Economic Affairs (2013) Progress report Enterprise Policy 2013: Enterprise Policy at full speed

Ministry of Economic Affairs (2014) Monitor Enterprise Policy 2014.

Ministry of Economic Affairs (2014). Budget 2015.

Ministry of Economic Affairs (2014). Progress rapport Enterprise Policy 2014 (in Dutch).

Ministry of Economic Affairs (April 2014). Stability Programme

Ministry of Economic Affairs (February 2015) Information about agreements in Topconsortia for Knowledge and Innovation (in Dutch).

Ministry of Economic Affairs (February 2015). Netherlands Invests €140 million in European Space Programme

Ministry of Economic Affairs (February 2015). Reaction on requests for permanent commission regarding innovation contracts and human capital agenda's (in Dutch).

Ministry of Economic Affairs (May 2014) On course and Adjust ('Koersvast en bijsturen'): Top Sectors Agenda 2014. (in Dutch).

Ministry of Economic Affairs (May 2014). National Reform Programme 2014

Ministry of Economic Affairs (October 2014). Response to questions on EA's Budget 2015 (in Dutch).

Ministry of Education Culture & Science's Education Inspectorate (2014) The state of education in the Netherlands.

Ministry of Education, Culture and Science (2011): Strategic Agenda for Higher Education, Research and Science in the Netherlands: Quality in Diversity

Ministry of Education, Culture and Science (November 2014): Science vision 2025 (in Dutch).

Ministry of Infrastructure and Environment (Nov. 2014) – Launch of Dutch Coalition against Climate Change (in Dutch)

Ministry of Infrastructure and the Environment (Jan. 2015) – The Netherlands as testing area for driverless cars.

Ministry of Economic Affairs (February 2015) To the top: Enterprise policy in action(s)

MKB Impuls Fonds (February 2015) MKB Impulse Fund fills a gap (in Dutch).

Netherlands Enterprise Agency (February 2015). Action Program Education and Entrepreneurship (in Dutch)

NSOB (2014) – An evaluation of the Interdepartmental Programme BioBased Economy.

Nuffic (February 2015) INSEAD: Netherlands good at attracting talent (in Dutch)

NWO (2010). Report about NOW Symposium 12 October 2010

NWO (2013) Annual Report 2012 and Annual Report 2013.

NWO (February 2015). Ambition; International collaboration

NWO (February 2015). Money follows researcher (MfR-scheme)

OECD (September 2014) - Reviews of Innovation Policy: Netherlands 2014. See especially table on p. 25.

OECD Reviews of Innovation Policy (2014), Netherlands. Overall assessment and recommendations.

OECD StatExtracts (December 2014). 'Globalisation: Activity of Multinationals'.

Omroep Brabant (February 2015) 321 million for innovation in South-Netherlands (in Dutch)

PBL Netherlands Environmental Assessment Agency & CBS (February 2015) – Ratio of special-economic Top Sector policy.

Project funding is allocated through the research councils NWO and KNAW, who receive their resources from the Ministry of ECS. Apart from allocated funding directly to researchers or projects, NWO also funds other institutions that are in charge of organizing research projects. An example here is The Netherlands Organisation for Health Research and Development (ZonMw), which is funding health research programmes. The NWO and KNAW funding for these institutes is institutionally allocated rather than project-based.

Rathenau Instituut (2014) – Total investments in Science and Technology (TWIN) 2012-2018.

RVO.nl (February 2015) 70 million for knowledge and innovation (in Dutch).

RVO.nl (February 2015) MKB Innovation Stimulus Top Sectors (MIT) (in Dutch)

Scival 2014, Scopus based publication indicators derived from Elsevier's SciVal platform, www.scival.com last accessed December 2014.

See European Commission's DG for Taxation and Customs Union (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.

SER (2013) Make it in The Netherlands! Programme 2013-2016

Sirius Programma (February 2015). The Sirius Program

Smart Industry (2014) Smart Industry: Dutch industry fit for the future.

Social and Economic Council of the Netherlands (2014) Energy Agreement of Sustainable Growth: Implementation of the Agreement.

STEM via Jet-Net (February 2015). STEM Teacher Academy

SURF (February 2015). Annual report SURF 2013

Top Sectoren (February 2015). Human Capital (in Dutch)

UKB (2011). Assessing Open Access policy per institution (in Dutch).

Van den Broeck (2014) ERAC Infopaper April 2014

VNO-NCW and MKB-Nederland (2014). European Outlook – Europe: vital to Dutch companies.

VSNU (February 2015). Collective Bargaining Agreement Dutch Universities (in Dutch).

VSNU/NWO/KNAW (2014) Standard Evaluation Protocol (SEP): Protocol for research assessments in the Netherlands.

Wetgevingsoverleg Ondernemerschap van 17 december 2012.

WODC (February 2015). Wanted: foreign toptalent: Evaluation of the Regulation High Educated (in Dutch)

WRR (2014) The Netherlands' earning capacity'

Commissie Veerman (2010), Differentiëren in drievoud. omwille van kwaliteit en verscheidenheid in het hoger onderwijs. Advies van de commissie Toekomstbestendig Hoger Onderwijs Stelsel, Den Haag.

Ministry of Education, Culture and Science (2011): Strategic Agenda for Higher Education, Research and Science in the Netherlands: Quality in Diversity.

WRR (2013). The Netherlands' earning capacity: Towards a learning economy (last accessed February 2015).

Annex 2 - Abbreviations

AOW	General Old-Age Pensions Act
AWT(I)	Advisory Council of Science, Technology (and Innovation) Policy
BERD	Business Expenditures for Research and Development
BvGD	Proof of Good Service
CBS	Statistics Netherlands (Centraal Bureau voor de Statistiek)
CDA	Christian Democratic Appeal
CPB	Bureau of Economic Policy Analysis
CU	Christian Union
D66	Democrats 66 Party
DLO	Agricultural Research Institutes (WUR)
EB	Centre of Policy Statistics
ECN	Energy Research Centre Netherlands
EL&I	Ministry of Economic Affairs, Agriculture and Innovation
ERA	European Research Area
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
EU15	European Union including 15 Member States
EU27	European Union including 27 Member States
EA	Ministry of Economic Affairs
ECS	Ministry of Education, Culture and Science
FES	Economic Structure Enhancement Fund
FTE	Full Time Equivalent
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GL	Green Left party
GO	Business Loan guarantee scheme
GOVERD	Government Intramural Expenditure on R&D
HAVO	Senior general Secondary Education
HE	Higher Education
HEI	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
HTSM	High Tech Systems and Materials
ICT	Information and Communication Technology
IPC	Innovation Performance Contracts
IU	Innovation Union
IUS	Innovation Union Scoreboard
KNAW	Royal Netherlands Academy of Arts and Sciences
LCV	National Commissino of Valorisation
LTI	Large Technology Institute
MARIN	Maritime Research Institute Netherlands
MBO	Vocational Secondary Education
MIT	SME innovation support for Top Sectors
NII	Dutch Investment Agency
NL	The Netherlands
NLR	Aerospace Knowledge Enterprise
NSFC	National Science Foundation of China
NWO	Netherlands Organisation for Scientific Research
OECD	Organisation for Economic Co-operation and Development
PBL	Netherlands Environmental Assessment Agency
PMO	Company and Public Organisations
PPS	Purchasing Power Standards
PRO	Public Research Organisations

PVV	Freedom Party
R&D	Research and Development
R&I	Research and Innovation
RCI	Regional Competitiveness Index
RDA	Research & Development Allowance
RVO	Netherlands Enterprise Agency (formerly NL Agency)
SBIR	Small Business Innovation Research Programme
SCP	Netherlands Institute of Social Research
SER	Social and Economic Council of the Netherlands
SME	Small and Medium Sized Enterprise
STW	Research Council for Technical Sciences
TKIs	Top consortia for Knowledge and Innovation
TNO	An independent research organisation in the Netherlands
TTI	Technologische Topinstituten
UMC	University Medical Center
VSNU	Association of Universities
VWO	Pre-university education
VVD	People's Party for Freedom and Democracy
WBSO	Research and Development (R&D) tax credit
WRR	The Advisory Council on Governance Policy
WUR	Wageningen University and Research Centre (collaboration between Wageningen University and DLO)

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