Progress through renewal

2016 Enterprise Policy Report
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After five years of pursuing an enterprise policy, now seems an appropriate time to take stock of the experiences gained. The Dutch economic system has developed favourably in recent years. According to the World Economic Forum, the Netherlands is the EU’s most enterprising and competitive economy. The Netherlands is strongly positioned, with a highly educated workforce, a sound and reliable, physical and knowledge infrastructure and a good digital infrastructure. The country enjoys a reputation as an attractive destination for foreign investments. The Netherlands has a strong and open international orientation and cooperative structures, stable macro-economic parameters, a powerful and rich tradition of public-private partnerships (PPPs), an attractive climate for new start-ups and an effective government system.

Labour productivity in the Netherlands is among the highest in the world. This is in part due to the country’s government-designated Top Sectors: priority areas of the economy whose performance is above average when measured against international benchmarks. Each Top Sector possesses unique and specialised knowledge and increasingly applies that knowledge beyond its own boundaries, combining it with the knowledge specialisations of other sectors in crossovers that target societal challenges. As such, the Top Sectors and their cooperation partners also contribute to the objectives of the National Science Agenda (NWA) and Horizon 2020.

While the growth of the Dutch economy in the past few decades has been mostly the result of a larger labour input, in the years ahead it will be mainly driven by rises in labour productivity fuelled by innovation. The Netherlands is in a good starting position to develop further into a region that is able to strike a balance between sustainable prosperity creation and a high quality of life for individuals and society at large.

In the past few years, both the Advisory Council for Science, Technology and Innovation (AWTI) and the Organisation for Economic Cooperation and Development (OECD) have issued recommendations regarding the Netherlands’ enterprise policy. They both positively assessed that policy, but remarked that a number of changes are still to be implemented fully. Institutional reform requires a transitional period in which the players involved can adjust to the new policy frameworks. The AWTI concludes that the achievements of the Top Sector policy are substantial. The real gain is the innovation in collaborative efforts within the ‘golden triangle’ of businesses, knowledge institutions and government bodies, which draw up and implement agendas and action plans with a shared vision of the future. The AWTI recommends that the top teams and Top Consortia for Knowledge and Innovation (TKIs) be given the opportunity to continue to expand the collaboration established in the past few years.

The future requires an activating enterprise policy that builds upon the Dutch economy’s existing strengths. This calls for an active government that applies public-private partnership to societal objectives and missions. Radical innovation is served by versatile and flexible government regulation that allows a greater degree of institutional renewal to promote innovation, without compromising other public interests.

**Key results of the 2016 enterprise policy**
The government uses its enterprise policy to create a business climate that stimulates sustainable and innovative enterprise.

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The government has formulated three objectives for its enterprise policy:
1. The Netherlands is to be among the world’s top-five most enterprising and competitive economies;
2. Top Consortia for Knowledge and Innovation (TKIs) in which public and private parties participate for in excess of €800 million, of which at least 40% is from private financing;
3. Growth in Dutch R&D activities to 2.5% of the Netherlands’ gross domestic product (GDP).

The objectives of the enterprise policy for 2020 have been largely achieved. Table 1 shows the progress of these objectives.

![Table 1. Development of enterprise policy objectives](https://www.rijksoverheid.nl/actueel/nieuws/2016/03/31/fors-meer-steun-voor-innovatieve-snelle-groeiers)

- According to the World Economic Forum’s Global Competitiveness Report, the Netherlands is the world’s fourth-most competitive economy, and the most competitive economy in the European Union.
- Despite the turbulent economic situation of the past few years, the relative scale of R&D investments in the Netherlands shows a slight upward trend to 2.00% (2014); this was in large part due to the amendments to the Promotion of Research and Development Act (WBSO).
- On the European Innovation Scoreboard, the Netherlands has progressed from innovation follower to innovation leader. Together with (1) Sweden, (2) Denmark, (3) Finland and (4) Germany, the Netherlands (5) is one of the core group of countries that score at least 20% above the European average on 25 indicators of innovative strength.

**Table 1. Development of enterprise policy objectives**

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<tbody>
<tr>
<td>Global Competitiveness Index (WEF)</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Share of PPP in TKI</td>
<td>€ 622 m</td>
<td>€ 814 m</td>
<td>€ 1,020 m</td>
<td></td>
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<tr>
<td>TKI private share</td>
<td>35%</td>
<td>44%</td>
<td>48%</td>
<td></td>
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<tr>
<td>R&amp;D activities (% of GDP)</td>
<td>1.90%</td>
<td>1.94%</td>
<td>1.96%</td>
<td>2.00%</td>
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- Strengthening of the financial position of SMEs through various measures:
  - the guarantee instruments (SME credit guarantee, corporate finance guarantee and growth facility) have been temporarily expanded;
  - the availability of risk-bearing capital has been increased by, inter alia, the establishment of the Netherlands Investment Agency (NIA), the Netherlands Investment Institution (NLII) and investments by the Ministry of Economic Affairs and the European Investment Fund (EIF) in the Dutch Venture Initiative (DVI);
  - new providers and alternative forms of financing, including crowdfunding and credit unions, have been stimulated;

• improvements to information provision, including via the National Financing Guide.

✓ **The Netherlands has successfully secured its spot on the international start-up map** thanks to StartupDelta. In the EU, the Netherlands is ranked as having the fourth best start-up ecosystem. Major results of StartupDelta include the relaxation of the standard pay regulations for start-ups and the introduction of the Start-up Box.

✓ Recent months have seen further efforts devoted to large **public-private partnerships**, such as Qutech (quantum technology), ARC CBBC (chemical building blocks for energy carriers, coatings and materials), RegMed XB (leading institute for regenerative medicine), Holland Innovative Potato (new potato varieties that contribute to food security, health and climate) and the Institute for Oncology. In these partnerships, both large and small private parties commit to publicly funded research for a number of years. These partnerships, as well as new public-private and public-public partnerships, have received an additional impetus with the elaboration of the National Science Agenda (NWA).

✓ As part of the Rijk Regio SME cooperation agenda, provinces, the Ministry of Economic Affairs and Top Sectors are working together to **help SMEs navigate the range of national and regional innovation instruments on offer**. As of 2016, all provinces are participating in the SME Innovation Stimulation Programme for Top Sectors (MIT).

✓ In the 2015-2016 academic year, more young people in secondary and higher education chose science and engineering subjects. There were **approximately 20% more enrolments in engineering programmes** across the board. The economic recovery has also resulted in an increase in the number of vacancies in technical and ICT professions

✓ A total of 206 Green Deals (as of July 2016) have been concluded since the launch of the strategy in 2011. This strategy has proved successful in achieving concrete green growth results in society at large.

✓ In 2015, the Invest in Holland network attracted to the Netherlands more than 300 foreign companies, which together invested **€1.87 billion in the Netherlands** and **created 9,300 additional jobs in the country**.

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**National Icons**

Following a successful first election in 2014, the government will again be appointing National Icons this autumn. The National Icons illustrate the Netherlands’ aptitude for developing innovative solutions to societal challenges: innovations that the Netherlands can be proud of, both now and in the future. The aim of the National Icons is twofold: to put the Netherlands on the map as an innovative country and to raise these Top-Sector projects to the next level by providing tailored support. The first round proceeded successfully and has yielded excellent results: the launch of a European flagship for quantum technology (Qutech), public-private partnerships in the area of stem cell technology (organoids) and partnerships with East Africa in the area of potato propagation (Solynta). For more information, visit [www.nationaliconen.nl](http://www.nationaliconen.nl).

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The enterprise policy also has a specific track: the Top Sector policy. Top Sectors are clusters of export-intensive companies and knowledge institutions that account for the greatest concentration of Dutch R&D investment. The government’s Top Sector strategy brings together entrepreneurs, knowledge and education institutions and government bodies to work on the development and implementation of competition strategies and innovation agendas. In this comprehensive approach, the participating parties work on joint research agendas (via the TKIs), the availability of technical personnel (via the Technology Pact and the Human Capital Agendas of the Top Sectors), targeted economic diplomacy, attracting foreign investment, identifying and eliminating specific restrictive laws and regulations, participating in European research and innovation programmes, utilising ICT applications and promoting more sustainable energy use. Since each Top Sector has its own particular character (in terms of technology, the nature of the economic activity and specific obstacles), there is scope for tailoring the policy approach per sector.

Financial resources have been made available for the implementation of the enterprise policy. The Ministry of Economic Affairs’ 2016 budget sets aside €1,159 million for its generic innovation policy (WBSO, Eurostars, InnovationPerformanceContracts) and €134 million for its specific innovation policy (TKI allowance, MIT, JTIs, Eureka clusters). Around two thirds of all of these financial resources will benefit small and medium-sized enterprises. To improve access to funding, the government acts as guarantor for basically sound enterprises in their efforts to secure financing. In 2016 total guarantees provided amounted to €1.7 billion.

AWTI recommendation 'Be flexible, differentiate, choose wisely'. Top Sector Evaluation in 2016

Minister Kamp (Economic Affairs), acting also on behalf of the Ministry of Education, Culture and Science, asked the AWTI to issue a recommendation regarding the Top Sector strategy. Now that this strategy has been pursued for almost five years, the AWTI has been asked to reflect on experiences with the strategy up until now and to examine possibilities for the next step. The recommendation was presented to the Minister on 6 September 2016.

In its recommendation, the AWTI concludes that the innovation of collaboration within the golden triangle of entrepreneurs, researchers and government bodies has been the true gain of the Top Sector strategy. It has resulted in greater dynamism than had been expected. The public-private partnership, as realised in the past few years, is of great value. The AWTI therefore recommends that the Top Sector strategy can and must be continued and further developed, and argues for a broader application to significant themes. It also recommends clarifying and differentiating the objective and the target group by offering tailored solutions within the Top Sector policy. Furthermore, the AWTI advocates an intensification of the strategy, including an strong link with the National Science Agenda.

In addition to the results of the interim evaluation for the TKI allowance and the upcoming analysis of the Top Sector strategy, this AWTI recommendation presents important ideas for the new government. The experiences and the initial results of the past period, supplemented with the AWTI recommendations, form the basis for the further implementation of the Top Sector strategy so that it contributes to sustainable economic growth.

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1 Previously, the AWT(I) issued an advisory letter on the Top Sector strategy in 2013, a full recommendation in 2014 and another advisory letter in 2015.

Investments in research and innovation are vital for the Netherlands’ future earning potential, the resolution of societal challenges and the ability to take up economic opportunities. The Netherlands has an excellent starting position in this area, as evidenced by international rankings. The country has also further strengthened its position under the current government. According to the 2016 European Innovation Scoreboard, the Netherlands, which comes in fifth place in that ranking, is one of the core group of leading innovative countries.
1.1 Highlights of the past five years

Under the Top Sector strategy, public and private parties cooperate on developing breakthrough technologies and solutions to societal and economic challenges. The various parties involved are forging stronger relationships, as evidenced by the anticipated rise of private contributions to innovation contracts, from €968 million in 2014 to €1,156 million in 2017. The TKI allowance and the joint programming by knowledge institutions and businesses play an essential role in this regard. Major public-private partnerships have been established over the past period. The R&D toolkit has also been further developed through, among other things, merging the WBSO and the RDA, changed access to the innovation box based on international agreements and the evaluation of the innovation box, the introduction of the MIT and the development of an up-to-date Intellectual Property (IP) system in the form of the unitary patent. The Future Fund provides a framework for the course embarked on in 2012 to work more intensively with revolving instruments.

1.2 Investments in R&D

Investments in R&D are the key to future sustainable economic growth and the resolution and economic leveraging of societal challenges. Table 1.2 shows a substantial increase of total R&D expenditure between 2011 and 2014. While this development is positive and the Netherlands is currently approaching the EU average of 2.03%, the country has still not achieved its objective of 2.5%. As part of the European semester, the Netherlands has been advised to target government spending more on research and development. The Dutch government replied that as soon as there was sufficient financial scope, it would include the advice to increase the prioritisation of its expenditures in its decision-making going forward. Given that levels of private investment in the Netherlands are lagging behind those in other countries, public investments will also need to focus strongly on eliciting additional private R&D.

WBSO

The Promotion of Research and Development Act (WBSO) is the most important government incentive for private R&D expenditure, supporting nearly 23,000 innovative entrepreneurs annually by lowering the costs of R&D. Ninety-seven per cent of the scheme’s participants are SMEs. It is estimated that in 2016 65.4% of the budget will go to SMEs, while the SME share of total R&D expenditure is approximately 40%. In addition to R&D wage costs, investments in research equipment or prototypes, for example, have also been eligible for WBSO grants since this year. The merger of the WBSO and RDA has made this

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Table 1.1: Position of the Netherlands in international rankings

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<thead>
<tr>
<th></th>
<th>2010</th>
<th>2015</th>
<th>2016</th>
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<tbody>
<tr>
<td>Position of NL in the Global Competitiveness Index (WEF)</td>
<td>7</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Position of NL on the European Innovation Scoreboard (European Commission)</td>
<td>8 (innovation follower)</td>
<td>5 (innovation follower)</td>
<td>5 (innovation leader)</td>
</tr>
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</table>

Table 1.2: Dutch R&D expenditure in 2011-2014

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tr>
<td>R&amp;D expenditure as a % of GDP</td>
<td>1.90</td>
<td>1.94</td>
<td>1.96</td>
<td>2.00</td>
</tr>
<tr>
<td>- of which the private sector accounts for</td>
<td>1.08</td>
<td>1.10</td>
<td>1.09</td>
<td>1.12</td>
</tr>
<tr>
<td>- of which the public sector accounts for</td>
<td>0.83</td>
<td>0.84</td>
<td>0.87</td>
<td>0.88</td>
</tr>
<tr>
<td>R&amp;D expenditure, in millions of euros</td>
<td>12,235</td>
<td>12,512</td>
<td>12,746</td>
<td>13,268</td>
</tr>
<tr>
<td>- of which the private sector accounts for</td>
<td>6,922</td>
<td>7,078</td>
<td>7,095</td>
<td>7,433</td>
</tr>
<tr>
<td>- of which the public sector accounts for</td>
<td>5,313</td>
<td>5,435</td>
<td>5,651</td>
<td>5,834</td>
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Source: Statistics Netherlands (CBS), Statline

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10 Parliamentary papers II, 2015/16, 34, 302, No. 120.
11 The unitary patent allows inventions to be protected in 25 countries through a single legal procedure.
12 The European semester is the framework for coordinating the economic policy of EU countries.
13 Parliamentary papers II, 2015/16, 21501-20 No. 1125, 30 May 2016.
15 Previously, these costs were compensated via the Research and Development Tax Credit.
scheme even more user-friendly and effective. Both in 2016 and 2017, the scheme will focus on innovative SMEs seeking to grow with an increased assistance percentage for the first €350,000 in R&D costs. In 2015, a WBSO application had a probability of success of 97.5%, regardless of whether an intermediary had been engaged.\footnote{Commitment from the General Consultation on Enterprise Policy, dated 11 February 2016, to inform the Lower House of the probability of success of WBSO and MIT applications.}

**Future Fund**
The Future Fund toolkit, such as the new Future Fund Credit for Research Facilities (TOF) scheme and the Innovation Fund SME+ (including the innovation credit), helps boost additional investment in R&D, particularly private investment. The TOF stimulates the establishment of research facilities and strengthens the knowledge infrastructure. The essence of the scheme is an interest-free loan with a long repayment period. An amount of €40 million from the Future Fund has been made available for the first tender. Interest was considerable: the available budget was oversubscribed by one-and-a-half times\footnote{Parliamentary papers II 2015/2016, 31 288 / 34 300 VIII, No. 543 dated 9 June 2016.}. The second tender will follow in late 2016.

**Testing factory for recycling PET bottles**
The Ministry of Economic Affairs has granted Ioniqa Technologies an innovation loan. This innovative start-up from Eindhoven is developing a new technology that allows polyethylene terephthalate or PET, a synthetic material used in the production of soft drink bottles etc., to be recycled endlessly. Thanks in part to this loan, the company is building a testing factory that will process in excess of 10,000 tonnes of PET per year.

**Deployment of Applied Research Organisations (TO2), NWO and KNAW**
The TO2 institutes (Deltares, DLO, ECN, NLR, MARIN, TNO) have intensified their collaboration by, for instance, working on joint projects that tackle societal challenges. Examples are big data analysis for smart farming and multi-material additive manufacturing. Moreover, they have continued their efforts to promote the involvement of Top Sectors and departments in the institutes’ long-term knowledge-based basic research so that the knowledge developed effectively meets the needs of its users. Thanks in part to these developments, the TO2 institutes are well aligned with Horizon 2020 and they are securing ever-increasing TKI allowances.

**Intellectual property rights as an incentive for innovation**
The Ministry of Economic Affairs has tightened up the intellectual property system. In particular, the establishment of the unitary patent, the unified patent court and Dutch involvement in this development are important for internationally operating businesses. For example, worldwide the Netherlands submits the seventh largest number of European patent applications. Rules of play for dealing with intellectual property rights in public-private partnerships have been drawn up and the intellectual property conditions of Technology Foundation STW have been updated to facilitate the effective sharing of knowledge developed in such partnerships. As such, the intellectual property system helps protect existing and future innovations.

The Netherlands Organisation for Scientific Research (NWO) also formulates research assignments jointly with the scientific and business communities and in relation to societal issues. The choice of subjects is the result of close consultations between researchers and the corporate sector. In the years ahead, the NWO will target its Top-Sector activities more on programmes that cut across the various Top Sectors, so that these activities also contribute to the National Science Agenda and Horizon 2020. In late 2015, the Hubrecht Institute (of the Royal Netherlands Academy of Arts and Sciences (KNAW)) and the Life Sciences and Health (LSH) Top Sector also concluded agreements for public-private partnerships in the area of new genetic analysis methods and research aimed at developing medication that promotes recovery following a heart attack.

**Promising Innovation Policy Report from the CPB**
In the past few years, various reports have been published with positive assessments of the Dutch government’s innovation policy, such as the policy analysis of the Ministry of Economic Affairs’ budget Articles 12 and 13 (2015) and the OECD innovation review (2014). In its Promising Innovation Policy report (2016), the CPB confirms the importance of innovation for the growth of prosperity and the role of the government in stimulating it. The policy analysis and the innovation review involved a comprehensive analysis of the entire innovation policy and toolkit. The Netherlands Bureau for Economic Policy Analysis (CPB) only examines specific instruments and sets out policy options for these instruments. Consequently, it does not discuss the innovation policy as a whole or the coherence of the toolkit. The options described by the CPB for separate instruments roughly cover two areas:
changes to fiscal instruments and financial regulations, and the organisational changes in the Dutch innovation landscape. With respect to the first area, the CPB indicates that its conclusions are based on empirical evidence; with respect to the second area, the CPB indicates it has little empirical evidence with which to substantiate the predicted effects.

1.3 Cooperation

Agreements have been laid down in innovation contracts regarding the intensive collaboration between the world-class Dutch public knowledge infrastructure, government bodies and companies. Thanks to this collaboration, knowledge is more effectively channelled to innovative products and services and companies are delivering a direct financial boost to the Netherlands’ knowledge infrastructure. Around €80 million in TKI allowances were allocated to knowledge institutions in 2015. A total of around €400 million in TKI-related incentives have been secured for knowledge institutions. The establishment of public-private partnerships is stimulated by the TKI allowances and – partly – by the MIT scheme. The large public-private partnerships demonstrate the strength of a joint approach to research and innovation.

Innovation contracts

The 2016-2017 innovation contracts and the underlying 2016-2019 Knowledge and Innovation Agendas (KIAs) encourage the Top Sectors and their partners to expand their knowledge position, as evidenced, for example, in a rise of private sector involvement in innovation contracts. In the past few years, the TKIs have invested in building communities, involving small and medium-sized businesses and collaboration between knowledge institutions and businesses. As promised to the Lower House, the effectiveness of the TKIs and the promotion of mutual collaboration will remain a focus of attention. As part of this effort, in 2016 the number of TKIs was reduced from 17 to 12.

TKI allowance

In terms of the number of joint ventures and the scale of private sector contributions, PPPs have been quite successful. The objective of the enterprise policy for PPPs based on the TKI allowances has been achieved. The 2016 Ministry of Economic Affairs budget has raised the target for 2020 from €500 million to €800 million. The desired growth of large strategic PPP initiatives and an increasing need for collaboration across sector boundaries require a relaxation of the conditions of the TKI allowance. Consequently, large and cross-sectoral collaboration projects will be permitted to apply directly to RVO.nl for project allowances that relate to the year 2017.

This avenue offers a solution to parties that have formed PPPs at their own initiative, but also for cross-sectoral projects whose coordination cannot be definitively assigned to a single TKI. In order to highlight this new option, the name ‘TKI allowance’ will be changed to ‘PPP allowance for research and innovation’. The existing application procedure via a TKI will continue to apply.

Health funds are investing enthusiastically in public-private partnerships

In the past few years, participation by health funds in PPPs has risen dramatically, a development that has been assisted by the Ministry of Economic Affairs’ incentive policy via the TKI allowance scheme. In the LSH top sector, health funds, knowledge institutions, the business community and the government cooperate in finding innovative solutions for serious health-care challenges affecting society, such as cancer, diabetes, and heart and kidney failure.

The top institutes for oncology and regenerative medicine (RegMedXB), the plans for which have been announced this year, are examples that distinguish themselves in terms of focus, mass and impact. By jointly investing in knowledge and innovation, these institutions are working towards the accelerated development of new treatment methods and solutions for patients. With these strategic PPPs, the Netherlands has gained an international reputation as a hotspot for new activity, research and innovation.

Commitments from the General Consultation on Enterprise Policy, dated 11 February 2016: Under the chairmanship of the Ministry of Economic Affairs, the TKI directors convene several times a year to discuss strategic topics, such as the KIAs, mutual cooperation on cross-sectoral themes and the organisation of the TKIs.

The Horticulture and Starting Materials TKIs have been merged into a single TKI. Furthermore, the EnerGO, SWITCH2SmartGrids, Solar Energy, Gas, Offshore Wind Farms and Energy and Industry TKIs together make up the Energy TKI.
The Dutch economy is powered by entrepreneurship. Entrepreneurship is the engine needed for gathering and utilising knowledge, trying out ideas, developing and marketing new products and for bearing the associated risks. As it is essential for companies to use the very latest knowledge, they work closely with customers, the education sector, financial institutions and the government. The government wishes to facilitate a good business climate, offer possibilities and opportunities and ensure the right preconditions are in place.
2.1 Highlights of the past five years

The enterprise policy has continued to develop in the past few years. There is a greater sense of connection with stakeholders and more self-regulation at companies. This is reinforced by the government’s continuing focus on generic preconditions for entrepreneurship: funding, human capital, excellent services, decreased regulatory pressure and attention to ambitious start-ups and companies that want to grow.

**Start-ups and scale-ups**

Start-ups and scale-ups are hugely important to our economy. They are a source of innovation and employment: 42% of new jobs are created by young companies. With groundbreaking technologies such as photonic chips, blockchain and 3D printers, start-ups and scale-ups are working on resolving societal challenges in areas such as health care, energy, cybersecurity and agriculture. In her capacity as StartupDelta special envoy, Ms N. Kroes has put the Netherlands on the map as a successful start-up location. The Netherlands is currently the third fastest-growing start-up ecosystem in the EU and comes fourth in the ranking for best EU start-up ecosystem after London, Berlin and Paris (Compass, 2015). Important results achieved include the relaxation of the standard pay regulations for start-ups, the Start-up Box, which helps start-ups easily navigate to the most suitable government scheme. The startupdelta.org portal is the Dutch ecosystem’s calling card both at home and abroad. While StartupDelta was initiated by the Ministry of Economic Affairs together with the Ministry of Education, Culture and Science and the Ministry of Security and Justice, it is now increasingly supported by innovation hubs and other parties in the start-up and scale-up ecosystem. To give the second phase of StartupDelta an impetus, His Royal Highness Prince Constantijn of the Netherlands has been appointed the new StartupDelta special envoy.

**2.2 Reinforcing the financial position of SMEs**

The credit crisis has had consequences for the financing of high-risk enterprises, in particular, with fewer loans and a high rejection rate of credit applications. In response, the government has taken the following measures.

- **Expansion of the guarantee instruments**

  To allow SME financiers to finance more companies, the government-guaranteed scheme for (relatively small) loans to small and medium-sized enterprises (BMKB) has been expanded. A pilot that opens the BMKB to non-banking credit providers has also been launched. Moreover, the Growth Facility has been expanded and the Business Finance Guarantee for larger loans has been set up.

- **Increased availability of risk-bearing capital**

  Via the Future Fund and its precursor, the Innovation Fund, more than €600 million has been made available for innovative SMEs via innovation credits, seed funds, the DVI and the ROMs, etc. Additionally, €75 million has been invested in the Early-Stage Funding (VFF) scheme and the co-investment scheme for business angels (particularly focused on start-ups). The VFF scheme will be made permanent from 2018. The European Investment Fund has supplemented the contributions to DVI and business angels with almost €167.5 million, with contributions from the province of Noord-Brabant amounting to €5 million. The Ministry of Economic Affairs stands surety for the Subordinated Loans Fund of the Netherlands Investment Institution.

- **Stimulating new financiers and alternative forms of financing**

  In addition to financing from banks, alternative forms of financing, such as crowdfunding, credit unions, SME bonds and chain financing are supported by guarantee frameworks, promotion campaigns and other means. The government also continues to support Qredits for loans of up to €250,000. In early 2016, a government guarantee was used to raise €100 million from the European Investment Bank (EIB) for Qredits to provide new micro and SME loans.

- **Information and services**

  Together with private partners, the National Financing Guide has been set up to increase the transparency of the financing market and make it easier for SMEs to find new forms and providers of funding. ‘Fink’, a pilot set up by the Ministry of Economic Affairs, aims to provide companies with ready insight into their chances of receiving funding from various financiers; furthermore, financiers need information on the possibilities of companies. The financing for the measures referred to is derived from, among other sources, the 2014 supplementary SME financing action plan. This plan represents a total of €155 million in additional funding and a €1 billion guarantee budget, which should result in an additional €2.5 billion in additional funding for the SME sector.

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Parliamentary papers 32-637, No. 244, Supplementary SME Financing Action Plan, 8 July 2014.
• Establishment of the Netherlands Investment Agency (NIA)
The NIA was established in the summer of 2015 with the aim of generating more investments with broader societal benefits for the Dutch economy. A further aim of the agency is to ensure that entrepreneurs and project owners are able to avail themselves of the various public financing institutions and instruments as well as to effectively make use of EU resources, such as those provided by the EIB and the EFSI.

2.3 Strengthening human capital

For business owners, well-trained employees are the engines of their organisations. In addition to knowledge, such employees are the key to renewal and growth. But the business owner, too, must possess the right skills in order for the business to grow successfully. This starts with good education in entrepreneurship.

Education in entrepreneurship

The Ministry of Economic Affairs supports the Young Enterprise Foundation, which has introduced around 35,000 pupils and students to education in entrepreneurship. This number is expected to grow to 55,000 in 2016. In 2016 the Netherlands Professors Platform for Entrepreneurship (NLPO) was launched. The platform was established by entrepreneurship professors at universities of applied sciences who have joined forces to create practice-based challenges and opportunities in collaboration with the business community and government bodies. The National Applied Research Authority (part of NWO) has launched a pilot to stimulate the marketing of knowledge concepts and products developed at universities of applied sciences.

Attracting and training talent

The Technology Pact should ensure a well-trained working population with sufficient numbers of smart and competent technicians for today’s and tomorrow’s jobs. The pact was recently updated (in the 2016-2020 Technology Pact). A few outcomes of the Technology Pact are as follows:

- Approximately 20% higher enrolment in engineering programmes.
- In the past five years, the central government, businesses and regional authorities have invested €480 million in public-private partnerships in the vocational education sector by financing Centres of Expertise (CoEs) and Centres for Innovative Workmanship, including regional investment funds. More than 2,100 companies are currently participating.

- The link-up with action agendas such as the Code Pact of StartupDelta: a joint venture of 31 public-private partners that supports schools, teachers and parents in giving programming classes at schools and elsewhere.

The City Deal ‘Warm Welcome to Talent’ has been signed by four ministries and four municipalities in order to increase the appeal of the Netherlands to enterprising talent from abroad. Furthermore, the Ministry of Economic Affairs has worked on formulating effective prerequisites such as the simplification of the knowledge migrant scheme, which features attractive conditions to entice foreign knowledge workers to take up employment or work as self-employed individuals in the Netherlands. The ‘start-up visa’ allows business founders from outside the EU to receive a one-year residence permit for the Netherlands.
2.4 Self-regulation and services for entrepreneurs

Regulations and services should support entrepreneurs in their activities. This requires an outward-looking approach and more self-regulation in the market. Examples of self-regulation in which the Ministry of Economic Affairs has been involved include the establishment of a code of conduct and a disputes-resolution procedure by the franchise sector, payment instalments and betaalme.nu, Corporate Social Responsibility and the radical review of the Corporate Governance Code.

Modernising the Chamber of Commerce

The Chamber of Commerce (CoC) has been transformed into a single organisation in the past few years. The CoC manages the commercial register and advises enterprises in the Netherlands. Examples of its activities include the National Financing Guide, nlgroeit.nl and the digital ondernemersplein.nl.

Better use of data and information are the most important factors that keep a knowledge economy going. The government has access to huge quantities of data with much potential. The key initiative in this area is The State of the SME Sector. At the initiative of the Entrepreneurship Committee, detailed information on the Dutch business community and financing is available in a large open data platform.

The provision of more data as open data is expected to act as a major incentive for the Netherlands’ innovative capacity and, hence, for the Netherlands’ business climate. The government will soon release more information from the commercial register of the Chamber of Commerce as open data.

2.5 Scope for entrepreneurs

The government wishes to offer entrepreneurs greater scope. It intends to realise this ambition by reducing the regulatory burden for businesses, citizens and professionals by €2.5 billion and through a customised approach to regulatory reform; smarter, better and more efficient supervision; and better digital government services. The Ministry of Economic Affairs reported on this to the Lower House via the Regulatory Burden Spring Report and the letter titled ‘Working on future-proof legislation and a future-proof legislative process’ from the Ministry of Economic Affairs and the Ministry of Security and Justice.

In addition to the activities outlined above, there is the multi-year programme Scope in Rules (Ruimte in Regels), in which the government (the Ministry of Economic Affairs and the Ministry of Infrastructure and the Environment) and entrepreneurs together seek greater regulatory scope for innovative investments. Since its launch, the programme has addressed 244 regulatory obstacles (as of 1 August 2016). Clarity has been provided for 143 of these obstacles in the form of a solution (74), a problem-solving approach (57) or a reply qualifying the obstacle as ‘conflicting’ (12).

The programme’s aim is to provide entrepreneurs with a definitive answer within six months. Sira Consulting specifically investigated the obstacles faced by sectors, including Top Sectors, and Green Domains on behalf of the programme. The outcome of this investigation can be found on the website www.ruimteinregels.nl, where entrepreneurs can also report obstacles they have encountered.


22 Parliamentary papers 33009, No. 30, Werken aan toekomstbestendige wetgeving en een toekomstbestendig wetgevingsproces, 6 July 2016.

23 When the interests of regulations and legislation are incompatible with the interests of the entrepreneur.

24 This represents a response to the commitments of the General Consultation on Green Growth of 16 March 2016.
The national enterprise policy is coordinated actively with the provinces. Each province conducts its own regional economic policy in line with its own strengths and opportunities. The central government and provinces are jointly responsible for elaborating the EU’s structural policy for the Dutch regions, for example via the European Regional Development Fund (ERDF). This cooperation between central and regional government is particularly important for the SME sector, which is predominantly regionally oriented. In order to align national and regional economic policy, the central government, provinces, the Association of Provincial Authorities, the Dutch Federation of Small and Medium-Sized Enterprises and SME members of the top teams drew up an SME Central-Regional Government Cooperation Agenda in late 2014. In this agenda, the parties made agreements aimed at streamlining innovation policy and service provision for the SME sector. Progress on the agenda is reported each year to the Lower House.\(^{25}\)

\(^{25}\) Parliamentary papers, 29697, No. 23, Voortgang mkb samenwerkingsagenda en evaluatie Regionale Ontwikkelingsmaatschappijen (ROM’s), 8 June 2016.
SME Innovation Stimulation Programme (MIT)
Since 2015 the Ministry of Economic Affairs, the provinces and the Top Sectors have been acting in unison within the MIT to help the SME sector navigate its way through the range of national and regional innovation instruments on offer. This year all provinces will be participating in the MIT for the first time. Consequently, the 2016 budget has been increased to €55 million, of which €20 million has been provided by the provinces. Interest from the SME sector was again considerable in 2016. The MIT scheme offers the SME sector knowledge vouchers and grants for feasibility studies and R&D collaboration projects. The results show that the MIT responds well to the needs of entrepreneurs; often it is the offer of a helping hand that gets an innovative project off the ground. In 2015 the probability of success of an MIT application with the intervention of an intermediary was 77% as opposed to 54% without an intermediary. The reasons for this difference will be examined in the MIT evaluation in the autumn of 2016.

European Regional Development Fund (ERDF)
The ERDF in the Netherlands consists of four programmes for various parts of the country and four cross-border programmes that promote innovation and a low-carbon economy in these regions. During 2015-2016, all ERDF programmes were made public via grant schemes, calls, tenders and, in the western part of the Netherlands, also via funds. These programmes, with which the SME sector and the knowledge institutions are now well familiar, are leading to high-quality projects focused on knowledge valorisation, public-private partnerships in the Top Sectors, cluster development, sustainability, crossovers and smart industry. The European budget for the eight ERDF programmes amounts to €1.2 billion, of which half has since been allocated to projects. The Ministry of Economic Affairs has made a total of €140 million available for co-financing purposes, an average of 44% of which has been committed to projects.

Early-Stage Funding
The Early-Stage Funding (VFF) scheme has been developed by the Ministries of Economic Affairs and Education, Culture and Science to help companies form an impression of the planning phase during the start-up phase. VFF loans are available to start-ups and SMEs wanting to gauge the probability of their ideas succeeding in the market. This year the regions have become more strongly involved in VFF. The regions participate in the national advisory committee and regional teams have been established to inform and screen entrepreneurs.

Services
Under the authority of the provinces, agreements have been made between national organisations (such CoC and RVO.nl) and regional organisations with the aim of easing access to services for the SME sector. For example, all provinces currently cooperate in the national digital Answers for Business website (ondernemersplein.nl).

26 See https://www.rvo.nl/sites/default/files/2016/02/MKB Innoveert.pdf.
27 Commitment from the General Consultation on Enterprise Policy, dated 11 February 2016, to inform the Lower House of the probability of success of WBSO and MIT applications.
Regional development agencies
Together with the provinces, the Ministry of Economic Affairs is participating in five Regional Development agencies (ROMs). The ROMs strengthen the economy of the region through business development, strategic acquisition and participation in young, promising companies. The SME Central Government Cooperation Agenda assessed the ROMs positively. They are appreciated by the business community and are resulting in increasing coherence between the policy objectives of the central government and those of the provinces. The existing grant relationship with the ROMs will be continued for the period 2017 and beyond, for which a €1 million grant will be made available per ROM each year.

City Agenda
The City Agenda is an important programme in which cities, the central government, knowledge institutions, the business community and other stakeholders work together on growth, innovation and liveability in cities. Initiated by urban regions, City Deals are concluded with the intention of strengthening the agglomeration and networking power of cities. These deals differ strongly in scale, number of partners, objective and execution owing to their bottom-up approach. The Ministry of Economic Affairs focuses on the deals that are aligned with its own policy objectives, yield concrete results and can be scaled up to other cities and regions. Nine City Deals have since been signed.\(^{28}\) The Ministry is participating in six deals that are currently in the execution phase.

Examples of central-regional government cooperative ventures

**UNIIQ Investment Fund**
The Ministry of Economic Affairs was intensely involved in the establishment of the UNIIQ investment fund of InnovationQuarter through a contribution from the ERDF central government co-financing programme. UNIIQ is an investment fund of €22 million that targets the proof-of-concept phase, helping entrepreneurs in the province of Zuid-Holland to bring innovations to the market faster. Entrepreneurs receive start-up capital to put their plans into action and to bridge the risky phase from concept to promising enterprise. By working intensively with knowledge institutions and incubators, entrepreneurs are actively supported in their strategic development.

**Amsterdam Economic Board (AEB)**
Economic structure enhancement is a shared responsibility of the central government and the regions, and calls for societal challenges to be tackled in a coordinated and collaborative manner. One example is the collaboration in the Amsterdam Economic Board, which bases its strategy on five urban challenges (including the circular economy). The Ministry of Economic Affairs and other parties in the golden triangle cooperate in the AEB in order to properly coordinate their policy development and execution so that opportunities are created to assist the Netherlands on the road towards sustainable growth.

\(^{28}\) Parliamentary papers, 34139, No. 17, Voortgangsrapportage Europese Agenda Stad en Agenda Stad, 7 July 2016.
Green Growth and a Bio-based Economy signify an increase in the Netherlands’ earning potential as well as a reduction of the country’s environmental impact and use of raw materials, including fossil raw materials. The aim is to ensure continued economic growth while reducing the impact on the environment. Figures from Statistics Netherlands (CBS) show all that on average the Dutch economy has become ‘greener’ since 2000. Between 2000 and 2014, the economy grew by 15% while pressure on the environment decreased in the same period. Emissions of greenhouse gases (CO₂) as a result of consumption in the Dutch economy remained stable.
The transition to green growth is in full swing. Nevertheless, many steps still need to be made. This will require smart market incentives, a stimulating and smarter regulatory environment, innovation, greening through assistance, trade and investments, and collaboration and partnerships. Statistics Netherlands has noted that the Top Sectors account for a relatively large share (40-80% environmental efficiency) in the greening of the economy. Under the 2016-2017 Innovation Contracts, the Top Sectors have increased their commitment to societal changes, including green growth.

4.1 Bio-based / Circular Economy

Bio-based economy projects, manufacturing of bio-plastics and biomass flows for industry growing in the Netherlands (see Table 4.1). We are seeing the development of ever more bio-based and circular companies, supported by EIA/MIA schemes, the instruments of the generic innovation policy, the Top Sector policy and other resources provided by the central and regional government. The Bio-based Economy 2015-2027 TKI is expanding the Netherlands’ already excellent knowledge position. Companies and knowledge institutions will be investing €270 million in knowledge and innovation in the bio-based economy in the years ahead.

The strategic vision document entitled Biomassa 2030, which was presented to the Lower House, describes the sustainable deployment of biomass. In Horizon 2020, bio-based is an important theme in which the Netherlands plays a prominent role, such as with the ‘Pulp2Value’ project which strives to use bio waste flows in the manufacture of high-quality chemical components.

The letter on the nationwide circular economy programme was presented to the Lower House on 14 September 2016. It describes the government’s ambitions regarding the circular economy and the associated instruments.

4.2 Electrically powered transportation

The government is committed to the further development of electrically powered transportation in the Netherlands. The Energy Agreement contains agreements regarding our ambitions for emission-free driving in 2035 and 2050, by which latter date all cars are to be emission free. The intermediate objective for 2025 is for 50% of all newly sold cars to have an electric powertrain, of which at least 30% are to be fully electric.

The 2016-2020 Electrically Powered Transportation Green Deal was signed in April 2016. It aims to keep the Netherlands at the forefront in the area of electrically powered transportation. The central government and parties from the Formula E-Team (FET) have expressed the ambition of 10% of all newly sold cars having an electric powertrain and 75,000 privately owned electric cars, including 25,000 new electric cars, on the road in 2020.

On 9 June 2015, twelve parties signed the Publicly Accessible Electrical Charging Infrastructure Green Deal, which implements the agreements contained in the Energy Agreement to remove barriers to the roll-out of a public charging infrastructure. Under this deal, the Ministry of Economic Affairs and the Ministry of Infrastructure and the Environment are making €5.7 million available for the construction of additional public charging points.
4.3 Green Deals

Since the inception of the strategy in 2011, 206 (July 2016) Green Deals have been concluded, resulting in the achievement of concrete results involving more than 1,200 various parties in society. The Green Deals are an accessible and successful instrument for green growth, as evidenced by the evaluation submitted to the Lower House in June 2016\(^{31}\). The strategy has inspired the European Innovation Deals and will be rolled out in other sectors with Health Deals and City Deals.

The very first international Green Deal, the ‘North Sea Resources Roundabout’ Green Deal, was concluded on 3 March 2016. At the initiative of the Netherlands, in this deal France, Flanders, the United Kingdom and the Netherlands are cooperating on a materials roundabout for struvite, PVC and compost. Collaborative international efforts are removing regulatory obstacles to the application of and trade in secondary raw materials.

A number of recently concluded Green Deals are aiding the agendas of the Top Sectors:

- **Green Village Delft**: a Delft University of Technology test bed for innovative activities, including activities related to a hydrogen supply chain, use of fuel cells for electricity production and water treatment (Energy, HTSM, Water);

- **Business with Biomass and Bio-based Gas**: aimed at the practical implementation of bio-refining and multiple creation of biomass (Bio-based Economy, Chemistry, Energy, Agrofood).

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**Photanol**

Photanol is a Dutch start-up which produces chemistry directly from CO\(_2\) and sunlight using modified bacteria. The ability of these bacteria to bind CO\(_2\) using sunlight and combining them with fermenting bacteria can yield products such as ethylene, lactate, ethanol, butanol and bio-fuels. Photanol uses solar energy and CO\(_2\) exclusively, produces no waste and is highly efficient. The company currently produces aromas and flavours and intends to branch out into fuels and base chemistry in the future. Photanol is part of the bio-based economy TKI.

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\(^{31}\) Parliamentary papers 33043, No. 71, Beleidsevaluatie Green Deals, 30 June 2016.

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The Green Village in 2016/17. Situated on the Delft University of Technology campus, this is a link in the innovation chain from fundamental research to broad applications in society.
In the Netherlands, ICT makes a large contribution to economic growth as it is being applied within all economic and societal sectors at an ever faster rate. Thanks to digitisation, we now have access to new insights (analysis of complex medical conditions), new products (smart meters, drones), new services (digital marketplaces, personalised health-care services), new working processes (customer-specific production, efficient transport) and new businesses (start-ups). In the world of academia, digitisation goes hand-in-hand with the movement towards Open Science (open access to scientific publications and research results). It also offers great opportunities for education via developments like Massive Open Online Courses.
Key data
The Netherlands is one of the world’s most digitised countries:
• 2nd Digital Economy and Society Index (EU);
• 6th Networked Readiness Index (WEF);
• 8th Akamai’s ranking of Internet speed (Akamai Technologies).

The share of the ICT sector has continued to grow over the years. In late 2015, 4.6% of Dutch companies were active in the ICT sector. Almost 163,000 new companies were established in the Netherlands in 2015. Of these companies, 5% operate in the ICT sector.

In 2014, Dutch ICT companies raised their turnover by 5.4% relative to 2013. This growth rate considerably outstrips that for the entire economy (1.6%). In 2014, ICT companies invested 14.9% more than in 2013. In the same period, the economy as a whole grew far less strongly: 2.3%.

5.1 Highlights of the past five years
Digitale Agenda.nl (2011-2015) and Digital Implementatie Agenda.nl, launched in late 2011, represent the Ministry’s ambitions to apply ICT for national growth and prosperity, and the associated preconditions. The agenda includes a number of action lines that create more scope for entrepreneurs to work smarter, stimulate the development of ICT knowledge and skills and facilitate a fast, open and secure infrastructure.

Sufficient numbers of employees with digital skills
The Workforce Digital Skills programme aims to ensure there are sufficient numbers of employees with digital skills, particularly in the SME sector, the Top Sectors and in central government. More and better digital skills will raise the Netherlands’ innovation capability and labour productivity. To address the shortage of ICT professionals, Team ICT developed the Human Capital Agenda ICT in late 2015. The 2016-2020 Technology Pact also devotes special attention to the potential employment that the ICT sector can offer.

ICT breakthrough projects
In 2013 the government launched a series of ICT breakthrough projects with the aim of accelerating the application of ICT within nine sectors and themes. This programme, which has since been completed, showed us that the breakthrough approach has had a positive effect on the encouragement and expansion of ICT usage and the effort to scale up promising ICT innovations. Many SMEs have been aided by ICT innovation and the projects helped to generate greater attention and awareness within businesses and government bodies regarding the opportunities that ICT offers. Working with external promoters proved extremely useful: they were the driving force behind the successes achieved. The lasting value of the approach is evidenced by the fact that various activities are being continued by the parties involved. As a case in point, the Big Data breakthrough project is being continued in a public-private consortium (Commit2Data) of Team ICT, and the Enterprise Dossier is to be included in the My Government for Companies digital environment.

Open Geodata breakthrough project
The Open Geodata breakthrough project stimulates the reuse of open data by tackling obstacles and better coordinating demand and supply. This project has resulted in new products and services, such as the release of government files like the Current Elevation Measurements Netherlands and satellite data of the Netherlands Space Office; furthermore, Open Data Relays have been held in the Agri & Food, Water, Energy and Smart Logistics sectors and in the area of Smart Cities. The European space programmes Copernicus (earth observation) and Galileo (navigation) also produce large amounts of satellite data that is harnessed to provide new services to companies, knowledge institutions and government bodies. The release of the digital Current Elevation Measurements Netherlands elevation map version 2 (AHN2) has, for example, generated added value in the energy sector: using AHN2 in combination with the national addresses and buildings database has made the placement of solar panels more efficient. This project has also benefited archaeology as archaeologists can now use the small differences in elevation in fields revealed by AHN2 to find the remains of old settlements that otherwise remain invisible to the naked eye.

32 Team ICT promotes ICT innovation with and among the Top Sectors.
33 See the chapter on Top Sectors for an overview of the activities of Team ICT.
5.2 ICT research infrastructure

Research, innovation and education will be increasingly data-driven, resulting in stringent requirements for hardware, software and data infrastructure. At the moment, the Netherlands has access to SURF’s high-quality digital infrastructure for education and research. The SURF infrastructure can also provide added value to businesses. For example, in collaboration with partners from the business sector, SURF is modernising and developing new services on behalf of its members. Businesses and public and/or private research projects can make use of data facilities such as high-performance computing. It is important that SURF optimally capitalises on the opportunities for public-private partnerships, primarily due to the contribution to innovation, but also as a way of supplementing its long-term budget. In recent years the Ministry of Education, Culture and Science and the Ministry of Economic Affairs have made significant financial contributions to SURF. This year, another €1.1 million of the Future Fund has been earmarked for ICT infrastructure for education and scientific research, as conducted by SURF.

5.3 Smart industry

The digitisation of industry is well under way. Since 1 January 2015, the business community, knowledge institutions and the central government have been working to implement the Smart Industry Action agenda. The results of this agenda in the past year include the following:

- **Action Line 1: Capitalising on existing knowledge.** Activities are continuously being organised to alert business people about the opportunities available to them in the area of smart industry. These activities are conducted in collaboration with partners such as Metaalunie, the Association of Mechanical and Electrical Engineering (FME), the Federation of Industry Associations for the Rubber, Recycling and Plastics Industry (NRK) and Nederland-ICT. There is also a network of smart industry ambassadors which currently has 150 members.

- **Action Line 2: Field Lab Acceleration.** The first ten Field Labs have been established. Of these, six receive support from the ERDF as well as central government co-financing. The Field Labs also receive financing from various other national and regional funds. A second series of Field Labs has since been launched. The Smart Industry steering group has awarded three projects Field Lab status and a further five prospective Field Lab status. €10 million in loans has been made available from the Future Fund, and the Van Veen amendment has made an additional one-off sum of €5 million available for field labs. The Ministry of Economic Affairs will have a specific scheme for Smart Industry Field Labs ready by late 2016.

- **Action Line 3: Reinforcing the foundation.** Dutch companies have submitted proposals to STW and NWO for working with scientists in order to investigate the possibilities opened up by big data for smart industry, etc. This was partly made possible by the HTSM, Creative Industry and ICT Top Sectors. The Smart Industry route in the National Science Agenda has been detailed. NEN, FME, TNO and the Ministry of Economic Affairs will draw up a Smart Industry standardisation agenda. In order to facilitate the sharing of data between parties, the Ministry is working with parties in the field to develop a standard cooperation agreement. A digital version of this agreement is soon to be released.

5.4 Strategic acquisition

Via the plan entitled ‘The Netherlands, Digital Gateway to Europe’, the Ministry of Economic Affairs has been taking active and targeted measures to attract, maintain and further expand foreign investment in ICT since 2011. The focus is on the strategic acquisition of businesses with supplementary knowledge and expertise, which enables reinforcement of existing ICT activities in the Netherlands. The Netherlands Foreign Investment Agency (NFIA) is looking for foreign ICT companies that could provide innovative applications for Top Sectors, for example, in the field of eHealth.

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26 Parliamentary paper 31288, No. 431, Motion of Van Meenen / Mei Lie Vos regarding SURF, 8 June 2015.
28 Parliamentary paper 29826, No. 66, Stand van zaken Smart Industry, 5 February 2016.
29 Following up on Van Veen’s motion, Parliamentary paper 34300 XIII, No. 25.
30 Parliamentary papers 34300 XIII, no. 12, Amendement Van Veen dat zorgt voor aanvullend budget voor de bevordering van Smart Industry, 13 October 2015.
Cooperation between the Netherlands and India in the area of big data serving the safety of large groups of people

ICT can help in increasing the safety of large numbers of people concentrated in a single location. An international consortium of universities (in Netherlands, India, Singapore and Russia) and companies (including Tech Mahindra, Salland Electronics and start-ups) are gathering big data related to human behaviour during the Kumbh Mela, a Hindu festival involving more than 50 million people taking a ‘holy dip’ in the town of Ujjain. Data on how people move in crowds is collected using drones, mobile phone information and sensors. This aim of this research project is to develop prevention and government intervention methods. The project is being financed by NWO, the Indian Ministry for Electronics and IT, and the participating companies. The following Netherlands-based parties are involved: University of Amsterdam, Delft University of Technology, University of Twente, SURFsara and eScience Center.

5.5 Digital agenda

On 5 July 2016, Minister Kamp presented to the Lower House the Digital Agenda for 2016-2017\(^\text{39}\), the theme of which is ‘innovation, trust, acceleration’. While the focus of the previous Digital Agenda was predominantly on the reinforcement of preconditions and the digitisation of the government itself (services to citizens and businesses), this Digital Agenda contains a comprehensive approach and a broader scope to include the digitisation of sectors such as health care and mobility.

\(^{39}\) Parliamentary paper 29515 No. 390, Digitale agenda, vernieuwen, vertrouwen, versnellen.
The Netherlands’ international economic connections are a major source of prosperity for the country. Indeed, the Netherlands earns 32% of its revenues from international trade, which also generates a third of employment in the country. The Netherlands is the ninth largest investor worldwide and the tenth biggest recipient of international investments. The government is committed to the long-term strengthening of the Netherlands’ international earning capability and stimulates the international activities of Dutch companies and knowledge institutions. For example, Top Sectors receive targeted support through technology and innovation missions and targeted international matchmaking efforts. Moreover, the government’s activities also focus on improving the Netherlands’ business climate with the aim of attracting more foreign investments and knowledge workers from abroad.

Source: Statistics Netherlands, Internationalisation Monitor, Q1 2015.
6.1 Highlights of the past five years

The Top Sectors have drawn up internationalisation agendas which specify priority countries. In order to pursue these agendas, joint actions of the Top Sectors and the Netherlands’ international economic missions network have been formulated. These actions include the organisation of trade missions headed by members of the government, participation in strategic fairs, linking up national and international networks via embassies, trade councils and innovation attachés (IA Network), agriculture councils and the NFIA and Holland Branding. A number of internationalisation agendas focus primarily on export opportunities. The Top Sectors are working together with the Ministry of Economic Affairs, the Ministry of Foreign Affairs and Netherlands’ network of diplomatic missions to expand these agendas through innovation-based collaboration, attract knowledge workers to the Netherlands and acquire knowledge-intensive companies and investments.

Strategic Travel Agenda and missions

The Strategic Travel Agenda ensures that the travel agendas of members of central and local government are well coordinated and that visits are effectively followed up. Itineraries are determined in consultation with the Top Sectors and representatives from the business community. Between July 2015 and July 2016, 15 trade missions headed by members of the government were dispatched to 16 countries, in which 996 companies and other organisations from several Top Sectors took part.

The Ministry of Economic Affairs also organises specific innovation missions. To ensure an optimum return from such missions, effective follow-up is arranged through a long-term programme-based strategy for the Netherlands’ bilateral relations with priority countries.

Holland Branding

The objective of Holland Branding is to distinctively and persuasively promote the economic identity of the Netherlands and thereby strengthen the trading and investment position of Dutch companies abroad. This involves developing long-term strategic relationships with economic decision-makers in promising sectors in foreign countries and positioning the Netherlands as the ideal partner (with its comprehensive solutions, projects and open, inclusive approach) for resolving global and local challenges.

Assistance, trade and investment

The Netherlands promotes sustainable and inclusive economic growth in developing countries. The Dutch government sets the parameters for a healthy business climate and stimulates good business practices. Companies are encouraged to find innovative solutions to local challenges in developing countries. The Netherlands enjoys an excellent international reputation in the area of sustainable and productive agriculture, good water management and effective logistics. Consequently, the Dutch government supports the investments of a growing number of Dutch companies via the Dutch Good Growth Fund. The government supports a large number of partnerships for sustainable enterprise, food security and water, in which companies, government bodies, civil society organisations and knowledge institutions join forces. The Dutch contributions are helping developing countries to generate economic growth that will benefit everyone, resulting in more employment, more sustainable production and the structural transfer of knowledge and skills. Assistance, trade and investment go very well hand in hand.

6.2 Foreign investments and business climate

Invest in Holland

With the Invest in Holland strategy 2015-2020, the NFIA and regional partners are joining forces to attract foreign companies operating in knowledge-intensive sectors to the Netherlands and to intensify cooperation within the network. In 2015, the Invest in Holland network attracted more than 300 foreign companies to the Netherlands, which together invested €1.87 billion in the Netherlands and created 9,300 additional jobs here. The NFIA’s share was 207 companies, 7,779 jobs and €1.76 billion in investments (see figure). Furthermore, in 2015 the NFIA, in conjunction with the Innovation Attaché Network, focused specifically on the knowledge-intensive acquisition of R&D-intensive companies.

The Investor Relations Programme (formerly the Investor Development Programme) was further professionalised in 2015, thanks in part to co-financing from a number of provinces and municipalities. The programme is centred on the structural organisation of the joint (central government, regional partners, provinces and municipalities) strategic account management of international companies in the Netherlands.

41 For further details, see the half-yearly report to the Lower House from the Minister of Foreign Trade and Development Cooperation (BHOS) regarding economic trade missions, working visits and visits to the Netherlands by foreign delegations.
Since early 2006, an average of 40% of all new jobs and investments in the Netherlands have been brought about through this programme. The new strategy has also resulted in National Acquisition Teams for multiple Top Sectors, a half-yearly edition of the Business Climate Monitor and an award-winning new website.

Extra jobs in the Netherlands thanks to foreign investments in 2015

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Jobs</th>
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<tbody>
<tr>
<td>1</td>
<td>United States</td>
<td>1,534</td>
</tr>
<tr>
<td>2</td>
<td>Great Britain</td>
<td>1,171</td>
</tr>
<tr>
<td>3</td>
<td>China</td>
<td>1,090</td>
</tr>
<tr>
<td>4</td>
<td>Japan</td>
<td>1,049</td>
</tr>
<tr>
<td>5</td>
<td>Germany</td>
<td>718</td>
</tr>
</tbody>
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Due to efforts by NFIA

| 7,779 | €1.76 billion |

Extra jobs Investments

6.3 International cooperation in knowledge and innovation

Innovation attaché network

The success of the Dutch economy strongly depends on the competitiveness of Dutch companies in international markets and on the country’s high labour productivity. Emanating from the Netherlands’ most important innovation partner countries, the innovation attaché network connects the Dutch knowledge economy to the world’s best performing economies. The network supports roadmaps for Top Sector internationalisation, cooperates with the NFIA in enhancing the knowledge dimension of investments and acts as a link in both inbound and outbound knowledge and innovation missions. In addition to Dutch policy instruments for internationalisation (such as Partners for International Business) and for innovation, the Horizon 2020, Eurostars and Eureka European roadmaps are important tools for connecting to the world top.

Result of the innovation attaché network in Japan

Philips is the first non-Japanese company to be awarded an innovation grant from a Japanese innovation programme. This grant is a 50% contribution to a research project that Philips has set up with Showa University in Tokyo. The project aims to demonstrate how Philips’ Digital Pathology system works in practice. A conference on e-health and a dinner at the Dutch ambassador’s residence in honour of the visit by State Secretary Van Rijn - both organised by the innovation attaché in Tokyo - have expedited the dialogue between Phillips and Japanese policymakers.

European R&D programmes

The agendas of the Top Sectors are well aligned with the Horizon 2020 objectives and the societal challenges it seeks to address. The Netherlands is performing well in Horizon 2020. Through till mid-2016, the Netherlands has been awarded a total of €1.152 billion in financing, which represents a return of 7.6% compared with the Dutch contribution of 5%. Of this amount, 27.5% is earmarked for companies, significantly more than in the Seventh Framework Programme (20.7%). Of the financing awarded to Dutch companies, 56% has found its way to SMEs.

Eurostars-2 is an important R&D programme for the Dutch SME sector. The Dutch SME sector is among the top 3 in terms of the number of innovation projects financed via Eurostars-2. In addition, the Netherlands is one of the leading countries in the strategically important Eureka clusters ITEA3 (embedded software) and PENTA (microelectronics and nanoelectronics).

6.4 Netherlands’ Presidency of the Council of the European Union

The Netherlands held the Presidency of the Council of the European Union in the first six months of 2016. Below is a summary of the most important results achieved during the Netherlands’ Presidency in the area of competitiveness, research and innovation:

✓ The Netherlands has committed itself to a stronger European innovation and investment climate. One important result is the adoption of the innovation principle. This principle assesses the impact of new policy and laws and regulations on innovation, to ensure that regulatory measures do not form an impediment to innovation. The European Commission also launched the European Innovation Deals aimed at addressing barriers to innovation arising from existing laws and regulations. The Innovation Deals create scope for pushing forward innovations, such as drones or self-driving cars. This approach was inspired by the Dutch Green Deals programme. The European Commission has also embraced the proposal to introduce a European Start-up Visa, which should make it easier for innovative start-ups to scale up operations within the EU.

✓ Presided by the Netherlands, the European Council decided to adopt a number of objectives and measures that facilitate Open Science. For example, the Council has decided that scientific publications are to be freely available to everyone via Open Access from 2020. As a result, not only researchers but also citizens, general practitioners, teachers and entrepreneurs will be able to benefit from the fruits of scientific research. The Member States have also agreed to work towards the optimum reuse of research data, which is vital for the circulation of scientific knowledge and will boost the impact of investments.

✓ A large number of events were organised with the aim of better aligning the Dutch business community with EU policy-making and financing sources. One such event was the ‘Innovation Enterprise – Financing Ideas from Europe’ conference on financing for innovative entrepreneurs, organised by the European Commission and the Ministry of Economic Affairs. During this conference, the new SME Initiative Securitisation Instrument of the EC, EIB and EIF was signed. Also launched was the DVI II with a budget of €200 million (of which the Ministry of Economic Affairs and EIF each provided €100 million). The objective of both these schemes is to improve access to venture finance.

✓ The Ministry of Economic Affairs organised the 2016 BioEconomy Utrecht conference. More than 300 European stakeholders established the building blocks for the European Bioeconomy Stakeholders Manifesto. In addition to the manifesto, an important outcome was the renewed attention for Europe’s bio-based economy. The manifesto represents an important contribution to the review and a possible revision of the European Bioeconomy Strategy.

✓ A breakthrough in the discussion regarding the relationship between patent law and plant breeder’s rights was achieved at a conference organised by the Netherlands where the European Commission promised to further elaborate its biotech guideline. Alternative methods for effectively enforcing intellectual property rights were explored during the ‘Follow the money’ conference, which was organised by the Netherlands together with the EU-IPO.

✓ In the area of circular economy, the Ministry of Economic Affairs has adopted the Council conclusions that also emphasise the importance of the bio-economy as a green motor of the circular economy. The Member States praised the text, which they found to be very well balanced. The Netherlands will apply these conclusions to the national circular economy programme.

✓ During the e-health week, the Fast-track Initiative was offered to support SMEs and start-ups operating in the health-care sector with the introduction and scaling up of innovative e-health initiatives. The Ministry of Health, Welfare and Sport will provide €20 million over the next four years for this initiative. A direct consequence of the international e-health week is the organisation in January 2017 of a national e-health week to introduce users, care professionals, study programmes, businesses and regional policymakers to the possibilities offered by e-health, bring these parties together and thus create new alliances and business models.

✓ To help accelerate the digitisation of European industry, the European Commission issued a statement aimed at reinforcing European competitiveness in digital technologies (smart industry). This statement contains proposals on future-proof laws and regulations and the targeted monitoring of industry standards. It also emphasises the importance of a workforce possessing the right digital skills.
The Top Sector policy was launched in 2011 in the midst of the economic crisis. Following a period of economic stagnation, the Netherlands now continues along the path towards economic recovery. This turnaround is in part thanks to the strong performance of the Top Sectors. The added value of the Top Sectors is growing faster than the rest of the economy when adjusted for declining natural gas production. The Top Sectors are characterised by high labour productivity, an orientation towards exports and substantial R&D investments. The Top Sectors account for 91% of all R&D expenditures in the Netherlands.

Source: Statistics Netherlands and RVO.nl

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An alternative sector classification has been chosen for the Top Sectors Logistics and T&U owing to the availability of data. Consequently, these figures do not correspond with the figures on pages 59 and 63.

### Added value 2014 (in millions of euros)

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<thead>
<tr>
<th>Sector</th>
<th>Value (in millions of euros)</th>
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<td>HTSM</td>
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<td>LSH</td>
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### Employment (FTE) 2014 (in 1000’s)

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<th>Sector</th>
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<tr>
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<td>Energy</td>
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<td>Water</td>
<td>57</td>
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<tr>
<td>LSH</td>
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</table>
Number of companies 2014
Netherlands 1,460,550

Export goods 2014
(in millions of euros)
Netherlands 433,405

R&D expenditures 2014
(in millions of euros)
Netherlands 7,433
The Agri & Food (A&F) Top Sector is a powerful motor of our economy, accounting for almost 10% of the Netherlands’ national income and employment. In addition, the sector makes an important contribution to the country’s sense of well-being by supplying sufficient, safe and healthy foodstuffs to the Dutch population every day. The sector is a world player, with the Netherlands being the world’s largest exporter of agricultural and food products after the United States.
Key figures

<table>
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<tr>
<th>Indicator</th>
<th>2014</th>
<th>Share in NL (%)</th>
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<td>Number of establishments</td>
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<tr>
<td>Export</td>
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<tr>
<td>R&amp;D expenditures</td>
<td>688</td>
<td>9.3%</td>
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</table>

Source: Statistics Netherlands (CBS) These figures are based on the functional classification.

Safe and healthy food for 9 billion people

The impact of A&F on the economy and society is set to increase in the years ahead. The sector has an agenda for addressing future challenges and further expanding A&F’s strong position. The agenda focuses on three strategic opportunities for economic and societal growth:

- More with less: innovations in sustainable food systems are to lead to less use of raw materials and lower emissions of greenhouse gases per kilogram of food product.
- Higher added value: development of high-quality food centred around health, taste and convenience.
- International leadership through the export of products, knowledge and technology.

Highlights of the past year

✓ Together with stakeholders, the A&F, T&U and HTSM Top Sectors have mapped out the National Science Agenda’s ‘Sustainable production of healthy and safe food’ path, including eight ‘game changers’ to address the challenges surrounding sustainable food production.

✓ In the ‘High Tech to Feed the World’ crossover programme, the A&F, T&U and HTSM Top Sectors are collaborating on the harnessing of high-tech/ICT developments. The AgriFoodTech platform, partly supported by the Ministry of Economic Affairs and in which the LTO, FME and FNLI and 4TU sectors cooperate, organises related activities involving societal and social aspects of innovation in A&F. Since breakthrough innovations are largely introduced by new players, the Ministry has issued an additional tender for the Seed Capital scheme for investment funds targeting technology start-ups active in Agri-Horti-Food-Tech.

✓ In 2015, A&F joined forces with four food regions, chain parties, education institutions and government bodies to establish the Dutch Agri Food Week, which highlights food production and food innovations. The first edition generated around 40 events and attracted some 17,000 visitors. For the 2016 edition, the organisers are aiming for national coverage and will focus more strongly on consumers.
In late 2015, the food industry, together with regional education institutions, presented a vision for more efficient professional training. Major elements of this vision are higher numbers of better qualified graduates, the development of progressive learning pathways and the use of expertise in regional knowledge banks.

Under the MIT scheme, 74 feasibility, innovation and advisory projects and 24 R&D projects (representing a total of €6.8 million) were awarded within A&F in 2015. Nearly 340 SMEs were supported from 2012 through 2015.

In 2016, 31 new public-private partnership projects, representing a total of €59 million, were launched at DLO and TNO. International cooperation in Horizon 2020 was boosted by 57 projects with DLO/TNO (including a €3.2 million individual contribution in 2015).

54 submitted proposals in 2016 resulted in 18 seed money projects (four with T&U), in which companies, working with Wageningen University and Research Centre and agriculture attachés, explore ways of capitalising around the world on Dutch knowledge and expertise. One of the focus areas of these projects is efficient chain management and quality development in the fruit, potato, poultry, dairy and pork chains.

As part of the SBIR Sustainable Food Production scheme, five projects have received €1.25 million in financial support for their development processes. These projects focus, for example, on processing vegetable waste into valuable protein and ‘Green Phosphate’, whereby animal manure is processed into a natural fertiliser that is as convenient to use as artificial fertiliser.

Future opportunities
The Agri & Food sector faces an enormous challenge. In 2050, 9 billion people will need to be fed. Rising levels of prosperity mean these people will be wanting to consume more high-quality proteins such as dairy, meat and eggs while water, land and energy are becoming ever more scarce. This development will place high demands on the productivity and efficiency of the food industry as well as create pressure to counter the depletion of raw materials, reduce emissions and prevent food waste. The ageing population and growing incidence of diet-related diseases will increase the social significance of the sector.

The Agri & Food sector wants to contribute to sustainable food security in the Netherlands and the world and sees in this challenge a major opportunity to further expand its significance for the economy and employment. In addition, the Agri & Food sector contributes to the well-being of the people (through factors such as health, convenience, taste and enjoyment) and social challenges, such as healthy ageing.

**The IJKakker public-private partnership**
The IJKakker public-private partnership develops and tests innovative sensors which generate new soil and crop data that are stored in a database. The partners use this data to develop and implement the latest services in precision agriculture, which allows farmers to use pesticides, water and fertilisers much more efficiently. The companies involved are able to market these new technologies and services around the world.

**The TIFN public-private partnership**
This is a unique worldwide platform where international companies and science cooperate in the area of food and nutrition. Scientific insights and solutions for lifestyle and diet-related diseases are central to this programme. The past few years have seen scientific breakthroughs in numerous areas, including a further understanding of the relationship between nutrition and health (the gastrointestinal function). Industrial innovations based on strong evidence regarding nutrition, exercise and muscles are currently in development and will be extremely relevant for healthy ageing. Key indicators of the past 5 years: 8 patent applications, 70 PhDs and 275 prominent publications.

‘The award of the second phase of the SBIR Sustainable Food Production project is first and foremost a recognition of the fact that we are on the right track with the technology used in our “groenwit” project (which processes vegetable waste into high-quality protein). Moreover, it presents us with an opportunity to demonstrate via a pilot that it is possible to upscale the technology so that commercial operations will eventually become feasible. It will allow the A&F Top Sector to really boost the high-value use of the food chain’s inevitable waste flows.’

Paulus Kosters, director of Provalor BV.
‘Food production is getting ever smarter’

Aalt Dijkhuizen
ambassador Agri & Food

The world population is growing and prosperity is increasing. These are two reasons for the strongly increasing demand for food. At the same time raw materials are becoming ever scarcer. The need for smart food production has therefore never been greater. How can we ensure we have sufficient healthy food that is produced safely and with care? What new expertise and technology are required to achieve this? And which joint ventures is the Netherlands currently involved in in this area?

A conversation with Aalt Dijkhuizen, ambassador of the Agri & Food Top Sector.

How do you look back on the past few years?
‘For the past two-and-a-half years I have been the ambassador of the Agri & Food sector, and I look back on that period positively. We have devised a clear strategy and defined the sector’s collective ambition. We wish to retain our leading position in the area of Agri & Food, and expand it where possible. That means targeted innovations, achieving a higher return in the chain and strengthening our international role. Now that we have come together around the table as members representing the entire chain, we are able to seize opportunities and address challenges more effectively. As an ambassador I am in the unique position to bring together a top-notch team of companies and organisations and determine our joint objective and ambition. I believe in the power of collaboration. Indeed, it’s absolutely necessary. After all, we are dealing with an end-product for which every link in the chain is important. Each component is in itself well organised, but it’s the entire chain that determines the result and the impact. That connection between components is extremely important.’

Which Top Sectors do you cooperate with?
‘All of them. Food innovation and production has links with all sectors. Every year we draw up a Knowledge and Innovation Agenda. A very important collaborative effort in this regard is with the High Tech Systems and Materials (HTSM) and Horticulture and Starting Materials (T&U) Top Sectors; together we have set up a special programme, “High Tech to Feed the World”. With the Chemistry and Energy Top Sectors, our focus is on a bio-based economy. We wish to use green raw materials even more effectively for food, materials, chemistry and energy. In other words, we want to use waste flows and upgrade by-products. A further example is One Health, in which we are involved together with the Life Sciences & Health Top Sector. After all, we’re not only interested in healthy animals, but also in healthy people. Regarding the people aspect, think about the reduction of the use of antibiotics and the development of alternative products.’

Are there any recent developments to report?
‘Food production is getting ever smarter. We are making increasing use of high tech and ICT, for example through precision agriculture, also known as smart farming. Smart farming allows us to drastically reduce the use of water, energy and pesticides. Drones allow us to better monitor the growth of crops as well as use more targeted fertilisation and combat diseases. The use of robots is also increasing. Robots are becoming more common in the dairy sector especially, and are often Dutch inventions.’

What have been the highlights of the Agri & Food Top Sector policy up till now?
‘We are proud of the number of companies that have joined our research programme in the last four years. They number 400, of which no fewer than 300 are SMEs. Together with knowledge institutions, they are investing €210 million. Something else we are proud of is the Dutch Agri Food Week, where we join forces and demonstrate important developments and innovations. The programme features no fewer than 100 events, ranging from an international Agri & Food conference for professionals to a national cooking competition for kids. Last year the event was attended by 17,000 visitors and this year we again expect a high level of interest.’

What are your expectations for the future?
‘I think we will continue to perform strongly if we focus on the six major lines of our Top Sector. Those lines are an unflagging focus on knowledge and innovation, a strong SME sector, further internationalisation, targeted focus on sustainability, good access to the market and society, and high-quality education at all levels. All this depends strongly on close collaboration with the other Top Sectors, also from an international perspective. I’m therefore delighted that this collaboration is increasingly becoming a reality.’
Chemistry | The Netherlands is Europe’s fourth-largest producer of chemistry. The sector is increasingly focused on sustainability, with products that are largely recyclable or biodegradable. Through the development of new products with new advanced properties, the chemical sector is seeking to achieve maximum added value from its raw materials. Furthermore, chemistry is essential to other industrial activities. Many other industries use raw materials, auxiliary materials or subproducts from the chemical industry.
The Netherlands to be recognised worldwide as the leader in green chemistry in 2050

The chemical industry’s objectives for 2030 are as follows:

• The Netherlands is to remain one of Europe’s top four chemistry countries.
• The industry’s carbon source is 15% bio-based, 10% (chemically) recycled material and 75% fossil.
• 40% reduction of CO$_2$ relative to 2005.
• 60% of plastics are to be recycled (10% chemical recycling, 50% mechanical).
• The turnover of the chemical industry is growing by an average of 3% per year.
• An R&D intensity of 7% for the chemical sector (5.3% in 2012).

Highlights of the year

✓ New innovative public-private partnerships are being developed along four main elements, of which the cross-sectoral bio-based economy agenda is a part: Chemical Conversion, Process Technology & Synthesis, Chemical Nanotechnology & Devices, Chemistry of Advanced Materials and Chemistry of Life.

✓ Start of the Advanced Research Center Chemical Building Blocks Consortium (ARC CBBC) with approximately €110 million for the first ten years; long-term cooperation between the business community (Shell, AkzoNobel, BASF) and science (hubs Utrecht University, University of Groningen, Eindhoven University of Technology, other universities and TO2). ARC CBBC is a national research centre for research into complex chemistry and energy issues associated with the growing demand for the world’s finite supply of raw materials.

✓ Establishment of Chemielink (www.chemielink.nl), a network of nine innovative laboratories (including two new labs in Utrecht and Groningen) and five industrial centres for open innovation in chemistry.

✓ Outside the EU: Focus country China. NWO and its Chinese counterpart, the Natural Science Foundation China, have jointly issued a fundamental call in the area of advanced materials. In late 2016 a new call will be organised in the area of materials.

Key figures

<table>
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<th>Indicator</th>
<th>2014</th>
<th>Share in NL (%)</th>
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<tr>
<td>Number of establishments</td>
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<tr>
<td>Export</td>
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</tr>
<tr>
<td>R&amp;D expenditures</td>
<td>857</td>
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</tbody>
</table>

Source: Statistics Netherlands (CBS)
During the chemistry round-table discussions in late 2015, the Minister of Economic Affairs and the chemical industry underscored the importance of cooperation within the chemistry clusters. In the past few years, all six large clusters have taken steps: cooperation is being intensified in Amsterdam, the Rein Willems action plan is being conducted in Eemsdelta, and Terneuzen and Emmen are key building blocks in the recommendations of the Balkenende Committee and the Vollebregt/Alberda Committee. Chemelot and Rotterdam-Moerdijk presented an ambitious action plan in 2016 with a focus on further consolidation and sustainability.

Chemistry customised action plan, which includes the establishment of a chemistry service point (www.ruimteinregels.nl/chemieloket), digitisation of licences, a risk-oriented approach and increased uniformity in the application of laws and regulations.

With regard to human capital, there are some 100 new participants in the chemistry talent programmes. The Chemistry Top Sector organises a student competition. The innovation network has been expanded to include a new CIV (senior secondary vocational education) in Emmen and CoE (higher professional education) at the HAN University of Applied Sciences. The Physics and Chemistry sector plan has been drawn up to raise the numbers of students enrolling in physics and chemistry study programmes and to boost scientific research and education.

Future opportunities
The Chemistry Top Sector strives for maximum utilisation and stimulation of innovation in the sector by working on solutions to social challenges in the area of health, scarce resources, sustainable production, reuse of materials, energy, food supply and climate.

The key to the future competitive success of the chemistry sector lies in innovation, joint ventures, the cross-linking of carbon with bio-based chemistry, sustainability, high-value products and collaboration between major corporations and small innovative companies. The Chemistry Top Sector also works closely with the HTSM (smart materials), LSH (future medicines), A&F (bio-based and healthy food, etc.) and Energy (energy efficiency and smart energy storage and transport) Top Sectors.

Examples
Innovation Link as a platform that helps SMEs develop their innovative ideas in the areas of chemistry and energy. Below are several examples of SME innovations in which Innovation Link played a role:

- **Liquid seal**: new bio-based coating for flowers and fruits that gives these products a longer shelf life and results in less waste (nominated as a Chamber of Commerce top 100 innovative SME).
- **Biogas Plus**: development of a small-scale bio fermentation process linked to manure processing, in conjunction with a large international dairy corporation.
- **Sono-Coat**: fluorescent coating from SME Encapson that increases the visibility of needles and catheters during ultrasound-assisted interventional medical procedures.
- **GATT**: unique polymer-based General Adhesive Tissue Tape (GATT), a tape that can adhere tissue without leaking for surgical applications.
- **20MED-nanogels**: 20Med Therapeutics has developed an entirely new type of polymer nanoparticles (nanogels), which are highly effective in delivering medicines to cells.

KIEM enabled us at a very early stage of the start-up to conduct important experimental research together with Leiden University. The insights gained are the foundation of the current concept that serves as a "bio-based compostable alternative to polystyrene padded packaging". The technological development focus is now on scaling up the production technology.”

Peter Westgeest, Commercial Director of start-up company Generation of Change.

KIEM is one of the public-private partnerships being financed from the Chemistry Innovation Fund, in which SMEs work with research universities and universities of applied sciences to address research questions from practice. KIEM wishes to lower the threshold for SMEs wishing to collaborate with knowledge institutions.
Creative Industry | The Creative Industry Top Sector is made up of a number of sub-sectors, such as architecture, digital design, fashion, media & ICT, gaming and pop music. The Top Sector plays an important role in stimulating innovation (in other sectors) and in resolving societal challenges in the areas of care and energy, within the smart industry and the retail sector. The recognition of the Creative Industry as a Top Sector in 2011 provoked considerable debate. The introduction of the term Creative Industry and the efforts of the top team have resulted in the improved organisation of this Top Sector and created a sense of connectivity between its various subsectors.
Europe’s most creative economy
The ambition of this Top Sector is for the Netherlands to develop into Europe’s most creative economy by 2020. To achieve this goal, the Top Sector’s efforts are directed mainly at stimulating crossovers, reinforcing the sector’s knowledge base, increasing internationalisation (particularly with respect to Germany) and an improved alignment between education and the job market. Furthermore, the top team, working with the Dutch Creative Council, devotes a great deal of attention to SME access to financing and improving the sector’s organisation.

Highlights of the year
✓ TKI CLICKNL has been responsible for a substantial increase in private sector involvement in research and innovation within the creative industry. In 2015, approximately 400 private partners were involved in research and innovation projects in this industry. For these projects, consortia used NWO schemes, TNO research projects, SIA RaaK®, European projects and the MIT scheme.
✓ The launch of the future-proof business model for TKI CLICKNL and establishment of two large public-private research programmes by the sector with support from the Ministry of Economic Affairs and the Ministry of Education, Culture and Science. These programmes for fundamental research bring together researchers, professors in higher professional education, TO2 partners, clients and the creative business community with the aim of increasing the knowledge base of the creative sector in order to boost its innovative strength.

RAAK supports networks of SMEs, professionals, professors, students, universities of applied sciences, knowledge institutions and international partners by financing research projects.

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<th>Share in NL (%)</th>
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<td>R&amp;D expenditures</td>
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Source: Statistics Netherlands (CBS)
The Human Capital Agenda focuses on stimulating entrepreneurship and facilitating the move from education to the corporate sector. The agenda also pays attention to the ongoing development of creative professionals through the ‘lifelong learning’ programme. Working groups exchange knowledge and experiences within these themes through, among other things, the higher professional education (HBO) platform for the creative industry. Publications are also available on creative hotbeds and entrepreneurship in creative study programmes.

With the launch last year of the Germany programme, the creative industry has increased its focus on this country. The Germany programme connects all creative industry initiatives in Germany (at fairs and during trade missions, etc.) in an effort to conquer the German market with a message. Some examples from 2016: the Netherlands was a partner country at the Munich Creative Businessweek, the Reeperbahn Festival (pop music) and the Frankfurt Book Fair.

In addition to the Germany programme, the sector is seeking opportunities for the Dutch creative industry in other, more distant markets (particularly China).

The Creative Industry is the ultimate cross-sectoral Top Sector, often acting jointly with other sectors. In addition, it provides a framework for the EU Grand Societal Challenges and other NWA routes: Resilient societies, Big data, Smart Industry, Smart liveable cities, Circular economy and Art and innovation.

Future opportunities
In the next few years, the sector will build upon the progress made in past years on the themes of knowledge and innovation, internationalisation and human capital. The creative industry has positioned itself as the facilitator of renewal; a role that will require a solid sector organisation. Challenges for the years ahead are the increase of private R&D in the sector, strengthening collaboration/crossovers with other sectors and further internationalisation. In addition, new online services and technologies will bring about structural changes and new opportunities for the creative industry. The top sector itself is responding to this by participating in programmes that focus on big data, virtual reality, block chains and 3-D printing.

Create Health
In cooperation with other Top Sectors, TKI CLICKNL has developed and executed various crossover programmes. The Creative Industry Top Sector is collaborating with the Life Sciences & Health Top Sector on ’Create Health’: a crossover programme in which the creative industry and the health-care sector collaborate on solutions that promote healthy ageing. In 2015 the programme resulted in two collaboration projects valued at €1.4 million, in which knowledge institutions, representatives of end-users, creative companies and health-care entrepreneurs/institutions cooperate.

Create Energy
The creative industry is working with the Energy Top Sector in the ‘Create Energy’ programme on the Smart Energy Cities Green Deal and with the HTSM Top Sector in the Field Lab Smart Industry. The retail sector is supported via the New Shopping Street platform.
Chemistry meets Creation

Chemistry and the Creative Industry: an unlikely combination at first glance. And yet these two completely different Top Sectors complement each other in various areas as ambassadors Gerard van Harten and Barbera Wolfensberger testify.

Looking back
Gerard van Harten, Chemistry Top Sector ambassador:
‘When we started five years ago with the Top Sector policy, the way the sector worked was different and the money flows were also arranged differently. We needed one-and-a-half to two years to implement a new system. That was frustrating at times because we wanted to get started straight away. Fortunately, the execution phase is now in full swing. It includes four programme lines, a clear roadmap and innovation funds.’

Barbera Wolfensberger, Creative Industry Top Sector ambassador: ‘The start was very different for us. While you were already a single sector, the creative industry hadn’t actually reached that stage yet. We used that initial phase to set things up. We had groundwork to do first in order to link up government, the business community and knowledge institutions in our fairly differentiated sector, and also to learn what our sector was actually all about. For example, during a tour we made to gauge international interest, we thought that countries like India and Brazil were considered popular, but the sector turned out to be far more interested in Germany at that point in time.’

Proud
Van Harten: ‘It’s great to see how all the individual Top Sectors are achieving success. I’m especially proud of the ecosystem that we created together with the Chemistry Top Sector. Our so-called iLabs – Innovation Labs – are physical breeding grounds where start-ups are positioned in the vicinity of a knowledge institution to accelerate the development of a promising concept into a scalable product. When they are ready to take the next step, they go to a Centre of Open Chemical Innovation, where the focus is on upscaling and implementation in the market. This step-by-step approach means that innovations no longer end up in what we previously referred to as the “valley of death”. With this new, unique landscape, we want to promote entrepreneurship in the sector.’

Wolfensberger: ‘I see the improved degree of organisation in the creative sector as a fine achievement of the past few years. We built it from the ground up and now we’re there. Now that we can shift the focus to cooperating with others, we’ve noticed that several other sectors are also interested in joining forces.’

Gerard van Harten
ambassador Chemistry
Cooperation

Wolfensberger: ‘I consider the Human Capital Agenda to be the best thing that we as Top Sectors have tackled jointly. After all, each sector has an interest in investing in current and future personnel. Stimulating entrepreneurship is important for the creative sector – our sector contains many SMEs and self-employed persons – but so is digitisation and creativity in education, preferably starting at elementary school level. Lifelong learning is becoming the norm as far as we’re concerned.’

Van Harten: ‘Our focus for the Human Capital Agenda was mainly on the inflow of new students in engineering programmes since this was lagging behind other areas. You could say that we’ve done a good job in the past few years as currently one in four students opts for an engineering programme. As a matter of fact, enrolments have risen so much that there is talk of imposing intake quotas.’

Wolfensberger: ‘A new crop of technical graduates is good news for our sector because the creative industry needs people with programming skills, for example. Thanks to the stimulation of higher professional and university education, the Netherlands has its fair share of thinkers. But we also need doers; people who can turn those ideas into something concrete. Take the Jean School in Amsterdam: the first and only school in the world where young and creative people can learn the craft of denim design and development. It produces fantastic students who can do something with their hands. I think we should be more proud of our senior secondary vocational education system.’

Van Harten: ‘The chemical industry is also referred to as the industry of industries. We really have to work to find new business and joint ventures outside of our own sector. It doesn’t happen automatically. So in that area, the creative industry can teach us a thing or two.’

Wolfensberger: ‘It’s easier for us to step outside our own sector since the end-user is key to what we do. We often provide services for other sectors. On the other hand, the chemical sector has always been far more knowledge-intensive and has a lot to teach us. I consider the painting restoration project at the Amsterdam Rijksmuseum an excellent example of how our two sectors have found each other and support and complement each other.’

Van Harten: ‘That project does indeed show how Top Sectors can cooperate, and in a public-private partnership no less.

The chemistry sector is involved in a similar joint venture with the LSH Top Sector for the development of medicines. Our sector has many long-term programmes since we only see real progress after a long period has passed. For example, we’re involved in a ten-year CBBC project with Shell, Akzo Nobel and a number of universities. We are also engaged in talks with other sectors to establish new programmes.’

Wolfensberger: ‘We’ve noticed that virtually all sectors share common ground. In the creative industry we’re currently working with the LSH, Energy and HTSM Top Sectors. And the retail sector of course, though that is not an official Top Sector. These so-called crossover programmes result in innovative solutions and an even larger innovative capacity.’

Innovation leader

Van Harten: ‘There are calls in our sector for more money to be made available in order to retain our position in the world market and keep talented people in the Netherlands. People still often go abroad because of the more expansive research possibilities available there. This is understandable, but a shame for the Netherlands.’

Wolfensberger: ‘I share this view. Good programmes and sufficient resources, combined with the intrinsic motivation of talented people, should ensure that the Netherlands remains a world-class player. A showpiece of the creative sector is Dutch Design. By looking and thinking in a certain way, we’ve become prominent in the international market. Icons and projects opened doors for us that had previously remained closed. But you can’t simply depend on past successes. Incidentally, that applies to all Top Sectors. They need to take full responsibility for themselves and have clearly defined goals. The role of the government in this is to stimulate and encourage.’

Van Harten: ‘We’re now living off the legacy of the past few years, but that will definitely be over at a certain point. Innovation is essential if we are to retain our position. I hope that the next government will take account of this and will not try to change the Top Sector policy too much. Following the start-up phase, the programmes are now fully operational. We need to focus on the further development of the ecosystems established and on the collaboration between sectors.’
The High Tech Systems and Materials (HTSM) Top Sector develops and produces high-value end-products, semimanufactured products, components and materials. Dutch high-tech products are smart, precise and efficient and are used around the world in, for example, medical equipment, semiconductor production, cars, logistical systems, aircraft, satellites and energy systems. HTSM develops key technologies, thus strengthening the competitiveness of the Dutch economy. HTSM is the largest Top Sector in terms of production, added value, exports and employment.
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Solutions for worldwide challenges

The demand for high-tech products is increasing worldwide. High-tech products are featuring more and more in solutions to social challenges around the world in the areas of health, energy, mobility, safety and the climate. This is made possible by technologies that are firmly rooted in the Netherlands: microelectronics/nanoelectronics, nanotechnology, advanced materials, photonics and advanced production technology. Consequently, HTSM is in an excellent position to remain a world leader in the future and to make significant contributions to the resolution of societal challenges. The sector aims to raise exports from €41.3 billion (2010) to €74.6 billion in 2025 and increase R&D expenditures from €3.45 billion (2011) to €4.92 billion in 2025. With the development, production and export of high-tech products, the sector is a vital motor and driver of the Dutch economy.

Many Dutch companies and knowledge institutions participate in important European research projects. For example, 37 Dutch parties are participating in 9 large-scale Joint Technology Initiative (JTI) ECSEL projects.

Existing PPPs such as Holst, ARC-NL and Qu-tech have been successfully continued while new PPPs in areas such as smart industry, composite materials and photonics are being set up.

A total of more than 600 SMEs are involved in the HTSM roadmaps. These companies provide a financial contribution to approximately 30% of the PPP projects within TKI HTSM. Innovation is further stimulated because in 2016 the SME sector has been successfully using the MIT scheme, as in previous years.

Highlights of the past year

✓ Since 2013, the total private sector contribution of HTSM companies to public-private joint ventures in R&D has grown by around 3% annually (to approx. €530 million in 2016). The business community accounts for two thirds of the investments in R&D joint ventures.

✓ Many Dutch companies and knowledge institutions participate in important European research projects. For example, 37 Dutch parties are participating in 9 large-scale Joint Technology Initiative (JTI) ECSEL projects.

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Key figures

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Source: Statistics Netherlands (CBS)
Human capital: the alignment between the business community and education institutions has been improved by three CoEs and five CiVs. Companies can influence the curricula and are involved in the education process by providing guest lecturers and practical training coaches. Each year, Dutch high-tech companies provide more than 200 Top-Sector grants to students.

Internationalisation is stimulated based on a joint agenda that promotes exports, Holland High-tech branding, technological collaboration, strategic acquisition and international knowledge workers in specific focus countries.

Exports are promoted through strategic trade fairs, etc. In 2016 these included the Hannover Messe, Semicon China, the Farnborough International Airshow, Semicon Taiwan, Automechanika Frankfurt and MRO Europe (aviation).

In close cooperation with NFIA and the regions, HTSM is making great efforts to secure strategic foreign knowledge-intensive investments for the Netherlands in important themes such as Automotive and Health Care (medtech) and Semicon.

Holland High Tech branding is successfully being applied for export promotion, international cooperation in research and the acquisition of companies and knowledge workers.

Future opportunities
The HTSM Top Sector is developing new public-private partnerships on important themes such as smart industry, composite materials, photonics and agri-technology. The Top Sector is working vigorously on European programmes such as the JTI ECSEL, the Eureka cluster programmes ITEA3 and PENTA and Horizon 2020. Expansion of the possibilities for the SME sector to participate in public-private research is extremely important.

The scarcity of ‘golden heads and hands’ is an important point of attention if the HTSM Top Sector is to grow as it desires. The alignment of education with the business community remains important and should be encouraged by promoting company participation in education, which is why the development of CiVs and CoEs is being further stimulated.

ECSEL ASTONISCH
HTSM plays an important role in devising and implementing solutions to worldwide challenges in the area of health. One example is the ECSEL ASTONISH project (Advancing Smart Optical Imaging and Sensing for Health), in which the Netherlands Cancer Institute Antoni van Leeuwenhoek, the Leiden University Hospital, Anteryon BV, Eindhoven University of Technology, Philips and other organisations are cooperating with Finnish and Italian parties (including ST Microelectronics). The aim of the project is to develop groundbreaking image processing and sensor technologies for detecting tumours and assisting in their treatment using minimally invasive techniques.

Smart, green and integrated transport – Cooperative mobility
A series of new technological developments have been deployed that will raise road capacity, traffic safety and comfort. Cooperative driving focuses on mobility whereby the road, vehicles and road users exchange information. Autonomous mobility refers to the increasingly automated movement of the vehicles themselves. Important research themes in HTSM are sensor technology, safe and privacy-protected communication, big data, algorithms for traffic management, and the interaction between mechanics and data flows.

Marc Hendrikse, Chief Executive Officer of NTS-Group. NTS develops, produces, assembles and tests complex (opto)mechatronic modules for large high-tech machine manufacturers.
The High Tech Systems & Materials (HTSM) Top Sector is building an ecosystem with growing public-private collaboration, more investment in research and a robust international trading position. A conversation with ambassador Amandus Lundqvist.

What is characteristic for the high-tech sector?
‘You can accomplish more by working together than working alone. That’s intrinsic to the high-tech sector, which operates in a world market and is of great importance for other sectors and for the societal challenges of this century. Start-ups, SMEs, large companies and researchers that wish to go further have gravitated around our 17 roadmaps. We regularly hear that people are pleased that these cooperative alliances exist. Sometimes it’s not possible for a subsector to resolve an issue on its own. The automotive industry, for example, is working on autonomous transport, which means that it needs not just more knowledge about cars, but also about the interaction between cars and their environment. Alignment between the roadmaps and other Top Sectors and with ICT as a transversal theme is indispensable. New developments are following each other in rapid succession. As a ambassador, it’s exciting to experience that from up close.’

How do you look back on five years of the Top Sector policy?
‘The HTSM Top Sector is characterised by a great measure of continuity as we have largely remained the same team since the inception of the Top Sector policy in 2011. As a result, we are well attuned to each other. In the past five years we have seen an increase in the number of public-private partnerships. This has put the Netherlands ahead of the rest of the world. A good example of this type of partnership is the Holst Centre on the High Tech Campus. We were recently able to secure the continued financing of this institute. This required the HTSM Top Sector joining forces with the Ministry of Economic Affairs, the province of Noord-Brabant and TNO to ensure that the Holst Centre can continue working with the business community on the development of wireless sensors and flexible electronics.’

What are you proud of?
‘When we started the Top Sector policy, there was an urgent need for young staff with technical training. The numbers of students enrolling in science programmes have since increased. We’re very pleased with this development. Our sector cannot survive without people with the right technical know-how and skills. The student influx is a direct result of the activities of the Human Capital Agenda and the Technology Pact, which was concluded in 2013 by the Top Sectors, education institutions, employers and other parties with the aim of increasing the number of technicians and improving the alignment of education with the job market. Furthermore, in recent years Dutch companies and knowledge institutions in our sector have scored well in European programmes for research and innovation, such as Horizon 2020. That’s certainly something to be proud of because European cooperation accelerates knowledge development and facilitates the sharing of high-risk investments. We have also agreed with the Ministry to retain the required level of matching.’

Which Top Sectors does HTMS cooperate with?
‘Cross-sectorally, we work in so-called crossover projects with, for example, Agri & Food and Horticulture and Starting Materials. In the ‘High Tech to Feed the World’ programme, we research opportunities in the agricultural sector aimed at increasing efficiency through the deployment of more high tech. These types of programmes show that is possible to collaborate not only for more knowledge, but also because together you have access to more resources.’

How is the HTSM Top Sector contributing to the Netherlands’ position as innovation leader?
‘The vision of the high-tech sector runs through till 2025. Under this vision, collaboration between companies, knowledge institutions and government bodies is essential for the Netherlands to retain its position as a world leader. Furthermore, the consolidation of the country’s trading position with other countries is important because the market for Dutch high-tech products and services is largely an international one. We also wish to preserve continuity in the Top Sector policy. We therefore expect that the new government will align the policy with the Dutch National Science Agenda and otherwise leave it pretty much unchanged. Investments in the ecosystem established could be increased if you ask me. After all, research is the motor of the Dutch economy and is essential if the Netherlands is to continue excelling in the world market.’
Solving water challenges in order to increase world prosperity – that’s the task of the Water Top Sector. Water issues are becoming more and more urgent around the world due to dramatic rises in urbanisation, the growth of the world population and climate change. The Netherlands is adept at finding innovative and sustainable solutions to issues in the subsectors Water, Delta and Maritime Technology. The Dutch have always had an extremely close connection with water. As the world is well aware of this, the Netherlands is well placed to further expand its strong trading position.
Water raises prosperity around the world
The Water Top Sector addresses water-related challenges in order to raise levels of prosperity around the world. It does this by jointly drawing up two-yearly knowledge and innovation contracts, jointly organising inbound and outbound missions and recruiting well-trained personnel.

Highlights of the past year
✓ A study commissioned by the top team into the sector’s economic strength (Netherlands Water Monitor) shows that the water sector grew in the period 2010 to 2014. Exports in particular rose significantly (+15%), but the number of persons employed in the sector and total turnover also registered growth.

✓ At Deltas the Delta Flume was opened during the signing ceremony of the new innovation contracts in the presence of three members of the government (from the Ministries of Infrastructure & the Environment, Economic Affairs, and Education, Culture & Science). The Delta Flume is an outstanding large-scale research facility that generates waves up to four metres high and can be used to test various types of facings. There is enormous interest in this facility from around the world.

✓ Working with the Ministry of Infrastructure and the Environment, ambassador Mr Huis in ’t Veld travelled to Brussels where he spoke with the European Commission and Dutch stakeholders about knowledge and innovation and about projects in Horizon 2020.

Key figures

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<td>R&amp;D expenditures</td>
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Source: Statistics Netherlands (CBS)
There have been a number of successful international missions conducted under the flag of the Water Top Sector, including a mission to India with Prime Minister Rutte and one to Bangladesh with Ministers Ploumen (Foreign Trade and Development Cooperation) and Schultz (Infrastructure and the Environment). In the latter mission, all participating Dutch parties presented themselves as a single consortium for all facets of harbour development. A Memorandum of Understanding was signed between the Netherlands, Bangladesh, the World Bank, Ideas for Development and Bangladesh Deltaplan 2100 and a Letter of Intent was signed with Bangladesh regarding land reclamation.

Minister Schultz paid a working visit to the Pioneering Spirit, the world’s largest construction vessel, which is owned by Allseas and was completed by Dutch suppliers on Maakvlakte 2. Apart from the vessel, discussions also turned to the future of the sector.

A well-attended World Water Lecture was organised in Leeuwarden, where more than 1,400 pupils spent a day discovering everything that the water sector has to offer.

Future opportunities
The Water Top Sector’s aim is to continue growing, particularly in terms of exports. To achieve this, it is important that the Netherlands continues to develop outstanding large reference projects, such as Markerwadden. Consequently, there is intensive cooperation between the High Water Protection Programme and the Delta Technology Task Force (an initiative of the Water Top Sector) to ensure that projects are conducted with a maximum focus on innovation. Furthermore, cooperation is being intensified with the Ministry of Defence in maritime affairs and with the drinking water companies and water boards in the area of water technology. For the water sector, the Netherlands is an example to the world when it comes to high-end solutions. As such, in the years ahead the water sector will be focusing on developing new knowledge and innovation projects in collaboration with other Top Sectors. A large new reference project will showcase the Netherlands, whether working independently or with others, as a country committed to developing solutions for a sustainable, circular and nature-friendly future.

Water Top Sector crossovers with other Top Sectors
Water is a connective factor in the resolution of a variety of societal challenges. The Water and Energy Top Sectors cooperate in many areas, such as in the Blue Energy project on the Afsluitdijk causeway between the provinces of Noord-Holland and Friesland. In Breezanddijk, a trial installation is currently being tested so that REDstack, in cooperation with Fujifilm and Wetsus, can gain knowledge about this new manner of energy generation. Blue Energy is a technique for generating energy from the difference in salt concentration between salt and fresh water. A further example of collaboration can be seen in the Eastern Scheldt storm surge barrier, where Tocardo is using turbines in the barrier to generate energy from the current between the pillars.

The Water Top Sector also cooperates with the A&F and T&U Top Sectors in, for example, the treatment and reuse of agricultural water for irrigation, in a project that aims to save water (circular). Another example of water-saving is the air conditioning in greenhouses by Priva. The sector also collaborates with the Logistics Top Sector in the design of hybrid ships and sustainable coatings. Another large cross-sectoral project is Markerwadden, where nature, water safety, water quality and sustainability meet.

‘We’ve known for a long time that you can’t pigeonhole innovations. While at the inception of the Top Sector policy each individual Top Sector went looking for its own identity, now we are more effective at using the things that connect us. This is reflected in strategies, innovation agendas, trade missions and events such as those of HTSM. As the water sector, we play a strongly connective role. We maintain intense and good contacts with all government bodies and have good connections and programmes with virtually all other Top Sectors.’

Hans Huis in ’t Veld, ambassador of the Water Top Sector.
Life Sciences & Health | The Life Sciences & Health (LSH) Top Sector is working for a future with engaged and active citizens living in a healthy economy. This will allow companies, knowledge institutions and the government to provide solutions both for the Netherlands and beyond. With the worldwide challenges presented by an ageing population and increasing technological possibilities (in terms of prevention, care and cure), LSH strives to expand in those areas which the Netherlands can make a difference. This relates to R&D, market share and export opportunities.
Active stimulation by the LSH Top Sector
The objective of the LSH Top Sector is to actively stimulate and support growth in the sector by pursuing the following action lines:

• Stimulate and facilitate public-private partnerships between knowledge institutions, government bodies, companies and health funds. Collaboration with the health funds is an important impetus in this regard.

• The introduction of the Health Deal instrument, supported by the Ministries of Health, Welfare & Sport and Economic Affairs, has made it possible to bring care innovations faster to market.

• Support companies that wish to further expand internationally through unambiguous Health-Holland branding, study programmes, collaboration within the Top Sector’s priority countries and trade missions/fairs.

Highlights of the past year
✓ In April, the Dutch Cancer Society (KWF), the Ministries of Education, Culture & Science, Health, Welfare & Sport and Economic Affairs and the LSH Top Sector expressed their joint ambition to support the establishment of a virtual top-level institute in the area of oncology. This world-class institute will conduct outstanding research into oncology combined with excellent valorisation. The commitment of a TKI allowance is an important catalyst for this project. The Ministries of Economic Affairs and Education, Culture & Science will also earmark €12.5 million from the Future Fund for valorisation activities.

✓ A significant increase of the TKI allowance (from €4 million in 2013 to in excess of €28 million in 2015). These resources have allowed for new projects to be initiated in the past year, such as the recently launched new research projects with an investment of €4.5 million in the area of cardiovascular diseases (in cooperation with STW, LSH and the Dutch Heart Foundation).

✓ Support to businesses, particularly SMEs, to help them gain market access, attract finance and promote internationalisation. The first Health Deal was concluded with the aim of furthering the implementation of an important innovation in cancer treatment (decision support) in the Dutch health-care landscape. At the initiative of the Top Sector, a webinar on financing was organised where start-up companies in particular received advice on financing possibilities. Furthermore, the past year saw the launch of a project to assist SMEs doing business internationally (HHINT starter programme) with the aim of increasing the number of Dutch companies engaged in successful exporting.

✓ LSH is the most R&D intensive of all the Top Sectors. In 2015, the sector was able to attract €4.3 billion in private investments (e.g. Acerta, T-Cell Factory). The excellent position of this Dutch sector acts as a powerful draw on international companies and knowledge workers.

“...technology has broad application possibilities and we hope that it will reduce the risks and complications of repeat surgeries. This will improve the quality of life and lower the costs of health care: two important objectives of the LSH Top Sector.”

Martijn Cox, CTO and co-founder of Xeltis, a company in medical aids which developed the very first biodegradable heart valves and blood vessels in the world.
The LSH Top Sector is represented at many national and international events and trade fairs: Innovation for Health, eHealth week, Medica, BIO Europe, BIO International, Building the future of health, Dutch Life Sciences SME Event, etc.

With support of the Ministry of Health, Welfare and Sport, the sector has launched initiatives in the areas of antimicrobial resistance (AMR) and eHealth. The Ministry of Health, Welfare and Sport has also provided direct funding for initiatives such as the Translational Research programme and the deployment of Intravacc.

Future opportunities
Continuing and intensifying the successful collaboration between parties in the sector (knowledge institutions, companies, health funds and government bodies) will lead to more innovative and future-proof care solutions in the Netherlands and beyond. The resulting increased activity will expand the country’s earning capability. Greater innovation will also result in better control of health-care costs. Cost-effective care innovations will be a future growth market in the Netherlands and elsewhere.

Smooth cooperation between parties is not enough. Human capital is indispensable for the LSH Top Sector to ensure its quality and the associated innovative strength. To this end, a Human Capital Agenda will be drawn up that will offer points of reference.

RegMedXB
A good example of public-private partnership is the first-phase project of the new research institute RegMedXB, which was established in 2016. This institute is working on solutions for chronic diseases (kidney failure, diabetes and arthrosis) through regenerative medicine. To this end, a budget of €18 million has been made available. The intention is to set up a permanent institute with a budget of €250 million for the first ten years.

SBIR active seniors
Bridges are also being built between the various Top Sectors. Excellent examples can be found in the projects that were awarded under the SBIR ‘Active Seniors’ project, which promotes the development of products and services to help elderly patients be more active safely while in hospital.
The Water and Life Sciences & Health Top Sectors want, above all, to continue and progress

Hans Huis in ’t Veld has been the ambassador for the Water Top Sector for four-and-a-half years while Jan Raaijmakers has served in the same role for the Life Sciences & Health Top Sector for one-and-a-half years. Though both ambassadors maintain that their sectors are very different, they nevertheless share the same ideas in certain areas.

Ambassador
Hans Huis in ’t Veld, Water Top Sector ambassador: ‘The water sector is very broad. It ranges from the maritime world, shipbuilding and dredging to flood protection and drinking water technology. I know the sector well. I have worked for the government, the private sector and I was chairman of TNO. Consequently, I am familiar with the “golden triangle”. I believe in the benefits of collaboration between government, the business community and knowledge institutions. Sometimes people ask me what my duties are as standard bearer. I then reply that I am the “man with the oil can” who keeps everything running. It is a privilege to represent the sector, promote growth and exports and achieve innovation.’

Jan Raaijmakers, Life Sciences & Health Top Sector ambassador: ‘I never expected to be appointed ambassador of a Top Sector. Up until a couple of years ago I was chairman of the management board of the Pharma top institute. When the government suddenly decided to change things, that marked the end of top institutes in the LSH arena. Initially, that was also the case for the Pharma top institute. However, through hard work we managed to save the Pharma top institute and, thus, its knowledge. The Pharma top institute was merged with CTMM and became the non-profit organisation Lygature on 1 June 2016. This experience made me very disappointed in the role of the government. It was only when I read about the latest developments in the newspaper that I began to see the opportunities. My opinion has now changed for the better. The Top Sectors have introduced a new vigour to our sector. Our collaboration revolves around innovation, exports, economic perspective and incentives.’

Looking back
Raaijmakers: ‘We’ve been working on building up the sector in the past five years. For example, we started playing an important role in facilitating collaborations with the SME sector. We try to put these companies in touch with one another. What’s more, biotechnology is currently experiencing unbelievable growth. The Netherlands has an excellent reputation in the tech world and it produces a lot worldwide. The sector is providing employment to thousands of people.’

Huis in ’t Veld: ‘What struck me was how focused each sector was on itself in the first two years of the Top Sector policy period. Other than that, there was a heavy emphasis on the economic agenda. There is now a lot more cooperation.’
Jan Raaijmakers
ambassador LSH

Raaijmakers: ‘We now focus on effectiveness and synergy internally and between the different Top Sectors. We work hard to facilitate whatever will make this happen. Because I know the sector so well, I truly relished the opportunity to help shape it further. For example, we are expanding cancer research under a single strategic line. As an ambassador, I can play a key role in this endeavour.’

Huis in ’t Veld: ‘Because water is a necessity of life, there are many social themes present in the water sector. We are engaged in flood protection, climate change and densely populated delta cities. In order to be prepared for the future, we conduct a lot of research via test beds, provided the government gives us the necessary resources. There is sometimes the risk that an experiment will fail. As an innovative country, it is important to foster a culture for dealing with such eventualities. The government is often a launch customer, i.e. a principal. This has allowed us to develop the Delta Flume and to achieve a strong position in radar technology, as we have done in health care and defence. If you never innovate, you’ll lose your position in export.’

Highlights
Huis in ’t Veld: ‘The fact that the Markerwadden and Building with Nature projects have become export items is something to be proud of. As a Top Sector, we take the initiative when it comes to export and promotion. In the past, a minister would say something like: “We’re going to Bangladesh. Who wants to come along?” Now there is coordination between the Top Sectors and we travel to a country as a group instead of as an individual company or institution. We advise the government on what’s specifically important for a certain sector or for all sectors.’
Raaijmakers: ‘We have drawn up an internationalisation strategy and agenda in consultation with the field. This provides us with a long-term focus and a systematic approach. Missions abroad are now far more effective. It’s no longer a case of doing fun stuff and that’s what continuity will benefit the sector most. We now know what works and what doesn’t. Thanks to their efforts, knowledge institutions will achieve a foundation for economic gain in about 20 years’ time. We mustn’t stop now, but continue to stimulate them.’

Planning
Raaijmakers: ‘In the period ahead we will be intensifying the current plans. The system is in place, so we can now focus on production. I sometimes read in the newspapers that politicians believe the Top Sector policy is just a drain on financial resources. Reports like that make people nervous. While we are open to improvements in our policy, what we need most of all is continuity. Because I’m confident that continuity will benefit the sector most. We now know what works and what doesn’t. A government that does nothing but economise often says that companies should do it themselves. But companies already do so much independently. It’s often forgotten that a basic level of knowledge is necessary to implement applications.’

Cooperation
Raaijmakers: ‘The Life Sciences & Health Top Sector collaborates intensively with other Top Sectors, such as Chemistry and Agri & Food. We search for common ground and I think that’s why we don’t yet do much with the Water Top Sector. Our sectors are too different. We need to make choices on account of limited resources and people. What should we invest our time and energy in? What will it yield?’
Huis in ’t Veld: ‘As water is a connective element, we work with all sectors. We cooperate with the Energy Top Sector in offshore wind farm and port logistics projects. We also work with the Agri & Food and Horticulture and Starting Materials Top Sectors because, after all, you can’t have food without water. Last week we were talking about the new potato and high-tech systems in the presence of representatives from the Life Sciences & Health Top Sector. And we work on trade promotion with the Ministry of Foreign Affairs. An international water agenda has been drawn up, in which the Ministries of Infrastructure & the Environment and Economic Affairs are involved alongside the Ministry of Foreign Affairs. These ministries now work together more often and more effectively, while at first they did everything separately.’
Horticulture & Starting Materials | The Horticulture & Starting Materials Top Sector (T&U) is an economic network of greenport clusters and regions existing of knowledge and research institutes, breeders, propagators, growers, marketing organisations and auctions, traders and suppliers, such as builders of greenhouses and air-conditioning systems. T&U is characterised by a strong international focus. The Netherlands is the world leader in ornamentals, starting materials (bulbs, vegetable seeds, seed-potatoes) and fresh vegetables. Worldwide, the Netherlands is the most influential country in the field of botanical research.
World solutions for world challenges
T&U seeks to be the world leader in sustainable solutions for global societal challenges:

- The Top Sector offers daily access to a safe and healthy plant-based diet and provides a healthy working, learning and living environment.
- T&U promotes food harvest security and, through the availability of minerals, fibres and minerals in its products, plays a major role in the fight against malnutrition.
- The Top Sector has the most sustainable horticultural production chains in the world.
- T&U intends to further expand its world market leadership position in the area of starting materials.
- The percentage of companies participating in Top Sector projects is to double by 2019 and treble by 2030 relative to 2015.

Highlights of the past year
✓ The umbrella programmes for the PPPs in knowledge and innovation projects are evolving and improving, stimulating greater coherence between research and innovation, on the one hand, and the various financing sources on the other (comprehensive programming). In 2015, €36 million was distributed among 125 PPPs for applied research. The growing participation of the SME sector in PPPs is a positive development. T&U successfully participated in multiple calls at NWO (public contribution of €17 million). The sector also participates extensively in European programmes (2015: €20 million).

✓ The ‘Sustainable production of healthy and safe food’ path was formulated with the broad involvement of knowledge institutions and the business community for the National Science Agenda.

✓ With respect to the Human Capital Agenda, the Top Sector is working actively on internationalisation in education, the alignment between education and the business community, a growing student population.

Key figures

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Source: Statistics Netherlands (CBS). These figures are based on the functional classification.
‘Thanks to the subsidy, it is possible to develop an entirely new activity for the sector: medicinal cultivation. We're delighted with this.’

Peter Olsthoorn, owner of Perfect Plants Holding. This company cultivates plants that are both edible and can be used to combat disease. An example is Dioscorea: a plant that breaks down fats and, as such, serves as a potential medicine against obesity. Perfect Plants is optimising the sustainable cultivation process in cooperation with Leiden University and TNO. T&U offers financial support and a platform for sharing knowledge.

(in response to labour market requirements) and systematic funding at the level of comparable technical sectors.

- SMEs are developing new forms of collaboration and financing, including crop cooperatives, in which members/growers conduct or commission research into solutions to practical problems.

- Participation in strategic trade fairs (Grüne Woche, Antalya Floriade, PMA VS in 2015, and Greentrade Fair Iran, WOP Dubai and Innovation Expo Japan in 2016); successful missions to foreign countries, including China, Japan, Iran, US & Canada, Kenya & Tanzania, and southern Germany (B2B, G2G, K2K).

- Public-private partnerships in the area of development cooperation: activities surrounding toolkits, climate partnerships, smart agriculture.

- Continued development of the Sustainable Urban Delta concept: comprehensive, sustainable solutions (horticulture and agriculture, water, infrastructure) in, around and to cities.

- The High Tech to Feed the World (HT2FtW) crossover programme by AF, HTSM, ICT and T&U is in development and the first project proposals have been submitted.

Future opportunities

In 2016 a number of large public-private partnerships and crossover programmes will be set up that are expected to grow in the years ahead. In conjunction with the NWA path entitled ‘Sustainable production of healthy and safe food’, eight ‘game changers’ have been defined together with A&F and HTSM. An investment impulse will be needed to be able to take the right steps with the HT2FtW crossover programme in the international context. The new large cross-sectoral PPP ‘Holland Innovative Potato’ is being established as an ambitious, modular PPP programme.

In the near future, T&U aims to make additional investments through an innovation challenge in order to increase the innovative strength of the SME sector. Furthermore, T&U will work with A&F and HTSM with respect to new funding options, such as the seed capital scheme for investment funds that target technology start-ups in Agro-Horti-Food-Tech.

Internationally, T&U wants to capitalise on the major opportunities available in Japan and Iran. Furthermore, T&U will continue to work hard to make the OS toolkit accessible for Dutch companies.

Energy and CO₂

With the themes Food Safety, Food Certainty and Health & Well-being, T&U is well aligned with the Food Agenda of the Ministry of Economic Affairs. Energy is central to the theme ‘More and Better with Less’, in addition to programmes that aim to make the chains more sustainable. T&U’s agenda offers ample opportunities for expanding green growth, which is also the overall objective of T&U.

The Energy and CO₂ programme reflects the ambition for 2050: a horticultural sector with a fully sustainable and economically profitable energy management system with zero CO₂ emissions. Part of the programme is the development of the Greenhouse of the Future, in which entrepreneur Duijvenstein sustainably cultivates tomatoes, water is recycled, heat is provided by geothermal energy and, thanks to innovative modifications in the use of glass, energy consumption has been reduced by 50%.
Loek Hermans has been the ambassador of the Horticulture & Starting Materials Top Sector since the inception of the Top Sector policy in 2011. What has been accomplished so far in the sector? What is the state of cooperation with other sectors? And where are the sector's challenges in the period ahead?

How do you look back on five years of Top Sector policy?

‘One of the great things about being a ambassador is that you connect knowledge institutions, the business community and the government. You are in a position to involve a large number of companies in policy-making. The Netherlands is the world leader in the Top Sector areas of Water, Agri & Food, and Horticulture & Starting Materials. Everyone comes to us. Wageningen University and the University of San Francisco are the world’s most prominent academic institutions in this field. SMEs account for 80 to 90% of all companies active in the horticultural sector. In the past five years, we have been able to involve 750 companies in the Top Sector on a permanent basis. I’m very pleased with that development. For some years now we’ve also been focusing on the alignment between the business community and knowledge institutions. Knowledge is increasing because we are conducting fundamental and applied research in 15 PPPs. Furthermore, the know-how among entrepreneurs is growing through intensive cooperation between education institutions and businesses thanks to the centres for innovative workmanship (in senior secondary vocational education) and the centres for expertise (in higher professional education).’

What are you proud of?

‘The sector is generating products that are unique in the world. In all subsectors – seed enhancement, bulbs, trees, ornamentals, vegetables and greenhouse techniques – we are the world’s number one innovator. Horticulture is the Netherlands’ best-kept secret, I sometimes say. From the tower at FloraHolland – the flower auction in Naaldwijk – you can view everything that is happening in the area: the techniques used, the cultivated varieties and resistance to diseases. The developments follow one another in quick succession.’

How important is ICT in the horticultural sector?

‘Extremely important. The use of ICT within our sector is increasing, even within our already very high-tech systems. We use plant-level technology to ration water and nutrients in horticulture. This doesn’t just guarantee an optimal crop and harvest, but also reduces the environmental burden and water and energy consumption. These technologies involve a lot of data traffic. We also use ICT to develop new varieties, which may also help to stave off food shortages, for example. Take the Holland Innovation Potato (HIP) project. In this project we are quickly breeding new varieties of potato that are suitable for countries where potato production is impeded by drought, for example.’

Where are the ICT challenges?

‘Consumers want to know more about the products they are eating. What we are currently looking at is how to develop a technology – like an app – with information on the origin of, for example, vegetables and fruit. How is it produced? What substances does it contain and what is its nutritional value? Healthy food is a social issue. Furthermore, being able to feed more than 9 billion people around the world in the future is also an enormous challenge. The population of Africa is even set to double. Who has the right technology to deal with this development? Who is training people in the various countries? We will need to gain a lot of experience in the years ahead. An important part of this is High Tech to Feed the World, an interdisciplinary programme in which we use high-tech systems and materials and collaborate with other Top Sectors.’

Can you mention some other challenges in the years ahead?

‘As long as there’s sufficient know-how in the Netherlands, we will be able to continue innovating and to keep our lead on the other countries. Dutch companies are really keen on working to resolve the issue of world food. A safe and guaranteed food supply is the world’s biggest challenge; there are water and mineral shortages everywhere. Iran, for example, would like to work with us. Iran is a country with oil, gas, space and a highly educated population. In fact they have everything, except water. How can our Dutch technology ensure satisfactory food production in Iran, without consuming too much water? Certain products require a lot of water. Should you cultivate products like that in a country like Iran or do you make other arrangements? Those are choices that we need to weigh up if we are to strike a healthy balance.’

‘The sector is generating products that are unique in the world’

Loek Hermans
ambassador T&U
Logistics | Logistics relates to the planning, organisation, transport and management of goods flows. From raw material to end-product. As the Gateway to Europe, the Netherlands has a leading position worldwide. In addition to the added value and employment provided by the logistics sector itself, the sector also contributes to other Top Sectors by facilitating international trade. Though it represents only 0.25% of the world’s population and 1% of world production, the Netherlands facilitates 3.7% of world trade. Its high-value and innovative logistics function is an important pillar of the Netherlands’ attractive business climate and plays a key role in drawing international companies and cargo flows to the country.
Strengthening our international competitive position

The objective is for the Netherlands to be among the world’s top players by 2020: (1) in the handling of goods flows, (2) as the chain manager of national and international logistics activities and (3) as a country with an attractive innovation and business climate for the shipping and logistics industries. An important goal is to secure the number one position in the World Logistics Performance Index in 2020. The Netherlands currently holds the fourth position.

The challenge is to be able to sustainably accommodate the expected growth in the flows of goods. Linking goods, information and financial flows will result in optimal utilisation of means and modalities of transport and will improve accessibility of the mainports of Rotterdam and Schiphol. At the same time, the Logistics Top Sector wishes to realise economic advantages and help solve social issues revolving around sustainability and accessibility.

Highlights of the past year

✔ The Holland Logistics Library (HLL) was launched in April 2016. The HLL is a public knowledge library dedicated to the Netherlands’ logistics proposition that is built and updated by professionals from the entire sector. The approach of the HLL is cross-sectoral and can be deployed abroad to attract cargo flows and logistics investments to the Netherlands (inbound) and for the promotion of Dutch logistics expertise and know-how (export). In 2016, the HLL intends to create a link to the international proposition and the activities of the other Top Sectors: logistics as an enabler of international trade. The public-private partnership involves the Ministries of Economic Affairs, Foreign Affairs and Infrastructure & the Environment, the NFIA, the Holland International Distribution Council, Schiphol Group and the Port of Rotterdam Authority.

Key figures

<table>
<thead>
<tr>
<th>Indicator</th>
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<tr>
<td></td>
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<td>Number of employees (FTE)</td>
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Source: Statistics Netherlands (CBS). These figures are based on the functional classification.
On 22 April 2016, the Amsterdam Arena hosted the successful and well-attended (more than 1,000 visitors) Congress of the Logistics Top Sector: Big Data, Small World. Using and combining data is becoming increasingly important for companies and makes the possibilities offered by logistics endless, such as the ability to predict the demand for parcel services, tracing inefficiencies in the logistics chain and optimising distribution in cities.

The Human Capital Agenda of the Logistics Top Sector has been updated and focuses on three spearheads: (1) sufficient high-quality outflow to the labour market, (2) an effective alignment between education and the job market through modern education methods and intensified knowledge sharing, and (3) stimulating social innovation. In education, ‘serious games’ have been developed centred around airport terminals, air traffic control towers and distribution centres. Employees, employers and social partners have taken ten concrete social innovation measures aimed at making both companies and their workforces more future-proof.

Cooperation between companies, government and knowledge institutions is focused on knowledge development and the transfer of knowledge that is relevant to the regions’ logistical spearheads.

Future opportunities

Information and communications technology (ICT)
The intelligent application of ICT and sharing big data between various parties in logistics chains allows for goods, information and financial flows to be connected. This will lead to improved predictability of goods flows, more consolidated loads, higher load factors for vehicles and vessels and the emergence of inland shipping and rail transport as full-fledged alternatives for road transport.

Link between earning capability and societal challenges
Smart and innovative logistics will result in economic advantages for companies (reduced transportation costs) and a positive contribution to societal issues such as sustainability and accessibility (reduced CO₂ emissions).

Making logistics more sustainable
The Logistics top team is dedicated to the theme of sustainability. The Logistics Top Sector wants to contribute towards the achievement of the climate objectives. It will be adding activities and projects to its current programme that specifically target the achievement of climate objectives. Sustainability in transport is playing an ever more prominent role for shipping companies in relation to their marketing and competitive positions. Decisions will be made for each market segment in the goods transport chain on how and when the objectives can be achieved through a combination of regulations, logistics optimisation and technology/fuel. The competitive position of logistics service providers and the extent to which a level playing field exists in a particular market segment are largely determined by the effectiveness and cost effectiveness of a measure.

The Logistics Top Sector also contributes financial resources to the City Distribution Zero Emission Green Deal. Efficient urban logistics is important for the economic vitality and attractiveness of the cities, allowing Internet orders to be delivered to customers’ homes, restaurants to serve their guests, stores to stock the latest collections in time and renovation projects to be carried out smoothly.

‘Collaboration, digitisation and sharing data are essential for a successful transport and logistics sector that facilitates the growth of the Dutch economy. That must be the goal of our Top Sector, as it will allow us to really improve our competitive position and continue playing a leading role.’

Arthur van Dijk, chairman of Transport and Logistics Netherlands (TLN) and member of the Logistics top team. TLN is a sector association with 5,500 members in the Dutch transport and logistics sector.
Energy | The Energy Top Sector is the driving force behind the innovations necessary for the transition to an affordable, reliable and sustainable energy system. The Top Sector achieves this by stimulating innovations that accelerate the transition to a fully sustainable energy supply, working with the business community, knowledge institutions, social organisations and government bodies to create new economic activities and strengthen the country’s competitive position.
Innovation for the energy transition

Our energy system is in transition. In a process driven by climate change, scarcity and the need for an affordable, reliable and sustainable energy supply, fossil fuels are making way for sustainable, renewable sources. This has consequences for the way in which energy is generated, transported, stored, consumed and saved. Methods of sustainable generation, integration of energy carriers, the possibilities offered by ICT and energy consumer behaviour are all changing. As a result, energy innovations not only have a technological character, as economic and social aspects also play an important role. Based on the dual objective (energy transition and growth), the sector’s ambitions are aligned with those of the Energy Agreement (2020/23) and the European energy objectives (2030 and 2050).

Highlights of the past year

Due to the Energy TKIs, a large number of projects are being carried out in all TRL phases\(^a\). Via a variety of programme lines, fundamental research (often via NWO), R&D (often with ECN and TNO) and demonstrations via schemes such as the SDE+ for innovation and the Energy Innovation Demonstration scheme are being conducted. After all, innovation does not focus purely on new technology, but also on enhancing existing technologies and making them cheaper. Moreover, valorisation requires a good eye for the changes in the energy system and for social developments: how do people want to use energy?

\(^a\) Technology Readiness Levels: nine research phases (from fundamental research to product launches).

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**Key figures**

<table>
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<th>Indicator</th>
<th>2014</th>
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<tr>
<td>R&amp;D investment</td>
<td>€550</td>
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</table>

Source: Statistics Netherlands (CBS)
The Offshore Wind Farms Supply Chain Tool TKI was introduced in 2015 to identify the various players. The players concerned can themselves use this tool for presenting themselves to the national/international offshore wind market.

The FLOW programme, the objective of which was to reduce the costs of offshore wind farms through innovation, has been completed. With its cost model, FLOW has essentially demonstrated that its projects significantly contributed to a cost reduction of 20% between 2010 and 2015. The results of the FLOW programme mean Dutch companies can assume a leading position in the international market for offshore wind farms.

A successful Energy Outlook was organised in which board directors and professors from higher professional education discussed the challenges posed by a sustainable energy supply for future professionals and skilled workers, potential smart contributions from education institutions and how this can be safeguarded in education plans.

As the Top Sector’s international agenda includes both the international knowledge agenda and the export agenda, an international knowledge strategy has been developed and the sector is working on exportable product-market combinations.

Future opportunities
In late 2015, the government presented an Energy Report that outlines how the Netherlands can respond to attain the European energy objectives for 2050. These ambitious objectives can only be achieved if there is sufficient attention for the innovations that help the Netherlands to make existing sustainable technologies smarter and cheaper, introduce new technologies, formulate the business cases for innovative solutions and fit the new energy system in the new social arrangements and adapt them to consumer preferences.

Results of a social dialogue on the Energy Report and the evaluation of the Energy Agreement, as set to take place in 2016, will serve as a guideline for the Top Sector in prioritising activities in the coming years.

Examples of energy innovation
• Develop technology for double-sided silicon solar cells and panels with a yield that is up to 20% higher.
• Nano-imprint lithography for manufacturing structures for light storage in solar cells that involve a reduced layer thickness for full light absorption, resulting in lower material and process costs in thin film PV.
• Product design for heat storage in a barrel at neighbourhood or district level, with smart solutions for the construction and installation and close connections of the elements of which the barrel is constructed.
• Fast charging stations along the A2 motorway (Powered by the Sun project) with sun PV and storage in use.
• Demonstration of application of pyrolysis oil in boilers at Friesland Campina.
• Orculo: The first polyesters produced from bio-aromatics, obtained from the catalytic pyrolysis of biomass.
• Silicon carbide membranes are very suitable for the treatment of ‘produced water’ (waste water from the production of oil and gas), making it possible to separate the oil and purify the water from 1,000 ppm to 30 ppm.

‘Via TKIs, the Energy Top Sector brings together knowledge and innovation and contributes strongly to cross-sectoral connections, resulting in insights and experiences from other markets strengthening the innovations in the Top Sector and, consequently, the position of Dutch companies.’

Marcel Dukker, CCO of Technolution.
The Energy and Logistics Top Sectors keep the engine running

Manon Janssen and Aad Veenman, the ambassadors of the Energy and Logistics Top Sectors, respectively, regularly run into each other. Their Top Sectors cooperate in a number of different areas and have a similar profile: service-oriented and supportive of other sectors. ‘Without energy and transport, the Netherlands would simply grind to a halt.’

Former boss at NS and Stork, among other companies, Aad Veenman is a member of several supervisory boards but has nonetheless ensured he has enough time in this calendar to promote the Logistics Top Sector both at home and abroad. Manon Janssen, CEO and chair of the management board of Ecorys, also regularly attends various national and international meetings to explain the Top Sector policy. Janssen: ‘Our Top Sector policy is unique in the world and people are very interested to learn about our approach. They are really amazed at the fact that knowledge institutions, government and businesses cooperate closely and exchange knowledge and innovations in various areas across the entire chain. At the Energy Top Sector and its TKIs, we have grown to around 1,400 affiliated companies and knowledge institutions.’

Veenman: ‘It’s now around five years since the policy was launched, and we can begin to pick the fruits. The policy really needed that time to get to this stage. But it’s not that strange really when you consider that in the logistics sector we had to bring together more than 4,600 companies. But now that we have, we are noticing the unique results we are achieving and that’s something we can be proud of.’

Among the world’s best performers

Veenman: ‘The aim of the Netherlands is to remain in the top five of the World Logistic Performance Index. Five years ago we had a spot in the top ten; now we’ve been among the best-performing five for years already. This is an exceptional achievement. The Netherlands only accounts for 0.25% of the world’s population and is responsible for 1% of world production, but we are good for 3.7% of world trade. That is a factor of 12 relative to the size of the population. In early 2016 I was presented with the prestigious VerkehrsRundschau Image Award in Munich for the best logistics region in Europe. Our roads, port infrastructure and overall hub function were mentioned, but our Customs department is also praised around the world for the extremely effective and efficient way it supports trade. That means we must continue to place our high Customs standards in Europe at the top of the agenda and not make do with lower standards.’

Janssen: ‘The Top Sectors cooperate on solutions that are important for the Netherlands and which extend beyond our borders. After all, the Netherlands is strongly focused on European and global trade. The port of Rotterdam is a wonderful example where all the sectors are represented. This area is a European hub where all issues in the area of logistics and energy come together, but also where the agri and chemical sectors play a role. Energy in the form of residual heat from the chemical industry is used, for example, to heat the greenhouses in the Westland area. Mutual cooperation between the Top Sectors mean we can place innovations, challenges and solutions in a holistic context. Society includes all the areas in which we have to operate together as sectors.

Cooperation between Top Sectors

Janssen: ‘Previously all the parties involved were inclined to work as individuals, from their own respective islands. Because we as a
Top Sector are a neutral platform, we are able to bring together different but also unlikely parties. This means we are able to cooperate in a way that transcends the chain, and that is our great strength. It’s not the case that we’ll suddenly decide as the Energy and Logistics Top Sectors to work together developing batteries to store renewable energy. What we do is truly provide the enabling innovations at the beginning of each chain. Energy and transport are the basic ingredients of our economy. Without energy and transport, the Netherlands would simply grind to a halt.

Veenman: ‘We also have dealings with one another as part of the Energy Agreement. We provide each other with technologies for reducing CO₂ emissions, establishing electricity charging stations for urban transport and the further electrification of vehicles. That’s something we happen to do together with the High Tech Systems & Materials Top Sector. There are always new instances of cross-fertilisation. Moreover, insights gained are not limited just to the business community and government; education institutions are also included. Human capital is an important factor for our industry and education is crucial in this regard. Study programmes will need to be developed which will optimally meet our future demand for human capital. As a country, we should also try to prevent those people from going abroad by offering them interesting perspectives. The inflow and outflow of students studying transport and logistics has increased dramatically in the past few years, from 400 to 2,000. This successful result is attributable in part to the permanent character of the Top Sector policy.

Focus on the long term
Veenman: ‘In the Netherlands we love change. While that can be a good thing, it can cause us to sometimes be too eager to change too quickly. That also applies to policy. The Top Sector policy benefits from continuity. Within this policy, the elaboration of the five main themes (knowledge and innovation, human capital, the international perspective, regulatory burden and societal challenges) will benefit most by the continuation of long-term public and private support. It’s important that we maintain the Top Sector policy, the developments within which will benefit most from long-term support. After five years, the Logistics Top Sector is taking innovative steps that have never been taken anywhere else in the world. This is because following constructive mutual consultations, we have arrived at a number of roadmaps that are now being consistently implemented, which promotes structural valorisation. Major changes take time to implement.’

Janssen: ‘We must recognise and treasure what we have with the Top Sector policy. For the Energy Top Sector, as for Transport, a long-term perspective will prove crucial if it is to achieve its objectives. The policy is bringing about changes which would otherwise never have been implemented or only in a very fragmented manner. The big step we have made is to establish a robust organisational unifying capacity and targeted innovation. By working together, responsibility for the energy transition rests not only with the government, as the business community and knowledge institutions now also feel they are part of this necessary change. The wheels of change are now turning faster.’

The value of a ambassador
Veenman: ‘Looking back at the past five years and the results we’ve achieved, I believe that we, the ambassadors, have accomplished quite a lot, particularly in terms of uniting extremely different parties and formulating and implementing joint objectives. In that process, the ambassadors play a largely supportive role which is primarily concerned with instilling confidence. Confidence that we have set in motion a structural change that will be made permanent by government policy.’

Janssen: ‘It also helps that we are doing this in a personal capacity and that we enjoy a good reputation within the business community and the sector. Our credibility allows us to connect and motivate large parties, both public and private. Thanks to connections, change is also possible in the chain. A wonderful example of this is a result of our Offshore Wind Farms TKI: a cost saving of 40% across the chain. Five years ago people said it was impossible, but in January 2016 we achieved the goal and we became competitive in terms of price. This was achieved thanks to collaboration within the chain. Other countries view a result like that with absolute amazement and wonder how we did it. I therefore consider it a great privilege to relate that story as an ambassador of our Top Sector policy on various stages around the world.’

For the future
Veenman: ‘The highest goal is to ultimately create a fully automated system that obviates the Top Sector as a catalyst. Ultimately, a top team must know when to call it a day. We will have served as the flywheel that kept everything running. A Top Sector is not an objective in and of itself. Janssen: ‘The ultimate goal is that society at large benefits on all fronts— not only economically, but also in terms of clean air, for example. That will require a vision for the coming 20 or even 50 years. After all, were doing this for the generations that will follow us. Take the “Energiewende” in Germany as an example. This programme has been successful because German governments pursued a consistent sustainable energy policy for 25 years. The choices that we made with the Top Sector policy work. Now it’s important to keep the fire burning, for sustainable prosperity and well-being.’
Information and Communication Technology | The impact and pace of ICT innovations are partly determined by the degree to which entrepreneurs and researchers jointly develop and apply technology, knowledge and business models.\textsuperscript{47} From agriculture and health care to education, logistics and science: no Top Sector can still move forward without ICT innovations. It is vital that ICT knowledge and skills are kept up-to-date, that the approach is multidisciplinary and that groundbreaking ICT solutions in one sector can also be applied in other sectors.

\textsuperscript{47} WRR (2013). Towards a Learning Economy.
ICT as cross-sectoral theme

In order to initiate and stimulate ICT innovation with and between Top Sectors, ICT has been made a cross-sectoral theme within the Top Sector strategy. To that end, in late 2014 a Team ICT was established, with Penning de Vries appointed the ambassador. Public-private partnership is the focus and it targets the development of knowledge and talents for applications, services, products, work processes and jobs for tomorrow and beyond.

According to the IT Research Assessment Committees, ICT research in the Netherlands (2009-2014) is of high or extremely high quality across the board. International developments however proceed at a fast pace and, from a global perspective, the Netherlands is lagging behind with the application of new digital technology and knowledge. Talent development is an important success factor for a strong digital economy.

Highlights of the past year

✔ For the new NWA, Team ICT has mapped out the big data example route together with the Royal Netherlands Academy of Arts and Sciences (KNAW), companies and knowledge institutions.

✔ In late 2015 an ICT (KIA ICT, 2016-2020) Knowledge and Innovation Agenda was published which was developed by Team ICT in a public-private partnership. The Agenda concerns ICT challenges that are relevant to all sectors/Top Sectors, such as big data and cybersecurity. NWO, TNO and the Ministry of Economic Affairs have committed their support to the agenda with funding totalling €40 million for 2016 and 2017. The national programme for big data research and innovation based on demand (Commit2Data) is an elaboration of the KIA ICT. Calls for big data and smart industry have commenced; calls for energy, cybersecurity, logistics and care are being prepared. The SME sector can gain experience with data analysis via regional data hubs, such as in Almere (available) and Amsterdam (available soon).

✔ Technology is developing at lightning speed. In order not to miss any opportunities, Team ICT, together with the Smart Industry Team and the FinTech ambassador, Mr Vermeend, is exploring how knowledge and entrepreneurship can be promoted in relation to block chain technology.

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Key figures

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Source: Statistics Netherlands (CBS)

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To improve the connection between supply (education) and demand (the business sector) and to encourage lifelong learning (retraining and further training), a Human Capital Agenda for ICT has been established. Efforts will be made to increase the supply of well-qualified ICT professionals, such as cybersecurity specialists and data experts, through trade fairs, internships, graduation places for students (from secondary and higher professional education and academic education) and organising guest lessons at secondary schools, etc. Work will also be conducted in Centres of Expertise and Centres for Innovative Workmanship, including centres in Utrecht.

Smart industry. In supplement to the field labs, a network of smart industry professors has also been established. This year will see the production of a legal toolkit that companies can use to share data responsibly as well as a smart industry ICT standardisation agenda.

Future opportunities
The Netherlands is still in an excellent position for ICT-based innovation. The current strategy will in any case be expanded in the area of internationalisation (promotion of the Netherlands as the Dutch Digital Delta via export promotion and strategic acquisition). The cybersecurity strategy will be developed further. Dcypher (Dutch Cyber Security Platform for Higher Education and Research) was launched by the Ministries of Security & Justice, Economic Affairs, Education, Culture & Science and the NWO on 5 April 2016 with the aim of adopting a national agenda for research and education, particularly higher education, in the area of cybersecurity. Dcypher connects data from the worlds of research, education, business and government. This is a boost for the CommitzData innovation programme and the Human Capital Agenda ICT and therefore to users’ confidence in digital working strategies and the presence of a strong cybersecurity sector in the Netherlands.

The recently published Dutch Cybersecurity Monitor (CSBN 2016) has revealed the problem of structural and large-scale digital espionage whose targets include the innovation initiatives of Dutch companies operating in the Top Sectors. The Netherlands must continue developing its cybersecurity strategy and take the next step in order to stay relevant in the digital era.

The foundation for utilising ICT innovations in PPPs has been laid. For 2017 and subsequent years, the road toward a data-driven and agile economy (Dutch Digital Delta) is not without significant challenges, in areas such as health care, mobility, energy, education and science. This will require continuous joint efforts on the part of entrepreneurs, scientists and government bodies.

Regional collaboration in training more big-data scientists
In the south-east of the province of Noord-Brabant, 300 new big-data scientists are needed every year. For this reason, Tilburg University, Eindhoven University of Technology, the province of Noord-Brabant and the municipality of Den Bosch have made agreements to coordinate the supply of regional education with the business sector’s demand for talent, knowledge (ICT, entrepreneurship) and innovation (technical, organisational). In September 2016, the new Jheronimus Academy of Data Science will begin offering a Bachelor’s programme in Data Science (maximum capacity of 80 students) and a Master’s programme in Data Science Entrepreneurship (maximum capacity of 40 students). This academy was inspired by the painter Jheronimus Bosch, who inventively built upon existing motifs with new compositions. This kind of approach is also a source of inspiration for other regions. In the Utrecht region, a partnership including Utrecht University, HU University of Applied Sciences Utrecht, ROC Midden Nederland, the Netherlands Organisation for Applied Scientific Research (TNO) and the regional business sector is working on the establishment of an IT Competence Centre. This contributes to one of the lines of action of Team ICT’s Human Capital Agenda for ICT.

“Seven Countries Emerging as Frontrunners in the Fourth Industrial Revolution. Finland, Switzerland, Sweden, Israel, Singapore, the Netherlands and the United States are leading the world when it comes to generating economic impact from investments in ICT.”


The Society is being digitised at lightning speed. This is why ICT innovation is becoming ever more important. Which developments can the ICT sector observe and how is it preparing for the future? A conversation with René Penning de Vries, ICT ambassador.

How do you look back on the past few years?
‘We have only been a top theme in the Top Sector strategy for two years now. Prior to that, ICT did not receive the attention it deserved. In the meantime, however, we’ve been reasonably successful in positioning the sector and establishing a name for ourselves. It’s both challenging and inspiring to be a ambassador. It’s inspiring because there is so much potential for improvement, and it’s challenging because you are able to bring people together without a formal structure. The trick is to find common ground with players from the knowledge and ICT worlds as well as with players from companies and institutions that use ICT.’

How can the Top Sector make a difference?
‘One of our programmes focuses on big data innovation, and the use of all kinds of various data to perform analyses or generate suggestions. Something like that might be used by companies that want to purchase sustainable energy quickly and flexibly, for example. Or by smart industries, where big data allows for new creation or earning models. Big data is also relevant in the health-care sector. Even before you visit the doctor, you can check what’s wrong with you using your own data. That same data can then be used for diagnosis and treatment. We call this personalised medicine. Due to the many possibilities, both university and public parties are positive about promoting data-based innovation. And of course we support new developments in ICT. That’s something I am proud of.’

Which Top Sectors do you work with?
‘The application of ICT pervades all sectors. Joint ventures are currently ongoing with the Energy and Logistics Top Sectors, with a joint venture with the Life Sciences & Health Top Sector scheduled. We’re also talking with Agri & Food about setting up a joint venture. A joint venture with Horticulture & Starting Materials would also seem a logical step. The essence of digitisation is that it makes things possible that were previously impossible. There was more mass production in the past. With the advent of smart industry, production has become smaller in scale and better aligned with the wishes of consumers. One example is 3-D printing. Other than with sculpture, for example, where you work a piece of wood and discard the rest of the material, with 3-D printing you start with nothing and keep adding small droplets of a material. The machine will print anything you want. If 3-D printers could turn out products on a large-scale, that would have a considerable impact on the transport industry in the Netherlands. It would mean that we wouldn’t have to import as much.’

What innovations can we expect in the area of ICT?
‘We want to introduce blockchains in early 2017.’ This is a technology that allows us to place our trust in digital information. As things stand now, we rely on the authenticity of information contained in the land register and the fact that a certain bank note is worth €10. With blockchains, citizens and companies play a crucial role in the exchange and processing of information. Blockchains mean less influence from large organisations, and more confidence and possibilities, for example via a safe application on your phone. However, blockchains are only a realistic option if you are thoroughly familiar with the technology involved. We are currently consulting with knowledge partners and strategic players on how best to use blockchains.’

What are the plans for the period ahead?
‘We need to remain level-headed and not get too carried away. We may have the reputation of being an innovation leader, but the Netherlands tends to move more slowly than other countries. Our joint ventures should be more substantial, and we must constantly renew. Digitisation is proceeding so quickly that there is now a huge shortage of experts. There is a need for more students, grants and internships as well as for a greater focus on talented ICT professionals. In 2020, we will have a shortage of 15,000 people with the relevant expertise. A number like that has me worried that if we don’t address this shortage immediately, it will be too late.’
Other sectors

In addition to the Top Sectors, there are other important sectors in which interesting policy developments took place in 2016: the defence and security industry, energy-intensive sectors, the hospitality industry and the retail sector.

Defence and Security Industry

The Dutch defence and security-related industry consists primarily of civilian enterprises and research institutions with specialised divisions engaged in military production and services. The sector is characterised by advanced technology, frequent innovation and highly skilled personnel. Owing to the limited domestic market, the sector is strongly focused on exports. The 651 companies that are included in this industry generate a combined turnover of €4.54 billion (of which 68% is derived from exports) and employ 24,800 people in the Netherlands. Of these jobs, 32% are involved in research and development. Owing to the growth in jobs related to services and ICT, the number of companies in the sector has grown strongly in the past few years.

Government policy aims to ensure that the sector and knowledge institutions are able to provide a high-value contribution to Dutch national security based on the operational interests and needs of the Ministry of Defence. Consequently, these players can also competitively operate in the European and international markets and in supply chains. Dutch companies are invited, either directly or indirectly, to participate in national military development and production tenders by means of industrial participation engagements. This policy is described in the Defence Industry Strategy. Since the Dutch market is too small to maintain the available expertise, the sector is also encouraged to participate in international joint ventures in the area of defence hardware. This has resulted in commercial relationships with European and American defence suppliers and Dutch companies deliver components of systems to both the Dutch armed forces and those of other countries.

Energy-intensive Industry

The energy-intensive industry (EII), which includes the chemistry, base metal, paper, refinery, construction and food sectors, contributes approximately €23.7 billion to the Netherlands’ GDP and generates more than 240,000 full-time jobs. The energy-intensive industry is at the threshold of a major transition owing, on the one hand, to increasing international competition and, on the other, energy and climate objectives.

The energy transition requires the government and the business sector to take on different roles. The nature of these different roles is not determined in advance and is subject to a case-based approach. This approach provides insight into the role that the energy transition requires the government and business sector to play. Based on cases, the parties involved then work towards a set of instruments with a broader scope of application. In the past year, the Ministry of Economic Affairs has undertaken a number of activities related to the EII. Research consultancy PwC conducted a quick scan of the industry on behalf of the Ministry. A number of activities also took place as part of the Energy Dialogue. At the initiative of the Ministry of Economic Affairs, a strategic round table discussion was held with representatives of the 20 industrial companies with the largest CO2 footprint under the Emissions Trading System (ETS). Furthermore, dialogue sessions were organised with parties including the metal industry, refineries, the chemical industry and the five Dutch seaports.

A joint agenda for the EII was drawn up by the EII steering group in which five companies, the Confederation of Netherlands Industry and Employers VNO-NCW and the Ministries of Infrastructure & the Environment and Economic Affairs participate. This agenda sets out the vision of the transition and specifies the prerequisites under which the EII can allow the transition to take place in the Netherlands. The main elements of the agenda are the focus on innovation, investments in breakthrough technologies, the creation of an international level playing field and a favourable business and investment climate.

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Hospitality industry

The hospitality industry generates an annual turnover of €68 billion and accounts for more than 600,000 jobs, which is more than 6% of the total number of jobs the Netherlands. Tourism boosts the level of services and improves the business climate. A varied offering of recreation, nature, culture, attractions, hotels and restaurants makes the Netherlands an attractive country in which to live and work. In 2015 the Netherlands set a new record for the number of foreign visitors: 15 million tourists and business travellers, who spent a total of around €10.9 billion. The majority of foreign visitors came from Germany, the United Kingdom, Belgium, the United States and France. The Netherlands also attracted more tourists from China.

In order to serve the growing number of international and domestic guests, a good-quality range of services and facilities is required that is able to respond to changing customer requirements. To achieve this and retain the right focus, the sector, together with the government and education, has drawn up an action agenda with five key projects. The progress of those key projects is being monitored by Gastvrij Nederland. The Ministry of Economic Affairs is working on four key projects: Holland City, a public transport card for tourists, national parks new style and the hospitality industry customised action plan.

The strategy of the Netherlands Board for Tourism and Conventions (NBTC) is to spread visitors across time and space by means of the Holland City concept: ‘supporting the known, introducing the new’. Visitor interests are linked to multiple locations in the country through the use of storylines, events, themes etc.

Retail

Retail is an important economic sector. It includes approximately 98,000 companies, has an annual turnover of approximately €99 billion and employs more than 781,000 people. The retail sector is recovering now that the economy is bouncing back and consumer spending is on the rise. Turnover in the sector is growing again: in the second quarter (Q2) of 2016 it rose by 0.5% relative to Q2 2015. The food segment especially is growing. The online channel also continues to grow; the number of online purchases increased by 18% and the number of people who shop online rose by 6%.

These figures reflect the transition that the retail sector is experiencing. The sector needs to respond quickly to a number of structural changes that are having a major and lasting effect on the Dutch retail landscape. In response to those changes, the Retail Agenda was launched on 17 March 2015. The aim of this agenda is to join forces with all stakeholders to get the sector ready for the future and to keep shopping areas and city centres attractive. The so-called RetailDeals are central to this approach, in which municipalities assume a coordinating role and draw up vision documents and action plans together with all relevant local stakeholders. To date, 84 deals have been concluded with a total of 119 municipalities. This autumn, further RetailDeals will be concluded with the provinces.

The first Retail Agenda progress report was issued on 12 May 2016. According to the report, the approach is working but an additional incentive is required as a result of recent developments. For example, the market for retail buildings has come under pressure as a result of the bankruptcy of a number of large players. It is estimated that there is a current overcapacity of 20% of the available retail floor space. To address this problem, the Vital Retail Areas impulse approach was launched on 1 June 2016.

53 Parliamentary papers 27838, No. 13, Retail Agenda, 17 March 2015.
54 Parliamentary papers 27838, No. 14, Voortgangsrapporage Retailagenda, 12 May 2016.
55 Between 2004 and 2015, turnover in the retail sector fell by 8% and the number of square metres of retail floor space increased by 11%.
Appendix 1: Summary of 2016 Enterprise Policy Monitor

The 2016 Enterprise Policy Monitor is an annual publication of the Ministry of Economic Affairs. This year the monitor was published for the first time on the website www.bedrijvenbeleidinbeeld.nl, which provides the most important facts and figures of the government’s enterprise policy.

The Netherlands rises to the fourth place in the Global Competitiveness Index
After the Netherlands rose last year to the fifth place in the Global Competitiveness Index of the World Economic Forum (WEF), this year the Netherlands has climbed to fourth place. This is the highest ranking the Netherlands as ever achieved in this index. This year the country was also the EU’s most competitive economy after it passed Germany in the ranking. The Dutch position improved mainly due to positive macroeconomic developments (a falling government deficit and lower public debt) and positive developments in the labour market. The country’s international position in terms of innovation also improved.

Public and private expenditure on PPP projects continues to increase
The objective of securing more private financing in the TKIs was achieved and last year the objective was adjusted upwards from €500 million to €800 million. The amount of public and private funds invested in public-private partnerships continues to develop expeditiously. The scale of PPP investments in 2015 is estimated at €1.020 million, with a private contribution averaging at 48%. Companies therefore invested around €490 million in the public knowledge infrastructure.

R&D investments up slightly
Despite the turbulent economic situation of the past few years, the relative scale of R&D investments in the Netherlands shows a slight upward trend. While this development is positive and the Netherlands currently surpasses the EU28 average, the country, with its GDP of 2.6%, has still not achieved its objective of 2.5%. The OECD average is also higher (2.4%), though the Netherlands was able to slightly reduce the gap. Despite a minor rise from 2009, private R&D intensity in the Netherlands has remained under the EU average for quite some time. However, in the relatively R&D-intensive Top Sectors, there is a clear upward trend in private R&D investments.

The Netherlands has a high labour productivity
Labour productivity in the Netherlands is among the highest in the world, coming in sixth place. Labour productivity is a measure that says something about a company’s competitiveness and a country’s prosperity. The high labour productivity in the Netherlands is in part due to its Top Sectors, whose performance is above average when measured against international benchmarks. The growth in labour productivity strengthened in 2015 and the Netherlands has now almost caught up with the United States.

Influx of technically skilled workers continues to increase
Improving the supply of technically skilled persons is an important spearhead of the enterprise policy. The inflow of students into science and technology programmes again increased last year. The increase was particularly high at research universities and in senior secondary vocational education, but decreased slightly in higher professional education for the first time in nine years.

Growth in the majority of Top Sectors slightly outperforms the rest of the economy
Adjusted for natural gas production, the real added value in all Top Sectors combined excluding the energy sector grew marginally more strongly than for the total economy in the 2010-2015 period. The added value of all Top Sectors combined grew less strongly than that of the economy as a whole in the same period. This can be attributed fully to the Energy Top Sector. This Top Sector experienced a shrinking turnover in 2014 and particularly in 2015, brought about by the decline in natural gas production (which forms part of the Energy Top Sector).

The ‘Bedrijvenbeleid in beeld’ website also contains the following notable results:

• The enterprise policy makes an important contribution to societal challenges and the greening of the economy. Nearly €1 billion of the financial innovation toolkit relates to sustainable initiatives.
• Each year, the European commission publishes a ranking for the innovative strength of the 28 EU countries: the European Innovation Scoreboard (previously known as the Innovation Unit Scoreboard). This year the Netherlands is in fifth place and is part of the core group of ‘innovation leaders’.
• ICT is a so-called breakthrough technology that plays a role in nearly all economic activities. The Netherlands is one of the world’s leading digital economies and benefits comparatively more from ICT than other countries. The Netherlands invests the most in ICT, and ICT facilities are used more in the Dutch business sector than the average for the EU.
• The Dutch population is highly skilled from an international perspective. This applies both to young people (students from the age of 15) and adults. In the area of human capital, the Dutch education system scores well in international rankings.
• Entrepreneurship in the Netherlands has been on the rise for a long time. This development is striking when compared to international benchmarks: there are few places in the world where entrepreneurship is growing like in the Netherlands. This development makes sense in a culture like the Netherlands where entrepreneurship is viewed positively. For the first time since the economic crisis, a number of rapidly growing businesses in the Netherlands is again on the rise.
• The Netherlands is unsurpassed when it comes to policies that promote competition in product markets and the reduction of obstacles to entrepreneurship and investment. For companies it is also becoming increasingly easy to do business in the Netherlands. Of the intended €2.5 billion reduction in regulatory pressure, 80% (nearly €2.1 billion) was already achieved in 2015. With respect to the customised approach to regulatory reform for businesses, by the end of 2015, 206 bottlenecks had been identified of which 74 were resolved.
• The analysis of the research programmes of the TKIs shows that at least half of the TKI research focuses on connecting and combining complementary knowledge specialisations of the various sectors and Top Sectors. Innovation always occurs at the intersection of knowledge areas and sectors where new combinations and applications arise (crossovers). Remarkably, young companies are more likely to participate in such crossovers than older companies.
• The driving forces behind renewal and innovation are dynamic companies that aim to challenge incumbents. These types of companies are identified each year in the Financieele Dagblad newspaper under the header ‘Gazelles’ (fast-growing companies) and ‘New Champions’ (innovative companies with a strong potential for the future). Both types of challengers appear to be avid users of the enterprise policy toolkit.

Core table representing the enterprise policy including Top Sector strategy, 2010–2016

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<tbody>
<tr>
<td>GCI (international position)</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>4</td>
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<tr>
<td>R&amp;D intensity (in % of GDP)*</td>
<td>1.83</td>
<td>1.88</td>
<td>1.92</td>
<td>1.94</td>
<td>2.00</td>
<td></td>
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<tr>
<td>of which Private R&amp;D intensity*</td>
<td>0.83</td>
<td>1.08</td>
<td>1.10</td>
<td>1.09</td>
<td>1.12</td>
<td></td>
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<tr>
<td>R&amp;D intensity of Top Sectors (in % of added value)</td>
<td>-</td>
<td>4.1</td>
<td>4.2</td>
<td>4.3</td>
<td>4.6</td>
<td></td>
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<td>PPP projects (in millions)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>622</td>
<td>814</td>
<td>1,020</td>
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<tr>
<td>of which private share in PPPs</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>35</td>
<td>44</td>
<td>48</td>
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<tr>
<td>Labour productivity level (international position)</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Number of WBISO companies</td>
<td>19,450</td>
<td>20,530</td>
<td>22,220</td>
<td>22,640</td>
<td>22,970</td>
<td>22,980</td>
<td></td>
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<tr>
<td>Number of RDA companies</td>
<td>-</td>
<td>-</td>
<td>13,860</td>
<td>16,160</td>
<td>16,620</td>
<td>16,510</td>
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<tr>
<td>Influx in science and technology programmes</td>
<td>84,085</td>
<td>78,958</td>
<td>79,180</td>
<td>79,670</td>
<td>80,205</td>
<td>82,980</td>
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Relative development of Top Sectors compared to the overall economy

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<tr>
<td>Real added value (2010=100)</td>
<td>100</td>
<td>100.0</td>
<td>99.6</td>
<td>101.5</td>
<td>99.9</td>
<td>98.4</td>
<td></td>
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</tbody>
</table>

*The year 2010 is the Ministry’s own calculation based on changes to non-revised figures for 2011/2010.

The three central ambitions of the enterprise policy in 2020

✓ The Netherlands is among the top five knowledge economies of the world.
✓ Top Consortia for Knowledge and Innovation in which public and private parties participate for in excess of €800 million, of which at least 40 % is financed by the business sector.
✓ Rise in Dutch R&D investments to 2.5% of GDP.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>4TU:</td>
<td>Collaborative alliance of the four Dutch universities of technology</td>
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<td>A&amp;F:</td>
<td>Agri &amp; Food Top Sector</td>
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<tr>
<td>AHN2:</td>
<td>Actueel Hoogtebestand versie 2 (Nederland Current Elevation Measurements Netherlands, version 2)</td>
</tr>
<tr>
<td>ARC:</td>
<td>Advanced Research Centre Chemical Building Blocks Consortium</td>
</tr>
<tr>
<td>AWTI:</td>
<td>Adviesraad voor Wetenschap, Technologie en Innovatie (Advisory Council for Science, Technology and Innovation)</td>
</tr>
<tr>
<td>BBE:</td>
<td>A bio-based economy is an economy in which crops and waste flows from agriculture and the food industry are used for non-food applications</td>
</tr>
<tr>
<td>GDP:</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>BHOS:</td>
<td>Ministry of Foreign Trade and Development Cooperation</td>
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<tr>
<td>BMKB:</td>
<td>Borgstelling mkb-kredieten (SMEs Credit Guarantee)</td>
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<tr>
<td>BZ:</td>
<td>The Dutch Ministry of Foreign Affairs</td>
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<td>CBS:</td>
<td>Statistics Netherlands</td>
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<tr>
<td>CIV:</td>
<td>Centrum voor Innovatief Vakmanschap (Centre for Innovative Workmanship), a collaborative alliance of education institutions and companies at senior secondary vocational education level</td>
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<tr>
<td>CoE:</td>
<td>Centre of Expertise. Cooperative alliance of education institutions and companies at higher professional education level</td>
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<td>CPB:</td>
<td>Centraal Planbureau (Netherlands Bureau for Economic Policy Analysis)</td>
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<td>DLO:</td>
<td>Dienst Landbouwkundig Onderzoek (Agricultural Research Service)</td>
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<td>DVI:</td>
<td>Dutch Venture Initiative, investment fund for access to the risk-capital market</td>
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<td>ECN:</td>
<td>Dutch Energy Research Centre</td>
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<tr>
<td>EII:</td>
<td>Energie-intensieve Industrie (Energy-intensive Industry)</td>
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<tr>
<td>ERDF:</td>
<td>European Regional Development Fund. European structural fund for regions characterised by declining industrial activity</td>
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<td>EFSI:</td>
<td>European Fund for Strategic Investments. The European Commission applies the EFSI to stimulate additional private investment via guarantees</td>
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<tr>
<td>EIB:</td>
<td>European Investment Bank. The European Investment Bank is the EU’s institute for long-term financing</td>
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<tr>
<td>EIF:</td>
<td>European Investment Fund</td>
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<td>EU:</td>
<td>European Union</td>
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<td>EZ:</td>
<td>The Dutch Ministry of Economic Affairs</td>
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<tr>
<td>FNLI:</td>
<td>Federatie Nederlandse Levensmiddelen Industrie (Dutch Food Industry Federation)</td>
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<tr>
<td>HLL:</td>
<td>Holland Logistics Library</td>
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<tr>
<td>HTSM:</td>
<td>High-Tech Systems and Materials Top Sector</td>
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<tr>
<td>ICT:</td>
<td>Information and communications technology</td>
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<td>JenM:</td>
<td>The Dutch Ministry of Infrastructure and the Environment</td>
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<tr>
<td>JTI:</td>
<td>Joint Technology Initiative</td>
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<tr>
<td>KIA:</td>
<td>Kennis- en Innovatieagenda (Knowledge and Innovation Agenda)</td>
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<tr>
<td>KNAW:</td>
<td>Koninklijke Nederlandse Academie van Wetenschappen (Royal Netherlands Academy of Arts and Sciences)</td>
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<tr>
<td>KvK:</td>
<td>Kamer van Koophandel (Chamber of Commerce). The Chamber of Commerce informs and supports entrepreneurs from setting up a company to finding a successor. It is also the administrator of the Commercial Register.</td>
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<tr>
<td>LSH:</td>
<td>Life Sciences &amp; Health Top Sector</td>
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<tr>
<td>MIT:</td>
<td>MKB-innovatiestimulering-Topsectoren-regeling (SME innovation stimulation programme for Top Sectors)</td>
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<tr>
<td>SME:</td>
<td>Small and medium-sized businesses</td>
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<tr>
<td>NFIA:</td>
<td>Netherlands Foreign Investment Agency. The NFIA supports foreign companies that wish to establish or expand international activities in the Netherlands. The NFIA also promotes the Netherlands abroad.</td>
</tr>
</tbody>
</table>
The Netherlands Investment Agency (NIA) supports Dutch investors and financial institutions in applying for so-called Juncker fund grants.

National Aerospace Laboratory (NLR), a knowledge enterprise in the area of aerospace in the Netherlands (TO2).

The National Science Agenda (NWA) contains the themes and research questions that scientists will focus on over the next few years.

The Netherlands Organisation for Scientific Research (NWO) finances top-level researchers, sets the direction of Dutch science through specific programmes and manages the national and international knowledge infrastructure.

The Dutch Ministry of Education, Culture and Science (OCW) is responsible for the education and culture sector.

Organisation for Economic Co-operation and Development (OECD) is a collaborative alliance of 34 countries for discussing, studying and coordinating social and economic policy.

Public-Private Partnership (PPP) is the central government and companies collaborate on long-term projects via public-private partnerships (PPP).

Research and Development (R&D) and Research and Development Tax Credit (RDA) are initiatives that support innovation in various sectors.

Regional Ontwikkelingsmaatschappij (Regional development company) (ROM) and Regional Training Centre (ROC) provide support to regional economic development.

The Netherlands Enterprise Agency (RVO.nl) supports Dutch small and medium enterprises (SMEs) in accessing new markets and technologies.

Small Business Innovation Research Programme (SBIR) is a funding programme for small businesses to conduct research and development.

Stimulation of Sustainable Energy Production (SDE) is a programme that supports the production of sustainable energy and focuses on companies and institutions in the field.

Through the Seed Capital scheme, the Ministry of Economic Affairs supports technical and creative start-ups in particular.

Technical Sciences Foundation (STW) facilitates knowledge transfer between technical sciences and users by financing excellent technical scientific research.

The organisation for ICT-related collaboration of Dutch higher education and research (SURF).

Topsector Tuinbouw en Uitgangsmaterialen (T&U) is a collaboration of horticulture and starting materials companies.

Topconsortium voor Kennis en Innovatie (TKI) brings together excellent private-public partnerships for research and innovation from the Top Sectors. TKIs stimulate synergy and coherence of research and innovation activities on economic and social spearheads.

TKI-toeslag (Top Consortium for Knowledge and Innovation allowance) stimulates public-private partnerships within TKI programmes by encouraging private contributions to those programmes.

Transport and Logistics Netherlands (TLN) is responsible for the logistics sector.

TO2: toegepaste Onderzoeksinstellingen (applied research institutes)

Toekomstfonds (Future Fund) is an instrument that invests in high-value facilities for research and development.

Technische Universiteit (TU) is the highest technical university in the Netherlands.

The Dutch Ministry of Security and Justice (V&J) is responsible for security and justice.

Vroege fase financiering (Early-Stage Funding) (VFF) provides early-stage funding for high-tech start-ups.

The WBSo is the collective name for the tax rebate for R&D work under the Salaries Tax and National Insurance Contributions Act and the R&D tax credit under the Income Tax Act.

World Economic Forum (WEF) is an independent international organisation with experts in the areas of business, politics, science and society established to influence global, regional and industrial agendas through various rankings.
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